

CITIZEN WILDLIFE MONITORING PROJECT
2013-2014 WINTER FIELD SEASON REPORT



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Cover image: Joanne Cormier inspects the trail of an American marten on the SnoPass transect. Photo by Joe Kiegel

Full report available online at: conservationnw.org/what-we-do/wildlife-habitat/wildlife-monitoring/wildlife-monitoring

Citizen Wildlife Monitoring Project partner organizations: Conservation Northwest, Wilderness Awareness School, and I-go Wildlife Bridges Coalition



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CITIZEN WILDLIFE MONITORING PROJECT

2012-2013 WINTER FIELD SEASON REPORT

EXECUTIVE SUMMARY

The Citizen Wildlife Monitoring Project uses trained volunteers to record the presence and movement of wildlife, through snow tracking surveys and remote camera installations, in pre-selected locations from the Washington Coast to the British Columbia Rockies with a strong focus in the Cascade Mountains. The project is conducted by Conservation Northwest, Wilderness Awareness School, and I-90 Wildlife Bridges Coalition.

This winter marks the eighth season of data collected at fixed transects along Interstate 90, in the vicinity of proposed and recently constructed wildlife crossing structures between Snoqualmie Pass and Easton in the I-90 Snoqualmie Pass East Project. It also marks the third winter season following the start of significant highway construction, including completion of two wildlife underpasses at one of the project's field sites and the fourth season of observer reliability assessment carried out to determine the reliability of snow tracking data collected on track transects.

This winter season, twelve remote camera sites were monitored between December and April focusing on wolverines in the Washington's Central Cascades, wolves in the South Cascades, and all wildlife presence along the I-90 Snoqualmie Pass East project area.

Seven different species were documented over the course of the winter, including one target species, wolverine, at the Chiwaukum site. This season also marked a successful pilot winter season in the Gifford Pinchot National Forest.

This winter, 84 volunteers participated in our project's wildlife monitoring: 54 volunteers took part in formal transect surveys and 30 volunteers installed and maintained remote camera sites. The season was marked by challenging tracking conditions, with almost no snowfall during the month of January followed by large amounts and continuous snowfall during much of the month of February.

PROJECT OVERVIEW

The Cascades Citizen Wildlife Monitoring Project (CWMP) is a joint project of I-90 Wildlife Bridges Coalition (a group of organizations focused on advocating for infrastructure improvements designed to improve habitat within the I-90 Snoqualmie Pass East Project), Wilderness Awareness School (an environmental education organization), and Conservation Northwest (a conservation and advocacy group). CWMP uses trained volunteers to monitor the presence, location, and movement of wildlife in the vicinity of proposed wildlife crossing sites east of Snoqualmie Pass along Interstate 90 in the Cascades, and elsewhere in Washington State. The project has a particular focus on rare and elusive carnivores, such as wolves and wolverines. CWMP is designed to support the conservation of our region's wildlife and wildlands by enhancing our knowledge of wildlife-habitat connections in our region, supporting the monitoring and management efforts of transportation and wildlife agencies, and providing engaging educational field experiences for volunteers.

The I-90 Snoqualmie Pass East Project is a 15-mile highway improvement project that includes measures for connecting wildlife habitat, including construction of wildlife crossings. Construction on the first phase of the I-90 Snoqualmie Pass East Project has started with funding from the Washington State Legislature. Construction activities were not active during the 2013-2014 snow tracking season.

A complete description of CWMP's goals and methods, as well as a record of previous season reports, is available online at conservationnw.org/monitoring. Amendments made to standard protocols for the program for this season are described in greater detail below.

SUMMARY OF WINTER FIELDWORK

The winter season spanned November 2013 through April 2014 and included wildlife snow tracking surveys conducted just east of Snoqualmie Pass along I-90 in critical connectivity areas and monitoring of wildlife remote camera stations set in important wildlife habitats in the Cascades.

Interstate 90 snow tracking transects

This winter we introduced a new transect to the study area, at Snoqualmie Pass just west of the construction zone. Because of lack of snow on lower elevation transects at the start of the season followed by extensive and continuous snowfall for much of the second half of the season, two transects were completed only twice this season. All the others were covered three or more times, though often in very poor tracking

conditions. The project significantly updated its field data collection methods, switching from handheld computers running on a windows platform using Cybertracker Software (cybertracker.org) to an online form constructed through Google Drive and accessed by volunteers using smart phones in the field.

The new transect, SnoPass, was introduced for several reasons. The Silver Fir/Hyak transect was originally designed to act as an off-highway control as well as to monitor wildlife activity in a patch of forest which the adjacent ski area planned to develop. The SnoPass transect runs just outside the construction zone along I-90. With the addition of this transect, the project is now monitoring a transect influenced by the highway as well as a section of road that will receive no modifications. The north leg of this transect is characterized by late successional forest (older forest maturing toward old-growth conditions) and includes a trailhead which receives moderate use by backcountry skiers and snowshoers during the winter. The south leg of the transect runs through a small patch of forest completely surrounded by development bounded by the highway on-ramp on one side and a large open lot on the other.

Observer reliability

To analyze observer reliability, three experts (Brian McConnell, David Moskowitz, and Marcus Reynerson: each a certified Track and Sign Specialist through Cybertracker Conservation, www.tracker certification.com) reviewed track photographs taken in the field by team leaders. The first recorded field observation on each leg of a transect was photographed and documented by the team leader and submitted to the project manager via email. The field protocol was amended to add written field observations to the photos submitted by team leaders in order to help reviewers analyze the sample tracks submitted. This supplemental information reduced the number of tracks deemed “unidentifiable” by reviewers. Reviewers documented a single verified error in the data sample from this year, the first error found in three years of testing observer reliability on the project.

Remote cameras

During the 2013-2014 winter monitoring season, twelve camera sites were installed and maintained. All twelve sites were within the Cascade Mountains in Washington. Of these sites, four were a continuation of locations monitored throughout the 2013 spring-fall camera monitoring season. Within the Cascades, we have further broken the study area into three distinct regions:

1. Central Cascades: Between I-90 and US 2
2. I-90 Corridor: Between Hyak and Easton along I-90

3. South Cascades: South of I-90

At the start of each season, monitoring objectives are established by project staff with feedback and guidance from the Advisory Council. These objectives are typically in response to current statewide priority species and identified important habitat for these species. Our 2013-2014 winter monitoring objectives were to:

1. Monitor the recovery of gray wolves (*Canis lupus*) in Washington's Cascades with a particular focus on the Southern Recovery Zone.
2. Document the presence of wolverine (*Gulo gulo*) and build a genetic profile of individuals recorded in the Central and South Cascades outside of the geographic scope of the ongoing North Cascades Wolverine Study.
3. Observe the behavior and presence of all wildlife species in key habitat connectivity areas east of Snoqualmie Pass along Interstate 90, where wildlife crossing structures are completed, under construction, or planned for construction under the I-90 Snoqualmie Pass East Project.

Of the twelve sites, four sites (10 cameras) were dedicated to monitoring wildlife presence along I-90, four sites (10 cameras) were focused on documenting wolverine presence near Highway 2, and four sites (9 cameras) monitored for gray wolf presence in the South Cascades (Table 1). All of the sites targeting wolverine detections were equipped with hair snagging brushes and a baited run-pole constructed according to a monitoring protocol developed by members of our Advisory Council (Appendix C). Camera teams at both wolverine and wolf camera sites applied scent lure (Caven's Gusto) near cameras as instructed in the General Remote Camera Protocol.

Table 1: Overview of winter remote camera sites.

Site Location	Site Name	Target Species	No. of Cameras	Bait/Lure Applied
Central Cascades	Icicle	Wolverine	2	Both
Central Cascades	Chiwaukum	Wolverine	4	Both
Central Cascades	Ice Lake	Wolverine	2	Both
Central Cascades	Sparkplug Lake	Wolverine	2	Lure only
I-90 Corridor	Gold Creek	All spp.	4	None
I-90 Corridor	Rocky Run	All spp.	2	None
I-90 Corridor	Price Creek North	All spp.	2	None
I-90 Corridor	Price Creek South	All spp.	2	None

South Cascades	Blue Lake Ridge	Wolf	2	Lure only
South Cascades	Cispus River	Wolf	3	Lure only
South Cascades	Taneum	Wolf	2	Lure only
South Cascades	Bumping Lake	Wolf	2	Lure only

RESULTS

Interstate 90 Transects

Transect data

Volunteers recorded 103 observations this season, the third highest number since the project's start in 2007. Observations identified 9 species this year (Table 2). Following the trend of past years, coyote made up the majority of detections, with "ambiguous" (species unclear), and bobcat being the next to most frequent detections. Shallow snow packs and low-quality tracking conditions in the beginning of the winter likely led to the increase in the number of ambiguous detections: tracks in mud or on drier ground are much harder to make out than those in snow. This year, Gold Creek transect was richer in species detections than at all other sites and during other years. 2007 was the only other winter tracking season with higher detections at Gold Creek. This may be because there was no new construction to deter wildlife; there are also new crossings structures now in place to attract wildlife, and future years may confirm this trend.

Table 2: Species detections over the winter season.

Species	Conservation Priority	Proportion of Detections	Most frequent area(s)
Marten	1	0.04	Snoqualmie Pass
Elk	2	0.09	Easton South, Price Noble West
Mule deer	2	0.04	Easton North
Coyote	3	0.46	Gold Creek
Ambiguous	3	0.11	Hyak
Bobcat	3	0.10	Price Noble West, Gold Creek
Beaver	3	0.08	Gold Creek

Raccoon	3	0.04	Snoqualmie Pass
Black bear	3	0.03	Snoqualmie Pass, Easton South
River otter	3	0.03	Gold Creek

Table 3. Summary of species detected in 2013-2014 winter field season.

Table 4: The yearly total number of detections, and the proportion of detections represented by each transect from 2007-2014.

	2014	2013	2012	2011	2010	2009	2008	2007
Total Detections	103	143	90	95	98	130	77	79
Easton North	0.12	0.12	0.08	0.19	0.11	0.15	0.17	0.11
Easton South	0.17	0.20	0.30	0.02	0.24	0.26	0.05	0.09
Gold Creek North	0.21	0.15	0.07	0.17	0.14	0.05	0.10	0.20
Cold Creek South	0.07	0.07	0.08	0.05	0.11	0.03	0.01	0.05
Hyak	0.07	0.07	0.16	0.22	0.09	0.05	0.03	0.13
Price-Noble East North	0.01	0.18	0.08	0.06	0.11	0.15	0.13	0.06
Price-Noble East South	0.05	0.10	.24	0.02	0.10	0.15	0.19	0.11
Price-Noble West North	0.04	0.09	0	0.04	0.07	0.13	0.06	0.18
Price Noble West South	0.16	0.15	0	0.22	0.01	0.03	0.25	0.06
Snoqualmie Pass North	0.09	NS	NS	NS	NS	NS	NS	NS
Snoqualmie Pass South	0.02	NS	NS	NS	NS	NS	NS	NS

