

CITIZEN WILDLIFE MONITORING PROJECT

2017-2018 WINTER FIELD SEASON REPORT



May 2018

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Cover photo: Team leaders from the project discuss a set of American marten tracks during a training at the start of the winter. Photo by David Moskowitz.

Partners: Conservation Northwest, Wilderness Awareness School



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Executive Summary

The Citizen Wildlife Monitoring Project (CWMP) 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 2017-2018. This field season was the twelfth winter of snow-tracking along Interstate 90, east of Snoqualmie Pass.

This winter was marked by a consistently good snowpack that lasted through March allowing transects to be completed from late December to mid-March. With the permanent addition of a transect west of Snoqualmie Pass and our second season of off-highway American marten track surveys, the project completed one of its busiest field seasons on record.

Project Overview

CWMP is a joint project led by Conservation Northwest 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 CWMP 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, CWMP 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.

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 winter portion of CWMP 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 Phase 1 of the I-90 Snoqualmie Pass East Project has been started with funding from the Washington State Legislature and completion is projected for the end of 2018. Near the Gold Creek transect, an underpass in this first phase section is now being used by wildlife. Construction in phase two has begun and includes an overpass near the Price Nobel transect. Construction activities were not active during the snow-tracking season.

In the past two years, CWMP has expanded its winter survey effort in the vicinity of Snoqualmie Pass. Track surveys for American marten north and south of Interstate 90 are an effort to better understand the range of this species and impact of the highway and human development on the connectivity of their population. The establishment of a new transect west of Snoqualmie Pass along the interstate, in conjunction with WSDOT is designed to begin to understand the current status and needs for improvement of landscape permeability along this stretch of the interstate.

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 <http://www.conservationnw.org/our-work/wildlife/wildlife-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

CWMP employs trained volunteers to walk transects adjacent to the interstate and document the tracks of wildlife. Set transects are monitored three times over the course of the winter on average and were 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.

American marten surveys are not along prescribed routes. Rather, general locations are assigned to a field team to survey. These survey areas are based on an attempt to fill in a more complete picture of landscapes currently occupied and unoccupied by the species adjacent to the highway corridor. This information will hopefully help identify the closed points of linkage for northern and southern populations and obstacles to connectivity for them. A route is selected based on access considerations and how to best cover the area. Teams record a GPS track of the route they take so that the project can track locations that have been surveyed and the amount of effort. Teams record tracks of American marten when they are detected as per the project protocol for on-transect surveys.

Results

Summary of 2018 Transect Data

During the winter field season 62 species detections were made across all 10 transects, 41 detections (66 %) were identified to species (8 species total, Figure 1) and the remaining 21 were ambiguous. Across detections, 33 were travelling parallel to roadway, 7 away from the roadway, and 14 towards the roadway. The remaining 7 had an unknown relationship to the roadway. Only a single level-one species was detected, a cougar at Price Noble. Two

level-two species were detected. Mule deer were found at Denny Creek and elk were found at Denny Creek, Price Noble, and Easton. It is notable that these observations were of sign other than tracks that could have persisted from the fall. It is not clear that there was any activity of either species during the winter within the study area. For detailed maps of detections for each transect site see Appendix A. Similar to past years, coyote and bobcat comprised most of detections made to species (45%).

As in years prior, Price Noble and Easton Hill remain the most species rich and species diverse of the five transects (Table 1), though this may be due to higher detection rates east of the crest, possibly due to better snow track quality (Table 2). Snow track quality (STQ) is recorded each visit with detections, and while we don't collect snow track quality during visits with no species detections, it serves as a general correlate for the ability to accurately detect and identify tracks. STQ scores of 1 denote snow conditions where all track features are obscured, and identifications are made primarily through track patterns of incomplete track sets (gaits), while STQ scores of 4 denote snow in which fine detail of individual tracks can be accurately identified and every track registers. All detections at Denny Creek, the lowest and westernmost transect, were made from scat identifications, and visits were free of snow multiple times. Thus, the odds of not detecting species that were present are much higher.

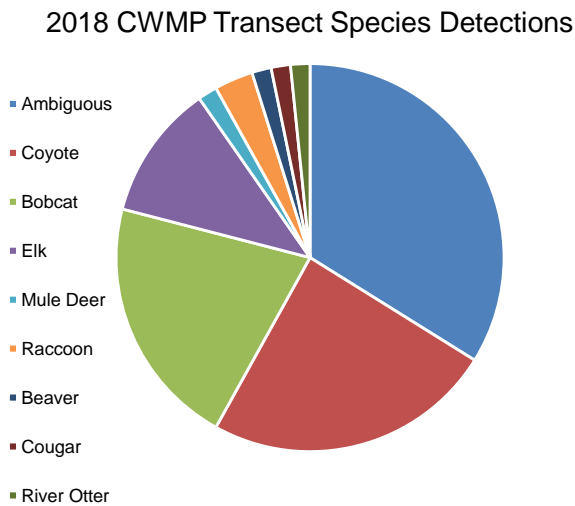


Figure 1. Total detections by species at all five transect sites on I-90 at Snoqualmie Pass during the 2018 winter monitoring season

Table 1. Distribution of species detections at the five transect survey sites during the 2018 winter monitoring season.

Species	Denny Creek North	Denny Creek South	Snoqualmie Pass North	Snoqualmie Pass South	Gold Creek North	Gold Creek South	Price Noble North	Price Noble South	Easton North	Easton South	Grand Total
Ambiguous			1	1	1		2	4	3	5	21
Coyote			3	2	1		1	2	2	4	15
Bobcat			1		1		4		5	2	13
Elk	1	2					2		1		7
Raccoon			1	1							2
Mule Deer		1									1
Beaver					1						1
Cougar							1				1
River Otter						1					1
Grand Total	1	3	6	4	4	1	10	6	11	11	62
Species Total	1	2	4	3	4	1	5	2	4	3	9

Table 2. The number of detections in four categories of snow track quality (STQ: 1 – lowest snow quality, 4 – highest snow quality) at each of the five transect survey sites.

