Guidelines for Carnivore Tracking During Winter in Wisconsin

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Welcome to Wisconsin's carnivore tracking program! These guidelines will explain how to prepare for and conduct track surveys. In addition, we have included answers to many frequently asked questions about the carnivore tracking program.

It is extremely important that volunteers follow all tracking procedures closely. If volunteers differ very much in the way they conduct surveys, it is impossible for DNR scientists to tell if their survey results were different because they used different procedures or if carnivore abundance really differed between survey blocks. Therefore, we ask that you CAREFULLY READ ALL DIRECTIONS BEFORE CONDUCTING YOUR FIRST SURVEY AND CALL US IF YOU HAVE ANY QUESTIONS. In addition, please take this guide into the field with you when conducting surveys and refer to it as necessary. The first time you conduct a survey, we suggest you refer to written procedures before completing each step of the survey.

Thank you very much for your time. Your participation in this program will help us achieve our goal of protecting Wisconsin's carnivores. Enjoy your surveying!

Background and Goals of the Carnivore Tracking Program

DNR researchers have conducted track surveys of furbearing mammals, including several carnivore species, since 1977. In 1979, the DNR began conducting formal wolf track surveys as part of the state wolf monitoring program, and a separate survey program for American marten began in 1981. The carnivore tracking program in which volunteers are participating grew out of these earlier surveys and was instituted in 1995. The goals of the current survey are to:

1) determine the number, distribution, breeding status, and territories of wolves in Wisconsin.
2) develop a sense of the abundance and distribution of other medium-sized and large carnivores in the state.
3) determine the existence of rare carnivores such as Canada lynx, cougar, and possibly wolverine.

TOOLS YOU WILL NEED

1) **Tracking guide**—There are a number of good tracking guides available on the market. Our recommendations are listed below:

A Field Guide to Mammal Tracking in North America by James Halfpenny is the guide we prefer for use in track surveys. This guide provides good explanations of measurements, gait patterns, and species track identification, and also provides excellent photos of scats.

Mammal Tracks & Sign by Mark Elbroch came out in 2003. It has excellent color photos and natural history information. Some terminology & measurement methods are different from what we use.

Peterson's Field Guide to Animal Tracks by J. Murie. This guide is the old standard for most trackers and is still a reliable, although not as complete a guide as Halfpenny's.

Tracking and the Art of Seeing: How to Read Animal Tracks and Sign by P. Rezendes has excellent photos of animal tracks and other sign. However, some of his information is inaccurate or outdated, so use with caution.

Bird Tracks & Sign by Mark Elbroch with Eleanor Marks is a good source for bird tracks & other sign.

The book, Tom Brown's Field Guide to Nature Observation and Tracking, is not as useful for our surveys. The illustrations of tracks are poor, and some of the information is inaccurate.

2) **Detailed map of the survey area** – Maps used by trackers MUST BE at a scale of 1:150,000 or greater. Coarser maps will not include all of the small, unpaved roads trackers should cover and thus not allow much precision in determining the location of tracks. The map provided in your packet should be used to orientate yourself to your area and for indicating the starting points of your survey and where you encounter wolf tracks. Detailed maps are available in the DeLorme Wisconsin Atlas and Gazetteer, available in many bookstores and sporting goods stores throughout the state. Detailed maps can also be obtained from the Wisconsin Geological and Natural History Survey (Madison, WI 53706) and, in many counties, the local Chamber of Commerce or County Forestry office.

3) **Data sheets, clipboard, and pencils.** Please write in pencil or permanent ink; normal ink may run if the data sheets get wet. Use separate survey sheets for each block and each survey.

4) **6-inch ruler** – marked in inches and mm

5) **Tape measure** – marked in both inches and mm

6) **Discriminate analysis forms** – found in Appendix 1 of this guide.

7) **35mm camera or digital camera**

8) **Optional equipment**
- Snow print wax or plaster of paris and mixing cups for making print casts
- Pedometer for determining mileage when walking
- Plexiglas to trace outline of tracks
- Geographic positioning system (GPS) unit for determining location of tracks
- Maptech Terrain Navigator or DeLorme Street Atlas mapping software
- Cybertracker software with PDA & GPS

CONDUCTING YOUR SURVEY

GENERAL SURVEY INFORMATION

1) **Species to look for**:
- Wolf
- Coyote
- Fox (red and gray)
- Free-roaming dog
- Bobcat
- Lynx
- Cougar or Puma
- Free-roaming domestic cat
- Bear
- Badger
- Fisher
- Raccoon
- Otter
- Skunk

2) **Each survey should cover 20-30 miles.** If you are responsible for surveying more than one block, you should survey 20-30 miles PER BLOCK.

