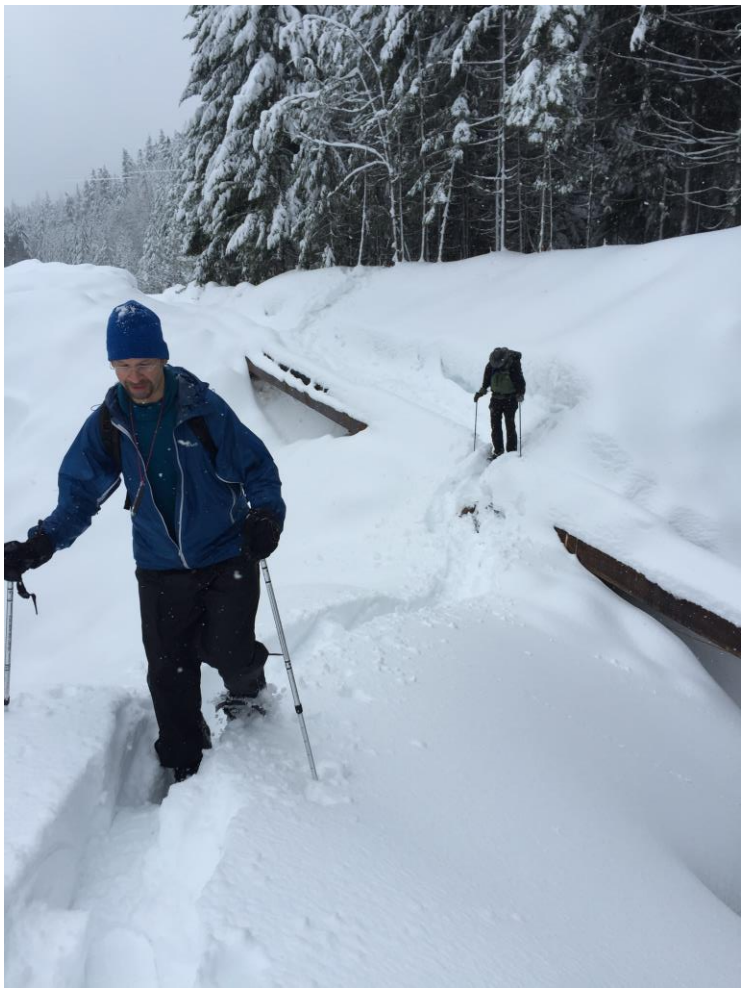
CITIZEN WILDLIFE MONITORING PROJECT

2015-2016 WINTER FIELD SEASON REPORT



June 2016

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Cover photo by Brooke Nelson, 2015-16 snowtracking team leader.

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

Conservation Northwest
Keeping the Northwest Wild

I-90
WILDLIFE BRIDGES
COALITION
SAFE PASSAGE
HYAK TO EASTON

WILDERNESS
AWARENESS
SCHOOL

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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 the Washington Cascades and other wildlands across Washington State and British Columbia. This report summarizes snow-tracking efforts for the winter of 2015-2016. This field season marked the tenth winter of snow-tracking along Interstate 90, east of Snoqualmie Pass.

Early copious snow that stayed on the ground through the start of March made for much better tracking conditions this winter than last. Conditions were characterized by deep powder snow for the first part of the season and heavy, wet snow often accompanied by rain in the latter part. Both sets of conditions offer tracking challenges by obscuring tracks and sign, but despite this, we were able to regain our standard number of transect visits for the season. All transects were visited at least 3 times this season. Construction around the Price-Noble transects forced the project to significantly alter how teams access these transects. Additionally, a potential new transect was scouted west of Snoqualmie Pass in conjunction with the Washington Department of Transportation. No high priority species were recorded.

This year we introduced new smartphone software for data collection in the field: Collector for ArcGIS. After initial rollout glitches, the software made it possible for teams to collect and upload data regardless of phone connectivity and to associate photos with observations. Team leaders also participated in a professional evaluation and certification of their wildlife tracking skills as a part of our ongoing assessment of observer reliability.

