

CITIZEN WILDLIFE MONITORING PROJECT

2014 SPRING-FALL FIELD SEASON REPORT



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(Photo of wolverine (Gulo gulo) at Ice Lake site)

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EXECUTIVE SUMMARY

For over a decade, the Citizen Wildlife Monitoring Project has marshalled citizen scientists looking for Washington's rare and sensitive wildlife. Using remote cameras and snow tracking, project volunteers monitor for wolverines, gray wolves, North Cascades grizzly bears, Canada lynx, and more, while also focusing on detecting wildlife present in places critical for wildlife connectivity, conservation, and habitat such as along the Interstate 90 (I-90) corridor.

Citizen scientists contribute valuable new information on the presence and patterns of wildlife in our state. Our project efforts cover geographic areas outside those where professional research efforts are ongoing, adding to and strengthening the work of agencies, biologists, and others.

From May through November 2014, 76 volunteers in the Citizen Wildlife Monitoring Project installed and maintained 22 sites in Washington and British Columbia. Sites were focused on Washington's Cascade Mountains and the Kettle River Range (the Kettle River Range encompasses southeastern British Columbia and Ferry County, Washington, in the United States). The main objectives for the 2014 spring-fall field season were to 1) monitor gray wolf (*Canis lupus*) presence in the Southern Cascades, 2) detect wolverine (*Gulo gulo*) presence in the North, Central, and Southern Cascades, 3) document grizzly bears (*Ursus arctos*) in North Cascades Grizzly Bear Recovery Zone, 4) observe all wildlife presence between Hyak and Easton adjacent to I90, and 5) document transboundary Canada lynx (*Lynx canadensis*) activity between northeast Washington and British Columbia.

With the assistance of Conservation Northwest program staff and our Advisory Council (Appendix I); we established four sites in the North Cascades, three sites in the Central Cascades, five sites in the I-90 corridor, and eight sites in the Southern Cascades (our points of delineation for Cascades regions can be found on Page 6 of this report). Though three sites were installed in the Kettles Range, one site on the British Columbia side and two sites on the Washington side, only two sites reported data to date. Since this was our second season in this region monitoring on both sides of the border, we expected some minor setbacks, ergo we will continue and expand monitoring in the Kettle Range during our 2014-2015 winter monitoring season, as well as our 2015 spring-fall season.

Over the course of the 2014 spring-fall season, we detected ten species. Our greatest success this field season was continued documentation of wolverines where we know they occur in the North and Central Cascades but continued genetic profiling and documentation of new individuals is meaningful. These wolverines are on the frontlines of recovery for the species in our region. Our other success this season was documenting Canada lynx in the British Columbia Kettle Range. Other season highlights include:

- Wolverines documented at both Ice Lake and Union Gap in the North Cascades and at Chiwaukum in the Central Cascades. Photo evidence from Ice Lake identified four unique individual wolverines; including Sasha who has been previously documented and may be denning in the area. Genetic material was collected by volunteers and is undergoing analysis by the project advisors from the USDA Pacific Northwest Research Lab. Chiwaukum also received visits from a number of wolverine this year. Similar to Ice Lake, genetic material is currently being analyzed for the wolverine documented at Chiwaukum.
- Two sites dedicated to documenting the presence of grizzly bears in the North Cascades were established. Monitoring for this species is a new endeavor this year as a result of movement in recovering grizzly bears in the North Cascades. One site was located directly in the National Park and established new relationships for the project there.
- Canada lynx detected at a new site in British Columbia near Highway 3 located in a crucial corridor for lynx movement between Canada and the U.S. Ongoing winter monitoring will continue at this site, which contains four cameras located within proximity to one another.
- American martens recorded at multiple sites, a sign of late successional forest nearby where martens often den and hunt. While not a target species of our project, data collected on martens will be shared with the Cascades Carnivore Connectivity Project¹, which is studying the barrier effects of highways in genetic diversity among populations of black bears and martens.
- The highest diversity of species observed at three different sites this year. Two sites were located in the South Cascades (Cowiche Creek and Rimrock Lake), while the other was located in British Columbia and included a target species, Canada lynx. Each of these sites documented eight different species, including Canada lynx, cougar, bobcat, elk, and deer, among others.
- Animals documented at the Gold Creek site were of particular interest this season due to the completion of two wildlife underpasses at Gold Creek. The recording of seven different species in habitat adjacent to these new crossing structures speaks to their use for wildlife to safely cross under I-90. Since the underpasses have transitioned from a construction to restoration phase, we expect to see wildlife using the underpasses and the areas adjacent to them.

The work of our volunteers through the Citizen's Wildlife Monitoring Project increases our understanding of wildlife on the Washington landscape and in the transboundary region

¹ Cascades Carnivore Connectivity Project, <http://www.cascadesconnectivity.org/>

between Washington and British Columbia. Not only does visual documentation of species influence research and policy decisions, these images create a narrative and put a face to our wildlands; the Citizen Wildlife Monitoring Project underscores the importance of monitoring and conservation efforts to ensure a stable landscape for Washington's wildlife.

PROJECT OVERVIEW

Over a decade ago, Conservation Northwest began using citizen science as a way to fulfill our mission of protecting and connecting wildlife and wildlands from the Washington Coast to the B.C. Rockies. Although the technology has changed since then, we continue to train and deploy hundreds of citizen scientists each year throughout our mission area with the Citizen Wildlife Monitoring Project (CWMP). The project uses remote cameras and snow tracking to document rare and sensitive species throughout core areas, providing security habitat for rarer wildlife, as well as more common species in strategically important locations. Since its inception, CWMP has remained an asset to wildlife agencies and professionals by providing additive monitoring efforts in areas identified as potential core habitat for some of our region's rarest wildlife. Our main project objectives are:

1. To engage and educate citizens on wildlife species and monitoring 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 exchange of information on wildlife, including data from monitoring efforts, between public agencies, organizations, and interested individuals.

Due to the number of partners in the Cascades ecosystem, CWMP operates in the Cascade Range through a collaborative effort, formalized in 2006, between Conservation Northwest, the I-90 Wildlife Bridges Coalition, and Wilderness Awareness School. Throughout each monitoring year, each organization leads a faction of the project: Conservation Northwest acts as the main volunteer coordinator for all efforts, as well as taking the lead in all remote camera efforts beyond the I-90 corridor in the north and south Cascades. I-90 Wildlife Bridges Coalition and the Wilderness Awareness School provide in-kind and financial support to the project.

