

# Wolf Remote Camera Traps: Scouting Guidelines and Installation Protocol

Citizen Wildlife Monitoring Project  
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## Introduction

Wolves (*Canis lupus*) are currently undergoing a range expansion in Washington State. The primary object of the Citizen Wildlife Monitoring Project (CWMP) in regards to wolves is to use remote camera traps and other non-invasive methods to document new populations of wolves. Secondly, the project aims to verify breeding status and actual numbers of wolves in new and documented packs. The focus of this document is provide relevant information for CWMP volunteers to effectively set remote camera traps to capture images of wolves in areas where their current presence is unknown. The final section of the document discusses methods and considerations for documenting breeding status and actual numbers using remote cameras in areas where wolf presence has already been established.

Wolves are wide-ranging species whose home range can vary considerably based on seasonal changes in prey species distribution, snow conditions, and human activity on the landscape. On a day-to-day scale, they will often travel many miles in a single night. On the broadest scale, young adult wolves typically disperse from their natal home range and travel up to hundreds of miles before localizing and establishing a new home range for themselves. Young non-resident animals that have not set up a home range may pass through an area and never return to it. Because of these features of wolf biology, pinpointing a specific location to detect the species over the course of even several months can be very challenging. Even with reliable sightings and track and sign evidence, the past presence of a wolf in a specific location is not a guarantee that the animal will return there any time soon, if at all.

However, the wide-ranging nature of wolves and territoriality of the species offer several opportunities for documenting their presence. Wolves typically use lightly traveled or gated roads for travel, as well as established human and game trails. They also carry out a variety of scent marking behaviors along these travel routes. As such roads and trails make excellent locations for setting camera traps as well as offering an efficient method for scouting potential locations for tracks and sign and selecting the best location to set a camera trap.

During the spring and early summer, wolves that are part of an established pack will have slightly more predictable travel patterns as they are tied to a den or rendezvous location for pup rearing. Winter months are the least predictable time for anticipating wolf location and movement as young of the year are capable of traveling long distances and the pack can wander their home range widely. However, snow pack and ungulate winter range will typically guide their habitat use at this time.

Wolves have excellent vision and an exceptional sense of smell. Their sense of smell and social nature can be used by researchers to elicit curiosity and territorial responses to help attract wolves to camera trap locations or slow them down during their travels to enable photo documentation by remote cameras. However, wolves are notoriously skittish and can be very wary of unusual scents, especially if they have had negative encounters with humans and traps.

### **Camera Trap Site Selection-General Location**

CWMP uses recent sighting reports 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 wolf habitat in Washington State, to select general locations for camera trap installations. Research from other ecologically similar landscapes, suggest that in Washington State wolves will typically select for rolling topography and middle to low elevations rather than high elevations and exceptionally steep habitat (WDFW 2011). This habitat selection mirrors prime habitat for their primary prey species in the region, deer and elk.

In conjunction with the projects advisory board and the WDFW and USFS biologists working with the project leadership team, CWMP identifies priority locations to field camera teams. The scale of these general locations range in size from 10 to several hundred square mile areas that appears promising for the detection of wolves.

Once these general locations have been identified and a field team is assigned to the area, a specific locations to actually set cameras must be selected. CWMP's leadership team works with each volunteer camera team to provide them with all of the available information which has contributed to selected the general location, including suggestions from local biologists and citizens about specific locations or landscape features that might be productive, specific location of recent putative wolf sightings from the area. Ideally, each field team will have several specific locations to target for installation when they head out in the field. Along with materials to set the camera trap, they will also have maps of the area, notes and coordinates of recent sightings (if applicable) as well as notes, and coordinates of specific locations in the field that appear to be promising locations to set camera traps.

Once in the field volunteer camera teams must select the specific microhabitat features to locate their camera trap. This step is key, as without very careful site selection the chances of capturing photos of a wolf on a remote camera are very low. Because of this, it is suggested that field teams allot a reasonable amount of time to explore the general location they have been assigned to assess multiple potential locations for their camera trap before they install. This may be a full day or even several days of scouting depending on the size and accessibility of the location.

