CASCADE CITIZENS WILDLIFE MONITORING PROJECT

WINTER 2008-2009 FIELD SEASON REPORT

April 2009

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ABSTRACT

The winter program of the Cascade Citizen Wildlife Monitoring Project (CCWMP, formerly Cascade Wildlife Monitoring Project) uses trained volunteers to record the presence and movement of wildlife, through snow tracking surveys and remote camera instillations, in the vicinity of proposed wildlife crossing structures along Interstate-90 in the Washington Cascades between Snoqualmie Pass and Easton. The third field season of the project continued to meet the projects several goals including: training volunteers in wildlife tracking and road ecology, and adding a third season of data on wildlife along Interstate 90. Data collected from this year mirrors findings from the previous season fairly closely. The transition to handheld computers for data collection was completed successfully. An increase in trailing activity was implemented with success. Recommendations for next season include: Conservation Northwest take over management of volunteers from Wilderness Awareness School for the 2009/2010 season with strong training still provided by Wilderness Awareness School, and supplementary component be added to educate the recreational public to recognize and document wolverine track and sign in the back country.

PROJECT OVERVIEW AND SUMMARY OF FIELD SEASON

CCWMP is a joint project of I-90 Wildlife Bridges Coalition (a campaign that fiscally sponsors the program), Wilderness Awareness School (WAS), an environmental education organization, and Conservation Northwest (CN), a conservation organization. CCWMP uses trained volunteers to monitor the location and movement of wildlife in the vicinity of proposed wildlife crossing sites along Interstate-90 in the Washington Cascades between Snoqualmie Pass and Easton. This report documents the winter field work for 2008-2009.

A complete description of the projects goals and methods is available online at:
http://www.i90wildlifebridges.org/monitoring.htm
http://www.i90wildlifebridges.org/CWMP%202006-2007%20Final%20Report.pdf.

Winter 2008-2009 Summary

The winter of 2008-2009 was the third field season for CCWMP. Minor protocol changes and significant changes to data recording methods were successful implemented, using handheld computers with integrated GPS units. Increased emphasis on trailing produced a rise in data on animal movement.

Despite two thirds of the trips recording sub-optimal tracking conditions, data collection was typical of the previous two years.

Summer Data Collection:

During the late summer of 2008, two team leaders performed a survey along the Gold Creek transect, collecting data following our snow season protocol to assess the use of this area following the draw down of the reservoir which floods almost all of this transect in the late spring and summer. Findings from these surveys are reported below.

METHODOLOGY CHANGES

Cybertracker Technology

This year we fully transitioned to the CyberTracker technology that we piloted last year; no paper data collection was taken into the field. Only one team experienced difficulties and the policy of pairing team leaders to share maintenance of equipment proved effective.

Trailing Emphasis

Subtracting remote camera operations from team responsibilities provided time for teams to trail a level two species toward the road during almost every trip. This allowed the project to collect more trailing data this winter than in the previous two years combined.

DATA

Data Analysis Methods

All observations associated with poor track quality (*Snow Track Quality* equal to 1) were not considered reliable and thus are not included among the data presented. Similarly treated were observations where species were recorded as ambiguous or unknown, all but two of which where associated with poor snow quality.

To account for unequal sampling effort, detection rates were standardized between sites, using visits (or completed transects) as the base unit of effort by which to index detections. The Easton Hill transect is twice as long as the other transects. Numbers of detections per visit were divided in half to provide an even comparison with other transects. Additionally, Shannon's Diversity Index ($H' = -\sum p_i \ln p_i$) metrics were constructed for each site to facilitate comparison between sites (Magurran 1988).

It is important to note that detection frequency would be best regarded primarily as an indicator of presence, and secondarily as an index of intensity of use. Detection frequency is not an index of population size, or of density. Even in the imaginary situation in which all species were distributed at equal densities across the landscape, it is unreasonable to assume equal probability of encountering sign of all species, due to ecological differences among them.

Trailing species was given a larger emphasis during this field season and subsequently more trailing records were recorded this season than in the previous two seasons combined. This season was the first time that we have mapped or done any in depth analysis of the results of trailing. For both of these reasons analysis of trailing data here refers to the cumulative efforts of the first 3 years of the project.

Transect Data

Diversity of detected species was decreased from the first two seasons (Figure 1). However, elk (*Cervus elaphus*) were detected in greater numbers overall and for the first time during the winter on the two Price Noble transects (Figure 2). As with the previous two seasons bobcat (*Lynx rufus*) and coyote (*Canis latrans*) comprised the majority of detections across all sites (Figure 2). No Level 1 species (see Appendix D) were detected during this field season and none have yet been detected during the projects three years of

winter surveys. American marten (*Martes Americana*) was not detected at the Hyak/Silver Fir site this field season but for the second year in a row tracks listed as ambiguous but potentially marten were recorded in the Price Noble area (East transect in 2008 and West in 2009). This species has yet to be definitively documented on any transect besides Hyak/Silver Fir.

Average detections per visit were down at our higher elevation sites but increased at our lower elevation transects (Figure 4). Consistent with the previous two seasons, the mid-elevation and ecologically diverse Price Noble transects continue to show the most variety of species encountered in the field. Shannon's diversity indices (which take both species variety and relative abundance of each species within the total into account) were constructed for each site (Figure 4). The locations of transect observations are mapped in Figures 5-8.

Summer use of Gold Creek Transect:

During summer surveys of the Gold Creek transect tracks indicated both deer and elk using the bridge over Gold Creek to pass under I-90. The exposed muddy lake bottom and sand bars along Gold creek provide excellent summer tracking substrate. These data are not included in the summaries of winter field work but a summary of findings can be found in the discussion section of this report.

Species	Detected since 2006	Detected 2009	Washington GAP Status/Notes
Beaver	x	x	present
Black Bear *	x		present/seasonal
Bobcat	x	x	present
Cougar	x		present
Coyote	x	x	present
Elk	x	x	present
Marten	x		present
Mink	x		present

Mule Deer	x	x	present
Raccoon	x		marginal/absent
River Otter	x	x	marginal

Figure 1. Species detected during snow tracking transects. (* Black bear have only been detected during the winter from historic sign that the project recorded during the first two field seasons. Historic is here defined as tracks or signs which were clearly not produced during the current field season such as trees scared with claw marks)