3) **Vehicle surveys should be conducted at driving speeds of less than 10 miles per hour**. Other wise, you will probably miss many tracks.

4) **Surveys should be run 1-3 days after a fresh snowfall.** If run earlier, there will not be enough time for fresh tracks to accumulate. If run much later, vehicle traffic or snow plowing may have obliterated tracks, or new and old tracks will have overlapped and getting counts will be difficult.

5) **Cover as many miles of unpaved, snow covered roads as possible per survey**. Miles driven along paved roads should be excluded from surveys, unless the roads are not busy and have an unpaved shoulder that can be tracked.

6) **In blocks with large areas that can't be driven,** survey these areas by snow shoeing or skiing, if possible.

7) **Conduct at least 3 surveys per block between November-March.** For an explanation of why we would like you to conduct this many surveys, see the section of FAQ"s below.

<u>COMPLETING THE DATA FORMS</u> - forms can be downloaded at
http://www.dnr.state.wi.us/org/land/er/mammals/volunteer

1) **Observer(s)** – list all observers conducting survey.

2) **Sheet Number** - enter the page number of this sheet & the total number of sheets for this survey

3) **Survey Block** – Write number of block.

4) **County** – List all counties in which tracking was done (some blocks cover portions of two or more counties).

5) **Snow Depth** – Measure accumulated snow in an area off the road.

6) **New Snow Depth on Road** - Indicate amount of snow on road surface or edge.

7) **Pack Name or General Area** – List name of any known packs in area or write general area such as "Stevens Lake".

8) **Temp** – Indicate temperature at start of survey and whether degrees are Celsius or Fahrenheit.

9) **Time of Last SnowFall** – If less than 48 hours, list hours at which last snowfall occurred. Otherwise, list number of days.

10) **Begin Survey: Section Township Range** – indicates the township and range coordinate that are located in the margins of the Wisconsin Atlas and Gazetteer. Make sure you circle E or W in the Range box. Only corner sections are labeled. Section numbers run from right to left. Refer to the front inside cover of the Gazetteer or accompanying handout for help.

11) **Survey Date** – Date of survey.

12) **Start Time** – Exact time survey begins.

13) **End Time** – Exact time survey ends.

14) **Cloud Cover** – Check the appropriate box for estimated % cloud cover.

15) **Past Weather** – Indicate high/low temperatures over last 24 hours.

16) **Precipitation** - Note any precipitation over the past 24 hours.

17) **Track Conditions** –
Poor = Many prints do not register; identifications are mainly from stride and gait patterns.
OK = Most prints register but often lack detail. May need to follow into woods to identify.

Good = Every print registers, but many do not show good detail.
Excellent = Every print registers and shows good detail.

18) **Roads & Direction of Travel** – At start of survey enter intersection, direction of travel, and name of road traveling on. Enter name of road & direction of travel whenever you change the road you're traveling on.

19) **Indicate on Map** – On your tracking block map, indicate your starting point and direction of travel. Show your route and mark where you encounter wolf tracks.

20) **Mileage** –

- The intersection where you begin your survey is mile 0. Reset your car's odometer or your pedometer at this time.
- Note odometer reading at every intersection and at every identified carnivore track.
- If you turn around or drive twice over any section of road, ONLY COUNT THE MILEAGE ONCE. For example, if you survey a six-mile dead-end road and turn around, the number of miles surveyed would be 6, not 12.
- Total number of miles should indicate the number of miles actually surveyed.

21) **Carnivore Groups** – write the number for each animal's tracks observed under the appropriate column. BE SURE YOU INCLUDE THE ANIMAL'S INITIAL ALONG WITH ITS TRACK COUNT. Example: 2W (2 wolves), 1F (1fox), 3C (3 coyote).

22) **Notes and Comments** – Indicate the direction of travel, track measurements, observations of scats and urination's for any wolf tracks observed. If available, list GPS location, preferably in decimal degrees.