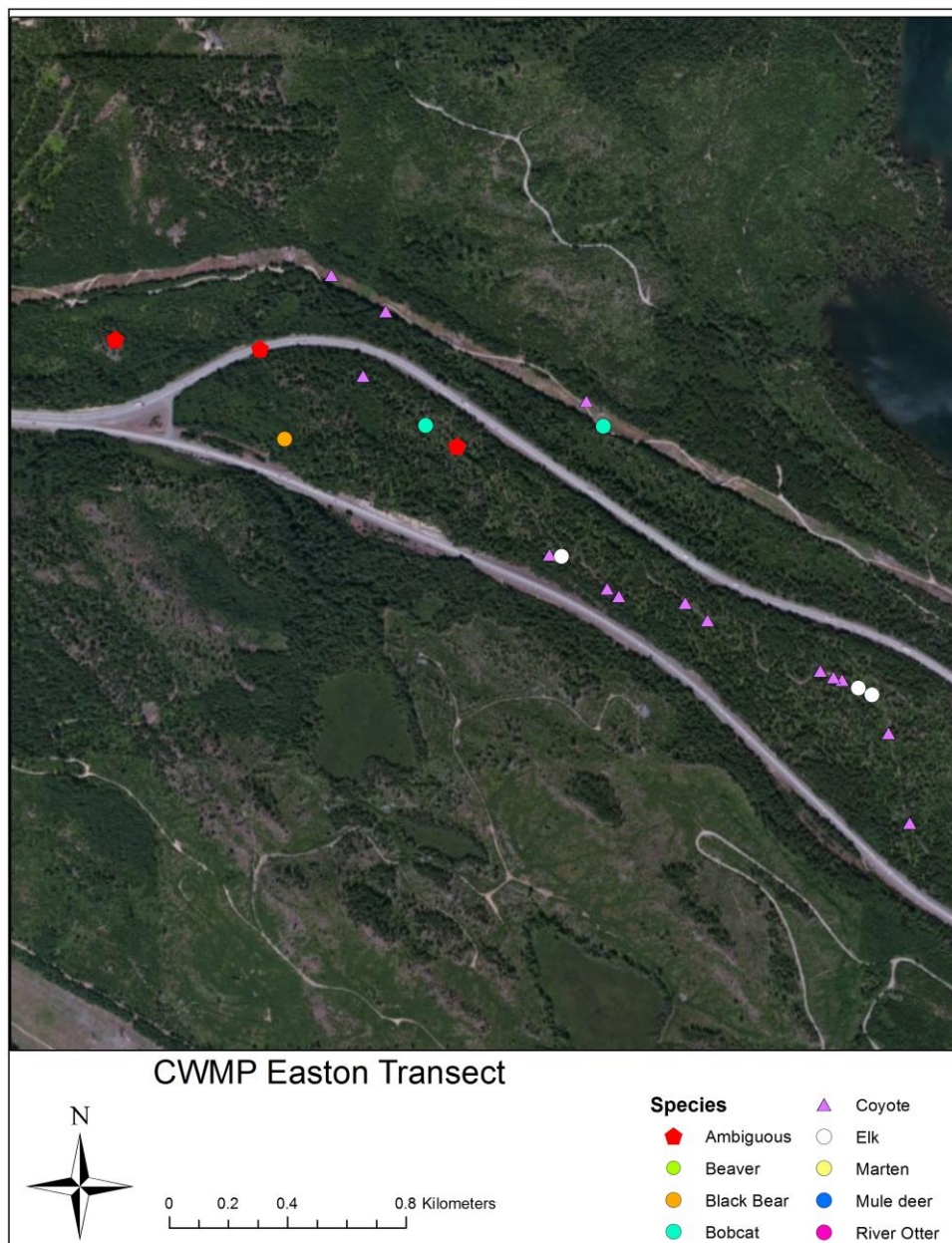
Trailing

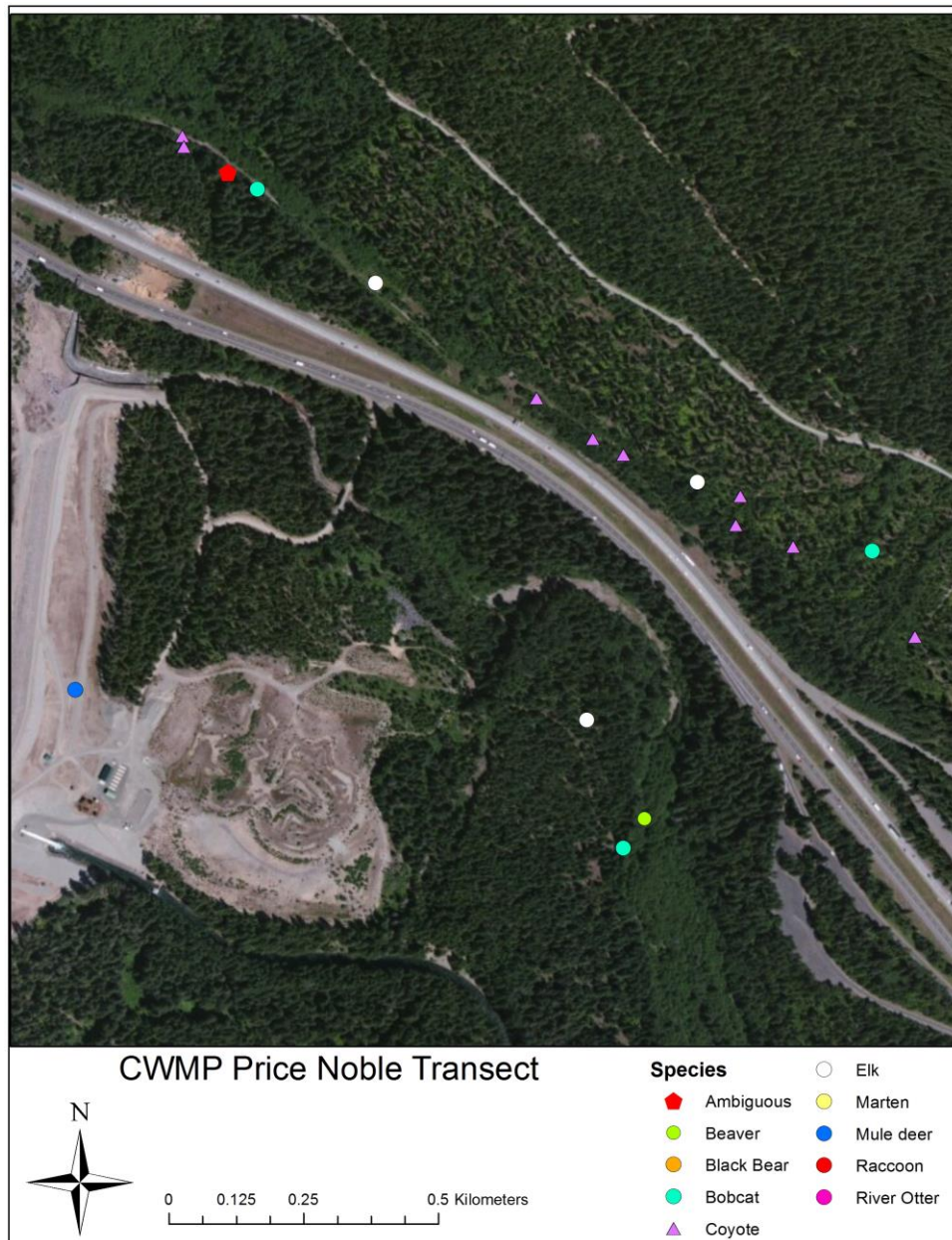
Trailing refers to following a set of tracks toward the highway and recording changes in behavior. This year there were 10 trailing events recording 4 species (See table 5). Typical of years prior, when trailing behavior was associated with the interstate, animals either traveled parallel to I-90 or towards and then away from it. This year there

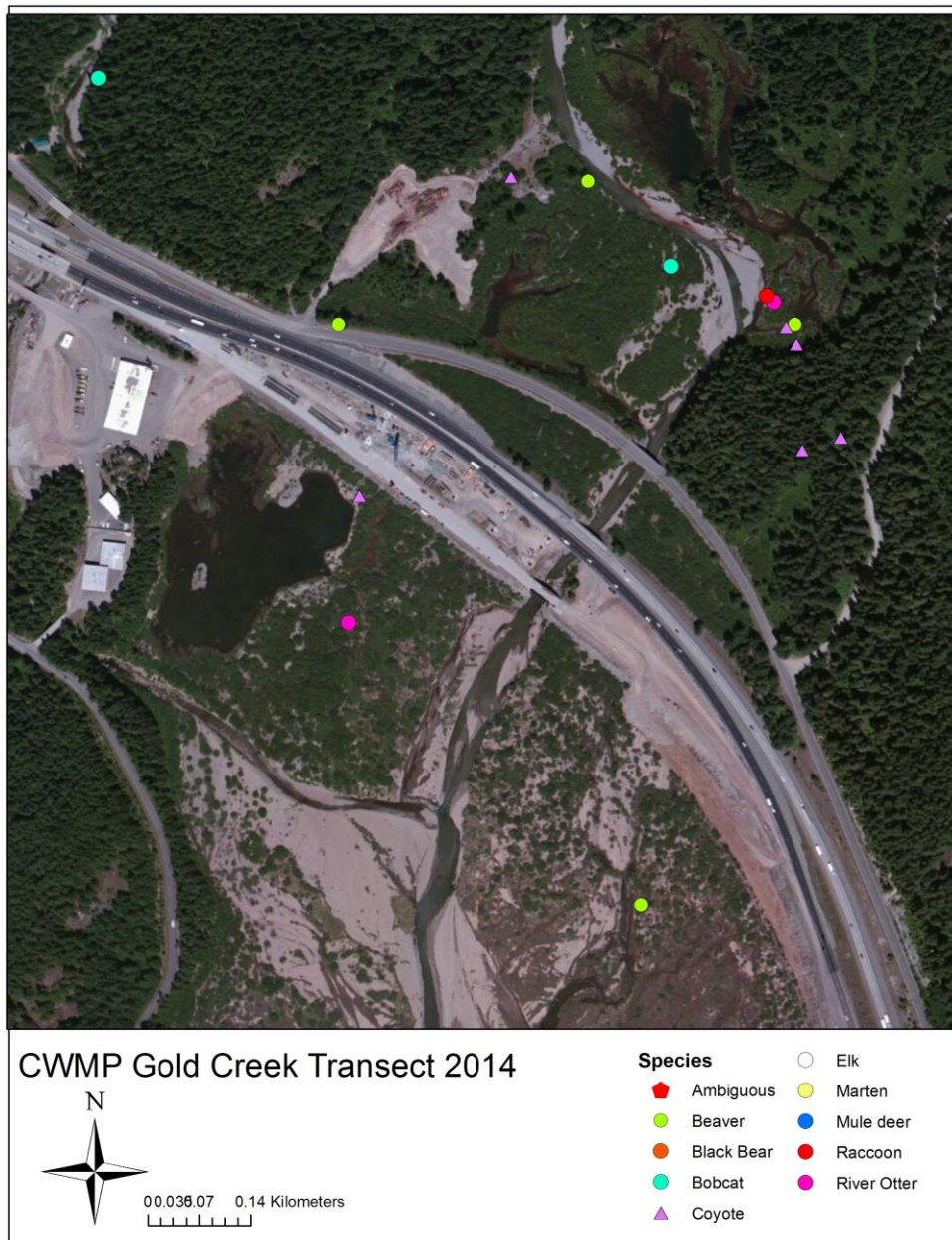
were three documented crossing of the roadway with one coyote documented using the recently constructed underpass at Gold Creek. Pine marten, the only priority Level 1 species positively detected, were trailed twice at the recent transect addition at Snoqualmie Pass, neither instance was an animal detected interacting with the interstate.