## **Scouting: Guidelines for finding the best specific location to set a camera trap**

### **Preparation For the Field**

Prior to heading into the field, review maps of the area, material on wolf tracks and signs, and guidelines for various methods for setting a camera trap (see below). 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 several days of scouting in order to locate the specific location to set them and up to an hour to sort out and prepare the specific location for actually setting the camera.

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.

### **In the Field**

Wolves often use roads, human trails, and game trails along streams, wetlands, through mountain passes or along ridgelines to travel through their home range. Roads that are used infrequently by people are often particularly sought out by wolves (Fritts et al 2003). Wolves leave recognizable tracks and scats along these travel routes. Walk, bike, or drive as much of the road and trail system within the targeted area as possible, focusing specifically on areas that had been identified as promising based on habitat and putative sightings. While exploring these area, search for tracks, scats, and other signs of wolf presence (see below). Areas with a concentration of sign would help narrow down where to locate a camera trap. If no sign is detected, scouting will allow the team to view a variety of options for setting camera traps before selecting the best option.

While scouting the area, consider various locations and how you would set your camera there, keeping in mind the various methods (covered below) for setting a camera trap. For trail sets, along with tracks and sign, look for locations that funnel activity in an area, such as where a road or trail goes through a pass or saddle, or where vegetation around the road or trail funnel wildlife travel onto the trail. Along

travel routes consider where you would apply a scent lure and how you would set your camera on it. Inspect trail junctions for signs of scent marking (scats and scratch marks). Look for carcasses of ungulates that may attract attention from wolves (these may be visited even a month or more after the carcass has been on the ground). In areas with human use, consider how you would set a camera in a way that would not likely be detected by people and how you will secure the camera.

Most teams have two cameras at their disposal. Once you have scouted your entire area, select the two most promising locations, ideally situated to monitor as broad a cross section of your area as possible.

### **Camera Trap Set Types**

There are several methods for designing a remote camera trap for wolves. The basic tool for all of these traps is the remote camera itself. The other components of a camera trap set are: the microhabitat selected for the set, potentially the addition of one or more attractants (scent lures) to the field of view of the camera. Various camera trap sets attempt to take advantage of different behaviors of wolves (Long et al 2008). These include:

- a. General travel: non-baited trail sets
- b. Intra and inter-species communication: trail sets on existing scats, scent marking, use of artificial scent lures
- c. Foraging behavior: sets on carcasses, bait, and food-item related scent lures.
- d. Pup-rearing behavior: sets on or near potential rendezvous locations.

Understanding the specific behavior which is the focus of the camera trap set is an important part of selecting the specific location for the set and the design of where to set the camera and whether and how to add an attractant.

