Wolverine Remote Camera and DNA Traps: Scouting Guidelines and Installation Protocol

Citizen Wildlife Monitoring Project
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Citizen Wildlife Monitoring Project partner organizations: Conservation Northwest and Wilderness Awareness School

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Introduction

Once shot on sight, trapped and poisoned as vermin, wolverines were thought to be locally extinct in Washington by the 1930s. But in recent years *Gulo gulo*, a member of the weasel family the size of a small border collie, has been making a comeback in the North Cascades under state protections from hunting and deliberate trapping. Genetic data from "hair snares" has linked Washington's resurgent population to wolverines in Canada.

Today biologists believe Washington's North Cascades wolverine population is estimated to be less than 40 animals (Inman 2013), with only around 300 wolverines remaining across the lower 48 states (USFS 2013). Between 2009 and 2016, only two individuals were documented south of I-90, north of Mount Adams and in the Goat Rocks Wilderness, but in 2018 the first reproducing wolverine has been confirmed in Washington south of I-90(CCP 16'& 18').

Though wolverines are renowned for being bold and ferocious, they are primarily carnivorous scavengers, feasting on a wide variety of foods, including carrion from winter-killed deer, elk and mountain goats. They will also hunt small mammals, including pikas, marmots, ground squirrels, porcupines and snowshoe hares, as well as eat bugs, berries, eggs and roots. Wolverines are generally extremely wary of people and do not pose a risk to hikers or backcountry travelers.

Though they're making a comeback in our region, these elusive creatures have slow reproductive rates and are highly dependent on protected mountain habitats, large wild territories, and a deep snowpack that persists well into the spring for their breeding dens. While they occupy an important niche in the mountain ecosystem,

wolverine populations are slow to recover from threatened levels, and are notoriously difficult to study.

There are several goals of CWMP's wolverine camera trapping and genetic sample collections for wolverines. With the current distribution of wolverines not clearly defined in the region, CWMP deploys camera traps in areas where the current presence of a wolverine population is unknown to ascertain the presence of animals in these areas and, if detected, collect genetic samples to understand their relationship to known populations in the region.

Additionally, CWMP maintains ongoing monitoring stations in the southern portion of the North Cascades Ecosystem in an attempt to document unique individuals from this population through genetic samples and photographs which display unique identification features on the chest of individual wolverines. Finally, as a citizen science project, this monitoring program aims to educate and engage citizens of the region in research and conservation of this sensitive species and the habitat it occupies.

Safety Considerations

Because many wolverine survey areas are in remote roadless and trail-less high elevation locations, volunteers with sufficient general backcountry skills are required for these installations. Additionally, for winter monitoring, some locations may present significant avalanche hazards. As with all of our volunteers, CWMP recruits individuals with sufficient skills to comfortably carry out the field tasks and helps identify the field hazards that maybe present for volunteers but does not train or evaluate volunteers stated skill set.

Wolverine habitat overlaps significantly with grizzly bear and black bear habitat and survey tasks such as traveling through the backcountry with bait and powerful scent attractants could theoretically increase the chances of an encounter with a bear by field teams. CWMP provides all field teams with bear spray and training on how to use it and manage bear encounters.

When ever in the field in bear country, especially when carrying attractants or searching for natural attractants, field teams should carry bear spray in a readily accessible location (e.g. on your hip) and be trained and prepared to use it. A group of people is less likely to be accosted by a bear. Making noise and keeping at least one person assigned to be a lookout can help reduce the likelihood of surprising or being surprised by a bear.

Camera Trap Site Selection-General Location

CWMP maintains a series of established monitoring locations in the North Cascades

Ecosystem where wolverines have been documented repeatedly over the past several years. New installations are established in other areas in an attempt to document the species in new locations in the region.