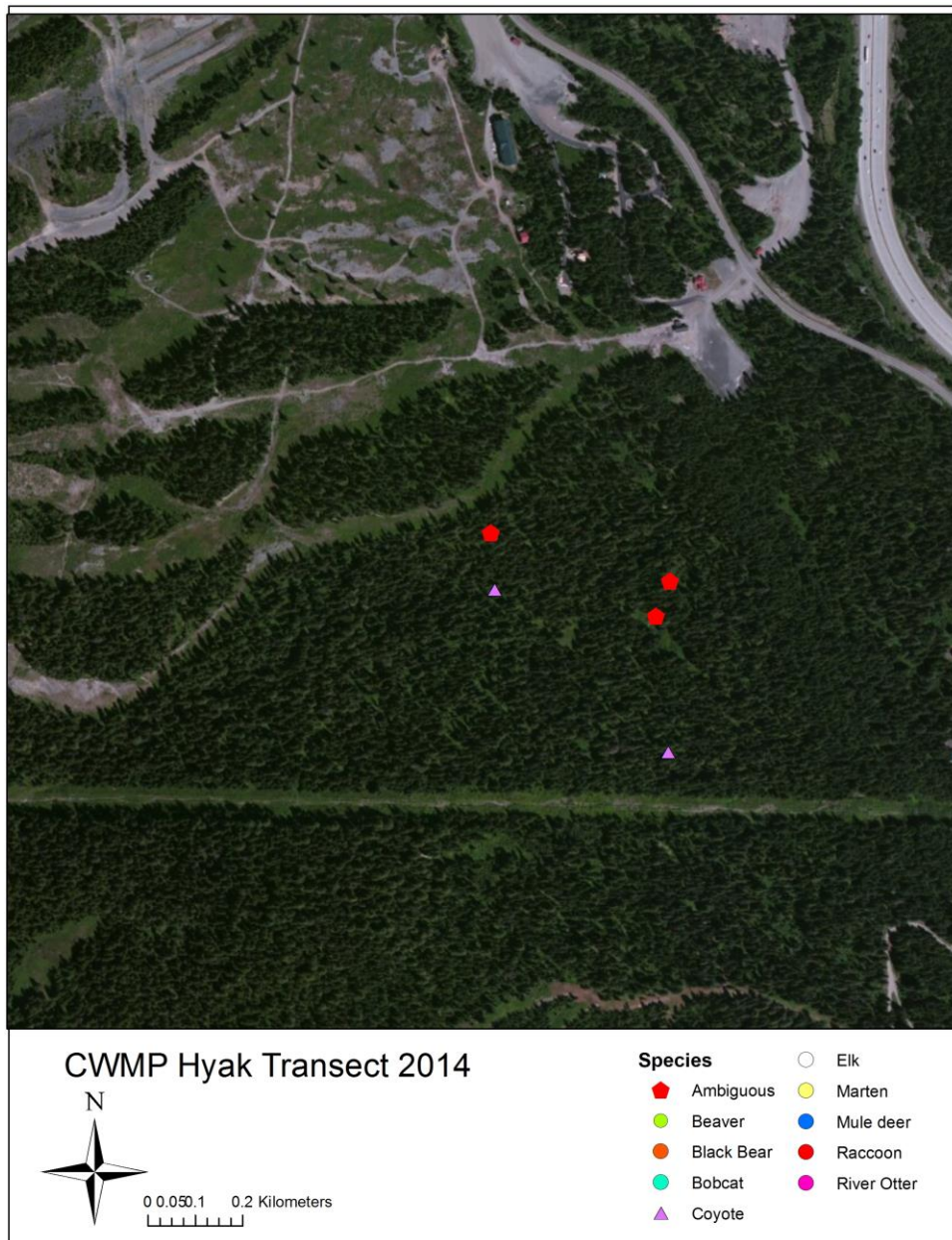
Table 5: 2014 Trailing records

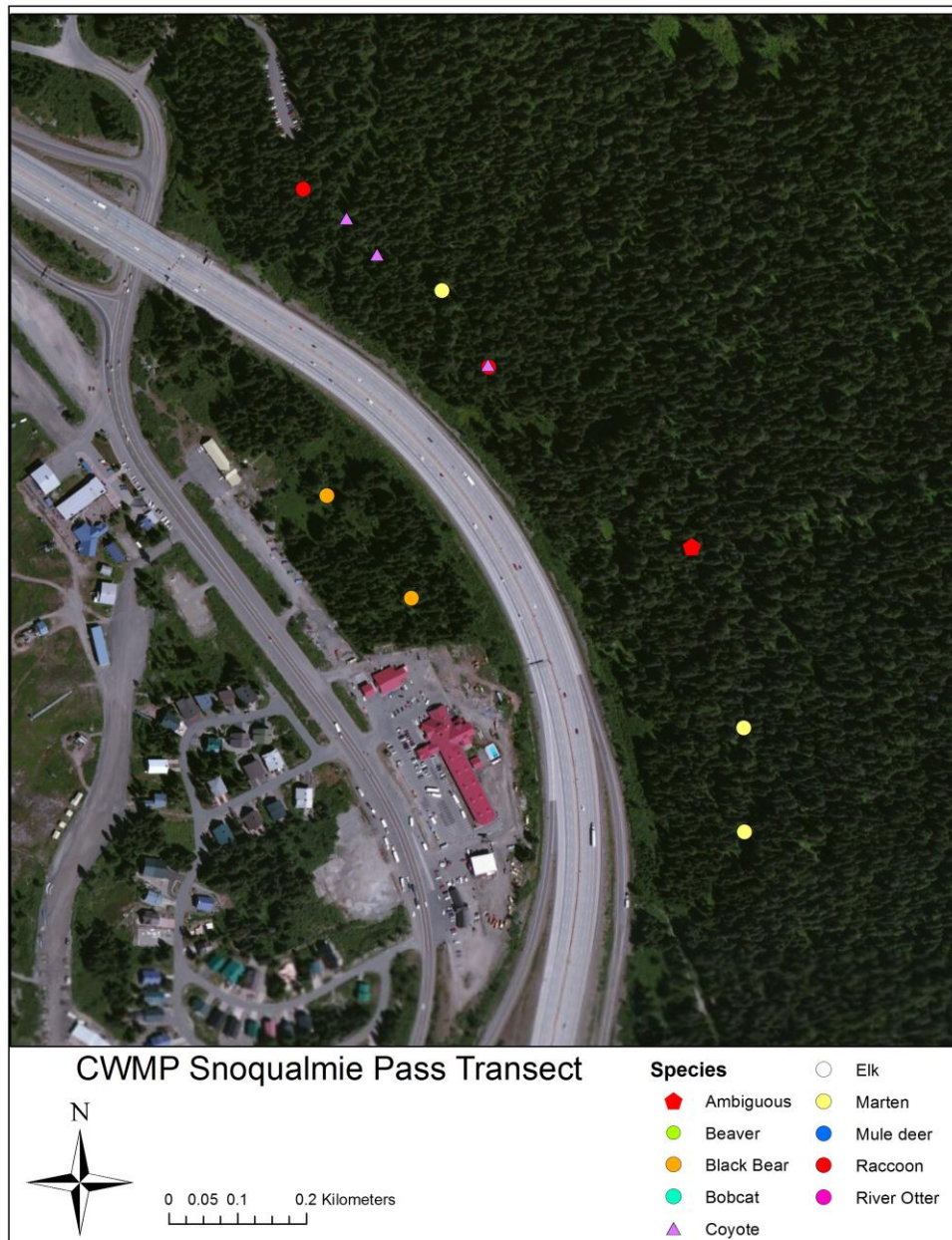
Species	Number of Trailing Events	Transects	Notes
Coyote	6	Gold Creek, Easton Hill	One crossing noted
Bobcat	1	Price-Noble West	Crossed roadway
Marten	2	Snoqualmie Pass	
Raccoon	1	Easton Hill	Likely crossed roadway











Observer Reliability

Over the course of the winter, 18 observer reliability data points were collected from team leaders as per the protocol discussed above and thoroughly detailed in the past two seasonal reports. This was less than during the previous year, likely due to extremely poor snow conditions during most of the field season (detailed elsewhere in this report) and by one new team leader who submitted only data points listed as “ambiguous.” As in previous years, coyotes were the most commonly reported species in the sample. Reviewers identified a single definitive mistake in identification made by observers in the field, the first since the project began testing observer reliability three

seasons ago (See Table 6). Excluding samples that could not be verified or refuted definitively out of the field, team leaders' correctly identified tracks correctly 92.9% of the time for the season and 98.4% since the project has been reviewing this.

Table 6: Observer Reliability Summary

	2013-14 winter	2010-2014 totals
Number of Observers Tested	8	16
Total Samples Submitted	18	86
Correct	13	60
Incorrect	1	1
Definitive Identification Impossible from Photograph	4	25
Percentage correct (omitting data which could not be verified)	92.9%	98.4%
Species Positively Identified	American marten, Black bear, Bobcat, Coyote, Elk, Mule deer, Raccoon	American marten, Beaver, Black bear, Bobcat, Coyote, Elk, Mountain lion, Mule deer, Raccoon, River otter

The overall experience and training level of this year's team leaders was similar to past seasons. Many team leaders hold professional certifications in wildlife track and sign identification. All but one team leader came to the winter monitoring season with significant amounts of training in wildlife tracking outside of the project training, primarily through the Wilderness Awareness School.

Volunteer effort

Even with fewer transect volunteers this year, the number of volunteer hours rose for 2013-2014 because of two factors 1) addition of another transect site and 2) the tracking of hours that volunteer team leaders spend training new and returning transect volunteers. This year, too, volunteers spent fewer hours on administration thanks to increased efficiency: tasks have become more routine; meetings are now done as conference calls or email meetings; and returning volunteers have strengthened the expertise of the project.

Table 7: Summary of volunteer participation for snow tracking transects 2014.

Number of Volunteer Team Leaders	9
Number of Other Transect Volunteers	45
Number of Transect Field Days	34
Transect Team Leadership Hours (Training and Field Days)	392
Project Leadership Volunteer Hours	69
Transect Volunteer Hours	1681

Remote Cameras

Our 2013-2014 winter field season began in December and ran through April. Over the season, 12 camera sites were monitored in the Cascades. The following results only include species of interest to this program and species falling within our three priority levels (Appendix C), thus excluding photographs of birds, hares, small rodents, domestic dogs and cats (and people). Due to increasing interest in the interaction of wolves and livestock in Washington, we include domestic livestock captured at our sites as a Level 3 species in our analyses.

Our program expands knowledge of wildlife presence in Washington; however, limitations to the breadth of our data do exist. Our data cannot ascertain species diversity, population size, or species absence. Rather, it focuses on species richness, which has invaluable application to the conservation and management of rare and sensitive species in Washington. Species richness is defined as the number of different species present within a defined area. For the purposes of the Citizen Wildlife Monitoring Project, we assess species richness by site, which we can then extrapolate out into our larger, defined study areas. In addition to appraising species richness, we also assess the number of identified priority level species per site. Thus the more species recorded from each level (with a particular emphasis on Level 1 species), the greater the importance to our project.

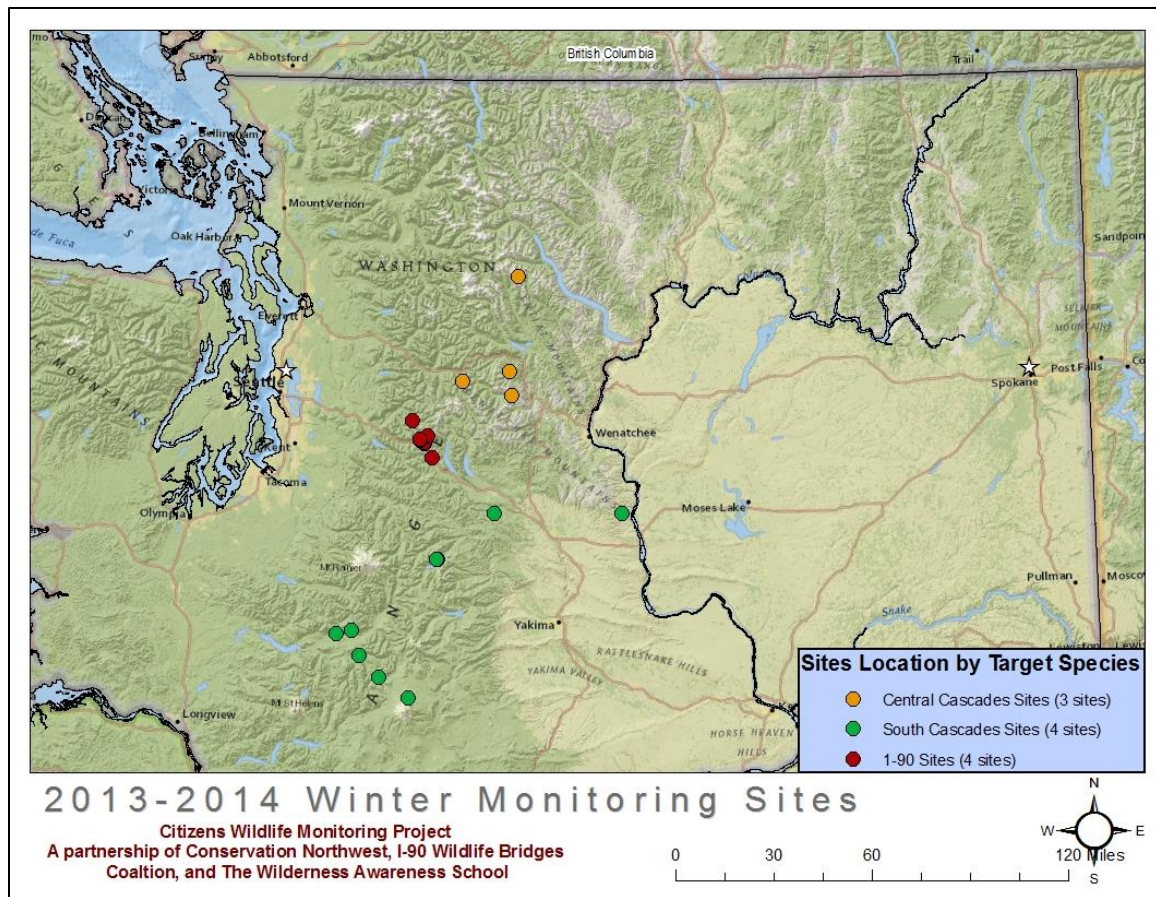
Though we separate our study into three distinct regions (Central Cascades; I-90 Corridor; and South Cascades), for the purposes of data analysis we will present the results from regions for the 2013-2014 winter monitoring season altogether. Note that each site represents combined data from two separately situated motion-triggered cameras set up within the same close vicinity.

All Sites

Table 8: Remote camera species detections over the winter season.

SPECIES PRESENCE								
Species Priority	Level 1	Level 2		Level 3				
Site Name	Wolverine	Cougar	Marten	Bobcat	Coyote	Deer	Elk	Snowshoe hare
Gold Creek								
Price Creek North					x			
Price Creek South								x
Rocky Run					x			x
Central Cascades Species Presence								
Chiwaukum	x		x					
Ice Lake (NO DATA)								
Icicle Creek				x				
Sparkplug Lake (NO DATA)								
South Cascades								
Blue Lake				x		x	x	
Bumping Lake			x					
Cispus River		x		x	x	x	x	
Taneum							x	

Over the course of our monitoring season seven species were detected by our remote cameras, including one of our target species – wolverine – at the Chiwaukum site. This site has year-to-year captured images of wolverine. Genetic analysis of hair samples gathered from gun brushes this winter are still being analyzed but will hopefully shed further light on the the individuals and population dynamics in the Central Cascades. American martin was also detected at the Chiwaukum site. Prior to winter snowfall, the Ice Lakes site received a single visit from a wolverine. However, the remoteness of the site precluded winter access, so as of release of this report there is no data available. Neither the Icicle nor Sparkplug Mountain sites received visits by their target species.



Four sites were set within the I-90 Snoqualmie Pass East project. To ensure complete coverage at the newly completed Gold Creek underpass, two cameras were placed directly within the underpass and two cameras were placed, one north and one south, of the underpasses in surrounding habitat. Though cameras were placed directly within the large Gold Creek underpass, no images were captured of wildlife despite coyote tracks detected on the Gold Creek transect. However, in other areas within the I-90 Snoqualmie Pass East project, both coyote and snowshoe hare were captured on remote camera throughout the winter.

None of our four sites set in the South Cascades captured images of their primary target species, the gray wolf. However, these sites did capture the largest diversity of species when compared to run-pole sites set for wolverine or those in the I-90 corridor. The three cameras along the Cispus River in the Gifford Pinchot National Forest captured the largest diversity of species compared to all other sites this winter. The Blue Lake and the Cispus River sites received multiple visits by elk, a main prey species of gray wolves. The Bumping Lake site received multiple visits from American marten over the course of the winter.

DISCUSSION

Interstate 90 Transects

This season's snow tracking transects showed very similar wildlife activity in the study area compared to years past. Trailing data documented the use of the interstate corridor by four carnivore species, including road crossings by two species and use of the recently completed undercrossing at Gold Creek.

Observer reliability

Despite documenting our first error in field identification, results this winter continue to suggest that observer reliability by our team leaders is very high. In four years of collecting data on observer reliability, we have documented a single error of field identification by team leaders (n=86). However, as with the previous two years, it was not possible to definitively confirm or reject the field observer's species identification for a significant number of data points. The percentage of ambiguous points this year was similar to previous years (22% in 2013-2014, versus 25% in 2012-2013). In the three years of data collection, the majority of these ambiguous or non-definitive designations (60%, n=25) were classified as "likely correct but photo is inconclusive" by reviewers. Many of these data points reflect challenging field conditions and the need to discern between species whose tracks and signs are difficult to distinguish in the field even under good conditions. Conversely, the fact that the majority of them were deemed "likely correct" by validators (the rest were classified as "indiscernible based on photo"), along with the fact that the definitive error rate is so low (less than 2% currently), suggests that it is unlikely there are many errors in this part of the sample.

Remote Cameras

This season further indicates that maintaining a winter remote camera monitoring program can provide valuable data on the presence and movement of key focal wildlife. In addition to providing continuity year around at some of our sites, winter monitoring also allows us unique opportunities not afforded during our larger workforce spring-fall season. This winter provided the first opportunity to monitor directly under the large Gold Creek underpass in its post-construction phase. In more remote habitats, we are able to use the scarcity of available food and our ability to clearly see tracks on snow to improve our documentation of species such as wolverine. This season's results from our remote camera sites added to our knowledge of wolverine presence in the Highway 2 corridor of the Cascades and documented a range of more common species throughout our coverage area. Monitoring this winter also shed insight on site placement for our 2014 spring-fall monitoring season in the Blue Lake and Cispus River areas of the Gifford Pinchot National Forest.

The continued documentation of wolverine at the Chiwaukum site, builds upon the existing location data, visual data, and the genetic information of wolverines documented in the previous winter monitoring season in the Central Cascades. Hair samples have been collected at the Chiwaukum site and, once analyzed, will provide information on the movements of previously documented individuals or identify new individuals traveling in the area.

The sites located directly within the Gold Creek underpass received no images of wildlife species using the underpass to complement data collected by the snowtracking portion of the winter monitoring project. Focusing our efforts on the Gold Creek underpasses and the surrounding habitat will continue to be a priority as we move into our 2014 spring-fall monitoring season.

Both the Taenum and the Bumping Lake sites were continued from the 2013 spring-fall monitoring season. These sites were prioritized due to the likelihood of capturing images of wolves moving into the Southern Recovery Zone and their winter accessibility for monitoring volunteers. During our 2014 spring-fall season we will continue to respond to verifiable sightings of wolves in the Southern Recovery Zone. This year we also piloted our first winter season in the Gifford Pinchot National Forest. We monitored two sites, Blue Lake and Cispus River all winter. These sites were in areas with high winter feeding grounds for elk and recently had reports of a black wolf in the area. At both sites volunteers documented a significant amount of elk, a main prey species of wolves, indicating that these areas are important to continue to monitor into 2014.