Transect	STQ				
	1	2	3	4	NA
Denny Creek					3
Snoqualmie Pass North		3	3		
Snoqualmie Pass South		2	2	1	
Gold Creek North	3	1			
Gold Creek South		1			
Price Noble North	2	2	4		4
Price Noble South	3	2	1		
Easton North	2	4	3	2	2
Easton South	1	4	4	1	2

Summary of 2018 Trailing Events

In 2018 there were 6 trailing events. No trailing events were recorded at Denny Creek transect. At Snoqualmie Pass transect a bobcat was trailed on the North side of the highway going parallel to the roadway and no crossing behavior was detected. At Gold Creek a bobcat was trailed on the North side of the highway and a river otter on the south side of

the highway, entering the creek. No crossing behavior was detected on either side of the highway. At Price Noble a coyote was trailed on the south side of the highway foraging and heading towards Keechelus lake. No relationship to the road was determined. A cougar was trailed on the North side of the highway, but no relationship to the road was established. Finally, a bobcat was trailed at Easton transect on the North side of the highway moving parallel with the road way. No crossing behavior was detected. See Appendix B for maps of trailing events.

Summary of 2018 American Marten Surveys

This year six surveys for American marten were completed (Appendix C). Three surveys were on the North side of the highway (Amabilis Mountain, Keechelus Ridge, and Kendall Lakes), two on the South side (Hyak Lake, Twin Lakes / Mount Catherine) and one in forest between the highway's east and west lanes (Denny Creek). American Marten were only detected on the North side of the highway at Keechelus Ridge and Kendall Lakes.

Citizen Science

The Citizen Wildlife Monitoring Project completed a total of 6 marten surveys and 24 winter tracking transects along the I-90 corridor between December 31st and March 18th. This year we had an increased number of total volunteer transect days and volunteer hours, including some much needed flagging maintenance that was completed on the transects prior to the start of the season. A total of 49 volunteers logged 815 volunteer hours in the field, over 29 field days.

Volunteers spent fewer hours on administration and entering data sheets manually, thanks to increased efficiency provided by use of a mobile phone app that is able to synchronize our data from the field and be saved online. General tasks have become more efficient as well, as we continue to conduct meetings as conference calls and returning volunteers continue to strengthen the expertise of the project. Our long-term partnership with the Wilderness Awareness School has provided consistently high quality wildlife trackers as our team leaders for the project, helping to maintain the reliability of the data collected.

Table 3. Summary of winter 2017-2018 volunteer participation hours

Number of Volunteer Team Leaders	10
Number of Volunteers Team Members	39
TOTAL PROJECT VOLUNTEERS	49
Number of Transect Field Days	29
Number of Transect Volunteer Days	107
Winter Training Team Leader Hours	215

Winter Training Team Member Hours	280
Project Leadership Volunteer Hours	25
Transect Volunteer Hours	815
TOTAL VOLUNTEER HOURS	1335

Discussion

The results for this year's field season were relatively unremarkable in comparison to past seasons in regards to species detections and locations. Perhaps most interesting is the growing picture of American marten presence and absence being painted by project survey efforts which continue to align with prior survey efforts by others which suggests there is either limited or no connectivity between populations north and south of the interstate.

The lack of definitive evidence of either mule deer or elk using the study area likely reflects the deep and persistent snowpack from this winter in the study area. In the past, low snow years have been associated with greater activity recorded for these species in the study area.

There were several notable errors in species identification made in the field by teams which were detected and corrected by expert review of images after the field season. This suggests the need for both continued attention to recruiting and maintaining well trained observers. It also suggests the current methods for documenting tracks allows for the skill of field observers to be augmented by out of the field expert assistance.

Recommendations for Next Field Season

1. American marten surveys: Continue to carry out these surveys next year. Create a summary of areas we have surveyed and refine locations to be focused on for next year.
2. Avalanche Hazard: Because American marten surveys can take place in a wide variety of geographic locations off of Snoqualmie Pass, including potentially areas with avalanche hazards not experienced on any of our near-highway transects, the project should develop a system for identifying and mitigating or avoiding these hazards for teams carrying out these surveys. This plan will be developed during the off-season and introduced for the coming field season.
3. Marten survey area access: Surveys conducted by a project team leader who is also a trip leader for the Mountaineers, a climbing club, allowed for access to terrain that would have been harder to access by general volunteers. Consider a more formal exploration of how to tap into this potential pool of volunteers for future surveys.
4. Flagging: Preseason flagging prior to snowfall was effective in preparing for the field season. Setting up volunteer crews to do this in September or October might allow for better weather for these outings.
5. Observer Reliability and Snow Track Quality: Finish a thorough review and write up of observer reliability from this project and how this relates to observer experience and snow track quality.

Acknowledgements

We appreciate supportive grants from WDFW ALEA Cooperative Grants Program, Norcliffe Foundation, Deacon Charitable Foundation, Lucky Seven Foundation, and an anonymous foundation that supported CWMP in 2017. This project would not be possible without your generous support. The North Bend Branch of Starbucks Coffee 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). This year we would like to thank Glen Kalisz for his recommendations and help establishing the Denny Creek North Transect.