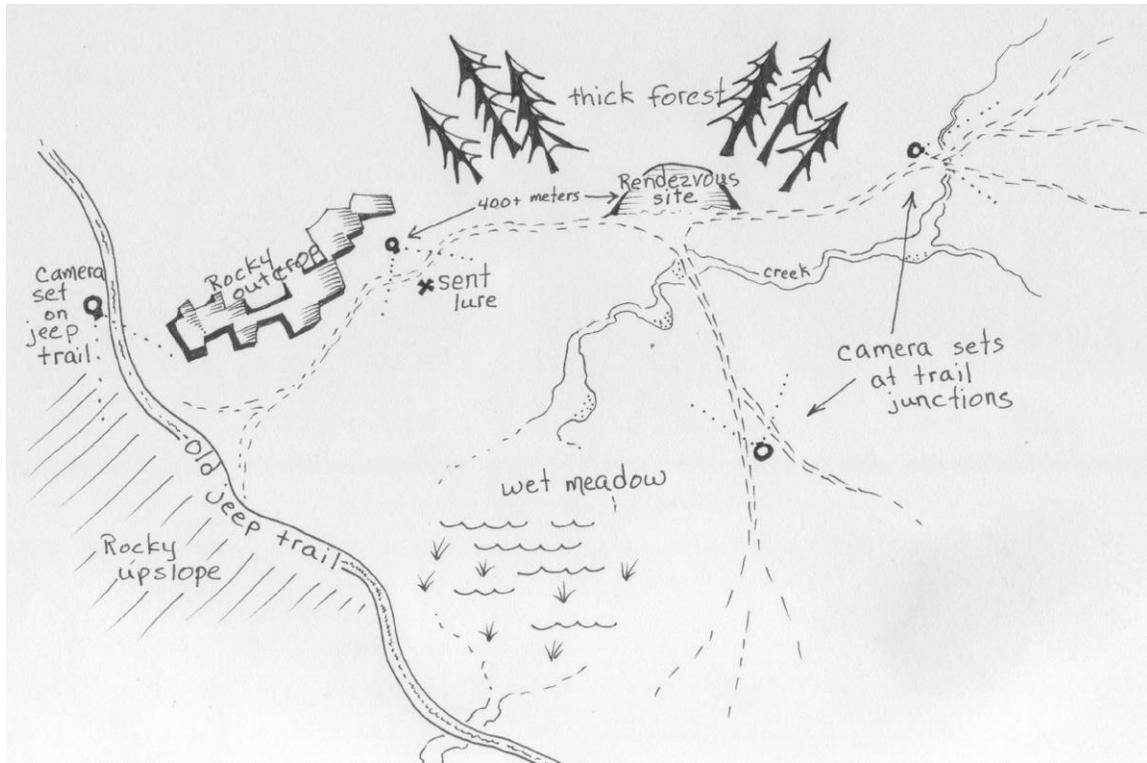


Figure 1. Overview of possible locations for remote camera traps for wolves, focusing on game trails and lightly traveled or gated roads. Illustration by Jenn Wolfe.

### Use of Imported Attractants

A variety of scent attractants can be used to draw wolves in front of your camera or get them to pause as they travel through the field of view of the remote camera. These include scent lures such as Gusto and other trapper's lures (see Table below). Bait, an actual food item, such as a deer carcass can also be used. Use of imported baits has a variety of ethical issues that must be considered as well as research permitting requirements. As such, importing of baits for remote camera traps targeting wolves for CWMP is typically not done. However, use of existing "bait" found on site, such as a deer carcass discovered in the area targeted for monitoring can be an excellent attractant.

The responses of wolves to attractants may vary considerably depending on the past experience of individual wolves and on the context in which the attractant is being used, specifically the amount of human activity in an area. Wolves are notorious for their ability to learn about and avoid potential traps set by humans. Scent lures typically work well for wolves that have not been negatively conditioned to the specific smell. However wolves that have been exposed to trapper's lures in conjunction with being radio collared (or attempts at this) or an actual trapping season may actually avoid those scents in the future rather than being drawn to them (Gabe Spence, pers. com.). Baits that have a human scent associated with them may similarly be treated with suspicion in some instances. However, in locations where human presence is common and typically benign, wolves may show little or no aversion to human scent in conjunction with scent attractants.

Attractant	Type	Producer	Use Notes
<b>Caven's Gusto</b>	Scent lure	Minnesota Trapline Products	Long range attractant, primarily designed for mustelids but has been effective in our efforts with canines and felines.
<b>Caven's Yodel Dog</b>	Scent lure	Minnesota Trapline Products	Alternate to Gusto. Primarily designed for coyotes according to manufacturer.
<b>Castorum</b>	Scent lure	Various producers	Beaver scent. Consider application on or close to the ground, such as on a rock, in a small manufactured dig or a small pile of sticks in front of the camera.
<b>Found carcass</b>	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.
<b>Imported bait</b>	Bait	NA	Ethical consideration, permit requirements. Not sanctioned for use in 2014 for wolf camera traps

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

### Trail Sets

Wolves often travel along lightly traveled roads, gated roads and game trails and because of this are commonly used to detect the species using remote camera traps. These sets can include the addition of an artificial attractant to slow down or direct the animal to a specific location.