PROJECT OVERVIEW

The Cascades Citizen Wildlife Monitoring Project (CCWMP) is a joint project led by Conservation Northwest, I-90 Wildlife Bridges Coalition, and the Wilderness Awareness School. The program utilizes remote cameras year-round to document rare and sensitive species throughout core areas in the Cascades, as well as for more common species in strategically important locations. During the winter months, trained CCWMP volunteers use snow tracking to monitor the presence, location, and movement of wildlife near proposed wildlife crossing sites east of Snoqualmie Pass along Interstate 90 in the Washington Cascades. Since its inception, CCWMP has remained an asset to wildlife agencies and professionals by providing supplemental monitoring efforts in areas identified as either potential core habitat or vital connectivity corridors between core habitats for some of our region's rarest wildlife. Our main project objectives are:

1. To engage and educate citizens about the detection and monitoring of sensitive wildlife species and in critical habitat areas;
2. To record wildlife presence in the I-90 corridor and along the I-90 Snoqualmie Pass East Project in strategic locations and in core habitat through remote cameras and snow tracking;
3. To record the presence of rare and sensitive species that regional and national conservation efforts aim to recover including fisher, gray wolf, grizzly bear, lynx, and wolverine;

4. To facilitate the exchange of information about wildlife, including data from monitoring efforts, between public agencies, organizations, and interested individuals.

CCWMP 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 winter portion of CCWMP is focused on snow-tracking along a 15-mile corridor on I-90 and providing data for the I-90 Snoqualmie Pass East Project. The I-90 Snoqualmie Pass East Project is a 15-mile highway improvement project that includes measures for connecting wildlife habitat, such as the 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 snow-tracking season.

A complete description of the Citizen Wildlife Monitoring Project's goals and methods, as well as a record of previous season reports, is available online at www.conservationnw.org/monitoring.

METHODOLOGY

Study Area

Snoqualmie Pass (3022 feet, 921 meters) is the lowest pass in the Washington Cascades. Interstate 90 traverses the pass from west to east as a divided highway with two to four lanes of traffic in each direction throughout the study area. A large downhill ski complex sits at the summit of the pass, along with associated human infrastructure. A few miles east of the pass, a large irrigation water reservoir on the headwaters of the Yakima River fills much of the valley bottom. The human footprint at the pass along with the high speed and heavily trafficked interstate highway makes Snoqualmie Pass the most tenuous wildlife corridor in the Washington Cascades. Ongoing reconstruction by the Washington Department of Transportation on Interstate 90 east of Snoqualmie Pass has been designed to improve road safety for motorists and increase the permeability of the road for wildlife.

Field Methods

CCWMP employs trained volunteers to walk transects adjacent to the interstate and track wildlife. Set transects are monitored three times over the course of the winter on average and are established at locations where crossing structures either exist and are being improved or have been targeted for installation. Transects run parallel to the highway about 150 meters from the roadbed. Field teams document tracks and signs of any mammal species larger than a snowshoe hare found along the route. At least one set of tracks is trailed on each transect per visit in an attempt to document the animal's relationship to the interstate. Observations are photo-documented in the field and all photos are reviewed by expert observers out of the field to assess observer reliability. All species of high conservation value are thoroughly documented, including photo-documentation, to ensure the accuracy of identification.