23) **Totals** --

- Summarize total miles and total observations of each mammal
- **FOR ALL SPECIES BUT WOLVES, TRACKS THAT FOLLOW THE ROAD OR CRISS-CROSS IT COUNTS AS ONLY ONE ANIMAL UNLESS MORE THAN 0.3 MILES OCCURS BETWEEN TRACK OBSERVATIONS**. See below for an explanation of how to calculate totals for wolves.

<u>WHEN YOU ENCOUNTER TRACKS</u>

1) **Consult your tracking guide to identify the species that made the tracks**.
   - **Several tracks may need to be observed before a species can be identified**.
   - **Different species may have tracks that look similar. Therefore, pay careful attention to gait patterns (the sequence of foot movements) when identifying tracks. A good tracking guide** such as Halfpenny's will describe the gait pattern associated with each species.
   - Tracks and gait patterns will vary with different types of snow conditions. When snow is very fluffy it may be necessary to follow tracks into adjacent forest areas to find tracks in denser, shallow snow where tracks are more reliable.

2) **Measure wolf tracks and stride each time they are encountered; photograph with ruler if uncertain of identification.** It would also be useful to measure tracks of other species the first time you encounter them on each survey.
   - The standard track measurements we would like you to use are shown on the backside of Appendix 1. In general, take length measurements from the heel to the tip of the longest toe, not including claws. Please DO NOT use the descriptions of track measurements found in

tracking books, as these may differ from ours. If we do not get consistent measurements, this data will be unusable.

- Stride is the distance from one footprint to the next place where a print of the same foot appears. It should be measured from heel to heel.
- The first time you encounter wolf tracks, report your observation to your regional coordinator.

3) **Take Care to avoid over counting the number of animals present**.
   - **For all species but wolves**, all tracks encountered within 0.3 miles of each other should be recorded as one animal.
   - **For wolves** you should follow tracks backward and forward until you can get a good count of the number of animals present. Wolves will often loop around and follow portions of a route more than once, so that what appears to be the tracks of four animals could be two wolves that looped around the same route twice since the last snow fall. Conversely, wolves may walk single file in deep snow, so that what appears to be the tracks of one wolf may actually represent multiple animals. In either event, you may need to follow tracks a long way before getting a good count. At minimum, follow wolf tracks from the point where they first entered the road to the point where they leave it.

4) **Record any other related sign encountered while tracking**.
   - Note all wolf raised-leg urination's (RLU's) and squat urination's (SQU). Evidence of blood in the urine should also be recorded. This information is important in determining the territories and reproductive status of wolf packs.
   - Note any carcasses killed or scavenged by carnivores. If possible, determine the predator involved and the age, sex, and physical condition of the kill.

IF YOU ENCOUNTER TRACKS OF A RARE SPECIES

1) Rare species include cougar (puma), Canada lynx, and possibly wolverine.

2) Take a photo of the track - be sure to place a ruler next to the track.

3) **Report your observation to your regional coordinator or the Park Falls DNR as soon as possible.**

4) **Fill out a rare mammal observation card and send it to the Park Falls DNR**.

5) **Make a mark of the location where the track was encountered on your map**.

IF YOU HAVE PROBLEMS IDENTIFYING A TRACK

1) Whenever **identification of tracks is uncertain, take photos for later examination.** Photos should be taken from directly above the track. Be sure to lay a 6-inch ruler with visible numbers next to the track before taking photos.

2) **If you are unsure whether a track was made by a wolf or a large domestic dog**:
   - **Check the gait**. Wolves often place their hind foot directly over the front print when walking, whereas in domestic dogs the hind foot is usually placed to the side of the front print.
   - Check the travel pattern**. Wolves usually walk straight down a road or trail unless they are scent marking**. Domestic dogs often exhibit irregular travel patterns.
   - **Dog tracks are often associated with human sign and are usually found near residences.** However, they do occasionally occur by themselves miles from any house.
   - If you are still unsure, try using the **discriminate analysis form**. Directions for using this form are found below.

3) **If you are unsure whether a track was made by a wolf or a coyote**:

- **Measure the front tracks**. Coyote front tracks are usually 2.8 inches (7.0 cm) in length or less. Wolf tracks are larger.
- **Measure the stride**. When walking, wolf strides measure 33-40 inches (84-100 cm), while coyote measures 25-30 inches (64-76 cm).