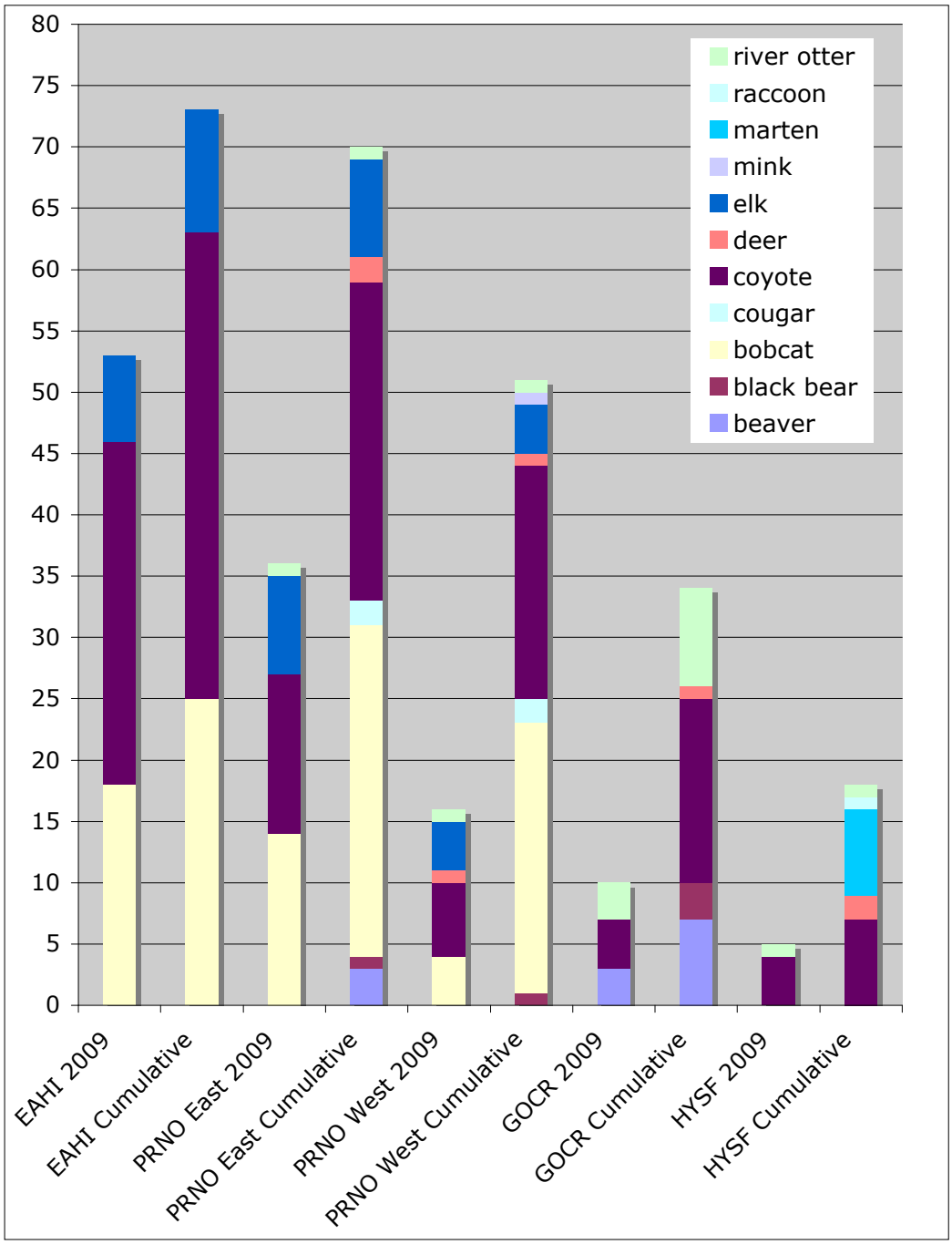

Figure 2. Number of times a species was detected by site in 2009 and cumulatively by transect.

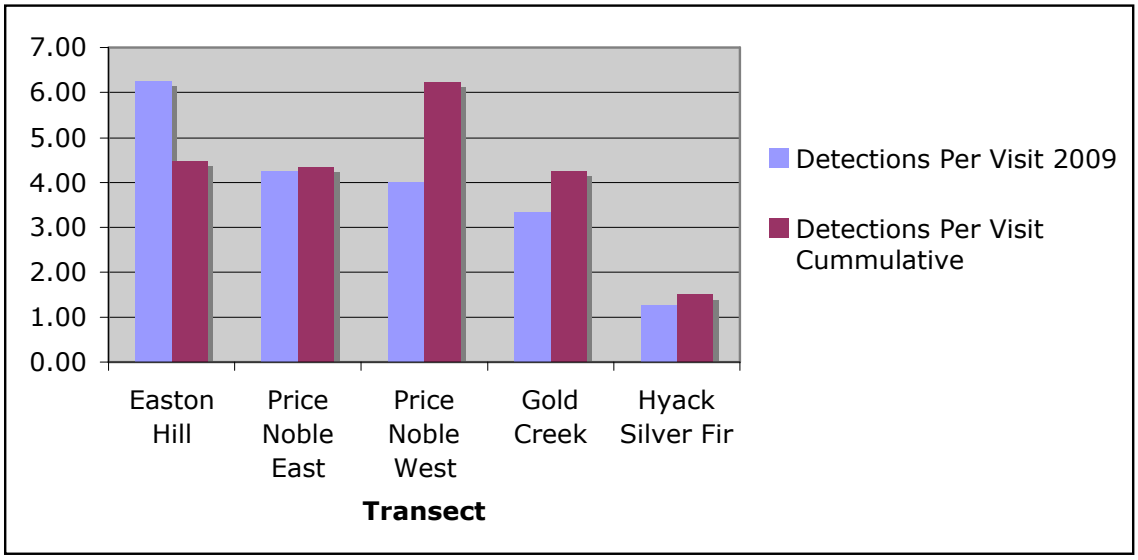

Figure 3. Average total detections per visit at each transect

Transect	Detections Per Visit 2009	Detections Per Visit Cumulative	Shannon's Diversity Index 2009	Shannon's Diversity Index Cumulative
Easton Hill	6.25	4.47	0.42	0.45
Price Noble East	4.25	4.33	1.35	1.65
Price Noble West	4.00	6.22	0.61	0.59
Gold Creek	3.33	4.25	0.47	0.58
Hyack Silver Fir	1.25	1.50	0.22	0.56

Figure 4. Average detections per visit by site and Shannon's Diversity Index ($H' = -\sum p_i \ln p_i$) of each site.