Often game trails follow landscape features such as ridgelines or the edges of riparian corridors. Such trails often become better defined in some locations and more dispersed in others. Looking for a part of the trail where the trail is well defined and where vegetation and landscape features funnel the likely travel route of wolves onto the trail. Locations such as this have the highest likelihood of capturing an image of wolves that pass through the area.

While trail and road junctions often attract attention from wolves as a location for scent marking, at other times, wolves will avoid actual junctions and “cut corners”

from one trail or road to the other. Because of this, setting a camera trap on a trail before a likely corner cut might help catch wolves on the travel route. Alternately, the use of a scent attractant on a camera set on or near a trail or road junction designed to elicit an intra-species communication response could be effective at bringing wolves all the way to the junction and encouraging the animal to come into the field of view of the camera.

#### ***Trail Set Without Additional Attractant***

Creating a trail set without any artificial attractant is less likely to cause an adverse response from trap shy animals, a consideration for sets in locations where game managers have been trying to trap and collar wolves. However, these sets require extremely careful attention to the specific location. Good situations for such a set would include identifying a spot on a trail where the landscape and vegetation strongly funnels animals along this specific location and where you have evidence that suggests multiple events of passage of wolves, such as repeated sightings along the route or tracks on the trail of multiple ages.

Wolves typically trot when traveling along travel routes such as roads or trails. Without an attractant applied in the field of view of the camera to stop the wolf, the animal may pass quickly in front of the camera causing either a very blurry image or the animal passing almost or completely through the field of view before the camera triggers. To account for this, be sure to set your camera angled down the trail rather than perpendicular to the trail. This will increase the time that a traveling wolf will be in the field of view of the camera. Camera settings should be set to get as many images as possible in each burst (3 typically) and the shortest rest period between triggers (1 second typically).



**Photo 1. A wolf from Washington's Lookout Pack in the North Cascades. This camera was set at the junction of two game trails. No additional attractant was used. Photograph by David Moskowitz.**

### *Trail Sets with Artificial Attractant*

Adding a scent lure within the field of view of the camera can help slow down or stop the animal to increase the chances of getting a clear photo with identifying features. Similarly, in places where there are multiple possible travel routes, adding a scent lure can increase the chances that a wolf will use the one that you have set your camera trap on.

Scent lures should be applied in a way that fits with the type of behavior the lure is designed to elicit. For a scent lure designed to trigger a scent marking response apply the lure to an object that would typically be marked by wolves or other animals. This might be a branch or log along the side of a travel route, or a prominent rock along the route. For lures designed to trigger a foraging/feeding response, creating a small dig along the edge of the route and applying the lure to the inside of the dig can mimic the caching behavior wolves are familiar with or the work of a small rodent. Scent lures along trail sets are not designed to draw in wolves from a long distance but reroute or stop them once they are in the general vicinity. As such, applying the lure high in a tree, or applying a lot of lure may not increase their effectiveness and may trigger wariness of trap shy wolves.

On roads and trails where there is human traffic, another consideration for the camera set will be avoiding detection and theft by people. Besides a security box and cable lock, setting the camera in a location that is obscured from the typical field of view for walking or driving humans can help with this, such as setting it on a tree with branches hanging over it and the camera aimed towards the ground in front of the camera where an attractant has been applied (Gabe Spence, pers. com.). This sort of set can help reduce the number of hits from human traffic along the main part of the road by taking this out of the field of the camera's sensor.



Figure 2. Remote camera trap set along a game trail incorporating a scent lure. Note the camera is looking down the trail rather than just across it. This should increase the amount of time an animal ends up in the view of the camera. Illustration by Jenn Wolfe.



Figure 3. Camera set along a route often used by humans. Illustration by Jenn Wolfe.



**Figure 4.** If the camera is set to view the road or trail, setting it below head height and with branches that partially obscure it from the view of a walking or driving human can help reduce likelihood of detection by passing people. Illustration by Jenn Wolfe.