4) **If you think you have found a cougar track, be sure you have not misidentified a dog track**.

- **Check for claw marks.** Cougar tracks lack claws, or rarely have narrow, knifelike claw marks. Dog tracks should have apparent claws.
- **Check the interdigital heel pad**. In cougars, the heel pad has 3 similar-sized lobes at the back, and the front of the pad is square and/or concave in appearance. The heel pad of dogs will not have even-sized lobes, and the front of the pad will be more round and pointed.

5) **Measure any small fisher tracks to make sure they are not marten tracks**. Although marten are generally much smaller than fisher, large marten tracks may overlap in size with small fisher tracks. You may consider a track to be a fisher if it is at least 1.6 inches (41 mm) long and 1.5 inches (38 mm) wide.

USING THE DISCRIMINANT ANALYSIS FORM

1) **An example of the discriminate analysis form is included in Appendix 1 of this packet**.
2) Discriminate analysis can be used to distinguish between wolf and dog tracks by comparing track measurements. **Measurements can be taken in the field or from photos or casts you have made**. Measurements can be in either metric units or inches.
3) **A list of the necessary measurements is located on the upper left side of the form**. These measurements are also illustrated on the backside of the form.
4) **Once you have taken all the measurements, use them to calculate shape ratios**. A list of these ratios is located directly below the measurement list on the front of the form.
5) **Now, look at the decision scales**. Here, you are asked to enter some of the ratios you have calculated in order to test whether those ratios are typical of a particular dog breed. Note that you are required to enter a different set of ratios for each breed.
6) **Multiply each ratio by the given coefficient. Add the product of each operation to determine the test statistic**.
7) **Compare the test statistic to the numbers given for dog, midpoint, and wolf**.

8) **Repeat this procedure for the other dog breeds. If all the analyses produce test statistics that are closer to that listed for wolf, you can be relatively sure you have a wolf track. Often, you can determine whether a track is made by a dog or wolf after comparison with only the first 3 dog breeds**.

TRACKING ETHICS AND CAUTIONS

1) Park vehicles on the side of the road in a safe location, but be careful to avoid getting stuck in snow covered roadside ditches.
2) When driving slowly, be especially alert for logging trucks.
3) Don't follow back roads with deep snow cover, and generally only conduct surveys using a four-wheel drive vehicle.
4) Don't follow wolf tracks for long distances off roads in March and April when wolves are starting to den. This may disturb the animals and/or cause abandonment of den sites.

5) Avoid disturbing tracks if possible. Others may also be conducting surveys.

6) Don't follow carnivore tracks on to posted private land unless you have the permission of the landowner.

7) Don't attempt to howl at wolves on the tracking survey. If you would like to conduct howling surveys, please contact us for additional guidelines.

REPORTING YOUR RESULTS

- Additional forms can be downloaded at http://dnr.wi.gov/topic/endangeredresources/forms.html#wolf or requested from our Park Falls office.
- Send a copy of the track survey form(s) to your regional coordinator after each survey, or at least monthly. This allows us to monitor which blocks are being tracked and which will need more attention. It also allows us to verify presence of new wolf packs before snowmelt.
- Your original track survey forms with maps and summary sheets are due in to the Park Falls DNR office April 1st.
- If you used a GPS & Maptech Terrain Navigator, DeLorme Street Atlas, or Cybertracker software, you can e-mail your map files to Jane.Wiedenhoeft@dnr.state.wi.us. You should still send your survey forms, maps and summary sheets in to the Park Falls office.

FREQUENTLY ASKED QUESTIONS

Why use snow tracking surveys to survey carnivores?

Because carnivores are often secretive and occupy very large home ranges, it is difficult to monitor them by direct observation of the animals. However, we can still estimate the abundance and distribution of carnivores by observing the number and location of their tracks. Other sign that trackers may encounter, such as scat, may be used to make inferences about the animals' breeding status or diet. In addition, tracking is relatively inexpensive and allows us to collect more data than would be possible using more expensive methods, such as radio collaring.

Why does the DNR involve volunteers in carnivore tracking?

Unfortunately, budgetary constraints allow us to hire only a few professional wildlife trackers. By involving volunteers in the tracking program, we are able to sample a much broader area than would otherwise be possible. Also, the volunteer tracking program allows more members of the public to be involved in wildlife survey work. We hope that this involvement will allow people to develop an understanding of the important role they play in the conservation of these species.