For new installations, CWMP project leadership identifies a general location for camera traps to be installed. Once in the field, field teams must select the microhabitat location appropriate for establishing the camera trap. These installations are selected based on recent sighting reports (of tracks or actual animals) provided by the public, the Washington Department of Fish and Wildlife (WDFW), and the United States Forest Service (USFS), along with models that predict high quality wolverine habitat in the region. CWMP's project advisory board also further helps refine target locations for camera trap installations.

Research on the preferred habitat from the North Cascades has confirmed findings from elsewhere in western North America. Wolverines activity is strongly associated with locations which maintain snowpack into late spring. In the Washington Cascades, where most of CWMP's survey work is carried out, this is high elevation subalpine and alpine habitats, much of it in steep mountain terrain, primarily roadless. Because of this accessing camera trapping locations for wolverines comes with significant logistical and sometimes safety issues for field teams.

Preparation For the Field

Prior to heading into the field, review maps of the area including the general location you are targeting for your camera trap, material on wolverine tracks and signs, and guidelines for setting a camera trap (see below). Field teams are provided with maps along with all of the field equipment needed for installations. Be sure to plan enough time for your trip to allow for getting to the general location, an appropriate amount of time to scout for setting camera traps and then actually setting cameras. Successful camera traps often require a significant amount of time scouting in order to locate the specific location to set them.

Collect all of the field equipment needed for the trip (see list below). Test remote cameras, ensure that memory cards are empty and batteries are full. Ensure that you know how to use the cameras and set cameras to the projects recommended settings. If there have been specific locations to target for scouting or setting your cameras, enter these coordinates into the GPS unit. Prepare your bait as appropriate. This may include drilling a hole in the marrow bone, or pre-rigging bait with wires to secure it to a tree in the field.

In the Field

For new installations, once you have navigated to the general location to set your

camera trap you must select the specific location to set the camera trap. If possible look for landscape features that will naturally funnel movement of animals, such as a pass on a mountain ridge, a well used game trail, a stand of mature trees surrounded by meadows or brush and forests right along the edge of treeline. Other things that might attract the attention of a wolverine on the landscape include marmot colonies, locations used heavily by mountain goats, and the carcass of any animal in appropriate habitat.

Look for tracks and signs that could be wolverine (see appendix below). Be sure to document it if you do and use it to help understand how the animal may have traveled across the landscape to help you decide on a location for an installation.

Be sure you are at least 200 meters from any human used road or trail and 500 meters from a campground. Follow the guidelines provided for the specific camera trap set you are constructing (see below) to ensure you have the appropriate tree configuration.

Figure 1 Classic wolverine habitat in the North Cascades of Washington in summer. Photo by David Moskowitz.

Camera and DNA Trap Set Types

Conservation Northwest deploys two different camera and DNA trap set types for wolverines. For short term monitoring, such as following up on reports of tracks in

areas where the presence of wolverines has not been established, a more simple baited station with a single camera is constructed. For ongoing monitoring of a location where we have had detections of wolverines in the past, a more elaborate run-pole set up is deployed which increases the odds of capturing photographs which help identify and differentiate different individual wolverines through photographs.

Short term installations

These installations follow the guidelines established in the *Coordinated Multi-state Wolverine Baseline Sampling* (Multi-state Wolverine Working Group, 2015) document. All teams will be provided with this document as a reference. The document will be annotated to reflect some minor variations for the specifics of CWMP's project.

Bait and scent lure is applied to a tree. A DNA collecting gun brush belt is attached to the tree below the attractant and a camera is placed on an adjacent tree to capture visitors to the attractant.

Figure 2 Short-term camera trap set up. A gun brush belt is attached to the tree and bait is secured above this so that animals seeking to access it must pass the gun brushes. Camera is set up to capture the base of the tree as well as the bait to ensure animals that visit the station but do not climb the tree are documented.

Long term installations: Run poles

Run poles are established and maintained following the protocols developed by Aubrey and Raley (2013) which field teams are provided with and trained in.