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

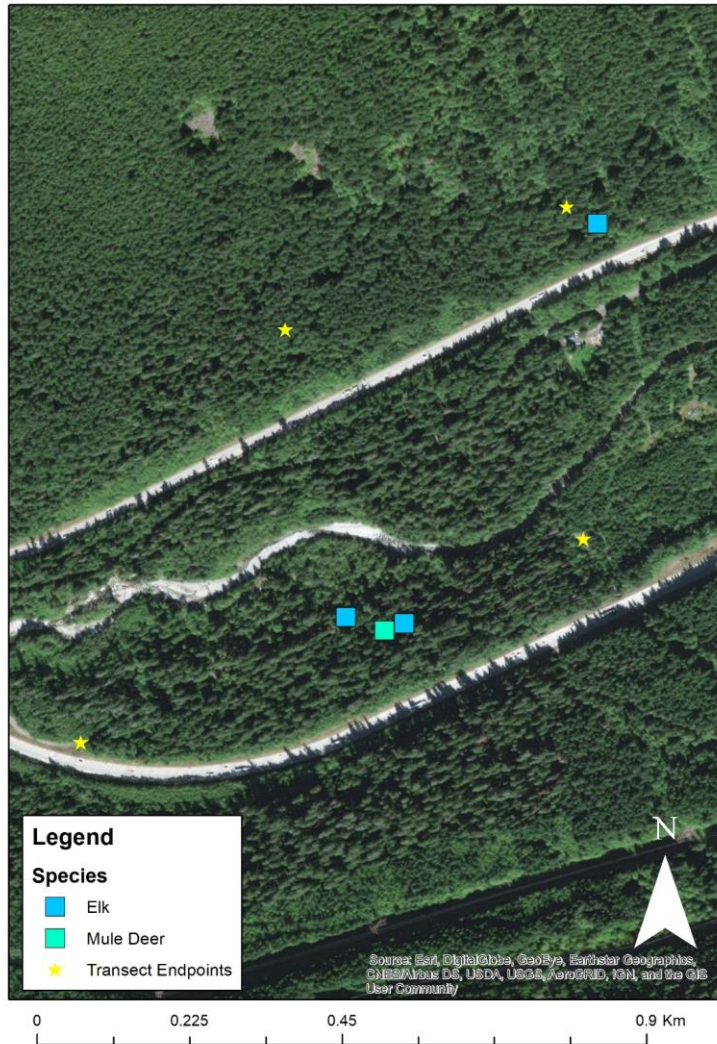
Team Leaders: Evan Adkins, Annabel Brennan, Brian Booth, Mallory Clarke, Grace Coale, Joe Kiegel, Adam Martin, Brooke Nelson, David Snair, and Kirsten Tauber.

Team Members: Alberto Chavez, Allison Barfield, Andy Held, Ben Mardis, Brett Hunter, Cate Burnett, Emily Rezek, Eric Skocaj, Erica Grant, Erin Donahou, Gabrielle Orsi, Gary Boba, Grace Prescott, Guthrie Schrengohst, Hans Heuer, Jonathan Paul, Julia Moylan, Justin Bishop, Justin Roberts, Kami Koyamatsu, Kane Ayub, Kara Hollenbeck, Kathryn Hansen, Katie Southard, Kelly Fine, Kevin Stone, Kurt Kiefer, Kyle Schultheis, Lindsay Hutchison, Luke Fabian, Mandy Paul, Mary Williamson, Monica Diaz, Rich Johnson, Stephen Miller, Tim Gibbons, Todd Daniel, Travis Prescott, Tricia Enfield.

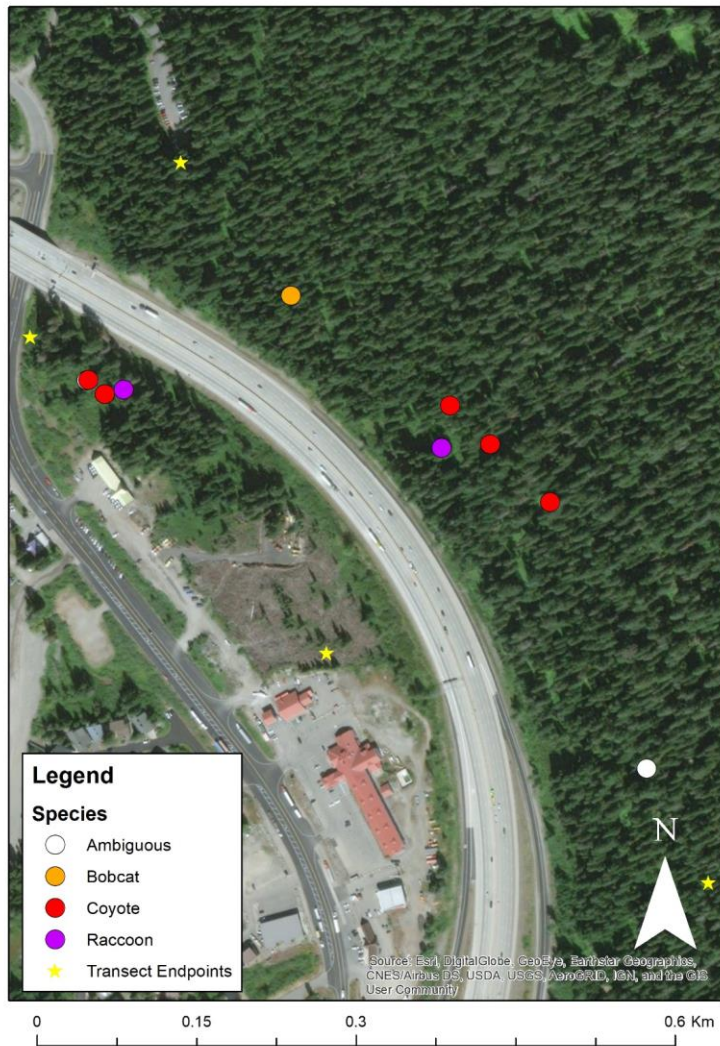
We have many volunteers and active supporters who contribute their time and expertise in various ways throughout the course of the program and the potential to miss people ever looms. Thank you to any we have missed!