RESULTS AND DISCUSSION

Summary of 2016 Transect Data

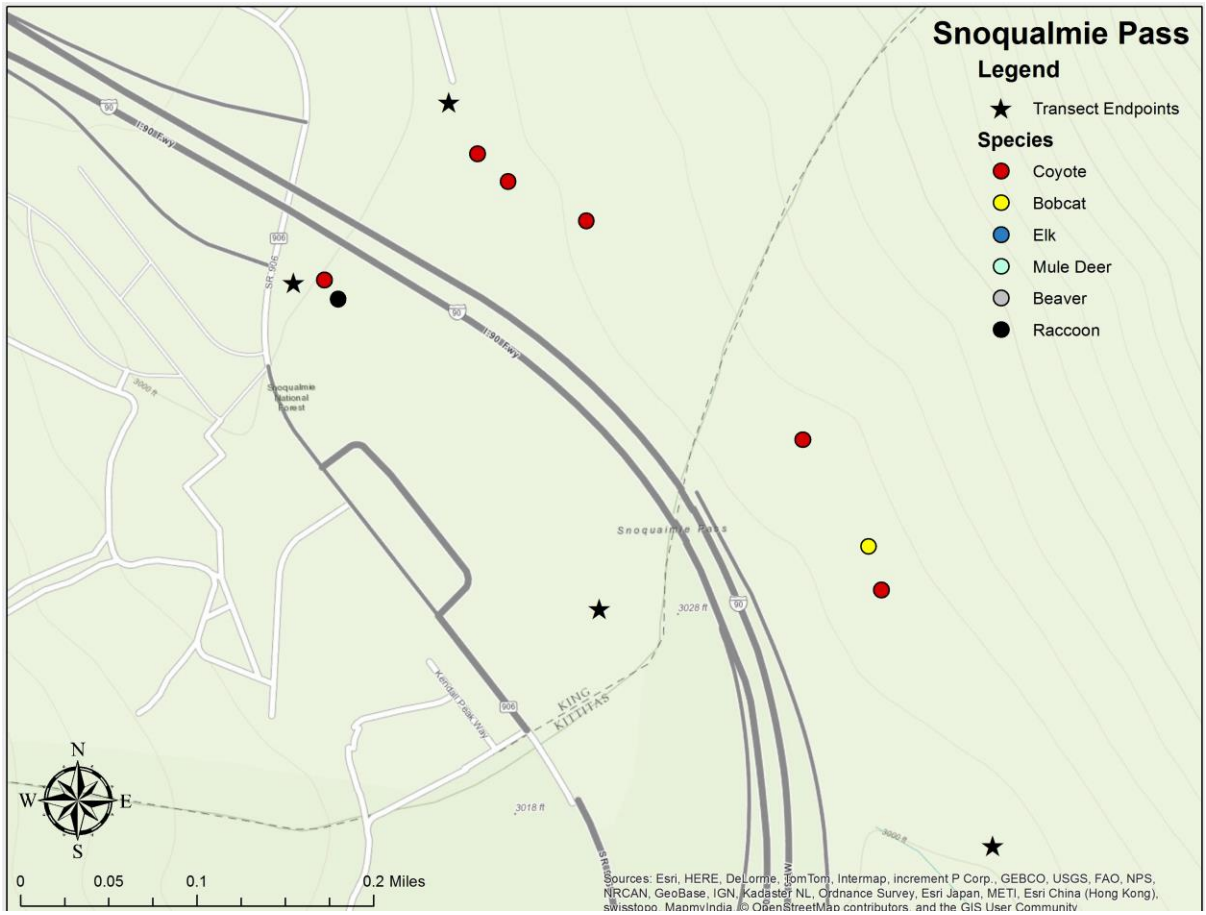
All transects were visited at least three times over the course of the winter. However, the northern portions of the Price-Noble West and Price-Noble East transects were only completed twice due to access challenges created by ongoing construction at these locations.

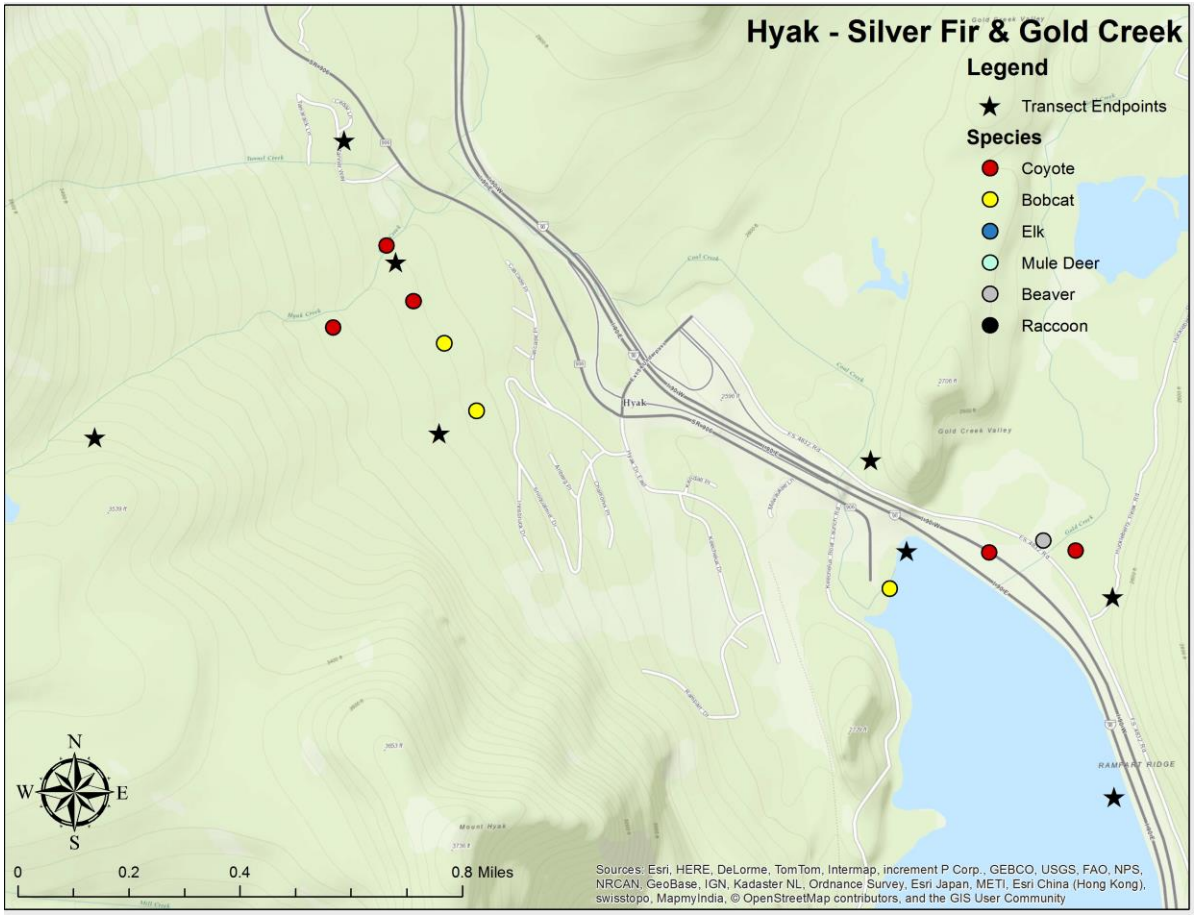
This year we had 80 detections of sign across all transects, representing 6 species. Ambiguous sign accounted for 32.5% of all detections. Tracks composed 97.4% of sign, and scat composed the remaining 2.6%. As in years past, coyote represented the largest number of detections (38.8%), and was found at Hyak and all five transects along the interstate on both sides of the highway. Bobcat composed 18.8% of detections at Hyak and all five transects along I-90, but was only detected on both sides of the highway at Easton Hill. Elk was detected twice at Easton North. Mule deer was detected once at Price Noble East North. Beaver was detected on two transects, but only on one side of the highway. Raccoon was detected at Snoqualmie Pass South (Table 1).