Run poles involve construction of a horizontal beam ("run pole") out from a tree which a wolverine will walk out on to investigate an attractant hung above the end of it. A camera is set to photograph the animal at the end of the run pole when the animal is facing the camera in hopes of capturing an image of its chest blaze. A hair snagging device is attached to the tree below the run pole or on the pole itself. A second camera is attached to another tree which photographs the ground below the run pole and attractant to capture images of any animals that visit the set but do not go out on the run pole.

Figure 3 Image of a wolverine captured on the "vicinity" camera set up to capture images of animals that visit run pole stations without going onto the run pole.

Figure 4 Photo of a wolverine captured on a run pole, clearly showing chest blaze which can be used to identify individual animals.

Attractants

Attractant	Type	Producer	Use Notes
Caven's Gusto	Scent lure	Minnesota Trapline Products	Long range attractant, primarily designed for mustelids.
Imported bait	Bait	NA	Typical bait items include: deer quarter, marrow bone procured from a butcher, rack of ribs, half of a beaver carcass.
Found carcass	Bait	NA	Ideal if one is located in the field. If location is not ideal, can be dragged to a location that works better for a camera trap. Drag route may act as a scent trail the target species might detect and follow into camera trap. Use caution in handling and working around carcasses in regards to disease transmission and bears.

Table 1 Attractants available for use by CWMP Camera Trap teams for wolverine sets.

Natural Bait: Found Carcass or Other Food Source

Wolverines are exceptionally efficient scavengers. Because of this, found carcasses on the landscape, no matter what their origin, make an excellent attractant for a

remote camera trap. Carcasses may be the result of predation by wolves or mountain lions, animals wounded but not retrieved by human hunters, malnourishment, road kill, or other causes. While a carcass will be the strongest attractant when they are fresh, wolverines will at times inspect or return to remains a month or more after they have been on the ground and been reduced to little more than bones and scraps of hide.

While scouting an area look for carcasses on the landscape. Fresh carcasses often have a strong scent. Follow up on these potential smells to see if you can detect a carcass. Similarly, fresh carcasses often attract a lot of attention from birds such as ravens, crows, jays, and magpies. Attend to and follow up on concentrations of these birds or their calls as they may lead you to a carcass. On travel routes in the vicinity of a carcass you may find an increase in the density of carnivore scats. If you find multiple scats along a travel route in a short distance, consider spending a little extra time exploring the vicinity to see if there may be a carcass in the vicinity.

If a carcass is detected, observe the vicinity carefully and approach the location slowly. When inspecting a carcass or setting up a camera trap around a carcass be efficient and spend as little time in the vicinity as possible. There are several safety considerations that are important in conjunction with fresh carcasses on the landscape. While mountain lions and wolves are typically retreating in the presence of humans around carcasses, black bears and grizzly bears are both attracted to carcasses and can be aggressive in defending these carcasses from intruders (such as citizen scientists!). Additionally, dead animals can be vectors of human disease.

Camera traps on a carcass can be created where the carcass is found or the carcass can be relocated to a spot more conducive to the trap. Road killed deer could be dragged off of the road to a more secluded location where detection by humans will be less likely. Carcasses found far from cover and trees can be dragged to a spot where a camera can be attached to a nearby tree (conversely, a structure such as a log can be dragged to the carcass location to attach a camera to). Dragging the carcass to a new location will create a sent trail which a wolverine can follow to find the carcass.

When setting a camera trap on a carcass, be sure to set the camera far enough away to capture the entire carcass and the area around it to increase the likelihood of capturing a wolverine that approaches but doesn't feed on the carcass. Conversely, carefully test the camera to be sure that it is close enough to the carcass so that movement on the carcass triggers the camera. If there is one most likely approach route to the carcass, setting the camera to both view the carcass and the approach route can increase the chances of catching animals that approach but don't come all the way to the carcass. Carnivores will often move and reposition a carcass in the course of feeding on it. A piece of cord can be used to secure a carcass to a tree or other stationary feature to keep the carcass in view.