Appendix A: Species Detection Maps

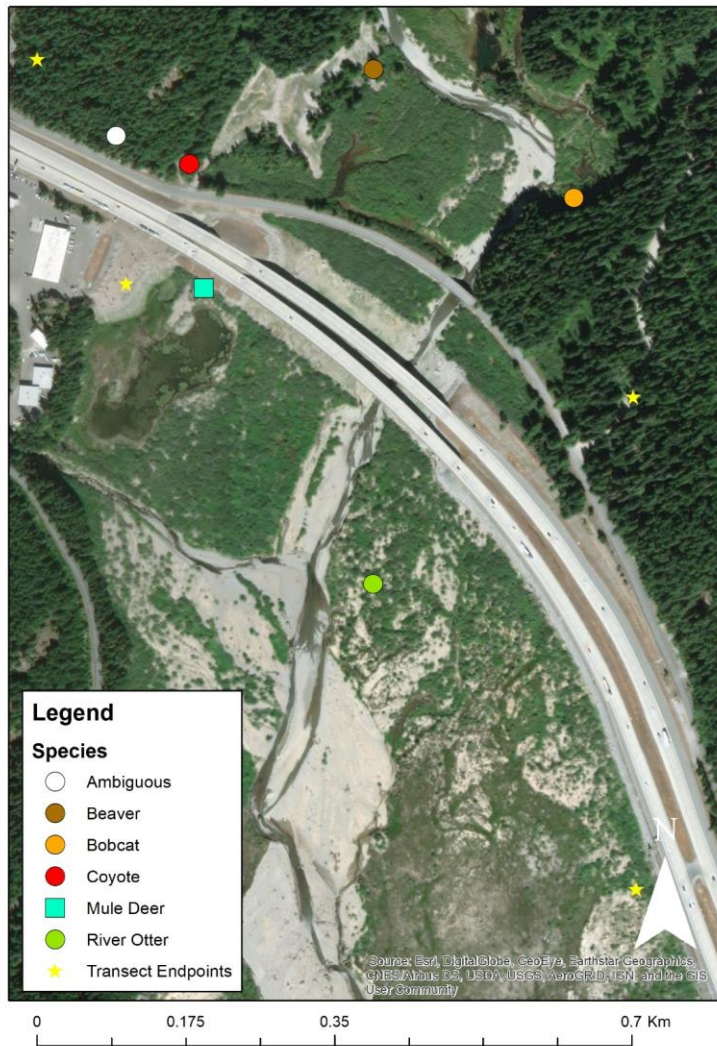
Denny Creek Species Detections



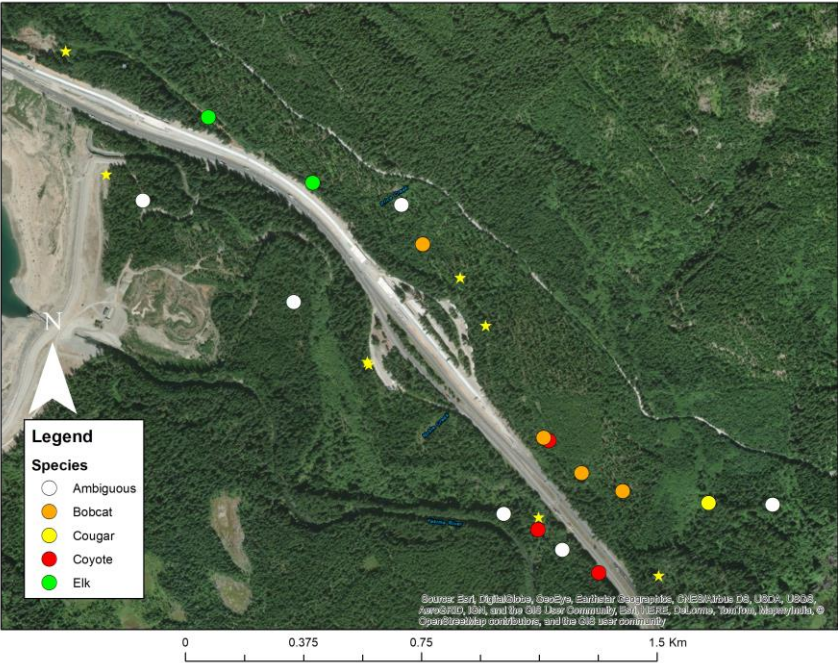
Snoqualmie Pass Species Detections



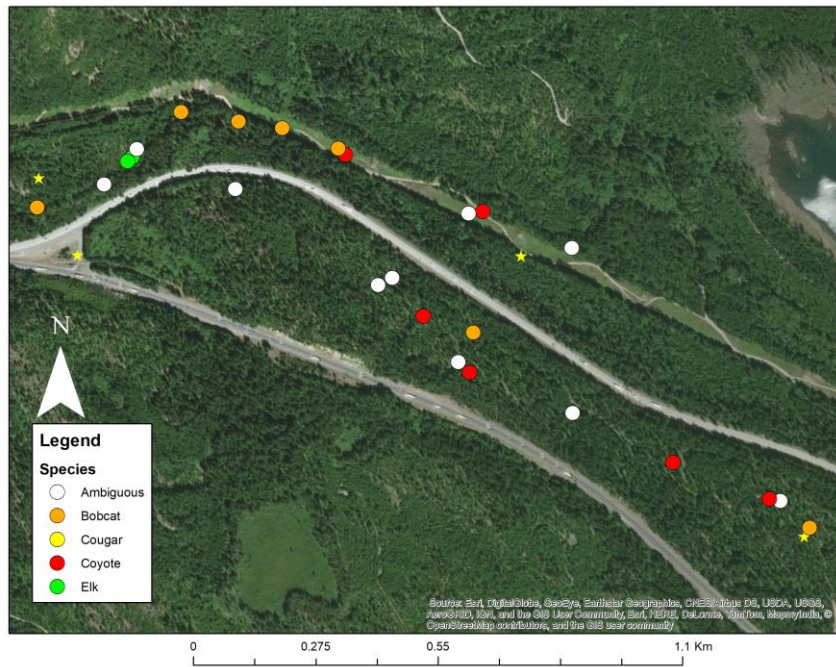
Gold Creek Species Detections



Price Noble Species Detections



Easton Hill Species Detections

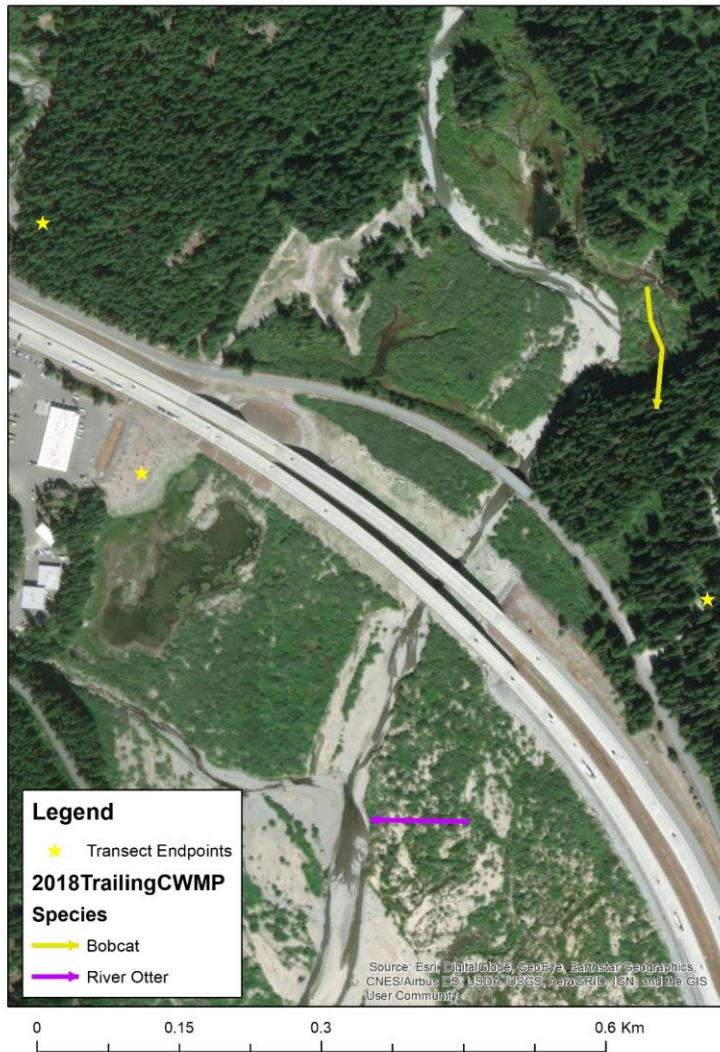


Appendix B: Trailing Events Maps

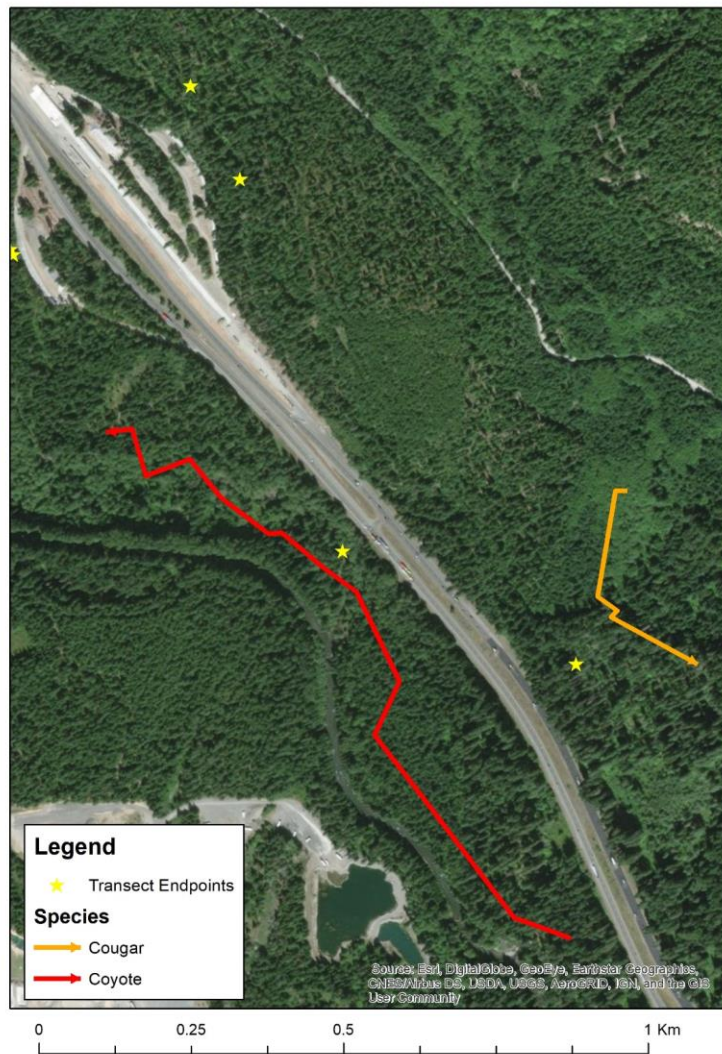
Snoqualmie Pass Trailing Events



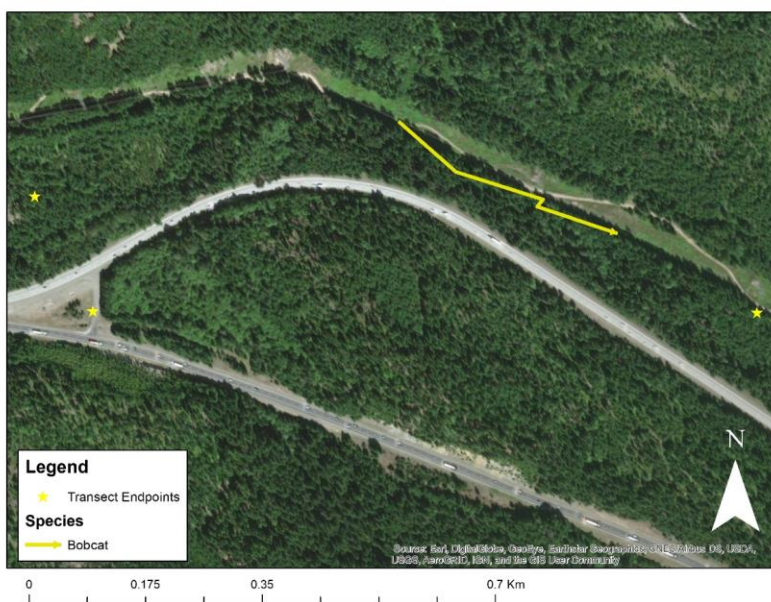
Gold Creek Trailing Events



Price Noble Trailing Events

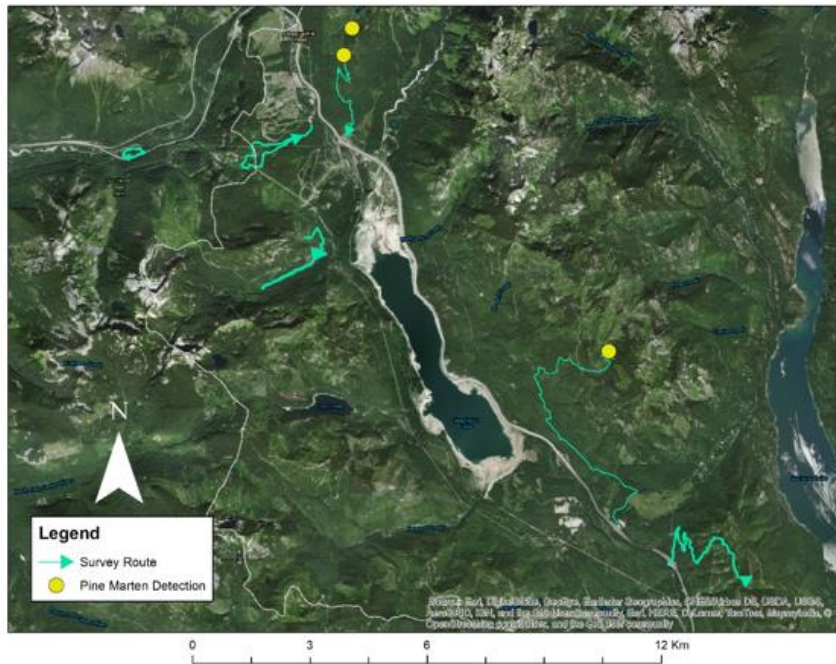


Easton Hill Trailing Events



Appendix C: American Marten Surveys

Winter 2018 Marten Survey Effort



Appendix D: Advisory Council

Jocelyn Akins (Cascades Carnivore Project);
Chris Loggers (Colville National Forest);
Aaron Reid (BC Ministry of Forests, Lands and Natural Resources);
Carol Chandler, John Jakubowski (Gifford Pinchot National Forest);
Sonny Paz, Jesse Plumage (Mt. Baker Snoqualmie National Forest);
Roger Christophersen, Jason Ransom, Regina M. Rochefort, Ph.D. (North Cascades National Park);
Monte Kuk, Patty Garvey-Darda, Joan St. Hilaire, Matt Marsh, Jo Ellen Richards, John Rohrer, Aja Woodrow, Don Youkey (Okanogan-Wenatchee National Forest);
Keith Aubrey, Cathy Raley (PNW Research Station, USDA Forest Service);
Gregg Kurz (US Fish and Wildlife Service);
Bill Gaines (WA Conservation Science Institute);
Dana Base, Scott Becker, Ben Maletzke, William Moore, Annemarie Prince, Trent Roussin, David Volsen, Scott Fitkin (WA Dept. of Fish and Wildlife);
Kelly McAllister, Mark Norman, Josh Zylstra (WA Department of Transportation);