Volunteer Effort

During the winter, 30 remote camera volunteers averaged three sites to each site for the season with an average site visit taking 7 to 8 hours roundtrip. Remote camera volunteer hours for the 2013-2014 winter season totaled 720.

Citizen Science

This season marks eight years of successful use of trained citizen wildlife monitors carrying out snow tracking surveys in the I-90 Snoqualmie Pass East Project area and consistent collection of a series of annual data. The use of a leadership team composed of a small number of volunteers and limited use of paid staff continues to be efficient and highly effective at meeting Citizen Wildlife Monitoring Project goals. By embracing a field team structure of highly trained team leaders working with entry-level volunteers, the project preserves high quality data collection while providing excellent educational experiences and recruiting future team leaders.

RECOMMENDATIONS FOR NEXT FIELD SEASON

Interstate 90 Tracking and Trailing

1. *Seasonal management of transect coverage.* In order to get consistent coverage of transects, project leadership need to stay alert to cancelled outings to efficiently redirect scheduled teams to under-surveyed transects as needed.
2. *Revise database* to allow for efficient tracking of information on which transects where visited, how many times, and other relevant data.
3. *Maintain the revised system for volunteer sign-up used this season.*
4. Increase the number of observer-reliability images collected, to enlarge the sample size for analysis.
5. Consider pushing back training dates to early January and the start of the field season to mid-January.

Remote Cameras

1. *Consistency of monitoring timeframe.* For a number of different reasons, our winter sites vary in length of time that cameras are active. This can often be due to varying difficulties y of site access and winter travel. Planning far in advance of bad snow conditions by the leadership team may result in a more consistent monitoring timeframe.
2. *Revise database.* New data and photo management methods will streamline efficiency and reduce errors in reporting data.
3. *Winter volunteer training.* Though the fundamentals of monitoring a remote camera site are similar to the spring-fall season, some different considerations are necessary for maintaining cameras during the winter. Volunteers could benefit from a winter-specific training.

ACKNOWLEDGEMENTS

Once again, monitoring intern Mallory Clarke's effort contributed to all aspects of another successful winter field season of track transects. Similarly, intern Adam Martin again spent many hours preparing for and implementing the field season as an active part of the project leadership. He carried out important GIS and data analysis of this season's data for this report. Thanks to our returning team leaders: Joe Kiegel, Brian Booth, David Snair, Thomas Murphy, Kerrie Murphy, Mallory Clarke, Adam Martin, Michelle M. Peziol, and Jeremy Williams. Welcome and thanks to our two new team leaders: Byron Rot and Alison Huyett. Our volunteer team leaders are the backbone of the project.

Thank you to all of the transect volunteers who participated in this year's fieldwork: Ayako Okuyama, Daryl Douglas, Joanne Cormier, Justin Brooks, Lidija Kamansky, Randall Taylor, Al Tidmore, Alec Meade, Brett Hunter, Chelsea Rabourn, Chris Shipway, Cindy Reznick, David Beckman, Denise McElhinney, Erin Ryan, Evan Adkins, Guthrie Schrengohst, Ichun Lin, Isaac Leese, JoAnn Fjellman, Joanne Cormier, Julianne Hower, Kathryn Hansen, Katie Remine, Kerrie Murphy, Kirsten Tauber, Kyle Durkee, Laurel Baum, Laurel Peell, Matt Zoba, Michal Maor, Mike Donofree, Muriel Deklerk, Natalie Reszka, Nate Breun, Nizan Maor, Paul Zoba, Rachel Nickerson, Russ Gerads, Shannon Schelinder, Sierra Rudnick, Tom Brenner, Tricia Enfield, Victoria Garcia, students of the Wilderness Awareness School's Wildlife Tracking Intensive course.

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Thanks to Track and Sign Specialists Marcus Reynerson and Brian McConnell for taking the time to help review our observer reliability photos. We thank our advisory council

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Appendix A: Photographs from Winter Field Season



Photo 1. Gold Creek South transect in early January. Snow cover was light or absent from transects for most of the month of January due to unusually dry field conditions.



Photo 2. American marten (*Martes americana*) tracks from the SnoPass Transect. Photo by David Moskowitz

Appendix B: Photo highlights from winter remote camera season



Site: Chiwaukum; Species: Wolverine (*Gulo gulo*)



Site: Icicle Creek; Species: Bobcat (*Felis rufus*)



Site: Cispus River; Species: Bobcat (*Felis rufus*)



Site: Price Creek North; Species: Coyote (*Canis latrans*)

Appendix C: Advisory Council and Species priority level

Advisory Council (includes specific site advisors and project collaborators):

Jocelyn Akins, Cascades Carnivore Project
Keith Aubrey, USDA Forest Service, PNW Research Station
Paul Balle, I-90 Wildlife Bridges Coalition Steering Committee and Woodland Park Zoo
Scott Becker, WA Dept. of Fish and Wildlife
Michael Borysewicz, Colville National Forest
Craig Broadhead, WA Department of Transportation
Carol Chandler, Gifford Pinchot National Forest
Roger Christophersen, North Cascades National Park
Scott Fitkin, WA Department of Fish and Wildlife
William Gaines, Conservation Science Institute
Patty Garvey-Darda, Okanogan-Wenatchee National Forest
John Jakubowski, Gifford Pinchot National Forest
Gregg Kurz, US Fish and Wildlife Service
Chris Loggers, Colville National Forest
Robert Long, Woodland Park Zoo, formerly Western Transportation Institute
Andrea Lyons, Okanogan-Wenatchee National Forest
Paula Mackay, formerly Western Transportation Institute
Kelly McAllister, WA Dept. of Transportation
Jesse McCarty, Okanogan-Wenatchee National Forest
William Moore, WA Department of Fish and Wildlife
Chris Morgan, Western Wildlife Outreach and BearTrek
Dave Moskowitz, Wilderness Awareness School
Sonny Paz, Mt. Baker Snoqualmie National Forest
Jesse Plumage, Mt. Baker-Snoqualmie National Forest
Cathy Raley, USDA Forest Service, PNW Research Station
Jo Ellen Richards, Okanogan-Wenatchee National Forests
Jay Shepard, WA Dept. of Fish and Wildlife
Joan St. Hinchlair, Okanogan-Wenatchee National Forest
David Volsen, WA Dept. of Fish and Wildlife
Aja Woodrow, Okanogan-Wenatchee National Forest
Don Youkey, Okanogan-Wenatchee National Forest
Josh Zylstra, WA Department of Transportation

Species Priority Level:

Level 1	Level 2	Level 3
Wolverine	Cougar	Black bear
Fisher	Marten	Bobcat
Lynx	Mountain goat	Coyote
Wolf	Mountain red fox/Cascades red fox	Elk
Grizzly bear		Mule deer
		Raccoon
		Snowshoe hare and smaller mammals

Snow Tracking Survey Protocol Winter 2013-2014

CASCADE WILDLIFE MONITORING PROJECT

Version: 30 November 2013

**A volunteer-designed collaborative project of
Wilderness Awareness School and Conservation Northwest**

Purpose:

This document is intended to provide practical instructions for teams of snow tracking volunteers and their team-leaders.

Introduction:

A major expansion project is planned for the Interstate-90 highway, known as the “I-90 Snoqualmie Pass East Project”, for a significant stretch of the highway between the Snoqualmie Pass and Easton. The project has progressed well into the planning stages with construction intended to begin within the next 5 years.

The project includes widening of the road and safety improvements, as well as a series of wildlife crossing structures. These structures are planned for sites known to be used heavily by wildlife in the area especially in animals’ attempts to cross the highway. Planned structures include underpasses (such as long bridges), culverts, and overpasses. Some planned overpasses are hundreds of feet long, covered with soil and vegetation, and effectively form a ‘tunnel’ for the highway.

During the planning process, good relationships have been maintained between government agencies and conservation groups. This wildlife monitoring project is a joint project of Conservation Northwest and the Wilderness Awareness School and is intended to provide more information about wildlife species presence and behavior at 4 sites of interest to Conservation Northwest, three of which coincide with planned wildlife crossings (Gold Creek, Price/Noble Creek, and Easton Hill). The other site, Hyack/Silver Fir, is the site of a proposed expansion to the ski resort. This survey is also intended to lay the groundwork for ongoing wildlife monitoring in the I-90 corridor and potentially more widely in the Cascades.

One previous snow tracking study was conducted by Peter Singleton and others as part of the planning process for the I-90 Snoqualmie East Project. Singleton’s study combined snow tracking data with roadkill records and habitat parameters to provide information to help decide the locations of the planned wildlife crossings. Our current monitoring

project seeks to a large extent to replicate the procedure used by the Singleton study so that our data may be comparable, and usable by decision-makers.

Project Goals:

This project is oriented towards the following goals:

- To gather information, using snow tracking methods, about the presence and identity of wildlife along the I-90 corridor in the vicinity of wildlife crossing sites proposed for the I-90 Snoqualmie Pass East highway project, and in addition, for one location in the vicinity of proposed expansion of a lift-access ski resort.
- To trail species of interest, recommended by several consulted biologists, with the intent of gaining insight into their behavior with respect to I-90: to determine, for example, whether given individuals approached the highway, paralleled it for some distance, attempted to cross it, or otherwise provide evidence of its impact on nearby animal behavior.
- To set up and conduct a study that can produce reliable data that can be collected consistently in subsequent years and analyzed through time as the proposed developments are built. To collect data that will be useful in assessing wildlife activity before and after the construction of proposed highway crossings in the I-90 corridor.
- To provide educational opportunities and training in snow tracking methods and road ecology to entry level volunteers and an opportunity for citizens concerned about the future of wildlife in our region to be involved in this conservation research. To initiate the training of volunteers to create a resource of volunteer skill for future surveys in the area.

Personnel/Training:

Data collection for this project is carried out by teams of volunteer naturalists and trackers. Survey goals, design, and methods were developed in consultation with government agencies and other organizations concerned with the I-90 Snoqualmie Pass East Project. Fieldwork is carried out in small teams of 3-5 volunteers and a team leader. All participants receive basic training in the fieldwork procedures and tracking identification. Team leaders are selected for their skill and experience with track and sign identification and familiarity with the specifics of the project's field procedures.

Team leader responsibilities:

- Conducting surveys at three sites with a team between January 1st and March 31st 2007.
- Preparing for each visit ahead of time (see below, Preparation before Departing).
- Understanding and following the field work procedure.
- Ensuring accuracy of data collection.
- Entering the team's data (from data forms) into the computer database as soon as possible.

- Ensuring data forms, samples and equipment are turned in.
- Emailing a description of your visit with any heads-up about the site to all team-leaders.
- Supervising team safety in the field.
- Setting a tone for safety, productive scientific work, and fun.
- Helping team members learn more about tracking and wildlife.

Team member responsibilities

- Understanding the purpose of the survey and working for that purpose.
- Passing information to team leaders and doing any data recording cleared by the team leader.
- Ensuring your own and others' safety.
- Contributing to an atmosphere of learning and fun.

Transect Locations and Coverage

NOTE: Site assignments and dates for tracking days will be organized at the team leader training. Each team-leader will be assigned three sites to visit.

This project surveys six locations along the I-90 corridor. These sites coincide with several proposed wildlife crossings or other proposed development. Each site involves two half-mile transects, one on either side of the highway, (except for Hyack/Silver Fir, which is not along the highway.) Below is a brief description of the sites with directions to them. (*All UTM coordinates are zone 10, NAD 83 datum*)

SNOPASS

	Northing	Easting
<i>North Transect Start</i>	619645	5253913
<i>North Transect End</i>	620141	5253235
<i>South Transect Start</i>	619519	5253750
<i>South Transect End</i>	619779	5253450

The SNOPASS transect is accessed off of exit 52, the first Snoqualmie Pass exit when coming from the west. From the eastbound off ramp, take a right and turn into the large plowed parking lot immediately to the right. This is a new transect starting in 2014, and is a location which is not going to be converted into a wildlife crossing, and thus will act as a true control. This site is accessed from the PCT.

The North Leg of the transect is accessed by carefully crossing the road and walking under Interstate 90. From the parking area go north, under the bridge, and a winter trail will lead north towards the trailhead for the Pacific Crest Trail. If inaccessible, you can continue north on the main road (NF 9041) to the first road spur on your right. This will take you up a small hill to a summer parking area for the PCT. The transect starts just south of the bathroom. The transect start is 10 meters south of the outhouse at the

trailhead for the Pacific Crest Trail (snowed in during the winter). Because this is a very popular location and very easy to find the specific start is not flagged. The transect travels about 150 meters off of the highway towards the east through Old growth forests. There are some small stream crossing, which may be exposed if snow levels are low. The transect end is well flagged at the coordinates above with pink flagging tape in a grove of particularly large Douglas fir trees. The end is about parallel with the onramp for exit 53 of the interstate, still 150 meters into the forest.

The South Leg of the transect will be significantly shorter than the north end due to lack of natural habitat on this side of the Interstate. The transect follows the thin line of trees adjacent to the highway for the length of this band of trees. The south transect starts at the beginning of the tree cover just south of the bridge and highway, and runs parallel to the highway until the forest ends behind the parking lot of the Chevron gas-station.

HYACK / SILVER FIR

	Northing	Easting
<i>Sidehill Start:</i>	620155	5250950
<i>Sidehill End:</i>	620440	5250080
<i>Hyack Creek Start:</i>	620410	5250575
<i>Hyack Creek End:</i>	619440	5250070

This site is accessed from the Silver Fir ski lift parking lot at Hyack. **This is the only site not involving transects that parallel I-90, ie. this is the only non-highway transect.** **Road-oriented items on data sheets are therefore not relevant for this site.** The Hyack site is of conservation interest because there is a proposal to expand the ski resort. The transects start a few meters from the parking area. One transect follows the trajectory of an existing trail; the other goes perpendicular to the trail, following a creek uphill.