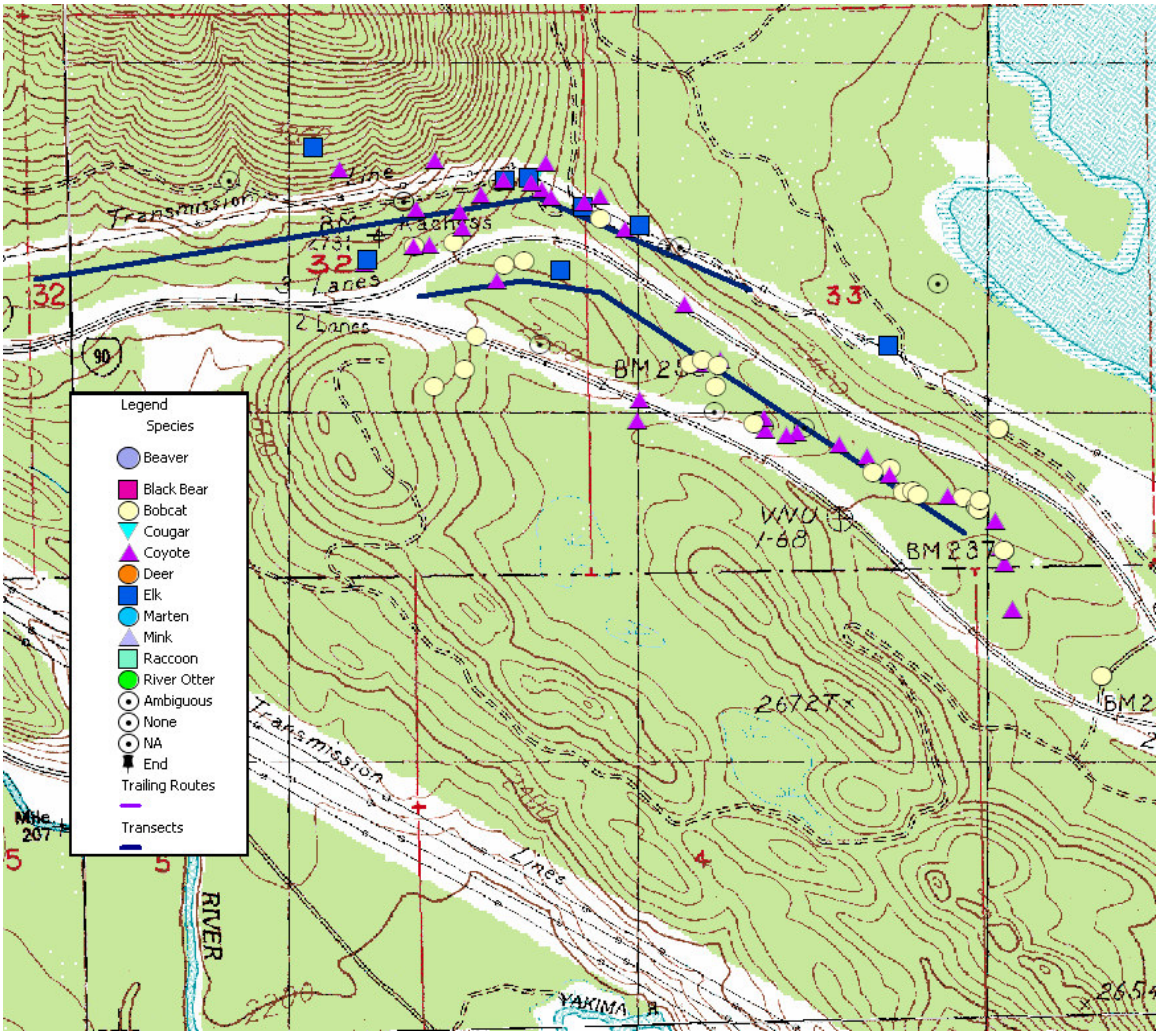

Figure 5. Wildlife observations made during 2008-9 along the Easton transects. Scale is approximately 1 inch = 0.3 mile.

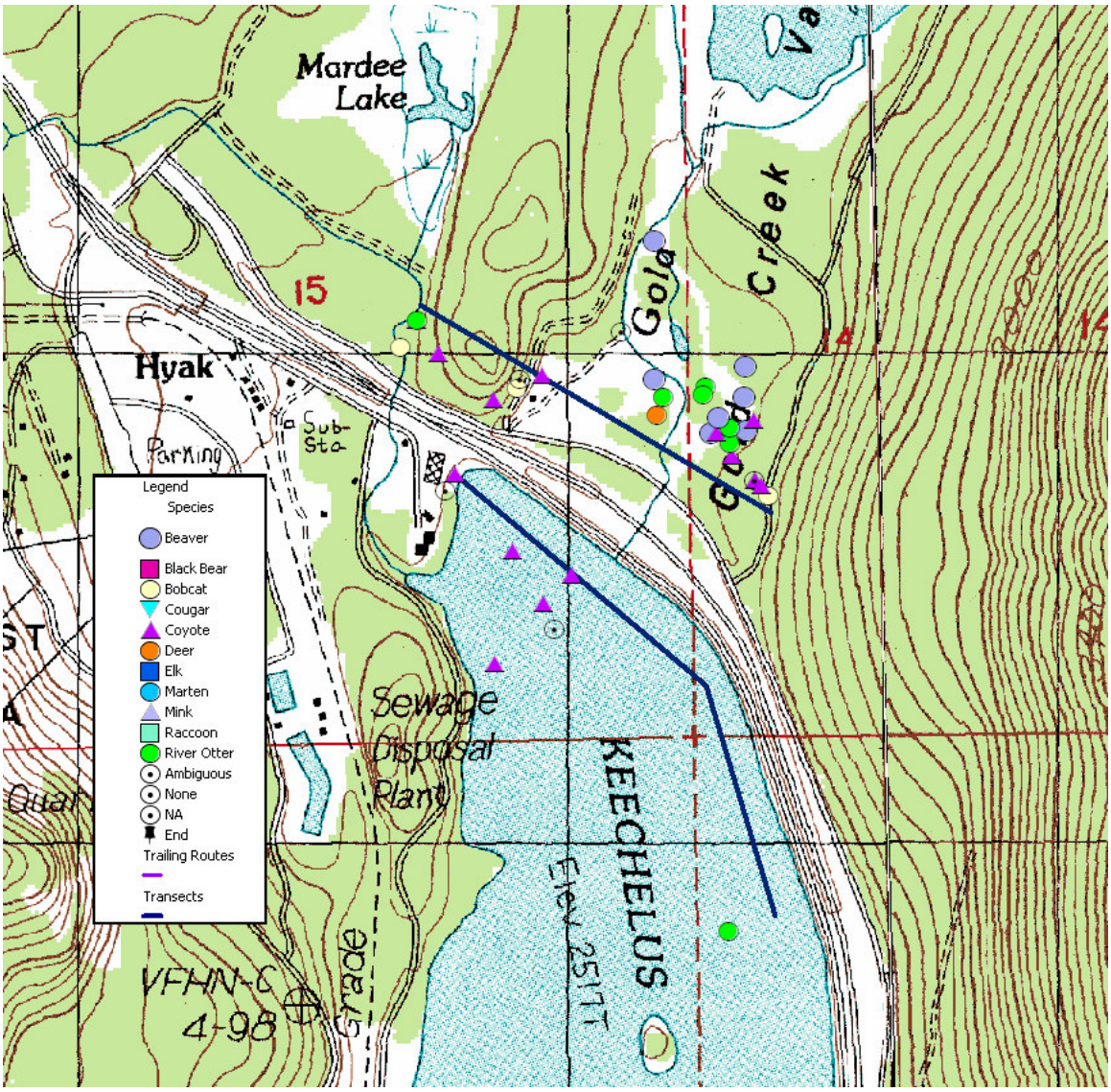

Figure 6. Wildlife observations made during 2008-9 along the Gold Creek transects. Scale is approximately 1 inch = 0.3 mile.