### Natural Bait: Found Carcass or Other Food Source

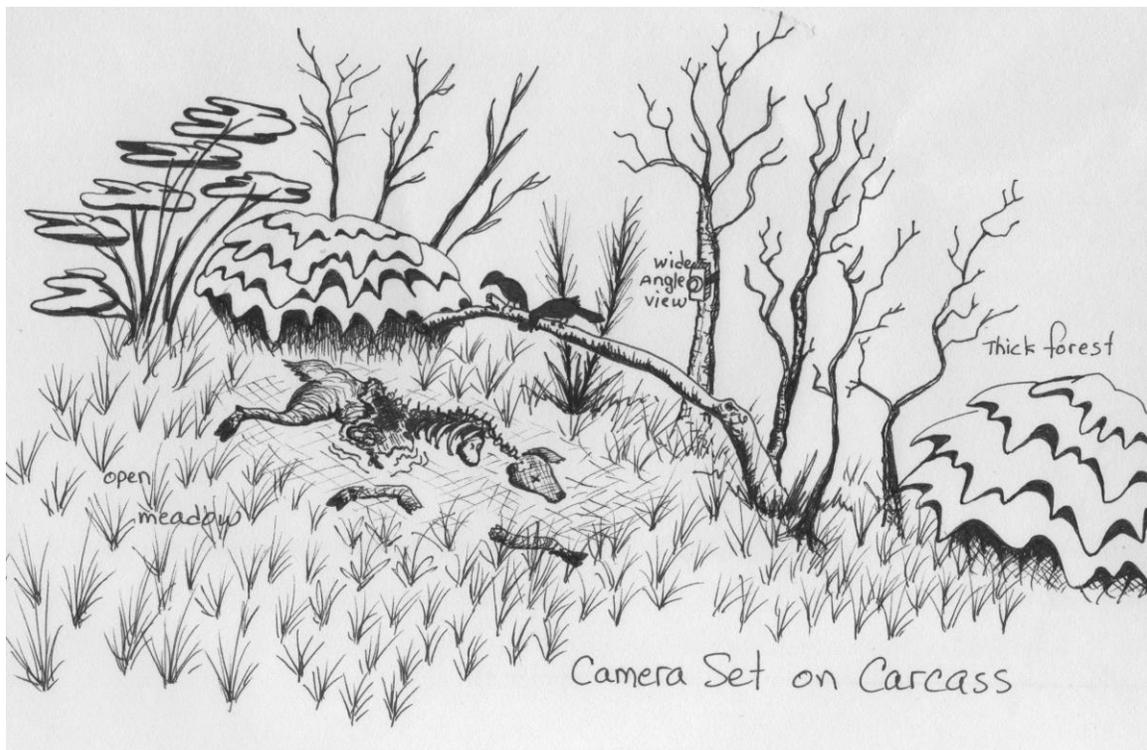
Wolves have evolved not only to kill but also find and scavenge the remains of hoofed mammals. Because of this, found carcasses on the landscape, no matter what their origin, make an excellent attractant for a remote camera trap. Carcasses may be the result of predation by wolves or mountain lions, animals wounded but not retrieved by human hunters, malnourishment, road kill, or remains dumped by humans after being butchered. Wolves are able to consume an entire carcass including the bones. While a carcass will be the strongest attractant when they are fresh, wolves 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, particularly coyotes or wolves. 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.

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 scent trail which a wolf can follow to find the carcass. Dragging the carcass for some distance before setting the trap might help draw in wolves as there is an increased likelihood that they will intersect the scent.

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 wolf 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. Wolves, bears, and lions 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 approach routes to carcass. Illustration by Jenn Wolfe.**



**Photo 2. Wolf captured on a remote camera trap set on the remains of a deer carcass that had likely been killed by wolves. The carcass was moved by the photographer to a location more conducive for monitoring with a remote camera (about 200 meters). This wolf arrived over 1.5 months after when the deer was killed. Photo by David Moskowitz.**

Besides a simple carcass, other locations that may attract wolves include bone yards where hunters or ranchers have dumped the remains of animals over time, locations where the Department of Transportation dump road killed carcasses, refuse sites such as illegal dump spots along forest roads, gut piles where a human has field dressed an ungulate, and hunter camps where animals have been field dressed, hung, or butchered. As part of a field teams research for locations that include a highway, a phone call to the local Department of Transportation office to learn if there is a roadkill dump location in the area might be productive.