Directions: Going East on I-90, cross the Snoqualmie Pass and take the Hyack / Gold Creek exit. Turn right after the ramp, to the South of I-90, and follow the road as it bends to the right. After a short distance there are signs to Silver Fir ski lift on the left; turn left and park in the far left (South-West) corner of the parking lot. Walking straight South from the South-edge of the parking lot will take you uphill to a logging road/ski corridor which runs parallel to the edge of the parking lot. Follow this trail to the left (approx. East), **keeping left at any forks**, till you reach a stream in a steep V-shaped channel. The intersection of the stream and the trail is the starting point for both transects at the Hyack site. The first transect, named “Hyack—sidehill”, follows the trail to the East of the stream, continuing straight if the road bends, and ends at the overhead power lines. The second transect, named “Hyack—Creek” parallels the creek uphill and also ends at the power lines. For this transect, walk along the East side of the creek.

Note: If the stream is too difficult to cross, walk up hill a short distance to find the footbridge. Having crossed, walk back downhill to the transect starting point.

GOLD CREEK

	Northing	Easting
<i>South Transect Start</i>	622490	5249740
<i>South Transect End</i>	621675	5249020
<i>North Transect Start</i>	621790	5249600
<i>North Transect End</i>	622380	5250020

Directions: The Gold Creek site is between approximately Mileposts 55.2 and 55.8 of I-90. It is accessed from a ‘frontage’ road at the same I-90 exit as the Hyack site. Going East on I-90, cross Snoqualmie Pass and take the Hyack / Gold Creek exit.

For Gold Creek North, Turn left after the ramp (onto Lake Mardee Road) to go under the highway. Once you are North of the highway, turn right on Gold Creek Road, Nf-4832. Follow the road East, and you will cross Gold Creek. Soon afterward, on the left, is a road (Nf-144) on the left, with a sign that says “Gold Creek Snow Park” and/or “Gold Creek”. This road marks the Eastern-most extent of the transect. The transect runs West from this point (and 150 meters from I-90) to the Western bridge in the Gold Creek valley. The transect is to the North of the small road (Nf-144) and some distance away from it, so that the transect is 150 meters from I-90. The transect crosses Gold Creek.

For Gold Creek South transect, take the same exit of I-90 and turn right after the ramp, onto Lake Mardee Road/906. Park in the parking lot of the Department of Transportation Maintenance Office. (Introduce yourself to the supervisor there, Al or Gary, to ask them where it’s OK for you to park).

To get to the Maintenance Office requires taking your first left off Lake Mardee Road/906, onto Nf-2219 and following this, staying left at any forks. (Road becomes Milwaukee Ln). The Maintenance Office is pretty much at the end of this road. Look for the large buildings and parking lot to the right of the road. The transect runs East from the East-most buildings (which mark the start of the transect), into the Keechelus Lake valley, parallel to I-90 and about 150 meters away from it—for half a mile. A useful landmark for the far (Eastern) end of the transect is the bare rock face of a cutting on the opposite (North) side of I-90. The transect ends at the bare rock face before the lights signifying chain on/off for drivers on I-90, and 150 m from I-90. The transect crosses Gold Creek.

PRICE CREEK / NOBLE CREEK TRANSECTS

There are **two pairs of transects** in this area, located just beyond the Eastern end of Keechelus Lake, at around Milepost 61. We have called the transects Price/Noble Creek West, and Price/Noble Creek East, and each of these is divided into North and South transects for each side of I-90.

PRICE-NOBLE WEST

	Northing	Easting
<i>South Transect Start</i>	626560	5241980
<i>South Transect End</i>	625620	5242620

<i>North Transect Start</i>	626860	5242300
<i>North Transect End</i>	625640	5242958

Directions: For **Price/Noble Creek West, South transect**, exit I-90 Eastbound at the first rest area exit immediately after the dam for Keechelus Lake. Take the logging/ski road that leads roughly South away from the *truck* parking area. This road will shortly come to a T. This T forms the starting point for both Price/Noble Creek West, South transect *and* Price/Noble Creek East, South transect. Price/Noble Creek West, South transect, runs West from the T along the road until the road bears left, at which point the transect continues on a straight trajectory into the woods, paralleling I-90. The transect ends at the Keechelus Lake Dam. The transect crosses several small creeks, which will probably be frozen on snow tracking days.

For **Price/Noble Creek West, North transect**, go East on I-90 and take Exit 70 (Easton Lake) and re-enter the I-90 highway Westbound. Then take the Price/Noble Creek rest area exit, where there is a Snow Park. This should be between Mileposts 62 and 61, and is on the North side of the highway. Walk up the snowmobile trail a short distance to the flagged start of the transect.

PRICE-NOBLE EAST

	Northing	Easting
<i>South Transect Start</i>	626560	5241980
<i>South Transect End</i>	627101	5241550
<i>North Transect Start</i>	626925	5242090
<i>North Transect End</i>	627510	5241210

Directions: For **Price/Noble Creek East, South transect**, follow the directions above (for Price/Noble Creek West, South transect) to find the T-junction mentioned. At this T, turn left and head straight East parallel to I-90 for half a mile to complete the transect. This route alternately follows an old road corridor, bushwacks down a forested slope, crosses a stream/wetland, rejoins the road grade, crosses a bridge and ends shortly after this.

For **Price/Noble Creek East, North transect**, start at the same Snow Park as for the Price/Noble Creek West, North transect, (exit from I-90 Westbound around Mileposts 61 and 62) and walk a half-mile transect East, and roughly parallel to the highway. Shortly after the strat the route turns diagonally left and towards the apex of a hill and continues down the far side of the hill. The transect ends about 200 meters into the denser canopy old growth forest which starts beyond the selectively cut block encountered prior to this.

EASTON HILL

	Northing	Easting
<i>South Transect Start</i>	634869	5235716
<i>South Transect End</i>	633270	5236500
<i>North Transect Start</i>	633915	5236475
<i>North Transect End</i>	633083	5236680

Directions: Located around Milepost 67.8, where the highway splits into two leaving a large vegetated island in between. There is a significant walk from where you park to where the actual transect starts on both the north and south legs of this transect.

Easton Hill South

Parking

- From I-90 Eastbound take exit 70 (Easton Lake).
- At stop take a left and go over the highway and past the Westbound on ramp.
- Left onto Sparks Road toward Lake Kachess
- Follow this road until just before it ends where people park to unload snowmobiles
- Take a left and go under 1-90 to the large parking area south of the Highway
- Park here (A snowpark pass may be required).

From Parking to start of transect:

- Walk back under the Eastbound lanes of 1-90. About 20 meters further on you will find a snow covered road running to the West (left). I placed a piece of orange flagging tape around a large Douglas fir by the road. Under the tree you will find a Forest Service road sign with **4814** on it.
- From this point, the transect starts .65 Km down this road and runs for 1.6km (1 mile) to just about the end of where the East and West Bound lanes of the Highway are divided.
- Follow the snow covered road for the .65 Km. I flagged any junctions that I thought might be confusing.
- The start of the survey should be well marked with flagging tape labeled "CWMP Easton South Transect Start".

Following the Transect:

- From here the transect follows this road for most of the mile.
- The road ends at some point (you will find yourself on the north side of the hill seen on the topographic maps. Continue heading west paralleling the highway until you come to a wetland.
- Work your way LEFT around the wetland (at some point you should pick up more orange flagging tape we left) and continue to head west towards the end of the transect.
- The end of the transect is about 2.24 km from where you left the plowed road). It is on the south side of forest that ends at a plowed turn-around used by snowplows and within sight of where East and westbound 1-90 remerge. The end is also flagged but once you hit the obvious turnaround you have reached the end.

Data Collection Note: As this transect is between the two directions filling out the direction of travel data point is different then at other sights. Your options are (towards, away, parallel). If it is going North (towards the Westbound lanes) this should be labeled TOWARDS. If it is going South (towards the Eastbound Lanes) this should be labeled AWAY....

Easton Hill North

Start of the Transect

Directions to the start of the Transect: North of the interstate, park at or near the dead-end sign, where there's also a sign indicating that the road beyond the dead-end sign is privately maintained. There is no official parking spot here so no snow-park required. (If you don't mind walking a little further you could drive under the highway and there's a turn-a-round parking spot down there, where you'd park for Easton Hill South, too.)

Walk down the road past the dead-end sign, parallel to the highway. You'll pass a few houses. KEEP LEFT AT ALL FORKS till your road intersects with the power lines – a transmission tower will be on your immediate right. Follow the power line corridor west until you have reached the 4th transmission tower – the transect starts here, on the left side of the power line corridor.

Following the Transect

Following the Transect: The transect starts by following the POWERLINE ROAD (west) until a old logging road cuts off to the left (well flagged hopefully). The remainder of the transect follows this road grade the entire way to the end point.

Field procedures

EQUIPMENT

DATA COLLECTION

- ✓ Smart phone with access to the internet.
- ✓ Clipboard.
- ✓ Data sheets (plenty). There are three types: Transect data sheets (back up incase of smartphone failure). Target species sheets, and Trailing sheets.
- ✓ Snow Tracking Quality designation key.
- ✓ Synopsis of Survey Protocol, and/or a copy of this document, Snow Tracking Survey Protocol.
- ✓ Waterproof bag/folder for completed sheets
- ✓ Pens and pencils
- ✓ Tape measure. Two rulers for photography. Ensure all include metric units.
- ✓ Your own notepad (eg. for site descriptions for future team leaders)
- ✓ Digital camera with sufficient battery and memory
- ✓ Notecards for labeling photographs
- ✓ Sample bags (Ziplocs)
- ✓ Working GPS unit with spare batteries (Can be an app on your smart phone)

LOGISTICAL AND SAFETY

- ✓ Maps of location
- ✓ Surveyors' Tape for flagging
- ✓ Compass
- ✓ Cell phone for emergencies
- ✓ Sufficient warm clothing, snowshoes, warm boots, food and water, headlamp, sunglasses, etc.

Recommended:

- ✓ Umbrella (useful for recording data when it's snowing)
- ✓ Tracking Field Guides

Field Team Preparation

Team-leaders should ensure several days in advance that they are well prepared for a planned survey expedition. Advance preparations include at least the following:

- Inform DOT and/or highway patrol of your intentions and the dates of your survey. Consult them about expected snow conditions and verify access to highway exits at your survey site. The telephone number of the DOT Maintenance Office for Snoqualmie Pass area is 425-434-5608.
- For Transects where a SNOPARK Pass is required, be sure that you have printed out a placard with information on CWMP to post in every vehicle which will be parked at the SNOPARK
- Keep track of the weather and snowfall at your site in the days before your visit day. Some resources for this include: The DOT website (including webcams) and NOAA websites. Certain conditions may make a field expedition too dangerous or unadvisable; if this is the case it needs to be rescheduled with your team.
- Find out and record the most recent snow fall. <http://www.wsdot.wa.gov/> has good information about conditions at the Pass including webcams. <http://www.noaa.gov/> is another good resource. You can also call the Snoqualmie Pass Maintenance Office at 425-434-5608.
- Check you have all equipment ready and working.
- Check in with your team to ensure they are ready and so is their equipment.
- Decide on final return-time, bearing in mind the weather forecast, possibility of snowy conditions on the road, and early darkness—as well as the schedules of your team-members.
- Ensure at least one member of the team has a reliable watch.

Field Procedures: Highway Transects

Team Leader:

- 1) On arriving at your site with your team, first ensure that vehicles are parked safely.
- 2) Gather your team together and review your day plan with them to ensure everyone is on the same page. Check everyone has all necessary equipment (see list above). Bring a cell phone for emergencies. Also ensure that volunteers all have sufficient warm clothing, water/tea, food, and other outdoor or safety equipment (eg. snowshoes, flashlight, lighter, etc.) for the day. Ensure that everyone is familiar with emergency procedures (Call 911).
- 3) Find the transect starting point. To do this, use the site descriptions in this document, and/or brightly colored survey tape left by previous teams. Highway transects are at a distance of about 150 meters from the road at the point you left the highway.

- 4) Conduct snow-tracking transect from the starting point (approximately .5 miles). Transects should maintain a straight line (constant distance of 150m) as far as permitted by the landscape. Transects should be well flagged. Replace flagging as needed IF you are SURE that you are on the transect line.
- 5) Upon reaching the furthest point of the transect (determined by a landmark and/or with a GPS unit indicating the transect end (see site descriptions above), the team will have recorded all relevant tracks seen along the transect.
- 6) On the return leg, your team takes the opportunity to trail Level 1 or 2 species in the order of our priority list (see Appendix). *If there were no level 1 or 2 species trail at least one Level 3 species.* Trailing data should be recorded using the “Trailing Sequence” on the PDA unit (it can also be recorded manually on a TRAILING DATA SHEET). The priority is to follow trails towards the highway. It is important to complete transects on both sides of the highway in a single day, however, and so teams should take this into account when deciding how long to spend trailing.

Procedure for Tracks: How to Document.

- 1) Stop your companions and bring tracks to their attention. Stop walking to prevent destroying tracks.
- 2) Record data carefully by completing all steps on the Google form on your smartphone or datasheet.
- 3) For Level 1 species, or ambiguous tracks that may be a Level 1 animal, document tracks with measurements, sketches, and photographs. Use the “Target Species data sheet” for this information.
- 4) Determine whether the animal is a trailing priority species (See list, Levels 1 and 2). If so, clearly mark trailable tracks for trailing on your return leg.
- 5) Mark the tracks as ‘done’ so a later team will know they have been recorded by your team. Draw an obvious circle around one or more tracks and leave a large footprint next to them with your boot or snowshoes.
- 6) Continue walking transect.

NOTE: For the first set of tracks that you positively identify on each leg of the transect, photo-document these tracks following the Observer Reliably procedures outlined below.

Procedure for Trailing: How to Document.

Trailing is to be done on the return leg of the transect except in the case of level 1 species which should be carried out immediately. *Attempt to trail at least one animal towards the*

road after each transect.

Level 1 species should be trailed wherever possible. In the case of the top 5 species (wolverine, fisher, lynx, wolf, and marten), these can be trailed even before a transect is completed, as they are critical rare species.

Level 2 species should be trailed in the absence of Level 1 species, after completing the outward leg of your transect and where time is available.

Level 3 species are not to be trailed until other work on the transect is complete and only if there are no level 1 or 2 species to trail.