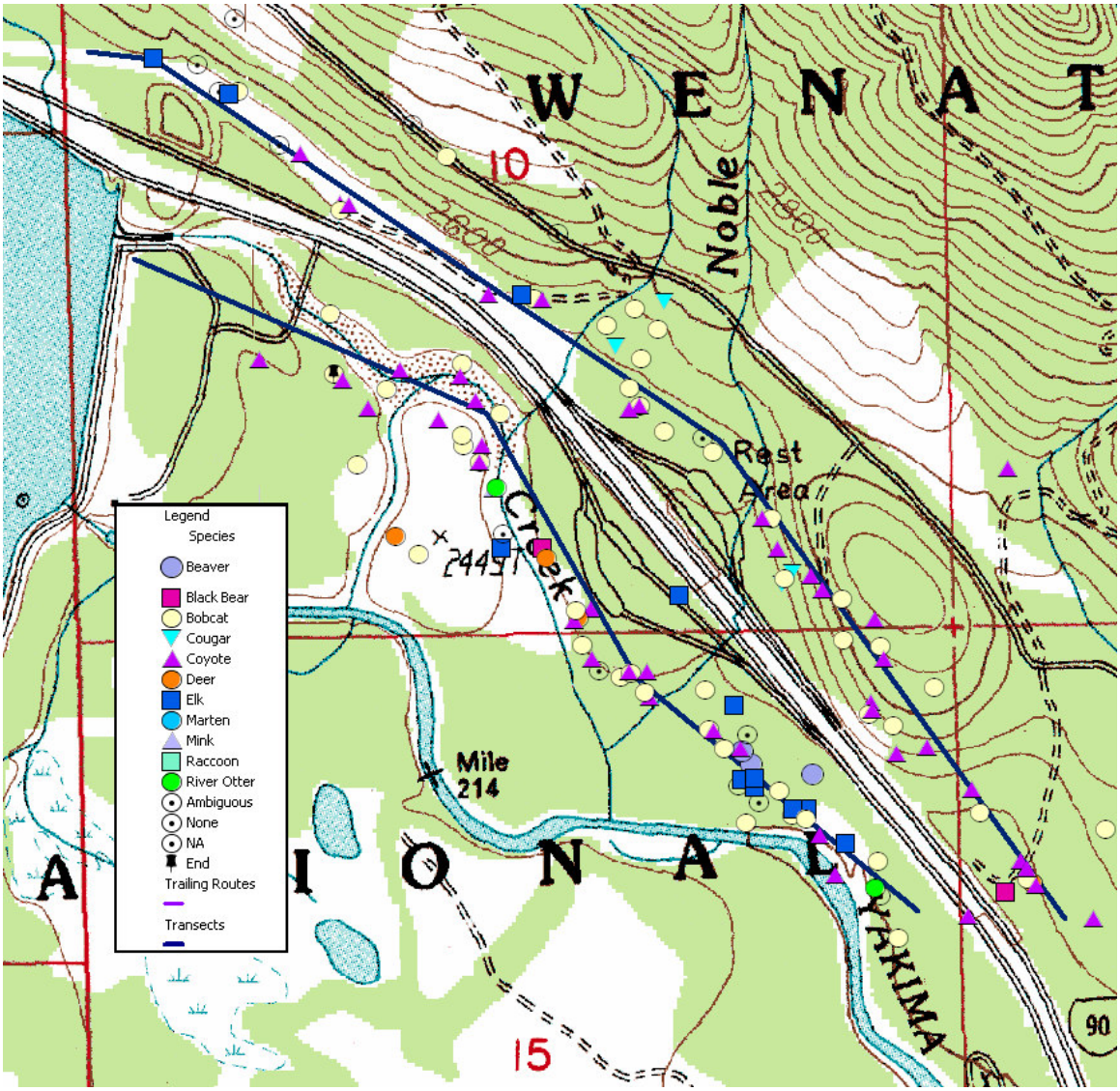

Figure 7. Wildlife observations made during 2008-9 along the Price-Noble transects. Scale is approximately 1 inch = 0.2 mile.