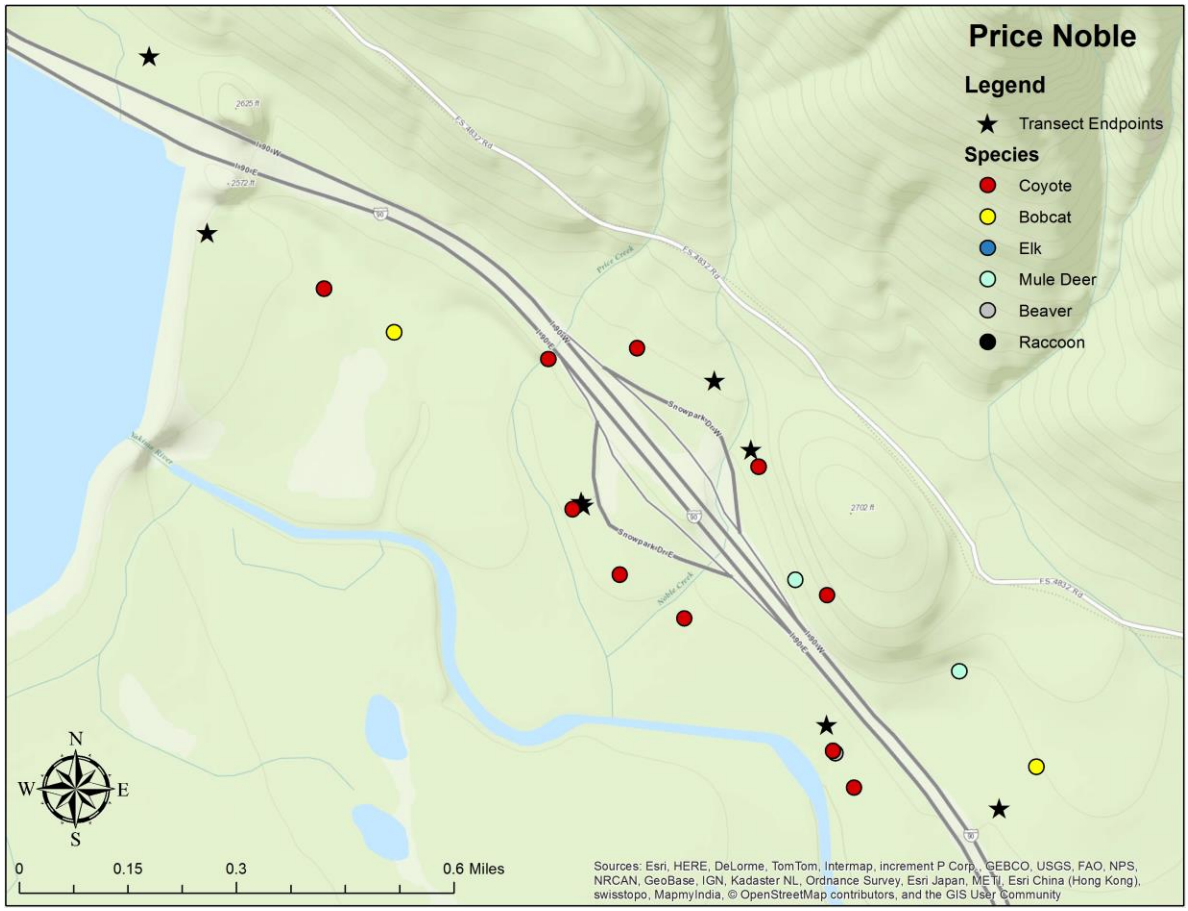
Transect Data

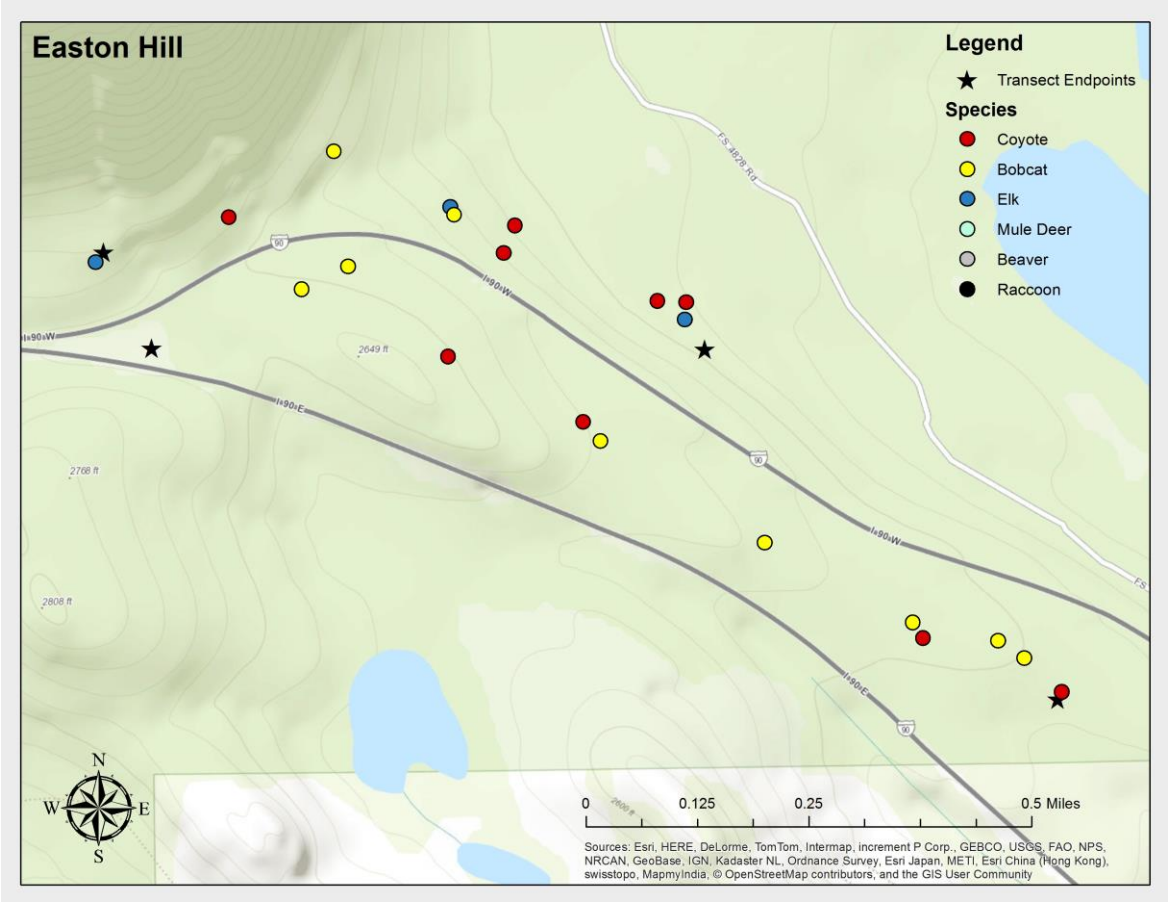
Transect	Coyote	Bobcat	Beaver	Elk	Mule Deer	Raccoon
Silver Fir Hyak	X*					
Silver Fir Side Hill	X*	X*				
Snoqualmie Pass North	X*	X				
Snoqualmie Pass South	X					X
Gold Creek North	X		X			
Gold Creek South	X	X*				
Price Noble West North	X					
Price Noble West South	X	X				
Price Noble East North	X	X			X	
Price Noble East South	X		X			
Easton North	X	X*		X*		
Easton South	X*	X				

Table 1. Species detected along each transect at least once, '*' denotes sites and species that had associated trailing data.