While not as powerful of an attract, even a small patch of deer hide can be used to draw a nearby wolf in front of a camera or pause on a trail set to allow for clearer photos to be taken of the animal (Adam Lieberg, pers. com.)

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!). Dead animals can be vectors of human disease. 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. If a carcass is detected, observe the vicinity carefully and approach the location slowly. 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. 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.

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.

### Potential Den and Rendezvous Sites

The only time of the year when wolf activity is consistently limited and predictable to some degree is during pup rearing when adults return consistently to den or rendezvous locations. Research suggests that in some areas, specific habitat features can help predict where these sites may be situated on the landscape. This information, in conjunction with putative sighting reports, and knowledge of track and sign patterns around these locations can help direct scouting activities to identify these locations on the landscape. Because they have a high density of use during the late spring and early summer, setting cameras on travel routes coming into these locations could increase the chances of detecting wolves during this time.

Den sites are typically in relatively secluded locations and within about a quarter mile from water (Trapp 2004). In some regions, habitat features such as wet meadow systems are good predictors of potential rendezvous sites (Ausband et al 2010). In the Cascades, rendezvous sites have been documented in a wide variety of habitats, without any discernable patterns thus far (Gabe Spence, Ray Robertson, pers. com.).

Field teams should consider identifying potential denning and rendezvous locations prior to heading into the field and then carefully scouting these locations for wolf tracks and signs and potential camera trap set locations. Using maps and satellite images, (such as through Google earth or Google maps), identify wet meadows, wetlands, and other small clearings in forested landscapes and figure out the best ways to access these locations.

Game trails in the vicinity of den or rendezvous locations typically get relatively heavy travel and scent marking attention (scats, scrapes, and urine) by wolves. Rendezvous sites that have been well used will often collect bones and parts of carcasses that have been killed in the area or brought back to the area by adults. Once in the field, visit potential locations and check game trails into and out of the area for sign.

Consider creating a trail set on routes leading into a den or rendezvous location. For potential rendezvous locations, setting a camera trap that observes the meadow or clearing and adding a scent lure in the proximate area can both cover the general

area and attempt to draw wolves into close proximity to guarantee they trigger the camera. Rendezvous locations often have carcasses in the vicinity. These carcasses could be used for camera traps as described previously.

Den and rendezvous locations are very sensitive features of a wolf pack's home range. Field teams should work hard to minimize disturbance at these locations. For potential den locations, camera sets should be set on travel routes close by but not actually at the location, such as on game trails 400 meters or more away. For both potential den and rendezvous locations, setting camera traps before rather than during the breeding season can help reduce disturbance. Some rendezvous sites are used repetitively and for prolonged periods of time while others are ephemeral. During camera servicing trips, field teams should reassess the area to determine if relocating a camera trap might be appropriate.

## **Managing Multiple Camera Traps In One Area**

Camera teams are typically assigned two cameras. Follow the following criteria for setting your two camera traps in the area you are assigned to monitor.

If there is compelling evidence of recent wolf activity in a specific location you may be directed to place both camera sets in relatively close proximity, such as along two different trails or roads within a small area. More typically you will be assigned a larger general area to monitor. As such, in order to cover as large an area as possible, remote camera traps should be set up at least 1 kilometer apart from each other. Barring compelling circumstances to move a camera quickly, camera traps should be left installed for at least one month.

After 1 month, consider moving the camera trap to a new location to increase our coverage of the area. However, it is not uncommon for a wolf to go several months before returning to a specific part of its home range. If there has been a lot of other carnivore and ungulate activity at a promising location, leaving the set for up to two months could be appropriate. Another consideration would be the quality of other available locations to move the camera trap to.

Consider setting two different types of camera traps in your area, perhaps one using an imported attractant and the other not, or using different attractants at each location. This variation can help detect wolves in areas where one scent might work better than another for local wolves.