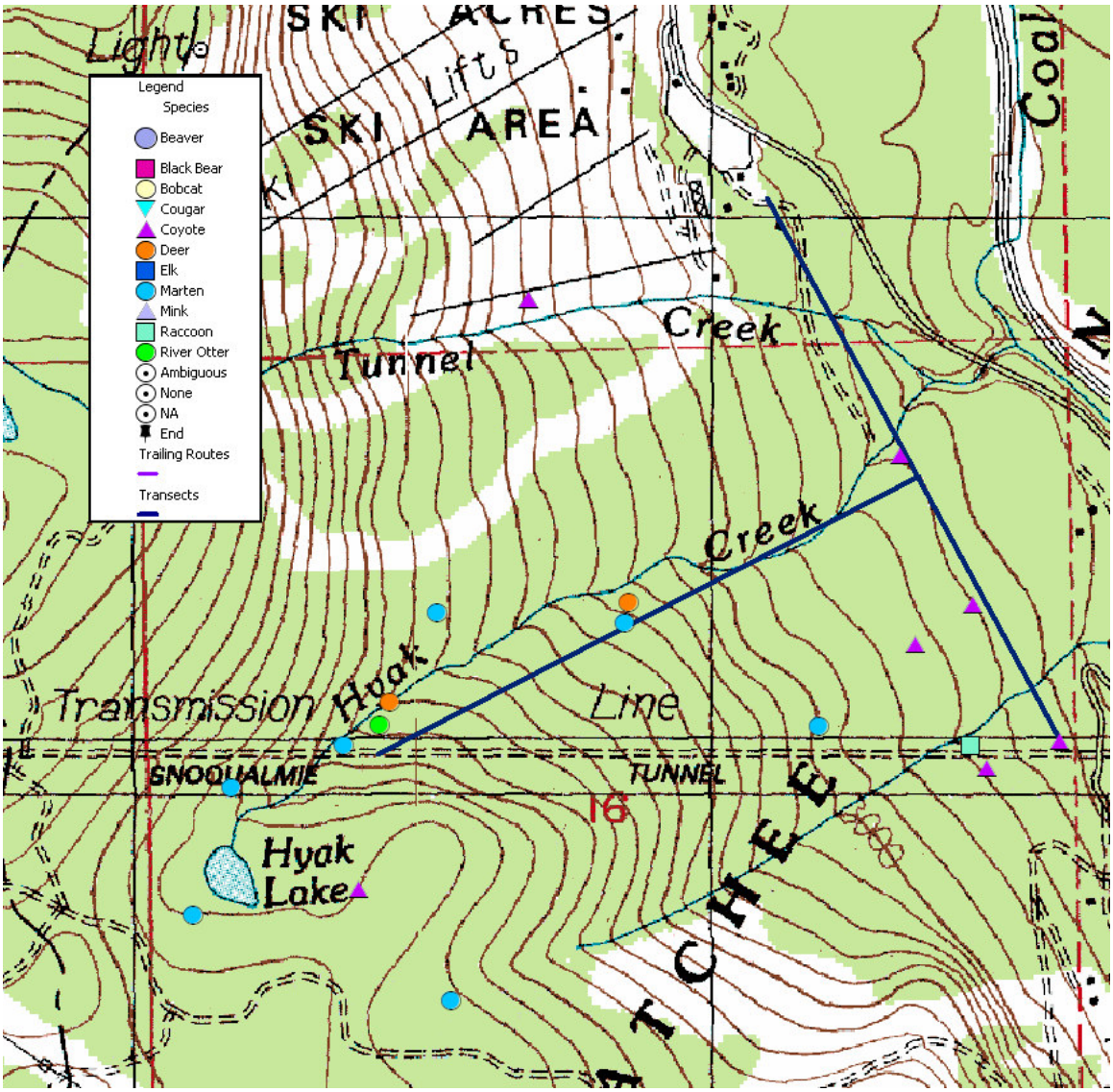

Figure 8. Wildlife observations made during 2008-9 along the Hyak/Silver Fir transects. Scale is approximately 1 inch = 0.2 mile.

Trailing Data

As of the end of the 2009 field season, trailing database consists of 26 records including 3 level 2 species (Fig. 9-12). Two erroneous coordinate pairs in the Price-Noble area and one in the Easton area were deleted from the trailing data. Of these 26 trails starting at about 150 meters from the highway, only one was definitely confirmed to enter the roadway. Several trails showed animals traveling to the edge of the highway and then traveling parallel to it for varying distances before turning away without ever entering or

crossing the roadway. On one occasion, a trail indicated an animal traveled to the end of the interstate and then immediately turned around and returned in the direction from which it had come. Numerous other trails showed no clear interactions with the highway despite their proximity to it (150 meters or less).

Species	# of trailing records	# of records of animal entering roadway	Other observations associated with roadway
Cougar *(Puma concolor)*	2		In 2007 species detected on both sides of the highway during similar time frame but crossing not confirmed (Price Noble transects)
Elk *(Cervus elaphus)*	4		2 records of animals traveling to edge of roadway and then either traveling parallel along road way (Price Noble East N) or turning around and retracing trail away from road (Easton N)
Marten *(Martes americana)*	3	Not applicable (records from Hyak-Silver Fir transect)	
Bobcat *(Lynx rufus)*	8	1	6 records of animal traveling along forest edge along highway possibly associated with hunting behavior.
Coyote *(Canis latrans)*	8	1?	3 records of animals of traveling to roadway edge and then traveling parallel. One associated with chain-off area (Gold Creek south) where substantial human debris including food may have been an attractant.
River otter *(Lutra canadensis)*	1	Not applicable (record from Hyak-Silver Fir transect)	