Snoqualmie Pass
Legend
Transect Endpoints
Species
Coyote
Bobcat
Elk
Mule Deer
Beaver
Raccoon
I-90/E Wy
SR 906
Snoqualmie National Forest
Snoqualmie Pass
3028 ft
KING
KITTITAS
Kendall Peak Way
3018 ft
N
W
E
S
0
0.05
0.1
0.2 Miles
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Hyak - Silver Fir & Gold Creek
Legend
Transect Endpoints
Species
Coyote
Bobcat
Elk
Mule Deer
Beaver
Raccoon
Hyak
Gold Creek Valley
RAMPART RIDGE
N
W
E
S
0
0.2
0.4
0.8 Miles
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Price Noble
Legend
Transect Endpoints
Species
Coyote
Bobcat
Elk
Mule Deer
Beaver
Raccoon
N
W
E
S
0
0.15
0.3
0.6 Miles
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



Summary of Trailing Data

There were 11 trailing events recorded this year, with two following ambiguous sign. A pair of coyotes was recorded using the Gold Creek underpass. No definitive highway crossings at other sites were detected, though three trailing events recorded animals moving towards and then away from I–90. The remaining five trailing events did not report activity associated with trying to cross or enter I–90.

Observer Reliability

This winter we continued to evaluate the observer reliability of our team leaders in snow track identification. Photographs of tracks positively identified in the field by team leaders were evaluated by two experts out of the field. Results from this were similar to the previous five seasons. No definitive errors were identified while it was impossible to confirm or refute the identification of about 15% of the photos submitted due to the quality of the photographs and the tracks documented. Over the past 6 years, with the evaluation of over 200 data points, the project has a definitive error rate of less than 1%. We will be carrying out a full analysis of this part of the study with results available within the next year.

Additionally, a sample of current and former team leaders participated in a professional evaluation and certification process for track and sign identification and interpretation through Cybertracker Conservation International. Eight team leaders were evaluated in January of 2016

over the course of two days at various locations within the study area by project leader David Moskowitz, who is also a sanctioned evaluator for this international certification program. All eight team leaders received a Level III certification, which reflects a high degree of accuracy in the identification and interpretation of a wide range of tracks and sign (Cybertracker 2016), generally consistent with the level of skill required for consistent data collection for wildlife research. Data from this evaluation will be used in conjunction with the photographic evaluation of field observations to enhance our analysis of the project's observer reliability. Our initial assessment continues to be that the reliability of our volunteer observers is exceptionally high.

Hyak/Silver Fir Transect

This year marked 10 seasons of data collection on the Hyak-Silver Fir transect, the project's only off-highway sample location. Construction of additional ski hill infrastructure began there 5 years ago which has significantly altered the transect location in terms of developed infrastructure and increased human use in winter. The initial impetus for monitoring this site was to assess wildlife use of the location due to proposed development. With five years of pre-development and five years post-development, an initial analysis of data from these surveys was carried out and is summarized here.

Development Summary: In 2007, a Memorandum of Understanding (MOU) was signed by environmental groups and Sky Lifts Inc., operators of the Summit East ski runs (Summit at Snoqualmie 2007). The MOU agreed to construction in the area but deferred construction of an additional lift and crossover trail until mitigation, wildlife studies, and scientific review of those studies could take place. Since that time, ownership of the area has changed hands, making the MOU outdated. In 2010, construction began on the plan that was signed in 2007. In 2011, access to the back side of Summit East opened with the completion of the "Hidden Valley" ski area. A new Silver Fir lodge opened in 2014 and the Rampart Quad chair lift was completed in 2015. The Rampart chair is advertised as giving skiers access to "glade skiing" or off-trail, forest skiing. This brings the count of new ski lifts in the area to four in the last six years. In addition, the Nordic Center reopened in the area several years ago, making 50 kilometers of backcountry accessible to cross country skiers via groomed trails (Summit at Snoqualmie 2016, 2016a).

Transect Data: Prior to the addition of the SnoPass transect in 2014, the Hyak-Silver Fir location was the only transect where American marten was detected in the study area. American marten has been identified as an indicator species for a variety of ecological evaluations of late successional forests and landscape connectivity in the Washington Cascades (see below). Perhaps the most interesting finding from the analysis of 10 years of data is the apparent decrease in the detections of this species on this transect.