CWMP has broadened its positive impact through an Advisory Council made up of project partners, government agency biologists, and professional researchers (Appendix I). Our Advisory Council provides valuable input to the review of our program; it also steers our yearly monitoring objectives and site locations. Councilmembers assist in developing our protocols, confirm identification of priority images from the season, and provide a scientific audience for results gained in the field from hair samples to tracks. These collaborations between project partners and advisors are crucial to the success of the program year to year. Collaboration keeps our efforts scientifically informed and relevant, ensures coordination rather than duplication of monitoring efforts statewide, and adds valuable on the ground information to the conservation community.

Monitoring seasons are broken into two terms: April – November (spring-fall) remote camera monitoring and December – March (winter) remote camera monitoring and snow tracking. At the finale of each season a monitoring report is prepared and made public through Conservation Northwest’s website (<http://www.conservaionnw.org/what-we-do/wildlife-habitat/wildlife-monitoring>). For the purposes of this report, we focus here on our results from the 2014 spring-fall monitoring season.

This season, we concentrated our study area in two distinct regions – the Cascade Mountains in Washington and the Kettle Range (the Kettle Range encompasses southeastern British Columbia and Ferry County, Washington, in the United States). Within the Cascade Mountains, we have refined the study area into four distinct regions:

1. North Cascades: North of US 2 and west of US 97
2. Central Cascades: Between I-90 and US 2
3. I-90 Corridor: Between Hyak and Easton along I-90
4. Southern Cascades: South of I-90

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

1. Monitor the recovery of gray wolves (*Canis lupus*) in the Cascade Mountains, with a particular focus on the Southern Recovery Zone. These sites were identified to respond to identified high-quality habitat where wolves are expected to expand their existing range and recover.

2. Document the presence of wolverines (*Gulo gulo*) in the North, Central, and Southern Cascades outside of the geographic scope of the ongoing North Cascades Wolverine Study.² In addition to collecting visual documentation through remote cameras, these sites also are set up to collect genetic information valuable to wildlife agencies.
3. Document grizzly bears (*Ursus arctos*) in North Cascades Grizzly Bear Recovery Zone as part of the Cascade Carnivore Connectivity Project's ongoing research.
4. Observe the behavior and presence of all wildlife species in key habitat connectivity areas east of Snoqualmie Pass along Interstate 90, where wildlife crossing structures are completed, under construction, or planned for construction under the I-90 Snoqualmie Pass East Project.³
5. Detect transboundary wildlife activity between northeast Washington and British Columbia with a specific focus on documenting and collecting genetic information of Canada lynx (*Lynx canadensis*).

Wolf Monitoring

Since 2008 when this program's remote cameras documented the first wolf pack in Washington in over 70 years, Conservation Northwest placed major focus on wolf recovery in Washington. As of March 2014, Washington is home to thirteen confirmed wolf packs making up over 52 wolves.⁴ Though the majority of these packs have established territories in eastern Washington, three packs now reside in the North Cascades. Conservation Northwest partners with the Washington Department of Fish and Wildlife to implement the state's wolf conservation and management plan developed in 2011. In addition to shaping wolf policy in Washington, Conservation Northwest through CWMP provides on-the-ground data used to better understand the distribution of wolves across the state.

The Wolf Conservation and Management Plan, written in 2011, identify three recovery zones in Washington: Eastern Washington, the North Cascades, and the Southern Cascades and Northwest Coast.⁵ According to this plan, wolves will be considered recovered in the state of Washington if there are 15 successful breeding pairs for three consecutive years. Additionally, each recovery zone must have at least four breeding pairs for three consecutive years. To date,

² North Cascades Wolverine Study. Lead Principle Investigator: Keith Aubry (USDA Forest Service, Pacific Northwest Research Station, Olympia, WA)

³ The I-90 Snoqualmie Pass East Project is designed to improve wildlife movement across I-90 between Hyak and Easton. The I-90 project design includes 14 key animal-travel areas, where one or more improvements will be made to allow for wildlife to better move across the interstate and waterways under the interstate. Maps of the identified areas for wildlife passage can be found at: wsdot.wa.gov/NR/rdonlyres/F6513B4C-12AE-43D3-ABA1-95104CAAD29D/72075/190_Project_Folio_ConstWeb.pdf

⁴ Washington Department of Fish and Wildlife Gray Wolf Packs Map: wdfw.wa.gov/conservation/gray_wolf/packs

⁵ Gary J. Wiles, Harriet L. Allen, and Gerald E. Hayes, *Wolf Conservation and Management Plan: State of Washington* (Olympia, WA, USA: Washington Department of Fish and Wildlife, December 2011).

there are 12 packs in Washington, none of which have been documented in the Southern Cascades and Northwest Coast recovery zones. To address the lack of documentation in the Southern Cascades, during the CWMP 2014 monitoring season we focused our efforts on responding to anecdotal reports of wolf activity south of I-90.

Wolverine Monitoring

The largest terrestrial members of the weasel family, wolverines are one of the rarest carnivores in North America.⁶ Wolverines prefer alpine environments where snow packs persist well into summer months. In addition to living in these difficult environments where food is scarce, wolverines are extremely mobile carnivores with home ranges between 100 km² to upwards of 900 km²; this means they typically live in low densities across large landscapes.⁷ After almost complete eradication in the 1900s from the lower 48 states, wolverines have begun a comeback to places such as the North Cascades; and since 2005, state researchers have identified a dozen individual wolverines. But much is still unknown about these rare and elusive species, and that's where the Citizen Wildlife Monitoring Project comes in.

Though currently unprotected, conservation groups have pursued listing the wolverine for endangered status under the Endangered Species Act at both the federal and state levels. In the fall of 2014, the USFWS published their final ruling on the listing status for wolverine nationwide and found the species did not warrant federal protections.⁸ In response to the negative finding from UFWWS, conservation groups have filed a lawsuit against the government to continue to pursue protection. Conservation Northwest and other organizations are pushing decision makers to create state and federal safeguards for wolverines as they recover across Washington and the lower 48 states.

Through CWMP monitoring activities, Conservation Northwest will help shape recovery and critical habitat plans for Washington, inform land management, and build upon ongoing research in the Cascades. Our goals for wolverine monitoring in 2014 were to 1) help the Entiat Ranger District of the Okanogan-Wenatchee National Forest monitor wolverines' presence in the Entiat Valley in the Glacier Peak Wilderness in the North Cascades, with a specific interest in documenting Sasha, a potentially denning and reproducing female wolverine, 2) document the presence of wolverines in the Central and Southern Cascades; and 3) collect genetic data through hair samples to help identify individual wolverines documented. In 2014, our

⁶ Keith B. Aubry, Kevin S. Mckelvey, and Jeffrey P. Copeland, "Distribution and Broad-scale Habitat Relations of the Wolverine in the Contiguous United States," *Journal of Wildlife Management* 71, no. 7 (2007): 2147, doi:10.2193/2006-548.; Vivian Banci, "Wolverine," in *The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States.*, ed. Leonard F. Ruggiero et al. (Fort Collins, Colorado, USA: USDA Forest Service Technical Report, 1994), 99–127.