Figure 5. Remote camera trap set on a found carcass, set to view carcass on possible aproach routes to carcass. Illustration by Jenn Wolfe.

Figure 6 Wolverine documented by a camera trap set up on a moose carcass discovered by skiers on the eastside of the North Cascades. Photo by Steph Williams, Drew Lovell, and Ray Robertson

To reduce the risks of disease transmission from a carcass avoid handling the carcass. If you want to move a carcass to a better location for your camera trap use

gloves and wash your hands immediately after finishing the task. As with artificial attractants, avoid touching a carcass and then handling your camera to avoid drawing attention to the camera by attaching scent to it. Have one team member deal with the carcass while another handles the camera.

Genetic Samples

If there is evidence that a wolverine has visited the station (e.g., tracks or a photo detection), the crew should carefully inspect the area around the station for scats and hair. If a wolverine accesses the run-pole, there is a good chance that they left hair on the run-pole arm. So it is important to inspect that surface for potential hair samples to collect. Please collect any possible wolverine scats or hair according to the directions in the methods document for run-pole camera traps. To prevent potential contamination of genetic samples, wear Nitrile gloves to collect samples and place them in collection bags or envelopes. Always use paper bags for scats (a separate bag for each scat) and paper collection envelopes for hair (never plastic bags which can trap moisture and ruin the samples for DNA extraction). When using a gun-brush hair-snagging device, place each gun-brush that has a potential sample into a separate paper envelope (or small paper bag). DNA samples deteriorate over time, so checking cameras on a regular interval of 4 weeks and collecting samples into dry and breathable receptacles will help to provide a potentially viable sample to our partners.

Managing Multiple Camera Traps In One Area

Camera teams are typically assigned two cameras. For run pole installations, both camera are used on the single set. For transient installations, teams will set up two distinct camera traps. These traps should be at least 2 km from each other. CWMP staff will help identify the distinct general locations for a team to target for installation that is both valuable from a monitoring perspective and practical from a logistical one.

Any installation should be left up for at least 1 month. It is not uncommon for a wolverines to go several months before returning to a specific part of its home range. However, based on a field teams evaluation of the results of an installation and additional evidence they have collected in the field about ideal location, after a month an installation can be disassembled an new one established elsewhere in the general location targeted by the team if deemed appropriate. If successful at documenting a wolverine, a transient installation could be converted into a long term one.

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Appendix 1: Wolverine Tracks, Scats and Sign

Follow guidelines laid out in the General Remote Camera Protocol Document for photo-documenting potential tracks and signs of wolverine found while in the field. Below are details for distinguishing wolverine tracks and signs to keep an eye out for while scouting for where to set up camera traps. Field teams should consider carrying a field guide to help distinguish wolverine tracks and signs in the field.

Footprints

Potential wolverine tracks are often encountered in the field but can challenging to differentiate from other large carnivores such as wolves, mountain lion and lynx. Their tracks are also commonly confused with snowshoe hare and hoary marmot tracks.