Since species can be present even when they are not detected during a visit, it is important to assess the probability that a species is not there when you did not see it. This is especially true for rare, infrequent and difficult-to-detect species. To calculate sighting rate, a non-parametric equation to test for sighting probability (Solow & Roberts 2003) was used. *[(year of most recent sighting- year of second most recent sighting) / (year of most recent sampling event - year of second most recent sighting)].* This equation calculates the probability that a given species will be sighted given another sampling event.

For Hyak, 2011 was treated as the first sampling year after development (ski hill expansion,

rather than highway construction) which started in 2010. Thus for species with more than one observation, a sighting probability was calculated by calculating two sighting rates: 2003-2011, and 2011-2016. For Mule deer, since there was only one sighting after 2011, the overall sighting probability was calculated as the "post-development" sighting rate. A species was considered sighted if it was definitively identified at least once during a sampling year. River Otter only had one sighting through the entire pre and post construction period, so a sighting probability was not calculated for it. See table 2 for results.

Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	pre-development	post-development	overall
Bobcat					1					2			1
Coyote	3		4	6	10	11		2		4	1	1	
Marten	6		1		6						1	0.286	
Mule Deer		2				3							0.5
Raccoon	1			1	1		1		2		1	0.667	
River Otter			1										
Total Species	3	1	3	2	4	2	1	1	1	2			

Table 2 Detection history by year and sighting probability pre- and post-construction of new ski hill infrastructure in the Hyak transect vicinity.

Detection probability for marten decreased by 40 % from pre-construction to post construction, which is by far the strongest decrease for any species. In comparison, detection probability for coyote and bobcat did not change. The fact that detection probability rates for coyotes and bobcats did not decrease further suggests that the decline in marten detections may actually be significant.

It is difficult to determine the significance of these results, because a similar control site where no construction activities were carried out was not sampled. Possible explanations for the decrease in sighting probability are construction, poor snowpack, or a combination of the two. It is worth noting that being the highest elevation transect within the study and having a generally northern aspect, the Hyak-Silver Fir site has had the most consistent snow coverage of any of our transects across the entire duration of the study. Others have found that the simplified forest structure and forest openings modify, and typically reduce the use of these areas by American marten (Moriarty et al 2015) while ski hill development has been shown to alter small mammal populations in ways that could be negative for American marten (Hadley 2004). Our

finding of a reduced detection probability for marten in the Silver Fir site is consistent with these findings.

The American marten has been the focus of recent research evaluating landscape connectivity on National Forest lands east of the Cascade Crest. This research determined that Snoqualmie Pass is acting as a barrier to connectivity for this species north and south of the Interstate (Gaines 2010). The Silver Fir-Hyak site is primarily covered with late successional subalpine forest, generally considered ideal habitat for American marten but is isolated from adjacent patches by ski runs and ski hill infrastructure. Within this context, our findings of a reduction in detection probability at a location close to the Interstate maybe an indication of continued degradation of this corridor for American marten.

This forest patch is ideal marten habitat, apparently some of the closest such habitat south of Interstate 90 on or east of the Cascade Crest. If human disturbance in the form of increased winter recreational infrastructure and activity are contributing to the decline in use of this habitat by American marten it would represent a significant problem for numerous ongoing efforts to maintain or increase the permeability of this important wildlife corridor in the Washington Cascades. Put in the context of climate projections that will add further stresses to this landscape bottleneck for montane wildlife species such as the American marten, it is of even greater concern. Project leadership will be talking with advisory committee members and reviewing recent and ongoing research efforts on this subject to determine what sort of follow-up analysis and continued data collection, if any, may be warranted on this subject.

Denny Creek Pilot Transect

This year CWMP engaged in a pilot survey of a location along the interstate west of Snoqualmie Pass in collaboration with the Washington Department of Transportation Habitat Connectivity Biologist Kelly McAllister. Students with Wilderness Awareness School's Wildlife Tracking Intensive assisted in a single-visit pilot survey at a site near exit 47, the Denny Creek exit off I-90. During this visit students recorded sign of two coyotes and a deer entering and crossing Eastbound I-90. Access to this potential transect is straightforward, with a parking area at Exit 47 on National Forest road 9034. Travel through the forest follows the campground road and the South Fork of the Snoqualmie River east to a spur off National Forest road 5800. The forest south of I-90 was not surveyed, but could potentially be accessed from the Annette Lake Trailhead. It appears that this would be a plausible location to survey as a part of CCWMP's winter work if there is interest in monitoring this location as a component of WSDOT's evaluation of permeability issues on this part of the interstate.