Dr. Dan Thornton (Washington State University);
James Begley, M.S. (Western Transportation Institute);
Chris Morgan (Western Wildlife Outreach and BearTrek);
Robert Long (Woodland Park Zoo)

Appendix E: Species Priority List

Tracking priority for this study in descending order

Level 1

Wolverine, fisher, Canada lynx, wolf, American 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, Canada lynx, wolf and American 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.

Snow Tracking Survey Protocol

Winter 2017-2018

CITIZEN WILDLIFE MONITORING PROJECT

Version: 8 December 2017

*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 and implementation stages, with wildlife underpasses at Gold Creek completed and the construction of the overpass at Price-Noble underway.

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. 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 site called Hyack/Silver Fir, is the site of a proposed expansion to the ski resort and monitoring was discontinued prior to the 17'-18' monitoring season. 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 projects field procedures.

Team leader responsibilities:

- Conducting surveys at three sites with a team between January 1st and March 31st 2018.
- 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. Below is a brief description of the sites with directions to them. ***(All coordinates should be in decimal degree format (hddd.ddddd, WGS 84 map datum)***

SNOPASS

	Lat	Long
<i>North Transect Start</i>	47.4276853	-121.413532
<i>North Transect End</i>	47.4214958	-121.407142
<i>South Transect Start</i>	47.426242	-121.415466
<i>South Transect End</i>	47.423496	-121.411881

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 (no parking pass needed). This transect was established 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.

GOLD CREEK

	Lat	Long
<i>South Transect Start</i>	47.389623	-121.376978
<i>South Transect End</i>	47.383299	-121.387970
<i>North Transect Start</i>	47.388495	-121.306287
<i>North Transect End</i>	47.392162	-121.378357

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, 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 transects** in this area, located just beyond the Eastern end of Keechelus Lake, at around Milepost 61. Since access changed due to construction, for field purposes we have changed the names of the transects to Price/Noble Creek North, and Price/Noble Creek South. Instead of assigning a team to the east side of both North and South or west side of both North and South, we now assign teams to cover both east and west ends of North or east and west ends of South. North and South transects are to be completed by different teams on the same weekends to continue to be able to collect data on animals crossing the highway. Both North and South are still divided into East and West halves which have their own start and end points (as the eastern and western halves are still treated as separate transects in our database).

The North side portion of these transects is probably the longest and most strenuous of any of our days of field work. Teams that select this transect should start early and be prepared for some travel just to get to the start of the transect. Following the transect involves some side-hill travel and one or more stream crossings of varying style depending on snowpack depth and coverage.