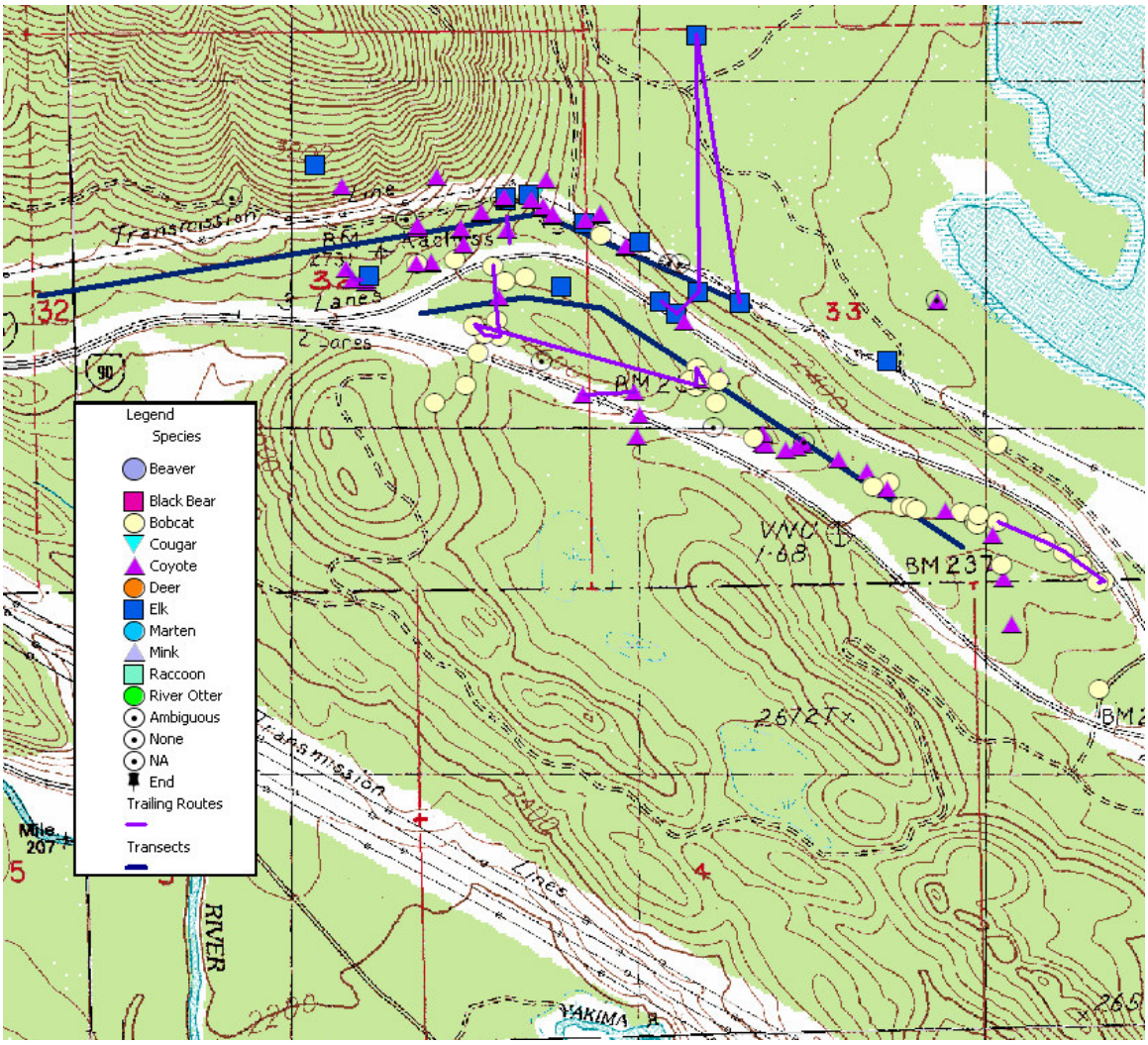

Figure 9. Combined tracking and trailing records summary for the Easton transect area. Includes all wildlife observations from 2007-8 transects, 2008-9 transects and 2008-9 trailing records. The minor apparent overlap of I-90 and one trailing line for coyote tracks is due to GPS error. Scale is approximately 1 inch = 0.3 mile.

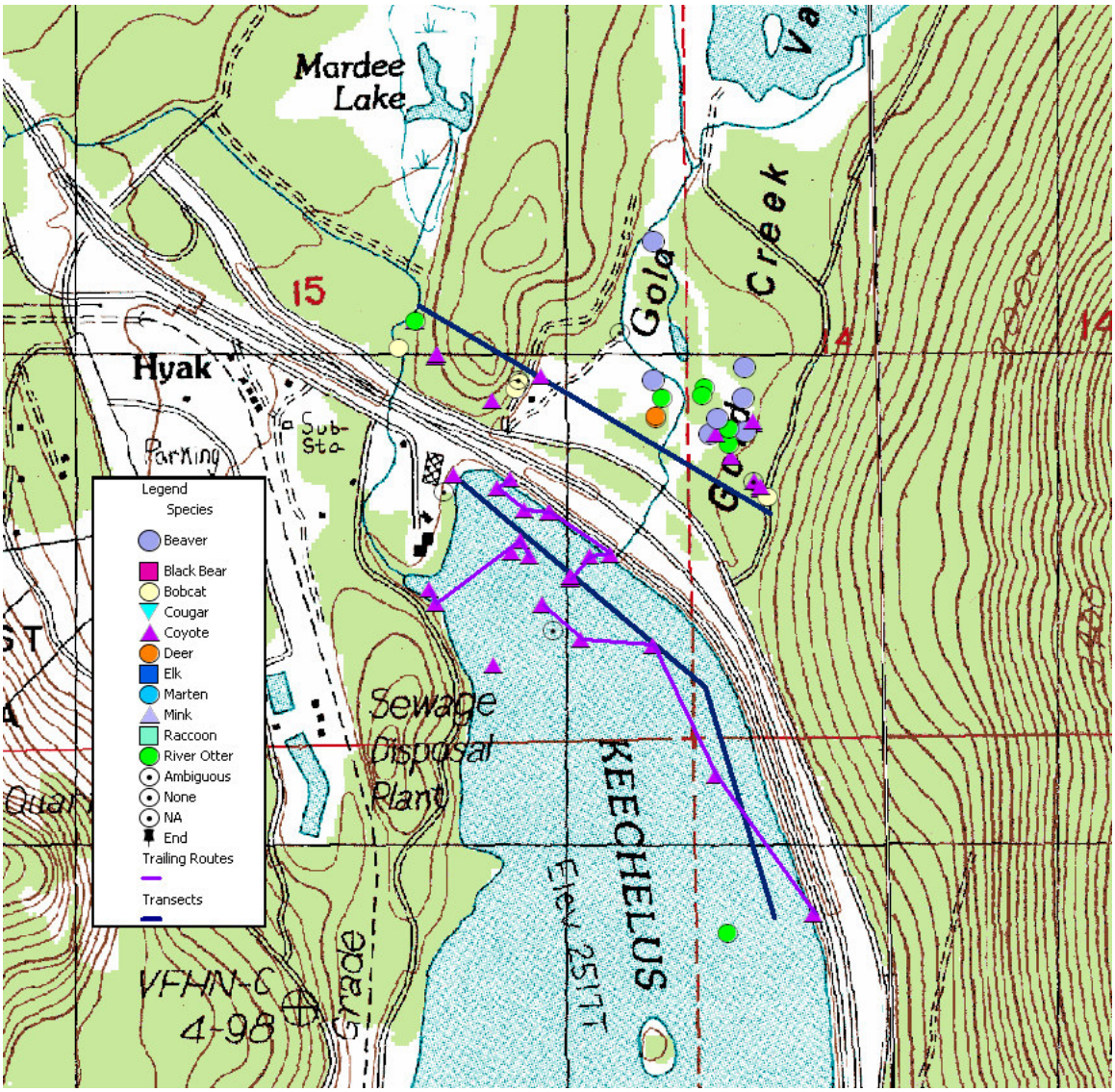

Figure 10. Combined tracking and trailing records summary for the Gold Creek transect area. Includes all wildlife observations from 2007-8 transects, 2008-9 transects and 2008-9 trailing records. Scale is approximately 1 inch = 0.3 mile.