Citizen Science

This year the number of transects completed and the amount of volunteer effort was significantly greater than last year, and on par with other years of the project with a consistent snowpack in the study area throughout the season. This field season, nine volunteer team leaders worked with an additional 34 volunteers to carry out 25 transect surveys. Six of nine team leaders have been with the project for many years, as have a number of the projects general volunteers. This level of experience has contributed to the ongoing success of the project and the ability of the winter field season to run smoothly with limited input from paid project managers.

Total CCWMP volunteer hours for the winter season added up to 1675, including 80 hours contributed to project leadership and management. Paid staff hours for the season were approximately 170, making nearly a 10 to 1 ratio for the amount of volunteer to paid effort for the project. This is consistent to prior years of the project.

RECOMMENDATIONS FOR NEXT FIELD SEASON

1. Investigate the recent and ongoing research efforts in regards to American marten presence in the Silver Fir/Hyak area and determine whether to continue monitoring these transects in relationship to questions about the use of this habitat by American marten.

2. Continue to explore the possibility of adding a transect on the west side of the pass in conjunction with WSDOT. This may include a pre-season route-finding visit.

3. Continue to explore improved ways of accessing the Price Noble North transects while recommending team leaders access the transect at the center and then proceed to cover both the east and west sections. Consider splitting the Price Noble North transects into two visits.

4. Create documents to advise team leaders with either iPhones or Android on the processes for using Collector, step by step. Explore ways to help increase the length of trailing segments recorded by teams in the field.

5. Advise team leaders and volunteers that they need to bring calendars and to be prepared to choose transect dates at the volunteer training. Include availability questions and information in interviews for future new team leaders.

6. Explore interest from WSDOT to have non-snow season tracking at the Keechelus reservoir.

ACKNOWLEDGEMENTS

We appreciate supportive grants from Icicle Fund, the WDFW ALEA Cooperative Grants Program, and The Orvis Company. Once again, SnoValley Coffee in Snoqualmie, Washington generously stored our field equipment and offered an excellent meeting location for our field teams for the duration of the season. We thank individual advisory council members, and project collaborators for the talent, time, and guidance they provide to the project (see Appendix 1 for a complete list of our advisory council members).

Most importantly, we are grateful for our volunteers, whose hard work and commitment to quality in and out of the field made this season possible. Without the ongoing volunteer commitments of Mallory Clarke and Adam Martin the quality of this project would be impossible to maintain.

Team Leaders: David Snair, Joe Kiegel, Mallory Clarke, Adam Martin, Brian Booth, Evan Adkins,

Brooke Nelson, Annabel Brennan, Andrew Stratton, Brooke Nelson.

Team Members: Clarissa Allen, Laurel Baum, Joe Cartwright, Matt Christian, Jack Payne Cook, Bob Cox, Lindsey Desmul, Tricia Enfield, Tyler Fink, Carol Gnojewski, Jonathan Goff, Kira Gordon, Erik Hagstrom, Kathryn Hansen, Michael Hauptvogel, Tori Henderson, Zack Hewell, Sarah Hirnyck, Brett Hunter, Lindsey Juen, Juliet Kiester, Robert Marino, Makie Matsumoto-Hervol, Stephen Miller, Shayne Noble, Emily Pixie, Kelly Ryan, Guthrie Schrengohst, Caroline Snijder, Becky Snijder, Sarah Stewart, Austin Werts, Matthew Zoba, and Paul Zoba.

We have many volunteers and active supporters who contribute their time and expertise in various ways throughout the course of the program and the potential to miss people ever looms. Thank you to any we have missed!

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Appendix I: Advisory Council

(Including specific site advisors and project collaborators)

We thank the individual advisory council members, specific survey area advisers, and project collaborators for the talent, time, and guidance they provided:

Jocelyn Akins (Cascades Carnivore Project), Keith Aubrey (USDA Forest Service, PNW Research Station), 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 (formerly Western Transportation Institute, Woodland Park Zoo), 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), 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), Regina M. Rochefort, Ph.D. (North Cascades National Park), John Rohrer (Okanogan-Wenatchee National Forest), Jay Shepard (WA Dept. of Fish and Wildlife), Joan St. Hilaire (Okanogan-Wenatchee National Forest), David Volsen (WA Dept. of Fish and Wildlife), Aja Woodrow (Okanogan-Wenatchee National Forest), Don Youkey (Okanogan-Wenatchee National Forest), and Josh Zylstra (WA Department of Transportation).

Appendix II: Species Priority List

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 because 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 Level 2 species present on the transect.