⁷ Banci, "Wolverine."

⁸ Washington Department of Fish and Wildlife December 17, 2013, press release: fws.gov/mountain-prairie/pressrel/2013/12172013_wolverine.php

wolverine monitoring continued in the Chiwaukum and Bootjack Mountains where our remote cameras have documented over four individual wolverines to date. To ensure that our efforts add to existing research, we focus on areas that lie outside of the current study area established by the North Cascades Wolverine Study and on geographic locations where specific requests for assistance from ongoing researchers are made to complement their efforts.

Grizzly Bear Monitoring

At one time grizzly bears (*Ursus arctos*) roamed throughout the wild areas of Washington. Since their near extirpation from the lower 48 states in the 1800's, grizzly bears were listed as endangered under the Endangered Species Act in 1975. In 1997 the North Cascades, along with five other recovery zones, was identified as a key area for recovery of the endangered bear species.⁹ Now, 20 years later after the recovery plan was written, the National Park Service and the U.S. Fish and Wildlife Service are embarking on an important public process to explore options on how to recover grizzly bears in the North Cascades.

Despite anecdotal reports of grizzlies in the North Cascades, no population or individuals has been confirmed in the area. Based on expert opinion and a database of sightings, the U.S. Fish and Wildlife Service believe there are fewer than 20 grizzly bears remaining in Washington's North Cascades ecosystem. The British Columbia Ministry of Environment estimates there are six grizzly bears in the Canadian North Cascades.

In 2010, with oversight from the North Cascades Interagency Grizzly Bear Subcommittee, the Cascade Carnivore Connectivity Project (CCCP) and other project partners began an extensive survey to detect grizzlies potentially occupying Washington's North Cascades Ecosystem (NCE). While this project has not yet found photographic or genetic evidence of grizzly bears in the study area, they continue to monitor the area to assist the National Park Service and the U.S. Fish and Wildlife Service in evaluating potential options for grizzly bear recovery in the region. CWMP's effort to detect grizzly bears in the NCE is designed to complement the work already carried out by the CCCP. Locations for surveying are selected based on the sampling model created by CCCP and the sampling method they employed based on the "hair corral" described by Kendall and McKelvey (2008).¹⁰ CWMP's field methods are adapted from these methods to focus on simple detection using remote camera data rather than DNA analysis based on genetic sample (hair) collection. CCCP's primary research objectives were to collect information on the

⁹ Servheen, C. 1997. Grizzly bear recovery plan: North Cascades ecosystem recovery plan chapter. U.S. Fish and Wildlife Service. Missoula, MT.

¹⁰ Long, R.A., J.S. Begley, P. MacKay, W.L. Gaines, and A.J. Shirk. 2013. The Cascades Carnivore Connectivity Project: A landscape genetic assessment of connectivity for carnivores in Washington's North Cascades Ecosystem. Final report for the Seattle City Light Wildlife Research Program, Seattle, Washington. Western Transportation Institute, Montana State University, Bozeman. 57 pp. and Kendall, K.C., and K.S. McKelvey. 2008. Hair collection. Pages 141–182 in Long, R. A., P. MacKay, W. J. Zielinski, and J. C. Ray, editors. Noninvasive survey methods for carnivores. Island Press, Washington, D.C.

genetic structure of carnivore populations in the NCE and secondarily to detect grizzly bears and other rare carnivores. CWMP's primary research goal is detection of grizzly bears.

I-90 Corridor Monitoring

Historically, I-90 has been known as a major barrier to north and south wildlife movement in the Cascades. As a result of an earlier large scale connectivity analysis of the Cascade Mountains, a narrow crucial corridor across Interstate 90 was identified for wildlife passage.¹¹ In an effort to create a more permeable interstate, the Washington State Department of Transportation has developed a 15-mile highway expansion project (I-90 Snoqualmie Pass East Project) where measures for safe wildlife passage have been incorporated into the plan. Multiple crossing structures, including two overpasses, are slated for construction within the next five years.

For over five years, our project has worked in concert with the Washington State Department of Transportation and Western Transportation Institute to monitor wildlife activity along I-90 in the project area. Through both remote camera monitoring and snow tracking, CWMP has provided valuable data informing the I-90 Snoqualmie Pass East Project (I-90 SPE) throughout its planning and implementation phases. During the 2014 monitoring season, construction of Phase 1 of the I-90 SPE project was underway while the three wildlife underpasses at Gold Creek and Rocky Run were in the post-construction phase and awaiting habitat restoration of habitat within them. In 2015, restoration projects will begin underneath the two Gold Creek underpasses.

Our goals in 2014 for monitoring the I-90 stretch from Hyak to Easton were to document wildlife activity in the habitat leading into to these completed wildlife crossing structures, while also documenting wildlife presence in key connectivity emphasis areas in future phases of the project.

Transboundary Lynx Monitoring

Washington is home to one of the largest populations of Canada lynx, the rarest wild cats in North America, in the lower 48 states.¹² Much like the history of wolverines in our state, lynx were targeted for trapping and hunting in the fur trade in the 1800s and early 1900s. Hunting pressure along with habitat decline reduced their numbers drastically in Washington.¹³ As a result of these pressures, lynx are protected under the federal and state Endangered Species Acts. Based on the preferred habitat of lynx, Koelher et al. estimate that Washington has

¹¹ I-90 Wildlife Bridges Project description and connectivity analysis: i90wildlifebridges.org/project-info

¹² Derek W. Stinson, *Washington State Recovery Plan for the Lynx* (Olympia, WA, USA: Washington Department of Fish and Wildlife, 2001).

¹³ Ibid.

approximately 3,800 km² of available habitat.¹⁴ Researchers have documented dispersal of lynx across the Canadian border in northeastern Washington.¹⁵ Since wildlife often move across political boundaries, Conservation Northwest works closely with U.S. and Canadian conservation allies to ensure that lynx and other wildlife can travel safely and seamlessly across the border. In 2013, Conservation Northwest began a pilot season in the Rossland Range of British Columbia to document lynx activity near the U.S.-Canadian border. We continued this program into 2014 and expanded into the Washington side of the Kettles Range.

Our major objective for 2014 lynx monitoring in British Columbia was to 1) document the presence of lynx in the transboundary linking habitats between British Columbia and Washington, and 2) collect genetic data from hair snags placed at each remote camera site to increase our understanding of lynx here and their relation to adjacent, better studied, lynx populations in the Rockies and Cascade Mountains.