- 1) On the outward leg of your transect mark trails you will want to follow for easy identification on your return leg, and note the trail in your field notes on a list of trailing possibilities.
- 2) When your team reaches the furthest point of the transect, the team-leader should review trailing possibilities from the outward leg and decide which are of highest priority. If no Level 1 species are detected, your team should be sure to complete the rest of the transects before trailing any Level 2 or 3 species.
- 3) On the return leg, follow chosen trails towards the highway. Record all discernable behaviors, especially with reference to the highway. For example, how close does the animal approach the highway? Does it attempt to cross it? Does it walk along it for some distance? Does it make a lay close to the highway? Does it remain in cover or in full view? See data sheet and attached notes for how to record these observations.
- 4) Where you start your trailing activity, start *TRACKING YOUR ROUTE* on your GPS unit. When you reach the end of forward or back tracking, *TURN OFF TRACKING YOUR ROUTE* while you return to the starting point of your trailing activity. Turn Tracking back on until you reach the end of the second leg of your trailing activity at which point you should once again end Tracking and save this route for download later.
- 5) Record the path of the animal by documenting frequent GPS UTM coordinates (obtained from your GPS) with associated commentary in notes, where appropriate – especially for Level 1 species. This may be of particular value if the tracks suggest an attempted highway crossing, as GPS records for tracks found on opposite sides may help determine whether the tracks probably belong to the same individual, which crossed successfully.
- 6) Trail Level 1 species as far as possible to gather as much information about the animal as you can. For Level 2 and 3 species, the energy expended trailing should depend on your team-leader's judgment, safety considerations, and whether both transects have been completed.
- 7) If you have found a Level 1 species, call David Moskowitz (425 891 4745).

Procedure for Sign other than Tracks

Follow the procedures outlined above for dealing with track evidence. In addition, take samples of hair and scat if the animal is or may be a Level 1 species. These samples should be placed in sealed bags and immediately labeled with Site Name, Date, Team-leader's Name and Observation Number.

Procedure for Ambiguous or Unclear Tracks or Sign

- 1) 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. If the animal can be positively identified, record species on data sheets as usual.
- 2) If clearer identifiable tracks cannot be found, then ambiguous or unidentifiable tracks should be treated with care, especially if they might indicate a Level 1 Species.
- 3) If the tracks are possibly Level 1, document them in detail. Follow the usual procedure for documenting tracks, and ensure good sketches, photos and measurements are taken.
- 4) Unclear tracks that are clearly NOT a Level 1 species should simply be recorded as "unidentified species". In the attached notes, list possible species if appropriate.
- 5) If you have found a Level 1 species, call Dave Moskowitz (425 891 4745).

Photographic Documentation Procedure:

Key points for photo-documentation of single tracks:

- Take photo looking directly down on track to reduce distortion.
- Include two scales, preferably rulers, one running lengthwise, the second widthwise.
- Take at least one picture of the track that includes a card in the picture with Site Name, Date and Observation Number and Team leader's name.
- Take multiple photographs to ensure you get a quality shot.

Key points for photographing gait patterns and trails:

- 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.

Sketches and Measurements

Fill out the Target species data sheet to record this information for Level 1 species. Attempt to make all drawings either life size or to scale (note what scale is).

Observer Reliability

Following the standard photo-documentation procedures for the project, photograph the first set of tracks you record on each side of your transect. Photographs should include one individual track or two together (such as a front and hind from an indirect register). Select tracks that will be clearest in photograph. Take multiple photos ensure you get a good exposure if needed. Also photograph any additional evidence used to positively identify the tracks.

When out of the field label each photograph with:
“OR” (observer reliability), transect name, side of highway, date
example: OR.PriceNobleWest.N.23DEC2011.jpg

If you take multiple photographs in the field, select the best photographs of the collection to send to David Moskowitz. It must be of the first data point you collect on each side of the highway. Email images from each transect leg to Moskowitz_david@hotmail.com. Include any other information you used to come up with your identification as pertinent.

After your visit

- 1) **Handing in you data:** Team-leaders are responsible for recording data sheets and entering handwritten data onto the Google data form. This can be done from any computer with internet access, including the project computer available at the SnoValley Coffee shop in the town of Snoqualmie. Data sheets should be left in the binder/tray after data has been entered. It is requested that team-leaders enter their day's data within 24 hours or by the end of the weekend, to ensure no data is lost. See Appendix 3.
- 2) **Email brief report of visit to all team leaders.** Since it is likely that other groups will visit your sites following your visit, please pass on information about the site. The next team will greatly benefit from a brief report, including site conditions, what you learned about animals in the area, topography, dangers, and any outstanding questions. Please email all team-leaders a description of your visit with any heads-up about the site when you've entered the data at SnoValley Coffee.
- 3) **Email David your Observer Reliability photographs.**

APPENDIX 1: SPECIES PRIORITY LIST

*Tracking priority for this study
in descending order*

Level 1

Wolverine
Fisher
Lynx
Wolf
Marten
Grizzly Bear
Cougar
Mountain Goat

Level 2

Elk
Mule Deer
Mountain Red Fox

Level 3

Black bear
Bobcat
Coyote
Raccoon
River Otter
Beaver

Any other wild mammals larger than a snowshoe hare encountered in the field.

Do Not Record

Snowshoe Hare and smaller animals

KEY

Level 1 species should be trailed wherever possible. In the case of the top 5 species (wolverine, fisher, lynx, wolf, and marten), these can be trailed even before a transect is completed, as they are critical rare species.

Level 2 species should be trailed in the absence of Level 1 species, after completing the outward leg of your transect and where time is available.

Level 3 species should only be trailed if there are no level 1 or 2 species present on transect.

Appendix 2: CWMP TRACK MEASUREMENT GUIDELINES

Length and Width: Use track minimum outline

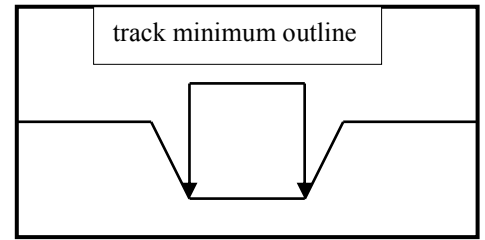
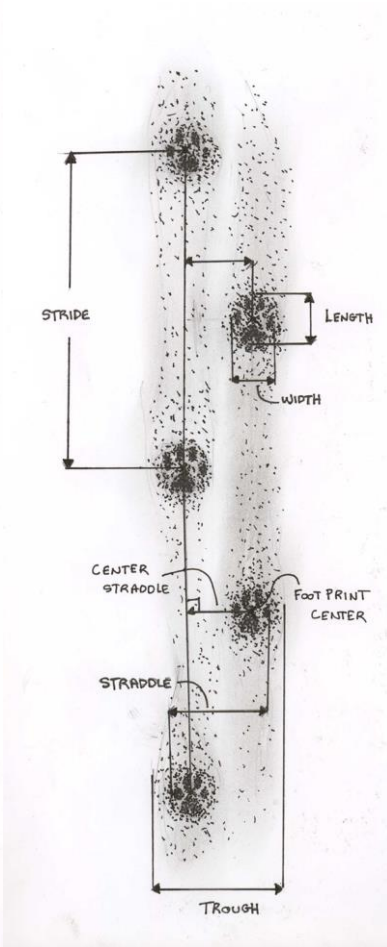
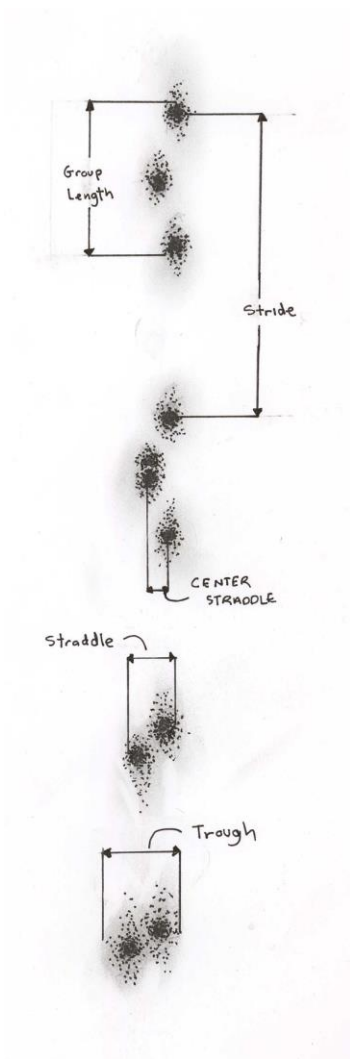
Group length: measured from the back of the track furthest back in a set of 4 tracks to the front of the track furthest forward. NOT USED FOR walking or trotting gaits (groups of 2)

Stride: measured from a place on one foot (such as the “center of the front left”) to the same place on the same foot the next time it appears in the trail.

Straddle: distance from the outside of the leftmost track in a trail to the outside of the rightmost (using minimum outline)

Center Straddle: distance from the center of the leftmost track in a trail to the center of the rightmost.

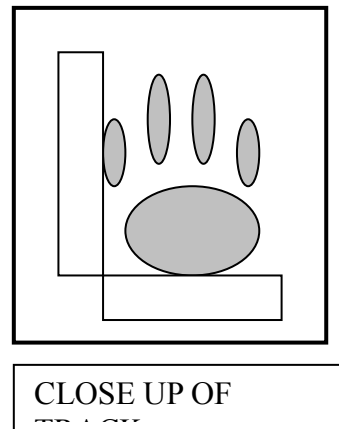
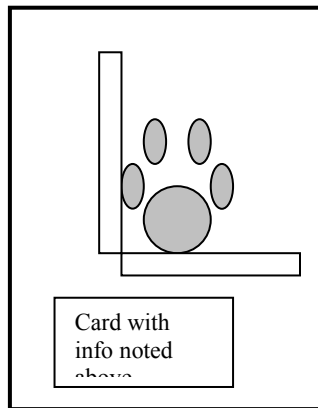
Trough: width of the entire disturbance created by an animals trail (greater then the minimum outline of the tracks which may be indecipherable in some instances)



Appendix 3: PHOTOGRAPHIC DOCUMENTATION GUIDELINES

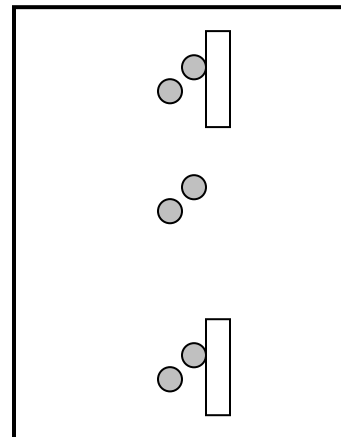
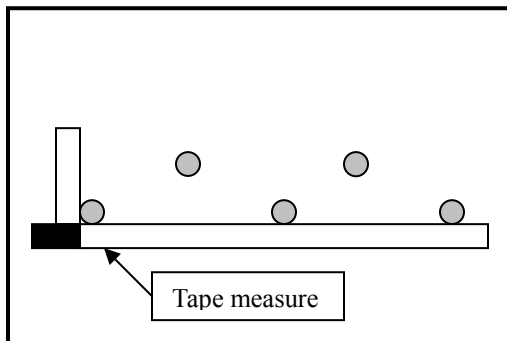
PHOTOGRAPHS OF INDIVIDUAL TRACKS:

1. Take photo looking directly down on track to reduce distortion.
2. For close up photographs, fill the entire frame with the track and measuring devices
3. Include two scales, preferably rulers, one running lengthwise, the second widthwise.
4. Take at least one picture of the track that includes a card in the picture with:
 - Site Name
 - Date
 - Observation Number
 - Team leader's name.
5. Take multiple photographs to ensure you get a quality shot.



PHOTOGRAPHS OF GAITS/TRAIL PATTERNS

1. 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).
2. 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.



PHOTOGRAPHING THE SETTING

Also consider taking photographs of people looking at the tracks or sign, or pictures which show

the tracks in the context of the location they are found to accompany the detail photographs.

Appendix 3: DATA ENTRY INSTRUCTIONS

NOTE: Everything you will need for recording your data should be located on the Google Drive Shared Folder titled: “TEAM LEADER FILES” which can be accessed from any computer with internet access using your google account information.

It is vital that data entry happens in a precise and consistent fashion in order to make analysis of this information possible. Incorrectly entered data may need to be discarded later on. If you have questions attempt to contact one of the following individuals:

David Moskowitz: 425 891 4745
Alison Huyett: 410-693-1591
Adam Martin: 603-325-0158
Mallory Clarke: 206-618-5228

GOOGLE FORM DATA COLLECTED IN THE FIELD

If you collected your data directly onto a smartphone in the field through the appropriate google form then you should have nothing to do once out of the field. If you are concerned that you may have made a mistake with your data entry you can view the data collected by opening the database for either Transect or Trailing Data located as a shared file on google drive. The databases are set up as “view only” for team leaders so if you find a mistake, carefully document which datapoint it is and what needs to be corrected and send an email to David Moskowitz.

DATA SHEETS

If you collected transect or trailing data on datasheets rather than on a smartphone in the field then you will need to enter your data through the appropriate Google Form. This can be done from any computer where you can access the internet.

Transect Data is entered through the form available at:

<https://docs.google.com/forms/d/1NAU-YWK8fm8C-P8G8rFzeKSm9dZSH03WQI10INWYfy0/viewform>

Trailing Data is entered through the form available at:

<https://docs.google.com/forms/d/1ImoGf90OBFppykqQdL4L4tUHf045Ss6im7nCaltYOY8/viewform>

Once you have entered your data through the Google form be sure to leave your datasheets in the 3-ring binder in the bin of field equipment at SnoValley Coffee.

Fill out a “Coversheet” (found in the three-ring binder in the section titled “Coversheets”). Place the coversheet at the top of your stack of data sheets, staple them together, three-hole punch them (careful to avoid destroying data) and put them in the 3-ring binder in the section labeled: “DATASHEETS.” The stapler, 3 hole punch and binder are found in the Rubbermaid tote.

If you enter your data at home after your transect, please bring your data sheets with you on your next transect and drop them off at that time.