## **Considerations for Documenting Breeding Status and Numbers**

The primary goal of CWMP remote camera teams is typically, at least initially to document presence of wolves in an area. Once this has been established, the project may wish to address additional questions such as residency of the animal or animals, breeding status, and actual numbers of wolves in a pack. Camera traps set

to simply detect wolves may also incidentally help answer these more detailed questions. However, there are several considerations to help design camera traps to help answer these questions.

### Resident versus transient wolves

Resident wolves will localize their activity in a specific home range and carry out scent marking and other territorial behaviors in the vicinity. Establishing a territory is typically associated with pairing of an adult male and female animal and eventually leads to the establishment of pack including subadult animals. Transient, dispersers are typically solitary and may be documented in an area once and then never again. Camera trapping efforts over a period of months that document wolves repetitively and document more than one wolf suggest that the wolves are resident in the area and likely to be attempting to reproduce in the general area. Camera traps that document scent marking behavior such as raised leg urinations, over marking of one animal on top of another's scent mark, scratching after defecation or urination are behaviors suggestive of resident rather than transient animals.

Camera traps set in locations where scent marking behavior would be predicted and using scent lures which might induce marking behavior from resident animals should be considered to help collect information on potentially resident wolves.

### Breeding Status

Two observations that can be captured on remote cameras about the breeding status of wolves are pups/subadult wolves and a female with swollen teats (indicating a lactating female). Breeding females have enlarged nipples (Kreeger 2003), probably most apparent when the wolf is actively lactating and nursing young. Carefully inspect photographs captured by camera traps for enlarged teats. Targeting potential rendezvous locations in late June through the late summer should be considered to capture images of juvenile wolves.



**Photo 3. Wolf pups captured on a remote camera set on a travel route adjacent to a suspected rendezvous location. A scent lure was applied to a rock where the two animals on the left are sniffing.**

Photo from mid-July in north-central Washington. Camera trap set by Ray Robertson for Conservation Northwest.



Photo 4. Note the enlarged teats of this breeding female wolf taken by a remote camera. Photo from early April, northwestern Montana. Photo by Adam Lieberg, Northwest Connections.



Photo 5. Note the enlarged teats of this female wolf, indicating it has breed and is likely currently lactating. Photographed in May. Photo by David Moskowitz

### Pack Size

Capturing images of multiple wolves on the same frame is the easiest way to assess numbers of wolves in an area using remote cameras. However, this only provides a minimum number, as some wolves in a pack may not be in the frame. Setting cameras on rendezvous sites and clearings where wolves might be predicted to congregate can increase the chances of detecting multiple wolves. On trail sets, aiming the camera down a trail rather than perpendicular to it can also help with this. In winter, in deep snow, wolves often travel single file. On trail sets, wolves may

pass sequentially in front of the camera, allowing them to be counted. Constructing a camera trap in a location where this sort of movement is predicted can increase chances of capturing them on film. Setting the camera to the shortest time between photo burst can help ensure getting all the animals passing by. Setting the camera to video with a long run time (60 seconds) could also help capture the sequential travel of animals.

Cameras set on carcasses are poor for determining actual numbers as wolves will often come and go from the carcass individually rather than communally. It may be impossible to identify individual wolves in a pack when size and pelage color are similar and therefore not possible to use sequential images to assess numbers of animals in a situation where one wolf is likely returning more than once to the camera trap location, such as at a carcass.

## Acknowledgements

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## Appendix 1: Wolf Tracks, Scats and Sign

Follow guidelines laid out in the General Remote Camera Protocol Document for photo-documenting potential tracks and signs of wolves found while in the field. Below are details for distinguishing wolf 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 wolf tracks and signs in the field. Western Wildlife Outreach has an online description available at: <http://westernwildlife.org/gray-wolf-outreach-project/signs-of-wolves/>.

### Footprints

Potential wolf tracks are often encountered in the field but can be hard or impossible to definitively differentiate from domestic dog tracks and, while larger, can resemble coyote prints. Overall, wolf tracks are large, much larger than coyote tracks and larger than all but the largest breeds of dogs.