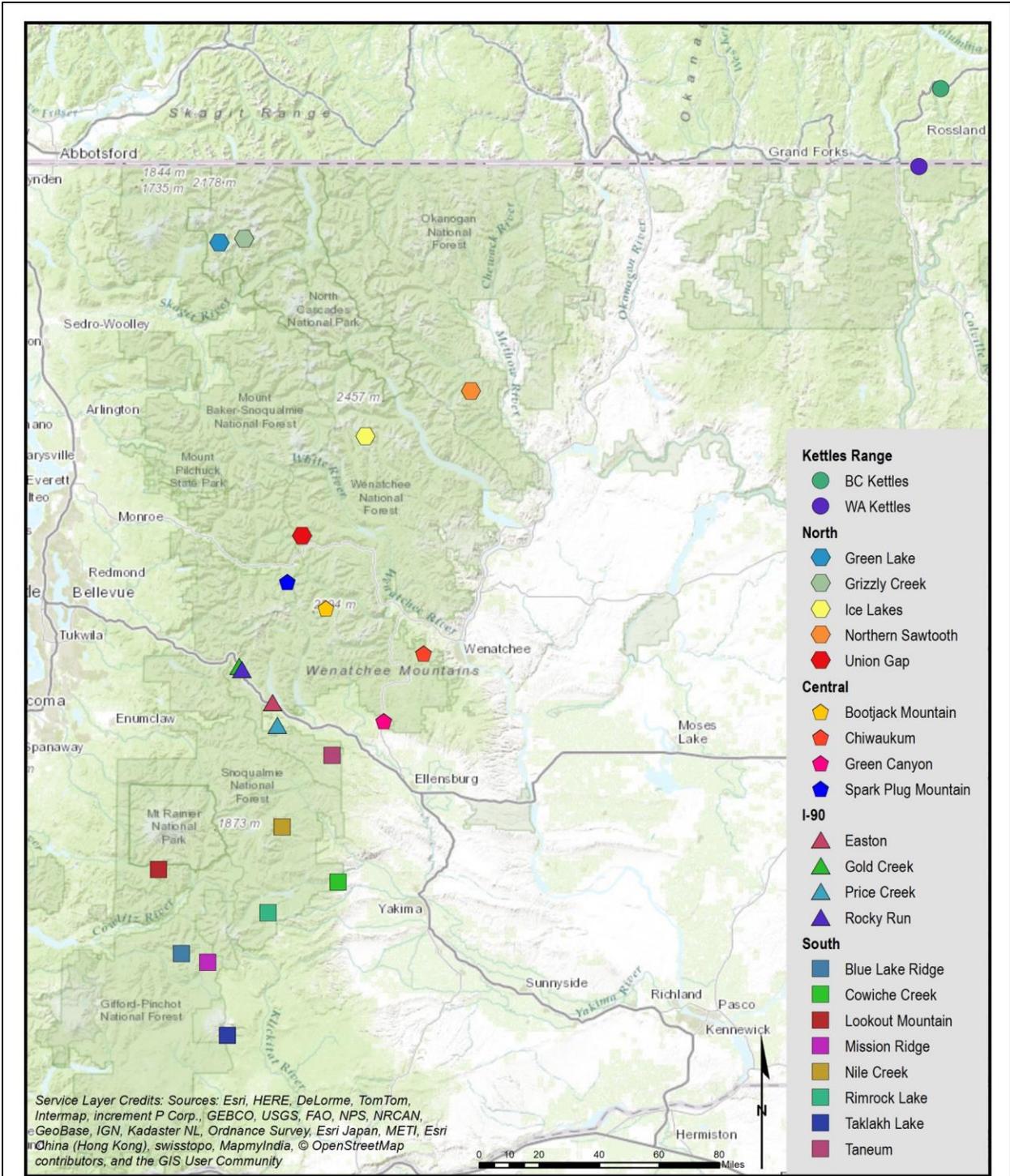
METHODOLOGY

CWMP is an entirely volunteer-based project supported by Conservation Northwest, interns, and other project partner staff. Though our winter monitoring season includes snow tracking techniques, the bulk of our work is accomplished through the use of remote motion-triggered cameras. The use of motion-triggered cameras represents an easy and verifiable method of documenting wildlife presence and has been used as a significant research tool in many projects worldwide.¹⁶ Additionally, motion-triggered cameras provide a tangible, low-cost way to engage citizens in wildlife monitoring and conservation. Together, our network of volunteers and cameras provide invaluable verifiable data on rare and sensitive species presence.

¹⁴ Gary M. Koehler et al., "Habitat Fragmentation and the Persistence of Lynx Populations in Washington State," *The Journal of Wildlife Management* 72, no. 7 (2008): 1518–1524, doi:10.2193/2007-437.

¹⁵ Stinson, *Washington State Recovery Plan for the Lynx*; J.D. Brittell et al., *Native Cats of Washington, Section III: Lynx*, Unpublished (Olympia, WA, USA: Washington Department of Fish and Wildlife, 1989).; and Kim G. Poole, "Dispersal Patterns of Lynx in the Northwest Territories," *The Journal of Wildlife Management* 61, no. 2 (1997): 497–505.

¹⁶ Masatoshi Yasuda, "Monitoring Diversity and Abundance of Mammals with Camera Traps: A Case Study on Mount Tsukuba, Central Japan," *Mammal Study* 29, no. 1 (2004): 37–46.; and Christen Wemmer, Thomas H. Kunz, and Virginia Hayssen, "Mammalian Sign," in *Measuring and Monitoring Biological Diversity*, by Don E Wilson et al. (Washington: Smithsonian Institution Press, 1996).



2014 Spring-Fall Monitoring Sites

Citizens Wildlife Monitoring Project

Study Area

This season our primary focus was on the Cascade Mountains in Washington. However, we continued our pilot project in the Rossland Range region of British Columbia and expanded into the Washington side of the Kettle Range looking for lynx in areas not far from the U.S.-Canadian border. To further delineate core habitats and to give geographic context to our site selections, we have defined our study area by the following boundaries:

1. North Cascades: North of US 2 and west of US 97
2. Central Cascades: Between I-90 and US 2
3. I-90 Corridor: Between Hyak and Easton along I-90
4. Southern Cascades: South of I-90
5. Kettle River Range: southeastern British Columbia and Ferry County, Washington, in the United States

Site Selection

At the beginning of each season, we select and prioritize monitoring sites in collaboration with all project partners and our Advisory Council. Sites are initially selected based on target species and core habitat with consideration to equipment inventory, as well as staff and volunteer capacity. Our list of sites goes through numerous iterations as we discuss priorities and capacity with our Advisory Council. The finalized list of sites serves as a guide for volunteer recruitment.