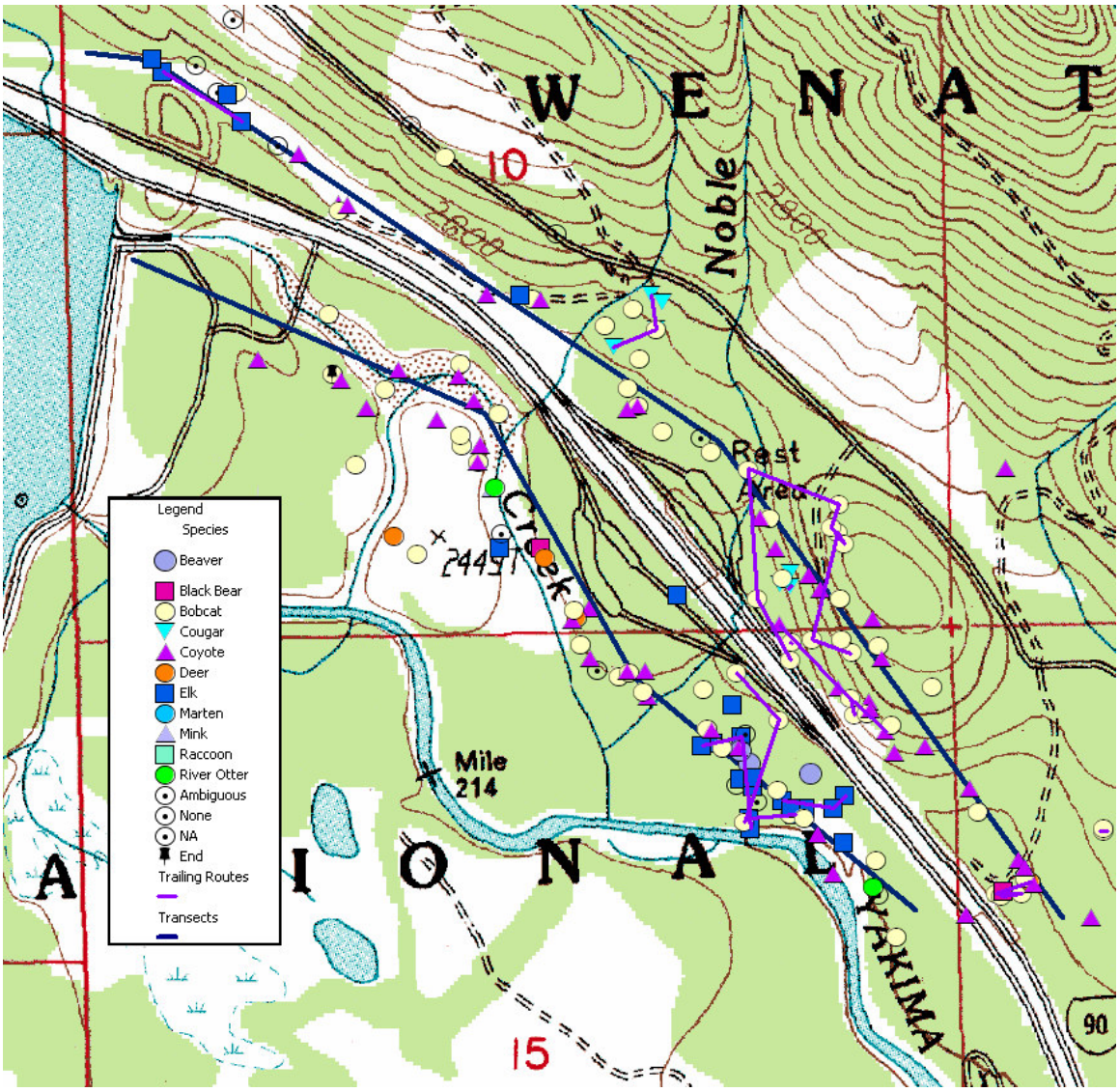

Figure 11. Combined tracking and trailing records summary for the Price-Noble transect area. Includes all wildlife observations from 2007-8 transects, 2008-9 transects and 2008-9 trailing records. Scale is approximately 1 inch = 0.2 mile.

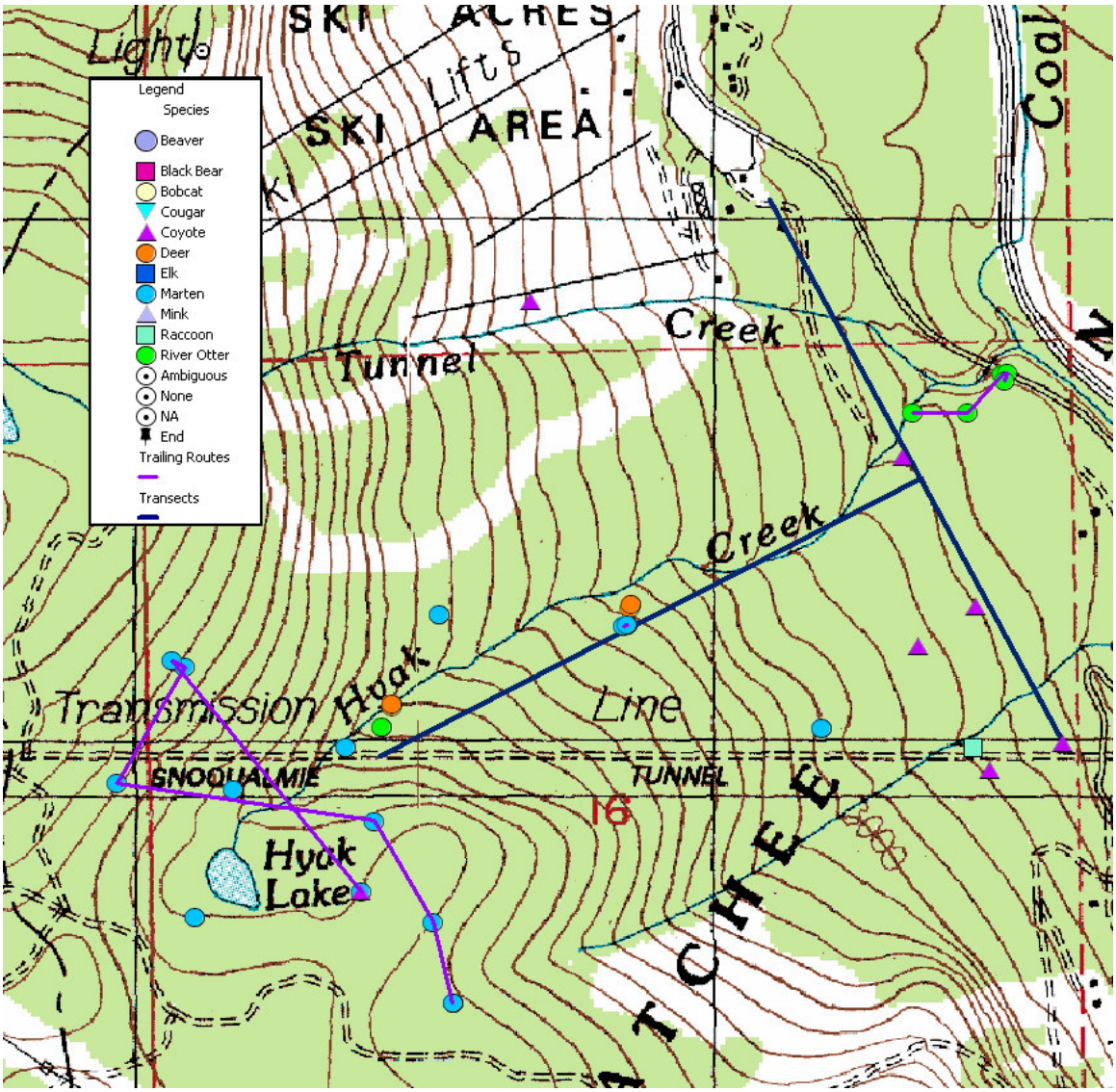

Figure 12. Combined tracking and trailing records summary for the Hyak/Silver Fir transect area. Includes all wildlife observations from 2007-8 transects, 2008-9 transects and 2008-9 trailing records. Scale is approximately 1 inch = 0.2 mile.