PRICE-NOBLE NORTH

	Lat	Long
<i>N-WEST Transect Start</i>	47.321871	-121.321224
<i>N-WEST Transect End</i>	47.328025	-121.337175
<i>N-EAST Transect Start</i>	47.32108	-121.32114
<i>N-EAST Transect End</i>	47.31456	-121.31353

Directions: Exit I-90 Eastbound at exit 62 and go left over 1-90. Follow Kachess Lake Road to the left. Park at the gate for FS road #4832. (47.31381 -121.29941) Hike road #4832 for a bit more than a mile. Take a left onto a cat track at 47.32320 -121.31913. Teams can use the GPS start point for "N-WEST Transect Start" to guide them to that starting point from this turn off. We suggest teams do the western half first, regaining the starting point after trailing on the return trip. Complete the eastern half second. Once trailing is complete on this half, the fastest return to the parking spot is to bushwhack back using the waypoint for the parking area given above.

On the western transect, walk up the snowmobile trail a short distance to the flagged start of the transect. The transect crosses two creeks which can be crossed at the transect if conditions make that safe, or teams can walk south along the creeks until they reach the highway where it is safe to cross. The transect ends in a wetland with the highway in sight.

On the eastern transect, walk a half-mile east from the starting point, roughly parallel to the highway. Shortly after the start, the route turns diagonally left and towards the apex of a hill and then 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.

PRICE-NOBLE SOUTH

	Lat	Long
<i>S-WEST Transect Start</i>	47.321871	-121.321224
<i>S-WEST Transect End</i>	47.328025	-121.337175
<i>S-EAST Transect Start</i>	47.32026	-121.32625
<i>S-EAST Transect End</i>	47.315079	-121.318249

Directions: Exit I-90 Eastbound at exit 62 and take a right onto Stampede Pass Road which will curve right immediately. When the road takes a 90 degree left turn, there will be parking on your right near a closed campground. Park and walk into the campground. Continue walking west until you find a trail leading west.

For eastern transect: look for the flagging that will indicate the start of the transect shortly after entering the trail. (This point used to be the end before access became difficult at the start.) Head straight west parallel to I-90 for half a mile to complete the transect. This route alternately crosses a bridge follows an old road corridor, crosses a stream/wetland, bushwhacks up a forested slope, rejoins the road grade, and ends shortly after this.

For western transect: where the eastern side ends, the western transect begins. Continue walking west along the road grade until the road turns sharply south at a creek. Once teams have walked out to the creek, they can walk south to a bridge if crossing conditions are not safe. Once the team has regained the transect on the west side of the creek, the transect continues parallel to the highway and ends at Keechelus Lake dam.

EASTON HILL

	Lat	Long
<i>South Transect Start</i>	47.261054	-121.217281
<i>South Transect End</i>	47.268468	-121.238269
<i>North Transect Start</i>	47.268246	-121.225078
<i>North Transect End</i>	47.269480	-121.240050

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.

Commented [1]: Coordinates slightly off. Latest Easton S Start coordinates (provided by Brian Booth, Jan '18): 47.26305, -121.21712. Starts directly on logging road, as reflected in written directions.

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:

- From the parking area, walk east through the eastbound lanes underpass, plus an additional 100m to a clearcut.
- From this point, the transect starts .4 miles from here.
- Follow a logging road around the left side of the clearcut for a quarter-mile. Upon reaching the point where this road enters forest, continue on the road for 0.14 mi to the transect start.
- The start of the survey should be well marked with flagging tape labeled "CWMP Easton South Transect Start".
- The final 1/3 of the transect is extremely thick timber and difficult to follow flagging. It would probably take 30 to 40 flags to be able to follow without navigational aids. To continue through this point to the end of the transect try one of the following:
 - Use a compass in coordination with the Collector map. The Collector map will show that you need to head west, but the low visibility can easily disorient you as to which way is west.
 - Enter the Start / End as waypoints on a GPS unit prior to the survey, and during the survey use the "Go To Waypoint" function.

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 than at other sites. 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.

DENNY CREEK

	Lat	Long
<i>South Transect Start</i>	47.394931	-121.467243
<i>South Transect End</i>	47.394969	-121.460881
<i>North Transect Start</i>	47.400309	-121.461758
<i>North Transect End</i>	47.398729	-121.467467

Directions: Take Exit 47 off I-90, take a left from the off ramp, crossing over the freeway to the North side, Take a Right on NF 9034 and pass under the west-bound lanes of I-90. Parking can be found near the bridge if very snowy. Walking up the road past a residence and driveway on the right there will be a **pedestrian culvert** shortly afterwards on the left, close to the highway to gain access to the North side of I-90.

For north transect: look for the flagging that will indicate the start of the transect after exiting the culvert, there will be a short uphill walk to gain the start. Head straight west parallel to I-90 for half a mile to complete the transect.

For south transect: a walk back to NF 9034 and continuing down the road to the SE, you will cross a creek (bridge) and the road becomes NF 9035. You will come to another parking location, this is fairly close to the first one. Following the road Eastward after a few curves you will reach the start of the transect.

FIELD PROCEDURES

EQUIPMENT

DATA COLLECTION

- ✓ Smart phone.
- ✓ Clipboard.
- ✓ Data sheets (plenty). There are three types: Transect data sheets (back up in case 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
- ✓ External battery pack for Smart Phone

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 inadvisable; 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) Record all wild mammal sign larger than a snowshoe hare encountered crossing the transect. Do not record the same species again if you find its tracks again within 50 meters, unless you can determine that it is definitively a different event (aka, significantly different aged tracks). Similarly, if you are sure that the tracks you have encountered are from the same animal you have already recorded previously, do not re-record. If you have more than one animal in a group (such as a herd of elk), record it

once for the event and include in the notes your estimate of number of animals in the group traveling together.

- 6) 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.
- 7) 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 every data point, photograph the tracks or sign following project photo-documentation guidelines (see below).
- 4) 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.
- 5) Determine whether the animal is a trailing priority species (See list, Levels 1 and 2). If so, clearly mark trail-able tracks for trailing on your return leg.
- 6) 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.
- 7) 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 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 every 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.