Each site is chosen with a particular target species based on our monitoring objectives for the year. For the 2014 spring-fall season, our priorities were wolves, wolverines, grizzly bears, all wildlife at I-90, and lynx in the Kettle Range in BC and Washington. Project staff works with specific advisors from our Advisory Council to develop site descriptions that include the purpose of the site, special considerations, and general information useful for site construction.

Throughout the season, volunteer field knowledge and experience help CWMP staff and the Advisory Council reassess each site based on data gathered during the season. Thanks to their constant presence on the ground in core habitat, our volunteers provide invaluable feedback on best site locations, as well as actual field conditions and habitat.

Over the course of our 2014 spring-fall field season, we placed cameras at 22 sites throughout our study area. 20 of these sites were located in the Cascade Mountains with the remaining three located in the Kettle Range (one in British Columbia and two in Washington), designated for our transboundary lynx monitoring. Guided by our Advisory Council, eight of these Cascade Mountain sites focused on documenting wolves, six focused on capturing wolverine,

two focused on documenting the North Cascades grizzly bear, and the remaining four were dedicated to documenting species along I-90.

Camera Stations

Depending on the targeted species and location of each site, remote camera station setup can vary. In conjunction with project staff, protocols were developed for each type of remote camera station. All camera stations targeting wolves or I-90 structures have a similar setup that includes motion-triggered cameras secured to trees and scent lure, unless specifically instructed otherwise (Appendix III and IV). Generally two cameras are placed within the same designated area; however, they are far enough apart to potentially capture different individual animals.

Though not much different than camera sets for general wildlife and wolves, sites targeting grizzly bears use a special lure developed by the U.S. Forest Service containing fermented cattle blood and fish oil. This lure is highly attractant to bears and is poured over a large pile of brush and sticks constructed by volunteers maintaining these sites (Appendix V). Cameras are positioned to capture bears as they smell and explore the brush pile and lure. Though these sites do not have hair snagging devices installed, if grizzlies are suspected to have visited the site, volunteers have been instructed to collect hair if available.

Sites targeting wolverine have a setup conducive to capturing visual documentation of their chest blazes (Appendix VI). These sites, called run-pole stations, are constructed with natural materials on site. Wolverine run-pole stations include two cameras, one set directly across from the run pole and the other off to the side. Each run-pole site includes bait strung strategically above the run-pole. Wild bait (deer, elk, etc., often from road kills) is preferred for these sites. However, in cases where wild bait was unavailable, bait was purchased at butcher shops. In addition to run-pole structures and bait, each site designated for wolverine detection was also equipped with snags for hair collection. Though individual wolverine can be identified visually from chest blaze photographs, DNA analysis is important to confirming individuals and retrieving additional information. The hair snag system CWMP employs consists of a gun brush belt with eight gun brushes attached horizontally. This belt is attached just below the run-pole around the tree. Hair samples are removed from the gun brushes using latex gloves at each visit and are sent away immediately for lab analysis.

Sites targeting lynx follow a National protocol developed in 1999 by McKlevey et. al (Appendix VII). In addition to having remote cameras, these sites are also equipped with hair snagging devices and scent stations designed to attract lynx for DNA analysis. The lure used for our 2014 season was different from our normal scent lure. However, in 2015 we will begin using a special mixture of glycol, glycerine and beaver castorium as recommended by McKlevey et. al. Scent stations are also equipped with catnip that elicits a rubbing motion on the hair snagging

devices. In addition to using scent to attract lynx to the stations, volunteers are also required to hang shiny material from an overhanging limb.

During the 2014 spring-fall season, the majority of our cameras were Bushnell Trophy Cam XLT though a few sites also had Reconyx RC55 or RC60. Camera settings are standardized across each site for comparability across the study area as outlined in the protocols (Appendix III). Volunteers are trained in camera installation and maintenance prior to each season at a training held by project staff.

All sites, regardless of target species, are marked with a scent lure with exceptions made in the I-90 corridor where the proximity of the site is too close to the roadway. Wildlife use scent markings as important means of communication to establish territories, find mates and prey, assess levels of danger, and ascertain other individuals within the same vicinity.¹⁷ Scent lure mimics this natural mode of communication and acts as an attractant bringing individual wildlife into the remote camera site.¹⁸ The application of scent lure in our project adheres to guidelines and best practices established by our Advisory Council.

Species Prioritization

Though each site is established with a specific target species in mind, data gathered on the presence of non-target wildlife is also valuable. We use a species priority list that categorizes Washington species in order of significance to our project as established by project staff in consultation with our Advisory Council. Using our category structure, we are able to establish protocols for documenting certain species of interest and facilitating timely communication with project partners during the season. All Level 1 species detected at a remote camera site during the season are immediately reported to project staff for confirmation and further communication. The priority listing for our 2014 season is as follows:

Level 1

Wolverine
Fisher
Lynx
Wolf
Grizzly bear

Level 2

Cougar
Marten

¹⁷ Fredrick V. Schlexer, "Attracting Animals to Detection Devices," in *Noninvasive Survey Methods for Carnivores*, by Robert A Long (Washington, D.C.: Island Press, 2008).

¹⁸ Ibid.

Mountain goat
Mountain red fox/Cascades red fox

Level 3

Black bear
Bobcat
Coyote
Elk
Mule deer
Raccoon
Snowshoe hare and smaller mammals
Livestock
Human (non-volunteer)

RESULTS AND DISCUSSION

During the 2014 spring-fall monitoring season data was collected from May through November. However, due to accessibility restrictions, information collected during the previous winter is included from sites (Ice Lakes and Sparkplug Mountain) which were established in 2013 but not reported on in 2013 and remained active through the current monitoring season.

Over the course of the season 22 sites were established and maintained by project volunteers. These sites were strategically positioned throughout the Cascade Mountain Range, northeastern Washington, and into the southern regions of British Columbia. The following results involve species of interest to this program as identified by our Advisory Council and project staff. Only species falling within the three priority levels are included (found on page 15). Due to increasing interest in the interaction of wolves and livestock in Washington, any observed domestic livestock and human activity is included in the analysis as a Level 3 species.

Though our program expands knowledge of wildlife presence in Washington, limitations to the breadth of our data do exist. Our data cannot ascertain species diversity, population size, or species absence. Rather, our data focuses on species richness, which has invaluable applications to the conservation and management of rare and sensitive species in Washington. Species richness is defined as the number of different species present within a defined area. In addition to assessing species richness, we also assess the number of observed events of identified priority-level species per site. For the purposes of this project, an event is defined as any visit of a single animal (or group of animals belonging to the same species) to a camera site with no gap greater than 5 minutes between images. Thus, the more events recorded from each level (with a particular emphasis on Level 1 species), the greater the importance to the goals of our project.

To give geographical context to the data, the results are summarized following the five study area divisions described in our methodology. Additionally, each site represents combined data from two separately situated motion-triggered cameras set up within the same vicinity, unless otherwise noted.