How are the data collected by volunteers used by the DNR?

Volunteer data is used to alert DNR to the presence of wolves in new areas. In a multi-year study, we determined that trained volunteers with at least 40 hours tracking experience collected data of comparable quality to DNR trackers. Data from trained and experienced volunteers is used in conjunction with other data collected by DNR to determine the overwinter wolf population, wolf distribution, and breeding status of wolves in Wisconsin.

Why aren't all carnivore species included in the surveys?

We do not include marten, mink and weasel as target survey species because adequate survey for these species would require careful examination of hare and squirrel tracks as well. Examining these tracks would reduce your ability to adequately survey a large block of land and thus reduce the probability that you would encounter the tracks of larger species. However, while you should not hunt for tracks of non-target species, you should record tracks of these species if you do identify them.

Why does each volunteer need to conduct at least three surveys each winter? Why does each survey need to cover 20-30 miles?

A study conducted by the DNR during the winter of 1992-1993 found that it took experienced trackers an average of 2.1 visits and 60 miles to get a reasonable estimate of the number of wolves present in a territory. Some trackers required three visits and as many as 148 miles to get a reasonable estimate. Based on these results, we do not think volunteers are likely to get reliable data if they conduct fewer surveys or cover fewer miles.

REFERENCES:

Elbroch, M. 2003. Mammal Tracks & Signs: a guide to North American species. Mechanicsburg, PA: Stackpole Books.

Elbroch, M., E. Marks, and C.D. Boretos. Bird Tracks & Sign: a guide to North American species. Mechanicsburg, PA: Stackpole Books.

Halfpenny, J. 1986. A Field Guide to Mammal Tracking in North America. Boulder, CO: Johnson Publishing Company.

Murie, O. 1954. A Field Guide to Animal Tracks. Peterson Field Guide Series. Boston: Houghton Mifflin.

Rezendes, P. 1992. Tracking and the Art of Seeing: How to Read Animal Tracks and Sign. Charlotte, VT: Camden House.

Wydeven, A., R. Schultz, and R. Megown. 1996. Guidelines for Tracking Surveys During Winter in Wisconsin. Wisconsin Department of Natural Resources soft publication, 24 pp.

Tools needed for building or working on a computer. For people who want to build their own Personal Computers.Â You don't need an expensive toolkit to build your own computer, but there are a few simple electronics tools that you absolutely must have. All of these can be easily obtained at almost any computer store or online. You may already have some of these tools. If not, then the easiest way to get the tools you need is to purchase a computer repair tool kit that contains all the tools you'll need, as well as a handy carrying case to keep them organized. As with all tools, you should buy the best quality computer tools that you can afford. Good tools last longer and make the job easier. Al The tools needed for electrical repairs includes both ordinary household tools and specialty tools. Learn common uses of the most essential tools.Â As with Phillips screwdrivers, you will likely need more than one size of straight-blade screwdrivers. If you have to choose just one, pick a medium blade; it will suit most projects. Straight-blade screwdrivers are also available with insulated handles for better safety when doing electrical work. 08 of 17. First-Aid Tools. While the use of force skills and tools are completely necessary, appropriate time must be spent learning to save a life. During a SHTF event, there will likely be little to no emergency medical response. You may be the only â€œEMTâ€ available. That being the case, each person in the family should have a personal first-aid kit with the minimum items I have decided to go through my database and share with you those that will for sure help you bring forward any project that you decide to embark on. I recommend you to bookmark this post so you can come back to it as I continue to update it. At the same time, since a lot of work has gone into this post, itâ€™s important for me to know what your thoughts are, make sure to share them below. Hereâ€™s my list of all online tools you will ever need: Inspirational & Motivational. Empathy Library: A whole library dedicated to items that further promote empathy! You can have authoring tools that will convert your power points into e-learning content. Also, some authorware can convert current pdf files into interactive content. Do you need branching scenarios with immersive, real-world backgrounds and decision-based interactivity? Try HTML5 and Flash generating course authorware. The list above shares SCORM and other compliance features. Check for those in your narrowed down courseware. If mobile learning is your main output, make sure the tool you select is device independent. Mobile learning interface have a different layout and feel. Donâ€™t let excel