TRAILING ROUTES

Smart Phones

For each trailing event in the field track the route using your GPS app on your phone. How to do this will vary depending on your app. Once complete, label the route following this format: Transect name-date-observation number. For example: EastonS-17NOV2013-2. Either in the field or once out of the field, export the route by emailing it to yourself. You can then move the emailed file onto the google drive shared folder entitled “Trailing GPS Files”-
https://drive.google.com/folderview?id=0B1ppDL0Ump4nb2RGamFuVHNSR0k&usp=s_haring

Many apps will produce files in a .gpx format as well as a .kml (google earth). Please be sure to upload the track in the .gpx format.

GPS Units

Follow instructions for the specific GPS Unit you are using to make a track for your trailing route in the field. Once out of the field use the appropriate cable to download the track from your GPS unit to the computer you are using. You can then upload the file (should be in a .gpx file format) to the same folder mentioned above.

PHOTOGRAPHS

Photographs can be uploaded to the shared google drive folder from any computer. If you are using the project computer there is a card reader in the computer case. If you are concerned bring your own card reader or cable to connect your camera to the computer.

Folder Name

Inside of the folder labeled 2013-2014 photographs in the Team Leader Shared folder, create another folder for your photos named with the following format:
<Transect Name-Date> (such as: EastonNorth-4JULY2013). All of your photographs

from this transect will go into this folder.

File Names

Rename photo files with the transect location, date, and associated data point number such as: **Hyack12.27.06_12.jpg**. For multiple photographs of one data point, label them as follows: **Hyack12.27.06_12.1.jpg**, **Hyack12.27.06_12.2.jpg** and so on (add a “.1”, “.2” etc. for successive pictures).

NOTE: For directions on handling observer reliability photos see section by this name below.

SPECIMENS

Specimens should only be brought out of the field in special circumstances. Use specimens to help identify ambiguous species and then discard them. If the specimens come from a level 1 species, hold onto them, and contact David Moskowitz about how to proceed.

TRIP REPORT

Trip Report Format:

1. Date
2. Transect Name
3. Team Leader Name
4. Team Member Names
5. Trip Report

From any computer, access your email provider and send out a trip report to all the team leaders and related parties on the list of team leaders that you received at the beginning of the season.

Write the report following the format above which includes: team leader name, date, transect location, team members. Following these items, write a brief (about 2 paragraph) report on your day.

- Include any recommendations/details that you have for subsequent team leaders who will be going to this location

Send the email to all of the **team leaders** and/or to David Moskowitz <moskowitz_david@hotmail.com>. *If you send it to David only, please make sure to put “PLEASE FORWARD: Trip Report” as the subject line.*

The trip report can be done from home but please complete and send the report that day

to ensure important information gets passed on to teams that will be visiting the transect in the future.

CLEAN UP THE WORKSTATION

Once you are done with your data entry at SnoValley, return everything to the Rubbermaid tote and replace it for the next team leader. Pat yourself on the back and have a good rest of your day (evening/night)!

SnoValley Coffee

Website: <http://www.snovalleycoffee.com/>

Hours: Mon – Fri: 6:00 am – 8:00 pm

Sat – Sun: 7:00 am – 8:00 pm

SnoValley Coffee Company

7811 Center Blvd.

Snoqualmie, Washington 98065

Ph: (425) 396-0337

Remote Camera Trap Installation and Servicing Protocol

Citizen Wildlife Monitoring Project
2014 Field Season

Prepared by

David Moskowitz
Alison Huyett

This document available online at www.conservationnw.org/what-we-do/northcascades/resources-page-for-wildlife-monitoring-volunteers/

Citizen Wildlife Monitoring Project partner organizations: Conservation Northwest, I-90 Wildlife Bridges Coalition, and Wilderness Awareness School



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Field Preparation

1. Research the target species for your camera, including its habitat preferences, tracks and signs, and previous sightings in the area you are going.
2. Research your site, consider your access and field conditions. *Where will you park? Do you need a permit to park in this location? What is your hiking route?* Call the local ranger district office closest to your site for information on current field conditions, especially when snow is possible to still be present.
3. Know your site: familiarize yourself with your location, purpose of your monitoring, target species, and site specific instructions (i.e. scent application, additional protocols).
4. Review this protocol and the species-specific protocol for your camera trap installation, to understand processes and priorities for the overall program this year.
5. Coordinate with your team leader before conducting your camera check to make sure you receive any important updates.
6. Gather the supplies needed for your check and schedule the pick-up either from the nearest Conservation Northwest office or your team leader/members. Conservation Northwest contacts Seattle Office: Alison Huyett (Monitoring Project Coordinator) 206.675.9747 ext 201
7. Resources such as data sheets and protocols are available for download from our website at: www.conservationnw.org/what-we-

[do/northcascades/resources-page-for-wildlife-monitoring-volunteers/](https://drive.google.com/folderview?id=0B2I2IM4EW_OkZHNKLVNJd0dCR1U&usp=sharing) or from the CWMP Google Drive folder:
https://drive.google.com/folderview?id=0B2I2IM4EW_OkZHNKLVNJd0dCR1U&usp=sharing

8. Before going into the field, make sure you/your team members have a copy of this document as well as everything else needed on the equipment checklist.
Most important: keys for cable locks on cameras, fresh camera batteries and memory cards, lure, blank data sheet, pencil, maps, a GPS to find your camera/document wildlife sign, and a digital camera to document wildlife sign.
9. Ensure you review the camera technical tips and field manual for your camera, and if you have access to the camera conduct a mock set up.

Installing a Remote Camera Trap

(For the first time the camera is placed in the field for the season, or in case you move a camera trap)

Target Species Guidelines

Creating a remote camera trap involves more than simply attaching a remote camera to a tree with the appropriate settings. The components of a remote camera trap include: specific location of the camera based on knowledge and prediction of target species behavior and activity, camera settings, and found or imported attractants.

All remote camera traps set up for CWMP are designed to target a specific species and with specific research questions in mind. In some instances such as along Interstate 90, camera traps are installed to monitor general wildlife activity in an area. See the relevant species specific camera trap installation guidelines for details for your specific location (links below for online access to these documents).

Wolves: <http://www.conservationnw.org/files/wolf-remote-camera-trap-guidelines.pdf>

Grizzly bear: <http://www.conservationnw.org/files/grizzly-bear-remote-camera-trap-field-methods.pdf>

Wolverine: <http://www.conservationnw.org/files/run.pdf>

Canada lynx: http://www.conservationnw.org/files/lynx_detection_protocol.pdf

General consideration

These are some general considerations for installing a remote camera trap, which apply to general wildlife monitoring sets and for most applications for species specific traps.

Location: Find a location where wildlife will most likely pass by – a game trail, a location with tracks or sign, travel corridors (valleys, river corridors), and/or excellent habitat for your target species (i.e. dense forested cover for martens). Landscape features that tend to funnel wildlife movement and areas close to water may be good sites. Place the camera so that it is pointed toward this area. Avoid sites within 500 m of campsites or human sign, or 250 m of human trails if possible (*this may be difficult for some of the I-90 locations*). At a minimum select a site out of the line of site from major trails and/or roads.

Trail Sets: If setting up a camera to target a trail, try to aim it at a 45-degree angle to the trail (instead of shooting up or down the trail, or directly perpendicular to it). A 45-degree angle generally captures the best images. When setting a trail camera on a road or trail used by humans, besides using a lock box and python lock, consider trying to set the camera below or above head height to keep it out of the line of site of people. Setting it in a location that doesn't draw attention can also help with keeping it concealed from people.

Lighting: For best results, consider how the light may affect the photos. Shadows and light changes themselves can actually trigger the camera, but note that pointing the camera in a north-south direction often offers the best results when possible.

Visual obstructions and False Triggers: Look for a clear site or one that you can easily clear the camera's view if obstructed by branches, leaves, or brush – plan to use a knife or saw if needed in forested areas to clear the screen. Be diligent about removing vegetation in the camera's view, especially from the foreground, as it can produce false triggers when swaying in the wind or when the sun hits it and creates shadows.

Mounting Instructions: Attach the camera to the mounting tree, above eye level (or at chest level) and pointed downward toward the trunk of the other tree/feature that you are spreading lure on. Depending upon the camera model you have, use the laser or test feature (see details below) and other team members to help aim it at the right location. Consider the size of the animal species that you are targeting while aiming the camera. Point it low enough to capture smaller animals like wolverine and pine marten, while the placement of the actual camera on the tree is high enough to get a view of larger animals, like deer or bear, walking by in front of it. Most often, cameras are mounted with an error of pointing too high, so aim on the low side.

Once you have the camera in position, use bungee cords and/or other methods to secure the camera to the tree. Branches or nearby wood may be helpful to help tilt the camera downward to ensure the aim is correct. Anticipating spring snowmelt and changing conditions in many locations, this step may need to be repeated during future camera checks. **After camera is secure, place your lock around the camera or through the provided lockbox the camera is mounted in.**

Test Your Set: Most of our cameras have a test function in setup mode. Following your camera model instructions, place your camera in test mode. Have one person walk in front of the camera and look for the red flashing light. Test the range of your camera by walking back and forth. The red flashing light indicates where the camera catches an image. Some cameras have a viewer feature that will allow you to actually view the test images recorded. Use this feature if you have it, or you can use a standard digital camera to view images as well. Set up your camera and walk in front of it in the location you anticipate wildlife to travel. Then turn off the camera, remove the memory card and view the photos on your viewer or camera. Reposition as needed. **Be sure to replace the memory card back in the camera and turn it back on!**

Data Sheet: Record the GPS coordinates (use Datum WGS 84, lat/long coordinates) on your data sheet only if this is a camera install/move or they were

not previously recorded. Carefully fill out all of the other information requested on the data sheet. Include relevant notes on the location and accessing it for people who will be servicing the camera trap. A few photographs of the area and the approach might be useful for this as well.

Flagging: If needed to find the location surveyors flagging tape can be used to help mark the location but don't rely on it because it can disappear and there may be flagging out there unrelated to our project. **Be careful about placing flagging that could give away our camera locations for security reasons. Use your judgment as to whether flagging is necessary and where and how much to use.**

Scent Lures and Imported Attractants

Some CWMP remote camera traps utilize imported attractants including bait, scent lures, visual attractants, and auditory attractants. Guidelines for the specific types of attractants are outlined in the species specific protocol documents. Below are some general considerations relevant for all uses of scent lures and other imported attractants on CWMP remote camera traps.

General application of scent lures: Find two trees (or a tree and a rock, log or other feature the camera can be aimed downward at), about 10 feet apart; one tree that is both large enough to mount the camera on and sturdy enough that it won't sway too much in breezes. The other tree or landscape feature is for spreading the lure on and can be any size, but make sure it is large/sturdy enough though to withstand animals rubbing and leaning against it and that the camera is angled properly to aim toward that area. Apply the attractant at a height where the target species can inspect it.

Scent lure can also be attached higher on a tree trunk or overhanging branch where it will catch the wind and travel further, acting to draw in animals from a longer distance.

Trapper's lures: With the highly concentrated trapper's scent lures (those in small bottles) remember a little goes a long ways. Simply use a branch dipped into the bottle for application, and drop a few drops at the base of the tree. You can apply some to the bark of the tree as well and hang the "lure twig" there or insert it in the bark, but do remember moderation.

With fish oil, fish fertilizer, or oil from a sardine can, you can apply the scent more liberally by pouring some with the aid of a branch lower on the tree and also higher, creating an oil slick that will remain on the tree through rain events.

Aiming the remote camera: Placing the camera about 10 feet from the lure tree/feature (or even a little farther out depending on the angle of the camera) is best for most camera models to avoid cutting off or only capturing portions of

animals. Full view of an animal's features is often needed for sure species identification. Make sure that every place that an attractant is applied is within the view of the camera so that wildlife spending time sniffing are captured on the camera. Set the camera and then trigger it and review the images to be sure that the area within the photo frame is appropriate.

Handling scent lures: Because the scent lures are so powerful it is vital to keep them separate from the remote camera to avoid drawing attention to the camera itself. Bears in particular can destroy remote cameras. Have one person on a team carry and handle the lures and a separate person handle the camera. When traveling in bear country with carnivore scent lures, always carry bear spray. When camping with it, treat it like food and store it away from where you camp, ideally hung from a tree as with precautions for food in bear country.

Make sure to record the exact names of the lure(s) applied by your team on your data sheet. This information will be entered into our database to track the wildlife response to different lures.

Setting Two Remote Camera Traps in the Same Area

Most teams will have two remote cameras to deploy in their assigned area. Refer to the specific guidelines for spacing of these camera traps and considerations for variations between the two in the species-specific protocols for wolves, bears, and lynx. For wolverines, these two cameras are used in conjunction with each other at the same trap site (see wolverine specific protocol).

For general wildlife survey camera traps, as along Interstate 90, space your camera traps at least 1 kilometer apart and attempt to set up the two cameras in distinctive habitats. This will help increase the diversity of captured wildlife. Other considerations might include setting cameras on opposite sides of the interstate, setting one on a trail that clearly leads to the road or a culvert under the road, and a second in habitat a bit more distant from the road.

Servicing a Remote Camera Trap

Instructions for servicing a previously installed camera trap

Getting to Camera Site

1. Use the site write-up, maps, written directions, GPS coordinates and photographs of the area taken by the installation crew to locate your cameras. It might be helpful to take a copy of the data sheet from the installation and/or previous visit, which may have useful notes on it.
2. Be on the lookout for tracks, scat, or other wildlife sign on the way to the camera and if encountered, document per **Wildlife Sign Documentation Protocol** section (below).

3. Look for flagging along the route and near the actual camera location if your team has elected to place it,
4. If you move camera location for any reason be sure to follow all the relevant instructions for creating a new camera trap installation including recording the location on the datasheet you fill out.