Cascades Mountains

North Cascades

Designated as the area North of US 2 and west of US 97, the North Cascades region consisted of four sites this season. The Ice Lakes and Union Gap sites were dedicated to wolverine detection (Table 1). Two new sites, Northern Sawtooth and Grizzly creek, were established in compliance with the 2014 CWMP primary goal to detect the presence of grizzly bears in the Cascade Range. The Ice Lakes site was established in the fall of last year. It was decided the site would be left up over the winter when rough terrain rendered it too difficult to access. Information collected during that time is included in this analysis.

Table 1: North Cascade remote camera sites

North Cascades Camera Sites				
Site Name	Target Species	Date Installed	Date Uninstalled	Lure/Bait
Grizzly Creek	Grizzly Bear	9/5/2014	10/27/2014	Lure
Ice Lake	Wolverine	N/A	N/A*	Both
Northern	Grizzly Bear	8/2/2014	10/11/2014	Lure
Union Gap	Wolverine	N/A*	N/A*	Both

*site remained active all year.

The Ice Lakes site was established within the known home range of Sasha, a previously documented female wolverine through the North Cascades Wolverine Study who was believed to be denning in the area. Our goal was to record not only Sasha's presence, but kits or other evidence of her reproduction. During the 2013 spring-fall monitoring season wolverine were documented at the site, however, identifiable chest blazes were not captured on camera as a result of misapplied scent lure and we were unable to specifically link the photos to her. To aid in identification, gun brushes were installed to collect hair samples for DNA analysis. This season Ice lakes documented species from all three priority levels, including 18 events from its target species, wolverine (Table 2 & 3). Images of chest blazes were successfully captured and show at least 4 individual wolverines, one of which may be Sasha. Hair samples were collected and a DNA analysis is being conducted to ascertain the number of individuals documented at the site and to confirm the presence of Sasha. No evidence of reproduction was recorded. This site will continue to be monitored through the winter under the guidance of Forest Service

biologists in the Entiat Ranger District and Pacific Northwest Research Lab in hopes of achieving our goals.

Union gap received visits from level 2, and 3 species. Specifically, 26 American martin events were documented, the highest number observed for this species at any site this year (Table 3). Improvements to this site’s setup were made in preparation for the upcoming 2015 winter monitoring season according to new protocols used by the U.S. Forest Service. A new hair snagging device equipped with alligator clips was added to the run pole, as well as a separate hanging wire that allows volunteers to raise and lower the meat without having to walk out on the pole. We hope these improvements will yield successful documentation of wolverine in the subsequent monitoring seasons.

No evidence of grizzly bear presence was captured at either Grizzly Creek or Northern Sawtooth. These results may have been influenced by an abbreviated monitoring period brought on by wilderness use regulations enforced by the National Forest Service. Access to these areas is limited to persons holding the required permits. Unfortunately, the time needed to obtain the appropriate permits interfered with establishment of these sites and we were unable to collect data for the full length of the season. Monitoring at Grizzly Creek and Northern Sawtooth will continue in 2015 for the entire 2015 spring-fall season. Only species belonging to level 3 were documented.

Table 2: North Cascade species detected by site

North Cascades						
Species Priority	Level 1	Level 2		Level 3		
Site Name	Wolverine	Cougar	Marten	Black Bear	Coyote	Mule Deer
Grizzly Creek				x		
Ice Lakes	x	x	x			x
Northern Sawtooth				x	x	x
Union Gap			x			x

Table 3: North Cascade capture events per species by site

North Cascades						
Species Priority	Level 1	Level 2		Level 3		
Site Name	Wolverine	Cougar	Marten	Black Bear	Coyote	Mule Deer
Grizzly Creek				15		
Ice Lakes	18	1	8			4
Northern Sawtooth				5	1	12
Union Gap			26			1

Central Cascades

The central cascades region is defined as the area North of I-90 to US 2 and housed a total of nine sites. Six of those sites fell within the I-90 corridor and will be discussed in the following section. This section describes the results from Chiwaukum, Green Canyon, and Bootjack Mountain (Table 4). The Chiwaukum and Bootjack Mountain sites were focused on wolverine detection while the Green Canyon site targeted wolves. Monitoring activities were continued at the Chiwaukum site from the previous seasons. Data reported from Chiwaukum represents data from four individual cameras at two sites in near proximity. CWMP has now been monitoring this site since the winter of 2011 and, to date, have documented at least five new individual wolverine using photo data and genetic analysis. Bootjack Mountain is another site continued from previous monitoring seasons. In the 2012 spring-fall monitoring season, Bootjack successfully documented a wolverine also documented at the nearby Chiwaukum cameras.

Table 4: Central Cascades remote camera sites

Central Cascades Camera Sites				
Site Name	Target Species	Date Installed	Date Uninstalled	Lure/Bait
Bootjack Mountain	Wolverine	7/27/2014	9/21/2014	Both
Chiwaukum	Wolverine	N/A*	N/A*	Both
Green Canyon	Wolf	6/27/2014	10/29/2014	Lure

*site remained active all year.

Monitoring at one location in Chiwaukum was cut short this season after the site was destroyed in a wildfire that claimed over 14,000 acres of the Chiwaukum Complex. Volunteers were instructed not to access the site until they were certain they could do so safely. Upon their return, they found two cameras holding their data had been incinerated along with the site. As a result, information was only gathered at this location through the end of June. The second location, however, was unharmed in the fire, allowing monitoring to continue within the Chiwaukum complex.

The Chiwaukum site was visited by species of all three priority levels including wolverine (Table 5). A DNA analysis of collected hair samples will tell us if the documented wolverine is a member of the previously observed wolverine or a documentation of a new individual. Though wolverines were not detected at Bootjack Mountain this season, it was important to return to both successful sites to continue collecting information on this population of wolverines residing in part or completely south of Highway 2.

Both the Chiwaukum and Bootjack sites documented the presence of American marten (Table 5). This is not surprising given that these wolverine sites coincide with prime American marten habitat. The presence of American marten in these areas may prove useful to the Cascades

Carnivore Connectivity Project, which is studying the barrier effects of highways in genetic diversity among populations of black bears and martens. The results of this study will help to inform future transportation infrastructure and policy as it relates to wildlife and road interactions.

Though targeting wolves, species detected at the Green Canyon site all fell within the level 3 priorities (Table 5). The Green Canyon site was selected in response to continued reports of wolf activity in the known Wenatchee pack territory. WDFW has had reports of two wolves traveling through the territory. However, there has been no confirmation that these wolves are a breeding pair or have established a consistent territory. Due to the proximity of the area to public grazing allotments and a city, WDFW conflict specialists requested assistance in documenting the activities of wolves in this area.