Volunteer Effort:

Total number of volunteers and total volunteer hours both slightly increased from the previous season. The ratio of volunteer hours to paid hours also increased. Twenty transects were completed, 1 more than in the project's last season, and three more than our initial season. As in the previous year, volunteers participated in every aspect of the

project from planning to implementation. The ratio of volunteer to paid hours for this project was over 10 to 1 for the season.

Activity	# of People	Hours
Project Leadership Team (volunteer)	2	82
Training and Transects (volunteer)	51	1092
Project manager (paid)	1	220

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

DISCUSSION

Transects:

Perhaps the most distinctive events of the 2009 field season was a large rain event in early January and a subsequent period of several weeks with little fresh snow. This created poor tracking conditions and is likely a contributing factor to lower than average overall detections for the winter and decreased diversity of species detected. This was the first field season where we did not record historic sign (mainly bear and ungulate sign on trees) and this also probably contributed to a decrease in overall detection rates this season.

The rain event created a strong rain crust that persisted for weeks. This crust, which made poor tracking conditions for light, soft footed species, may also account for greater than average elk activity and records of elk from higher elevation transects than in the first two field seasons. This increased elk activity may also account for the higher rate of detections on the Easton Hill transect than in previous seasons.

Summer Gold Creek Transect:

A survey of the Gold Creek transect was carried out in early September, about two months after the reservoir pool level dropped low enough for the transect to be exposed. Tracks of three terrestrial mammals were found on southern transect route: elk, deer, coyote. Extensive tracks of deer and elk were also found under the interstate at the current Gold Creek bridges as well as along the creek on both the north and south sides of the interstate.

These findings indicate that this area is used by at least a few terrestrial species once reservoir pool levels are low enough. That deer and elk are currently using the existing passage under the interstate which was not designed for terrestrial wildlife passage is a promising sign for the effectiveness of an improved wildlife crossing structure (underpass) at this location. Management of reservoir pool levels would be an important component of maximizing the effectiveness of these structures.

Trailing:

Trailing has revealed no definitive evidence of an individual animal crossing the highway. Accounts of elk, coyote, and bobcat traveling directly to and then either paralleling the highway or immediately turning away from the highway are consistent with the theory that the highway is a general deterrent to travel (Forman et. al. 2003). However, in the case of bobcat and coyotes, travel routes and micro-route selection along the forest edge of the highway corridor likely indicate hunting and scavenging behavior for both species. Micro-route selection which weaves in and out of the forest edge through areas of dense prey species sign is consistent with hunting travel patterns with successful results (chase and kill sequences) that have been observed for both species in similar habitat (David Moskowitz, unpublished field notes). Scavenging along the road edge may be for either road killed animal carcasses or foodstuffs discarded by humans (observed specifically at the chain-off area on east bound lanes adjacent to the Gold Creek South transect).

Another explanation for travel along the highway edge for some accounts could be increased snow density from plowing operations that would allow for greater floatation on the snow and therefore easier travel. This may be the case particularly for

the elk trailed along the edge of the roadway as this species has a low foot-loading index (high degree of penetration into snow) (Halfpenny and Ozanne, 1989) and must exert an increasing amount of energy to travel through deep snowpack (Parker et. al. 1984). Elk generally move to lower elevations then the study area for the winter, a migration which is in part carried out to avoid energy costly travel through deep unconsolidated snow (Adams, 1982). This explanation would not be valid for trails that followed the forest edge but did not travel over the plow debris immediately adjacent to the roadway.

Citizen Science:

We see that the use of trained citizens to carry out this project has been successful during all three years of its operation. The number of volunteers and the number of times transects are surveyed during the winter have both increased. The ratio of volunteer hours to paid hours continues to grow as volunteers gain more experience and organizational task move behind us. Team leaders who have lead teams for more than one season contribute to this rise in efficiency. As in previous years, the use of a leadership team composed of 2 volunteers and a single paid staff member has proven to be both efficient and highly effective at meeting the project's goals. Using the field team structure of highly trained team leaders working with several entry level volunteers, the project has continued to maintain a high degree of quality in data collection while also providing excellent educational experiences and recruiting future team leaders.

Changes for the next field season:

1. Consolidate volunteer management for the summer and winter portions of CCWMP to increase efficiency of communication with volunteers, many of whom are involved with both parts of the project.

2. Further develop protocol and training for winter recreationalists to identify and document tracks and signs of wolverines (*Gulo gulo*) that they may discover during backcountry outings. Sightings and documentation can be used to direct remote camera teams. DNA (extracted from hairs collected from tracks/beds or from scat)

collected from these sightings can of their own right provide definitive evidence of the presence of this species as well as contribute to our understanding of the distribution and genetics of wolverines in the Cascades.

Acknowledgements:

Thank you to the funders who generously supported this past season of citizen monitoring through generous gifts to the I-90 Wildlife Bridges Coalition including the Wilburforce Foundation, ALEA Cooperative Funding from WA Department of Fish and Wildlife Service, and National Forest Foundation. A special thanks to the Starbucks in North Bend for donating the use of their closet space for storing equipment during the winter field season.

Thank you to all of this winter's volunteers who donated their time, energy, and enthusiasm to this project in many large and small ways: Adam Martin, Allison Lee, Andrew Knutzen, Brendan Higgins, Brian McConnell, Chantal Argyle, Chantrelle Johanson, Chris Lee, David Snair, Doerte Mahanay, Doug Beeman, Emily Hudspeth, Greg Sommer, Heidi Rodenhizer, Henry Gales, Jean Leonhardt, Jenny Cochrane, Jessica Hahn, Joan Golston, Joe Kiegel, Joe Talbot, John Sanderson. Jonathan Goff, Julie Stanford, Kari Hiser, Kate Thayer, Keith Harlow, Kelly Staples, Kerry Murphy, Krishni Seasholes, Kyleen MacGugen, Laura Appell, Lindsay Huettman, Mallory Clarke, Matt Monjello, Maureen Corlas, Meg McNabb, Mike Mahanay, Paul Wachur, Penny Green, Peter Bettmann-Kerson, Randall Martin, Richard Champlin, Riley Fleet, Rob Lohr, Roger Urbaniak, Ruth Woods, Sam Appell, Stephanie Van Dyke, Steve Smith, Terry Stanford, Thomas Murphy, Tim Bootz, Trent Elwing, Jesse Wanskasmith and Tracy Durnell.

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