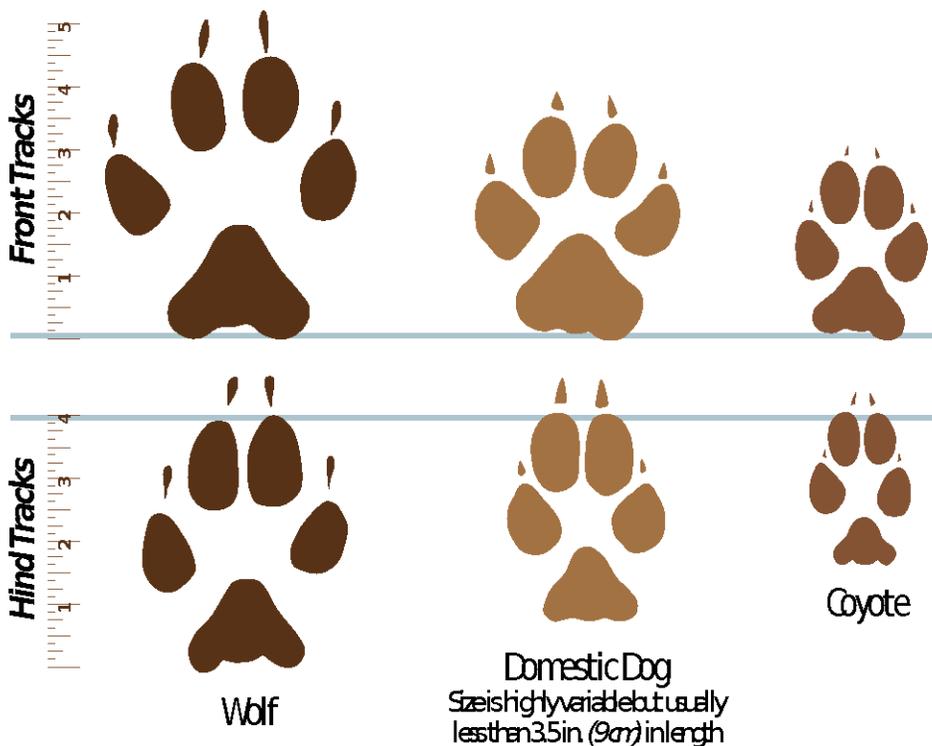


Figure 6. Comparison of wolf, domestic dog and coyote tracks. (Diagram by Western Wildlife Outreach. Track illustrations by David Moskowitz)

	Front Length	Front Width	Hind Length	Hind Width
Wolf	11.0 cm (8.9-12.8)	9.8 cm (7.8-12.4)	10.1 cm (8.6-11.6)	8.2 cm (6.8-9.8)

Coyote	6.7 cm (5.4-7.8)	5.3 cm (4.2-6.3)	6.1 cm (4.4-7.5)	4.6 cm (3.5-5.4)
Dog	Highly variable	Highly variable	Highly variable	Highly variable

**Table 2. Comparison of wolf and coyote measurements (Moskowitz 2010). Domestic dog measurements vary widely and can overlap with both wild canid species.**

**Scat**

Wolves often deposit their scats on roads and trails. Fresh scats are often quite strong smelling. As wolves consume little or no plant material contents are typically entirely animal tissue.



**Photo 6. Wolf scats are tubular and typically 1-1.5 inches in diameter. Photo by David Moskowitz**



**Photo 7. Some wolf scats are twisted in appearance. Scats are often filled with deer or elk hair. Photo by David Moskowitz**

## Feeding sign



**Photo 8. Ungulate carcasses consumed by wolves often have long bones that have been cracked. Jagged bone fragments are often also found. The parts of the carcass may be spread out over a large area. Photo by David Moskowitz.**

## Appendix 2: Specific equipment for field teams setting wolf camera traps

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

- Paper copy of this document
- Print outs 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. For travel on gaited roads a mountain bike maybe useful for scouting and accessing remote cameras.
- Field guide and identification materials to help identify wolf tracks and sign.