Table 5: Central Cascades species detected per site

Central Cascades										
Species Priority	Level 1	Level 2		Level 3						
Site Name	Wolverine	Cougar	Marten	Black Bear	Bobcat	Elk	Mule Deer	Other	Livestock	Human
Bootjack Mountain		x						x		
Chiwaukum	x		x	x			x	x		
Green Canyon				x	x	x	x		x	x

Table 6: Central Cascades capture events per species by site

Central Cascades										
Species Priority	Level 1	Level 2		Level 3						
Site Name	Wolverine	Cougar	Marten	Black Bear	Bobcat	Elk	Mule Deer	Other	Livestock	Human
Bootjack Mountain		1						5		
Chiwaukum	1		16	42			8	17		
Green Canyon				10	2	30	23		19	1

I-90 Corridor

The area along I-90 of interest to the CWMP lies in the 15 mile stretch between Hyak (milepost 54) and Easton (milepost 70). As a result of connectivity analysis, this section of I-90 was identified as a crucial corridor for wildlife passing from the North Cascades to the South Cascades. Unfortunately, the construction of I-90 resulted in, not only a physical barrier for wildlife seeking safe passage throughout the Cascade Range, but also exposed and highly degraded habitat. In efforts to mitigate harm to our wildlife, the I-90 Snoqualmie Pass East Project was introduced and the construction of safe wildlife passages began. Monitoring these sites gives invaluable information to the Washington Department of Transportation and other decision makers as they upgrade and retrofit the interstate.

CWMP has prioritized the I-90 corridor for multiple years with both remote camera monitoring and snow tracking. The closing of the 2013 monitoring season coincided with the completion of three wildlife underpasses and the conclusion of Phase 1 of the I-90 Snoqualmie Pass East Project. In the 2014 spring-fall season, six cameras were installed in the I-90 corridor to document all wildlife activity (Table 7).

Although originally established as a 2013-2014 winter monitoring site, data for the Rocky Run site was not analyzed until this season when the camera was retrieved. The camera was positioned directly north of one completed underpass. The analysis of the Rocky Run site is included in this report. Additionally, another site was monitored over the 2014 season however due to unforeseen circumstances we have yet to receive the full season’s data. Any data collected from the Upper Gold Creek site will be reported during our winter monitoring season.

Table 7: I-90 remote camera sites

1-90 Camera Sites				
Site Name	Target Species	Date installed	Date Uninstalled	Lure/Bait
Easton	All	N/A*	N/A*	None
Gold Creek	All	6/14/2014	11/1/2014	None
Price Creek	All	6/29/2014	7/12/2014	None
Rocky Run	All	1/25/2014	8/14/2014	None

*site remained active all year.

All of the 1-90 sites were visited by a wide range of level 3 species and a majority of them documented the presence of cougar, a level 2 species (Table 8). These sites also had high event detections of ungulates, more so than our other study areas (Table 9). This is significant, particularly with the Gold Creek site, due to the proximity of these sites to the highway and the newly completed underpasses. It is notable that all these sites are in habitat directly adjacent to where several wildlife crossing structures will be constructed as part of the I-90 Snoqualmie Pass East Project, including the first wildlife overpass, which is scheduled to begin construction following snow melt in 2015.

Two of the completed underpasses are located at Gold Creek, thus making species documented at Gold Creek and Upper Gold Creek of particular interest this season. Construction of the underpasses had been ongoing since 2009, leaving debris and construction material remaining within the underpasses. To complement the construction of these underpasses, Conservation Northwest has hosted multiple workshops enlisting volunteers in the restoration of habitat adjacent to these structures. In 2015, Conservation Northwest will begin restoration activities within the underpasses to complement our ongoing restoration work. As these underpasses transition from construction to restoration, continued monitoring is important to record wildlife

as they use the structure. During the spring-fall season our cameras were placed in the habitat approaching the underpasses both North and South, while in winter we monitored directly within the underpasses. This season Gold Creek documented seven priority level species, including one level 2 species, cougar (Table 8). In the 2013 spring-fall monitoring season fewer species were documented in the I-90 corridor and all documented species belonged to priority Level 3. The recording of this progress and seven species in the habitat adjacent to these new crossing structures speaks to their potential use by wildlife to safely cross I-90.

Table 8: I-90 sites species detected by site

I-90 Sites									
Species Priority	Level 2	Level 3							
Site Name	Cougar	Black Bear	Bobcat	Coyote	Elk	Mule Deer	Raccoon	Other	Human
Easton	x	x	x	x	x	x			x
Gold Creek	x	x	x	x	x	x	x		
Price Creek	x		x	x	x	x		x	
Rocky Run					x	x		x	

Table 9: I-90 capture events per species by site

I-90 Sites									
Species Priority	Level 2	Level 3							
Site Name	Cougar	Black Bear	Bobcat	Coyote	Elk	Mule Deer	Raccoon	Other	Human
Easton	2	11	5	19	45	28			12
Gold Creek	1	1	2	7	22	68	1		
Price Creek	1		2	3	7	3		3	
Rocky Run					7	27		29	

South Cascades

The South Cascades, defined as south of I-90, represents the Southern Recovery Zone as designated in the Washington Wolf Conservation and Management Plan. To date, no wolves have been confirmed south of I-90, though anecdotal reports have placed wolves in this area for years. Since 2008, wolves have continued to recover in Washington steadily re-colonizing in new parts of the state. Now, three packs have made the North Cascades home, two of which are just north of I-90 in the Teanaway and Wenatchee/Colockum areas. As wolves recover in the state, documenting their dispersal to new areas of Washington is crucial to inform land and species management of wolves.

Seven of the eight monitoring sites in the South Cascades were dedicated to wolves (Table 10). The exception being Lookout Mountain which was a run-pole site focused on wolverine detection just south of Mount Rainier in the Gifford Pinchot National Forest. All sites were

chosen as a result of anecdotal reports of the target species in the area and guidance from agency biologists in the local ranger districts in each location.

Monitoring at Nile Creek was cut short this season due to camera theft. Unfortunately, both cameras from this site were stolen; the first camera was discovered missing in the beginning of the season, and the last, upon return for the final check. As a result, data is only included from this site in the months between June and August. Additionally, a camera was also stolen at Taklakh Lake. However, we were able to replace the camera and retrieve data for the remainder of the season.

Table 10: South Cascades remote camera sites

South Cascades Camera Sites				
Site Name	Target Species	Date Installed	Date Uninstalled	Lure/Bait
Blue Lake Ridge	Wolf	5/19/2014	N/A*	Lure
Cowiche Creek	Wolf	6/8/2014	9/20/2014	Lure
Lookout Mountain	Wolverine	6/17/2014	9/28/2014	Both
Mission Ridge	Wolf	6/14/2014	10/25/2014	Lure
Nile Creek	Wolf	6/14/2014	8/16/2014	Lure
Rimrock Lake	Wolf	5/16/2014	8/23/2014	Lure
Taklakh Lake	Wolf	6/1/2014	11/16/2014	Lure
Taneum	Wolf	5/26/2014	7/27/2014	Lure

*Site will be continued throughout the winter.