Once out of the field upload photos from each side of the transect into a separate folder in the google drive shared folder for team leaders. Follow labeling conventions for folders as noted in instructions available in the shared google drive folder. If needed create a word document in each folder with notes about additional pertinent information you used for determining the identification of any observations where this is required as supporting information for photographs.

Ensure that all the information needed to link the photograph to the specific observation number it references is included either in the photograph itself, the file name, and/or the folder the images are loaded to on google drive. Because teams will be documenting every observation this year we are forgoing the time consuming file labeling convention used in the past. Please ensure that this information is accessible for each observation.

After your visit

- 1) **Handing in you data:** Data collected via collector in the field should be automatically uploaded to the online database so there is nothing to do out of the field. 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. 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 once you've entered the data from the day.

APPENDIX 1: SPECIES PRIORITY LIST

Tracking priority for this study in descending order

Level 1

Wolverine
Fisher
Lynx
Wolf
Marten (On transects other than SnoPass)
Grizzly Bear
Mountain Goat
Cascade Red Fox

Level 2

Cougar
Marten (On SnoPass)
Elk
Mule Deer

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

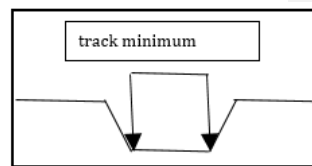
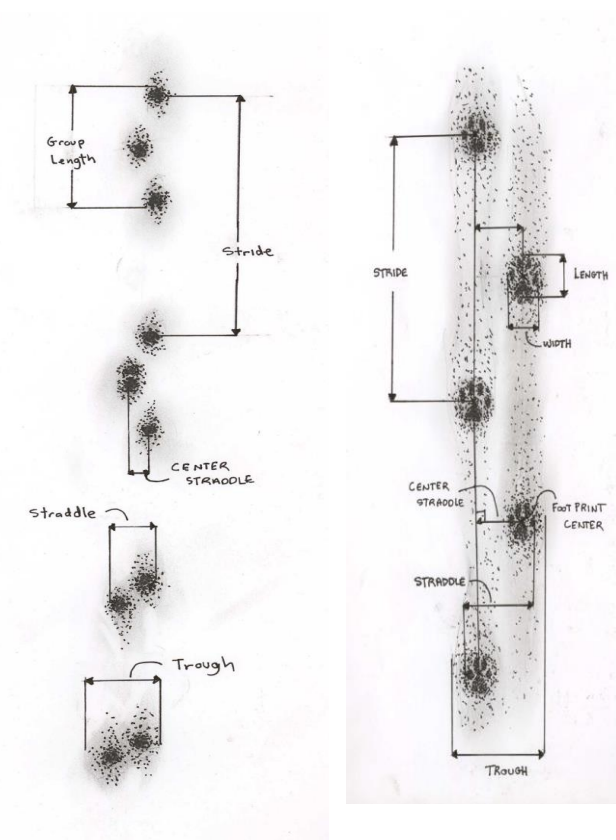
Group length: measured from the back of the track furthest back in a set of 4 tracks to the front of the track furthest forward. NOT USED FOR walking or trotting gaits (groups of 2)

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.

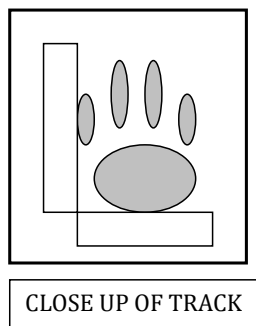
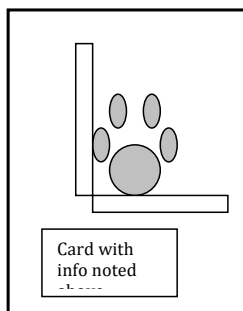
Trough: width of the entire disturbance created by an animal's trail (greater than the minimum outline of the tracks which may be indecipherable in some instances)



Appendix 3: PHOTOGRAPHIC DOCUMENTATION GUIDELINES

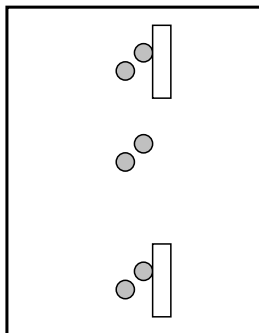
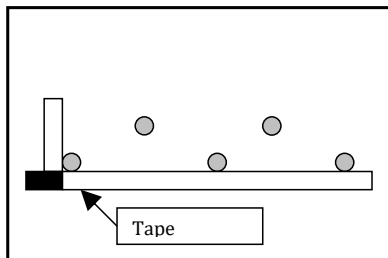
PHOTOGRAPHS OF INDIVIDUAL TRACKS:

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 4: 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

Laurel Baum: 206-724-8114

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 Collector App or 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 data point 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/1lmoGf900BFppykQdL4L4tUHf045Ss6im7nCaltYOY8/viewform>

Once you have entered your data through the Google form be sure to leave your datasheets in the bin of field equipment at Starbucks Coffee.

Fill out a "Coversheet" (found in the CNW folder) Place the coversheet at the top of your stack of data sheets, & staple them together, and put them in the CNW folder.

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 unit or the GPS app on your phone. How to do this will vary depending on the unit or your app. Once complete, label the route following this format: Transect name-date-observation number. For example: EastonS-17NOV2016-2. 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/open?id=1qSlyy6koX4mztqKQ0TCW10v9o3bxRk11>

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. Make sure GPS units are recording in WGS 84.

PHOTOGRAPHS

Upload photographs to the shared google drive folder from any 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-4January2016*). 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: ***Easton12.27.16_12.jpg***. For multiple photographs of one data point, label them as follows: ***Easton12.27.16_12.1.jpg***, ***Easton12.27.16_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

Only bring specimens 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:

Date
Transect Name
Team Leader Name
Team Member Names
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 paragraphs) 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 Starbucks, return everything to the Equipment tote and replace it for the next team leader. Pat yourself on the back and have a good rest of your day (evening/night)!