Basic Overview of Camera Trap Check

1. Upon arriving, walk in front of the camera and trigger the motion sensor. This picture will verify that the camera is working and also serve as a reference if the date/time is incorrect (*make sure to record the actual date and time of the check on your data sheet so that we can match against the date/time on the photos when we download them in the office in case there is any malfunction with the camera date/time*). If the camera does not trigger, your batteries may already have died or your memory card is full.
2. Unlock the cable lock with your keys to access the camera.
3. Use the technical instructions for the appropriate camera model to replace the batteries and memory card, check/set up all of the camera settings (*Links to all models users guides is below and on our website. Hard copies of user manuals are made available to team leaders and stored in the office.*).
4. If applicable for your camera trap, apply lure and install bait according to your specific sites instructions (*Every site has unique directions, be sure to understand and follow yours*). Please remember that a very little amount of lure goes a long ways, and that too much long can deter animals. Their noses are much more powerful than ours. If you are applying bait you will receive specific instructions from our staff and/or advisory council on this. Do not apply bait at your site unless instructed.
5. **Carefully fill out the data sheet with all requested information.**
6. Arm the camera to take pictures before leaving the site. Be sure to step in front of the camera to be sure you capture a “camera check” image which will act as a reference for the survey period when the camera trap is next serviced.

After your Camera Trap Check

Email a brief report of your visit to your team leader. If there are any important news/findings, such as signs of a Level 1 species, problems with the camera or location, etc... contact your team leader immediately upon return and cc: alison@conservationnw.org and jwatkins@conservationnw.org If not critical, still please pass on any information about the site to your team leader. The next team will greatly benefit from a brief report, including site conditions, what you learned about animals in the area, topography, hazards, and any outstanding questions.

Team leaders will be the communication point between your team and Conservation Northwest.

Upload photos from retrieved memory cards to Google Drive (online photos sharing service) and fill out online data form (see instructions for both below). Or you have the option of returning the memory card(s) and data sheet(s) to your team leader or the nearest Conservation Northwest office ASAP, so that we can get the photos from your camera downloaded and reviewed and store the camera check information into our database. Mark on your data sheet how data is being returned, in case the images become separated from it.

Cameras should ideally be checked roughly each month throughout the season, depending on the camera location and accessibility. Your team leader will schedule checks to ensure that cameras are being checked regularly and lure refreshed at the camera location.

Review, tag, and upload photos from retrieved memory cards on online Google Drive (online photos sharing service) and fill out online data form (see instructions for both below). Email a brief report of your visit to your team leader and Alison Huyett (ahuyett@conservationnw.org). If there are any important news/findings, such as photos of the target species, problems with the camera or location, etc., contact your team leader and CNW immediately (ahuyett@conservationnw.org and jwatkins@conservationnw.org). The next people from your team checking the camera will greatly benefit from a brief report, including site conditions, what you learned about animals in the area, topography, hazards, and any outstanding questions.

Considerations for relocating a camera trap

Selecting a camera trap location, preparing the site and setting the trap can be labor intensive. Most of our target species have very large home ranges and even if they occupy the habitat where the camera trap is set, they may not return to it for weeks or even months. For both of these reasons once set, barring extraordinary circumstances, camera traps should be left in place for at least one month. Extraordinary events might include: large changes to the landscape where the camera has been set such as logging, fire, snow pack changes, increase in human activity in the vicinity, or compelling and time sensitive evidence of a much more promising location in the area being surveyed.

After one month, it is reasonable to assess whether or not to continue to monitor the specific area where you have set your camera trap or relocating it. Sites that have been very active with a variety of other carnivore species might encourage you leave the camera trap where it is currently located. Sets that have had a very low amount of activity might suggest that you relocate the camera. Other considerations could also include an abundance of other promising locations to monitor or conversely, the location where it is currently set still appearing to be the most promising option.

Remote Camera Data Sheet and Online Photo Submission

Photos should be processed following the guidelines in the Remote Camera Photo and Data Management Guidelines (available online at <http://www.conservationnw.org/files/field-team-photo-managment-guidelines.pdf>). Below is a synopsis of this process. Refer to full document for details.

Process Remote Camera photos: Review and tag photos in Picasa

1. Download Photos to your computer.
2. Open Photo Folder in Picasa (Under the “File” menu select “Add Folder to Picasa and navigate to the folder on your computer with remote camera photos”).
3. Determine if you have any series of photos taken by false triggers such as light changes, temperature changes, waving branches, etc. Delete all false triggers (carefully inspect images before deleting to ensure not missing something subtle). Sometimes these can number in the hundreds or thousands and we do not need to catalogue or store them. Note that you can select multiple photos at once to delete when in the screen with rows of thumbnails.
4. In Picasa using the “tags” feature (found in the lower right corner of the screen) to tag all photos with species ID using the labeling conventions guidelines listed at the bottom of this document. Note that you can tag multiple photos at once by selecting as many as you want to tag at once in the screen with rows of thumbnails than adding a tag. Follow guidelines for tagging photos in the [Remote Camera Photo and Data Management Guidelines](#).

Upload photos to Google Drive

5. Navigate to the folder on Google Drive labeled with the team leader name and camera location name, which should be set up for you already by Conservation Northwest. If this folder has not been set up you can create it and share it with wildlifemonitoringproject@gmail.com or you can send an email to Alison Huyett (ahuyett@conservationnw.org) asking for help setting up this shared folder. Once you have found this folder you can add it to “My Drive” on Google Drive so it is easy to locate in the future.
6. Each time you upload new photos from a camera check you will need to create a folder within the folder mentioned above for each camera you check (most teams will have two camera sites) within the above folder. The folder will need to be labeled as such:
Location_XXX (previous visit date)-XXX (current visit date)
Example: Mt. Rainier Camera #1_12AUG12-30AUG12
And for second site:
Mt. Rainier Camera #2_12AUG12-30AUG12
7. If applicable you can include a note in each camera folder (via word document or google text document) for any instances of runaway photo taking

from false triggers, or other relevant issues. Place this word document in the folder with the applicable photos

Other general field photos

Within the main folder for each camera location you will also find a folder (or can create one) named <General Photos>. Upload any relevant photos you take with your own digital camera of the site/route to site/wildlife tracks sign, etc. Within the “General Field Photos” folder create a folder for each time you head into the field. (**Example “Mt. Rainier site visit 8_30_12”**)

Label Photos as best you can prior to uploading into the folder and include a word document with additional details such as GPS coordinates of specific photos and route descriptions, etc as needed. Note that if you have the ability to add GPS coordinates and captions to individual photos metadata, CNW will be able to access this information.

Enter data into online Remote Camera Check Data Form

All data from each camera install, check, location change, and removal needs to be entered in the field on your Camera Data Deployment/Check form while in the field. Once you get home enter all data from field data forms into the online form: <https://docs.google.com/forms/d/1Vp8xGm7RneIGWBtL7SQXhJC9v8s3kFJS9cxiCzjRWJQ/viewform>. This data form needs to be filled out for each camera you install/check/remove every time you visit it!

Notify CNW once you have uploaded your photos

Once photos are completely uploaded to the shared folder, email wildlifemonitoringproject@gmail.com that photos have been uploaded.

CWMP Communications Protocol

Due to the potential social and political sensitivity of some species and the importance of this work being shared in a scientific and thoughtful manner, the Citizen Wildlife Monitoring Project has a Communications Protocol for all volunteers and staff of the effort.

All photos taken by cameras owned by the CWMP are owned by the non-profit organizations sponsoring this effort, and we strongly encourage that any cameras not owned by our effort but participating in it please follow this protocol as well.

- All photos taken by cameras and retrieved by teams are only released to people outside the program by one of the three program sponsor organizations or by an agency affiliated with our Advisory Council. *Volunteers are not to share their results with anyone outside the program directly.*
- Photos gathered off of a camera are sent in per the protocol above for review and decisions about communicating.

- If you feel you have captured a photo of your target species, or a unique photo that interests you – you can upload it to Google Drive and alert our staff to view OR email it directly to our staff. Photos can be emailed simultaneously to alison@conservationnw.org and jwatkins@conservationnw.org (to ensure that even if one of us is on vacation they are viewed).
- Selected photos are shared on our website, and results reported monthly in our volunteer e-newsletter. Requests for any photographs can be made through our program to alison@conservationnw.org or jwatkins@conservationnw.org
- Photos that need further identification or discussion are taken to our Advisory Council prior to any wider release, and we will notify you of the discussion and outcome.
- Any interaction with the media based on the results of a camera is decided upon by the host non-profit organizations, and shared with the Advisory Council.
- An annual report is prepared at the close of each season that will report on all results, and at that time all results, with the exception of details of camera locations, are public knowledge.

If any member of the press approaches you about the program, please re-direct them to our offices and staff.

Contacts for Remote Camera Work for 2014:

Project Coordinator: Alison Huyett, alison@conservationnw.org or 206-637-9747 ext 201; Project Director: Jen Watkins, jwatkins@conservationnw.org or 206.940.7914V

Wildlife Sign Documentation

It is not uncommon for the carnivores we are working on detecting to leave tracks or signs of their presence even if they do not trigger our remote camera trap. If you observe tracks, scat or other signs that maybe of one of our target species on your way to the camera or at the camera site, use these procedures for documenting the sign. This information may be useful for refining our camera trapping effort or as evidence in its own right of the presence of our target species.

Target Species

CWMP remote camera efforts focus on several different target species around the Pacific Northwest.

North Cascades and Northeast Washington: wolves, wolverines, grizzly bear, Canada lynx

Southern and Central Washington Cascades: wolves, wolverines

Interstate 90: Mammals larger than a snowshoe hare. Especially interested in observations associated with these species in relationship to their use of areas immediately adjacent to the highway, crossing the interstate or using crossing structures to travel under the interstate.

Documenting Tracks and Signs

See appendix for diagrams and further instructions.

Stop your companion(s) and bring tracks to their attention. Stop walking to prevent destroying tracks. Determine if you believe the tracks or sign in question could possibly be one of our target species. If so, proceed to documenting them. If not, carry on with your other activities.

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

If clearer identifiable tracks cannot be found, then ambiguous tracks, which could be one of our target species, should be documented with care. Unclear tracks that are clearly NOT the target species do not need to be documented. Photograph tracks, trail patterns, and other signs as per photo-documentation procedures below.

General consideration

Take multiple photographs to ensure you get a quality shot. Take at least one picture of the track that includes a card in the picture with:

- Date
- Location name
- Observer name
- GPS coordinates and map datum

Individual tracks

Take photo looking directly down on track to reduce distortion. Include two scales, preferably rulers, one running lengthwise, the second widthwise (Collapsible ski poles with cm calibrations showing also work).

Track patterns, trails, and 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. Also consider taking photographs of people looking at the tracks or sign, or pictures, which show the tracks in the context of the location they are found to accompany the detail photographs.

Trailing And Specimen Collection (Optional/Recommended)

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 target species' trail.
- To search for and collect specimens that can be used for DNA analysis (e.g. hairs or scats).

If you are able to locate and collect a genetic specimen related to tracks which you have photo documented, carefully collect the specimen following the same guidelines laid out for our camera traps which also include genetic specimen collection or our wolverine track documentation protocol

(http://www.conservationnw.org/what-we-do/northcascades/pdf-reports-and-forms/2010_wolverine-protocol-1).

Out Of The Field

Once you come out of the field contact Conservation Northwest for specific instructions on how to handle delivery of materials (photographs, specimens).

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/resituating remote cameras, hair snags, or follow up tracking surveys.

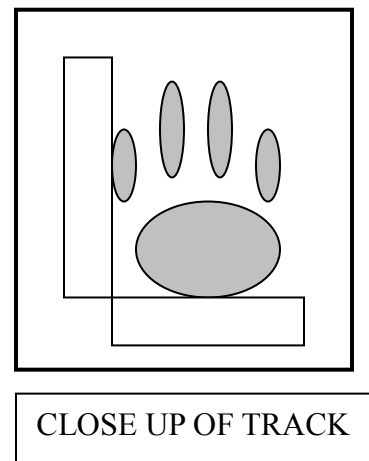
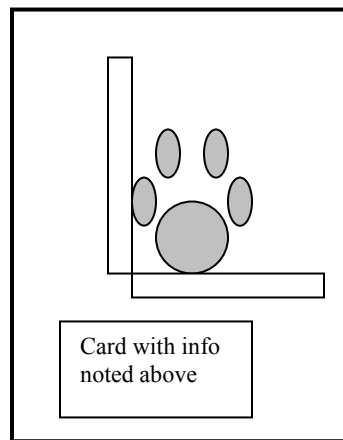
Acknowledgements

The field methods documented here represent the work of many individuals over the course of the years this project has been underway. Thanks much to all of the past CNW staff and project volunteers that have written, revised, or offered feedback on this and past versions of this document. A special thank you to members of the project's Advisory Council for lending their time to the continued development of our field methods.

Appendix: Track Photo Documentation Guidelines

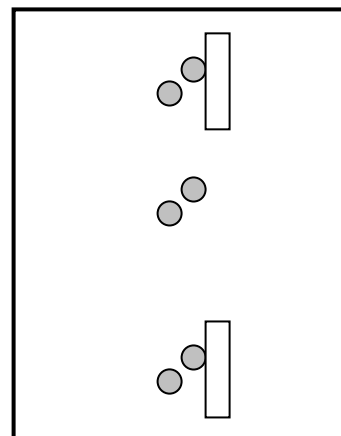
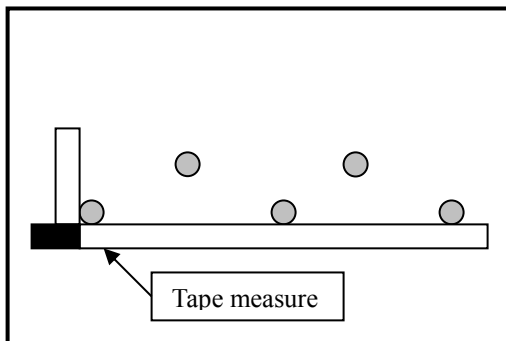
PHOTOGRAPHS OF INDIVIDUAL TRACKS:

6. Take photo looking directly down on track to reduce distortion.
7. For close up photographs, fill the entire frame with the track and measuring devices
8. Include two scales, preferably rulers, one running lengthwise, the second widthwise.
9. Take at least one picture of the track that includes a card in the picture with:
 - Site Name
 - Date
 - Observation Number
 - Team leader's name.
10. Take multiple photographs to ensure you get a quality shot.



PHOTOGRAPHS OF GAITS/TRAIL PATTERNS

3. 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).
4. 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.



PHOTOGRAPHING THE SETTING

Also consider taking photographs of people looking at the tracks or sign, or pictures which show the tracks in the context of the location they are found to accompany the detail photographs.