Neither wolves nor wolverines were documented at any of the South Cascade sites (table 11). Despite non-detections, CWMP will continue to monitor the Southern Recovery Zone and respond to anecdotal reports as directed by agency biologists in 2015. Although the target species were not recorded, all of the sites documented the presence of deer and elk, which are primary prey for wolves (Table 11). Both Cowiche Creek and Rimrock Lake captured the largest diversity of species for the project, totaling eight species per site (Table 11).

Table 11: South Cascades species detected per site

South Cascades									
Species Priority	Level 2	Level 3							
Site Name	Cougar	Black Bear	Bobcat	Coyote	Elk	Mule Deer	Other	Livestock	Human
Blue Lake Ridge	x	x	x	x	x	x			x
Cowiche Creek	x	x		x	x	x	x	x	x
Lookout Mountain		x	x		x	x			
Mission Ridge	x	x	x	x	x	x			
Nile Creek	x			x	x	x		x	x
Rimrock Lake	x	x		x	x	x	x	x	x
Taklakh Lake				x	x	x			
Taneum		x	x	x	x	x	x		

Table 12: South Cascades capture events per species by site

South Cascades									
Species Priority	Level 2	Level 3							
Site Name	Cougar	Black Bear	Bobcat	Coyote	Elk	Mule Deer	Other	Livestock	Human
Blue Lake Ridge	19	10	1	6	27	37			10
Cowiche Creek	1	1		1	5	6	90	2	1
Lookout Mountain		11	1		6	2			
Mission Ridge	2	4	4	19	31	11	88		1
Nile Creek	1			10	22	10	1	1	3
Rimrock Lake	1	1		13	81	15	46	18	4
Taklakh Lake				x	x	x			
Taneum		2	1	6	5	15	5		

Kettle River Range

Following its pilot season in 2013, Canada lynx monitoring in the Kettle River Range this season occurred on both sides of the U.S.-Canadian border. One site was established in southeastern British Columbia and two additional sites were established in Northeast Washington to document transboundary lynx activity (Table 13). The site in British Columbia was equipped with four different camera locations, while Northeast Washington sites each monitored at the standard two locations. Data for the one of the sites in the Kettles has not been reported yet; as a result the data collected at that site will be reported in our 2014-2015 Winter Monitoring Report.

Table 13: Kettle River Range remote camera site.

Kettle River Range				
Site Name	Target Species	Date Installed	Date Uninstalled	Lure/Bait
WA Kettles	Lynx	7/19/2014	N/A*	Lure
BC Kettles	Lynx	8/28/2014	10/14/2014	Lure

*site will remain active through the winter.

Although the Washington Kettles sites only found evidence of level 3 species, the B.C. Kettles sites observed species in all three priority levels (Table 14). Most importantly, a lynx was successfully documented at one of the B.C. camera locations. In addition to visually documenting the species, hair samples were collected using a hair snagging device (Appendix VII). These samples will be analyzed within the next year.

Information on transboundary activity of rare and sensitive species is sparse and much needed. This makes our efforts in this area vital to the understanding of species near political boundaries. Due to differing management techniques and wildlife policies, transboundary issues are paramount to Washington’s management of its wildlife. The British Columbian Canada lynx population likely acts as a source population for the U.S. population, increasing the genetic variation and, subsequently, stability of our diminishing lynx populations. As conversations continue on the future of Canada lynx populations in Washington, continued monitoring efforts provide valuable information on the state of the population in the Kettle Range. For this reason, further expansion of sites on both sides of the border is planned for CWMP in 2015. Additionally, CWMP will begin partnering with researchers at Washington State University who have just begun similar research on Canada lynx in the nearby Colville National Forest

Table 14: Kettle River Range species detected by site

Kettle River Range									
Species Priority	Level 1	Level 2	Level 3						
Site Name	Lynx	Cougar	Black Bear	Elk	Coyote	Moose	Mule Deer	Other	Livestock
WA Kettles			X				X	X	X
BC Kettles	X	X	X	X	X	X	X	X	

Table 15: Kettle River Range capture events per species by site

Kettle River Range									
Species Priority	Level 1	Level 2	Level 3						
Site Name	Lynx	Cougar	Black Bear	Elk	Coyote	Moose	Mule Deer	Other	Livestock
WA Kettles			6				16	17	3
BC Kettles	1	1	2	2	1	2	5	4	

RECOMMENDATIONS FOR FUTURE MONITORING

At the end of each season we reflect on lessons learned as we begin the process of planning for the next field season. Information and guidance from volunteers, project advisors, project

partners, and project staff helps us compile best practices for remote camera monitoring in Washington. These recommendations improve the efficacy, efficiency, and power of our work.

Already being assessed and incorporated in the 2015 spring-fall monitoring season are specific recommendations. In the 2015, CWMP will:

- Conduct a review of site selection standards to deter camera theft and loss of project resources. We saw six cameras stolen over the course of the 2014 season, in order to reduce this amount of loss; the leadership team will consider techniques and equipment that will deter theft.
- Continue and expand monitoring efforts for grizzly bears in the North Cascade Ecosystem, as well as continue to develop research relationships within the North Cascades Park.
- Continue to focus on wolverine sites in areas that can be monitored safely year-round. Assess current methods for collecting hair samples at run-pole stations via Union Gap pilot site.
- Expand monitoring activities further into the Gifford Pinchot National Forest and adjacent wilderness areas.
- Reach out to colleges and universities to engage upcoming wildlife professionals in wildlife monitoring in the state and look for other opportunities to partner with ongoing efforts.
- Develop a new strategy to provide volunteer and coordination capacity to build off of our second pilot year effort in the Kettle Range in British Columbia and Northeastern Washington to study Canada lynx in this transboundary region.
- Compliment and streamline efforts between CWMP, Washington State University, and Selkirk College researchers monitoring Canada lynx in Northeast Washington.
- Ensure early coordination with other monitoring efforts throughout our coverage area both professional and citizen.
- Evaluate our new data management system implemented this season to facilitate data exchange between volunteers and project staff. Look for new methods of data collection that may ease data management on both the volunteer and project staff end of the project.
- Refine our database so that we can tackle larger research and conservation questions with the robust data set we have from years of monitoring efforts across the state.
- Provide expanded opportunities for connections between volunteers and other ongoing wildlife field research in our state, and field skill trainings.

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