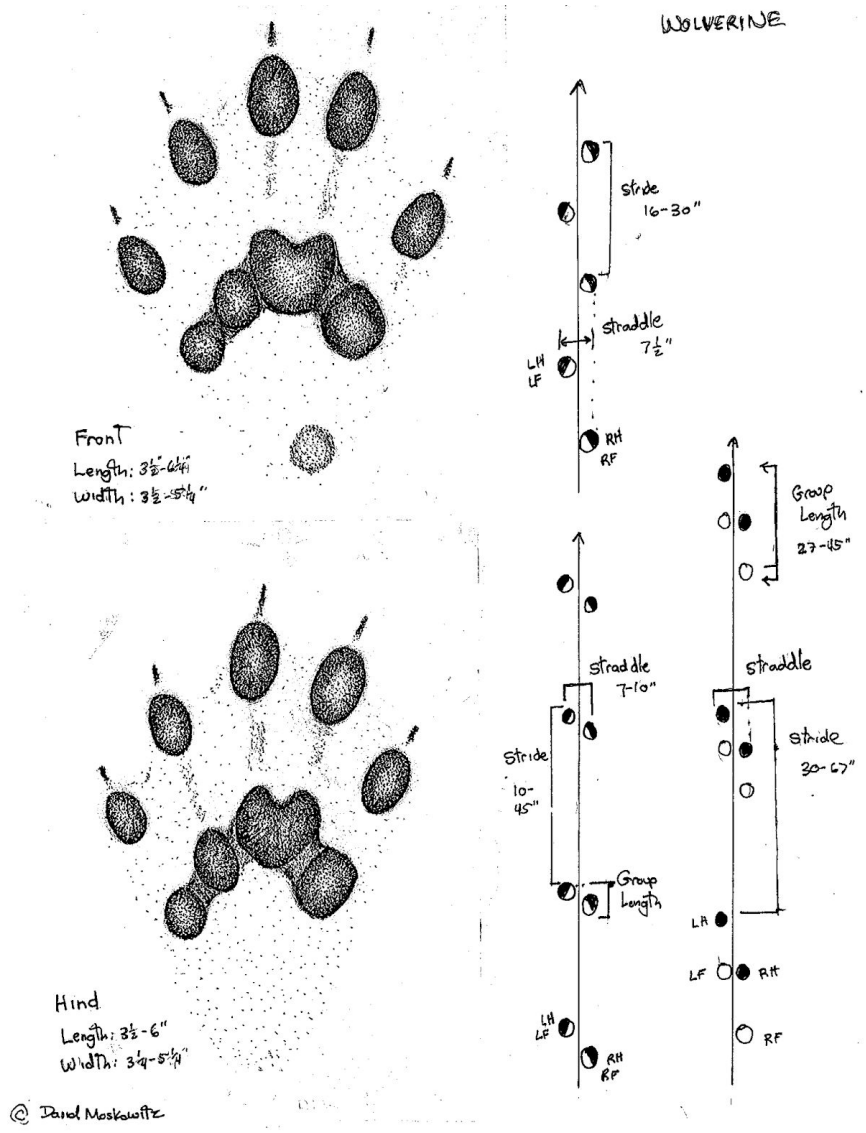

Figure 7 Wolverine tracks and track patterns

Figure SEQ Figure * ARABIC 5 Wolverine track in snow. Photo by Brian Booth

Figure SEQ Figure * ARABIC 6 Wolverine trail. Photo by Brian Booth.

Figure SEQ Figure * ARABIC 7 Photo of wolverine track. This is the classic angled pattern of 2 tracks which is commonly used by wolverines in deep snow. Photo by Brian Booth.

Scat

Wolverine scats can appear very similar to other similar sized carnivores such as coyotes and badgers.

Figure 14 Wolverine scat. Photo by David Moskowitz

Figure 15 Another presentation of wolverine scat. Photo by David Moskowitz

Feeding sign

Wolverines have powerful jaws and can break even the largest bones of hoofed mammals. Carcasses that have been fed on by wolverines will often be characterized by lots of bone fragments. Wolverines can also dig large holes in the snow and dirt in their search for food.

Figure 16 Mountain goat bones consumed by a wolverine. Photo by David Moskowitz

Appendix 2: Specific equipment for field teams setting wolverine camera traps

See also general list of equipment for remote camera teams (available online at: http://www.conservationnw.org/files/2014camerageargchecklist.pdf). In addition to these items the following may be useful in setting camera traps for wolverines.

- Paper copy of this document and the appropriate camera trap set up guidelines for a run-pole or transient installation.
- Printouts of maps and emails about sighting locations and recommendations for potential camera set locations.
- Appropriate transportation: vehicle capable of driving the forest roads you will be traveling on.
- Bait and scent attractants.
- Bear spray for non-winter field work.
- Appropriate navigational and safety equipment for field conditions (GPS unit, avalanche equipment, etc).
- Field guide and identification materials to help identify wolverine tracks and sign.