



# Snowshoe Hare Transect Survey

## Prepared for:

Government of Northwest Territories,  
Environment and Natural Resources

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This project involves preproduction work for a video to instruct field personnel on the methods to be used in conducting a snowshoe hare scat study. The following is an outline of scenes, components of scenes, photo notes, and suggested script notes.

**It is important to note that we had to do all the photography in March, so there is a lot of snow on the ground. The conditions will be far different in summer. We have added still photos contributed by various field people, mostly Danny Allaire. Many thanks to all for their contributions.**

**It is best not to directly read the script notes, but to use them as a guide.**

## Video

*Photo of snowshoe hare with title: Snowshoe Hare Transect Survey.*



## Script notes

The snowshoe hare transect survey is a study that will extend over at least 10 years, and will help with understanding the fluctuations in abundance of the snowshoe hare, which will in turn help in understanding the impact of the hare cycles on predators like lynx and foxes and on some raptors.

Since snowshoe hare populations are difficult to assess directly, we will be using a system of counting their scats (also called pellets) over a number of widely dispersed study areas, with more than 4000 meters of transects in each area.

In this study, you will set up four lines (called transects) of 20 permanently-marked narrow quadrats at least 500 m apart, and checking these once per year. In June each year, you will count and then remove the snowshoe hare scats deposited in each quadrat. The each year, you will be counting only pellets deposited during that year.

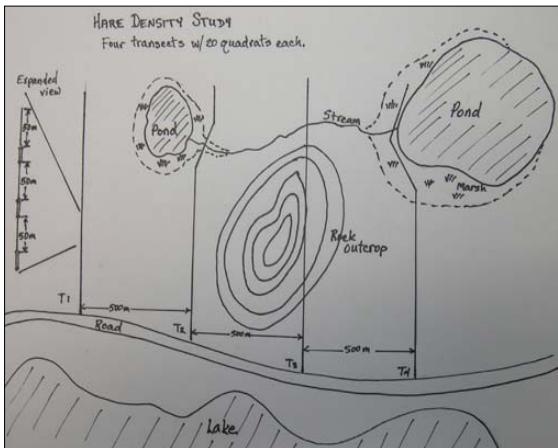
If you have not had experience with this type of study, you should watch this video at least twice. It will show you how to set up the transects, how to install stakes that outline the quadrats, how to make a movable boundary marker you can use to show the outline of each quadrat when you are ready to count the scat pellets in each.

- 1) **Study setup (permanent): four lines of 20 narrow quadrats, each 500 m apart, in typical habitat, checked once per year. (See drawing, diagram of an example of how to set up the transects.)**

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## Video

*Photo of a diagram of transects set up along a road.*



## Script notes

You will be setting up four lines of 20 narrow quadrats each, in typical habitat or mixtures of habitats. The four transects should be at least 500 m apart. This drawing shows how the transects can be set up. This diagram shows a hypothetical series of four transects.

These can be set up from a road or a cutline. The hare transects do not have to be entirely in the same habitat type, but can go from one habitat type to another. If a lake intervenes, simply change directions to avoid the lake.

You will number the quadrats from the start of each transect, 1, 2, 3, etc. Put the number on the data sheet and on the first stake of each quadrat.

These quadrats will be checked once per year, in June.

## 2) Preparing the transect markers: (in the shop):

- Need 20 1 X 2's if boards are 8 ft. in length
- Cut pieces of wood from the 1 x 2's: cut into 1 ft. lengths, then two cuts to make a point. (Need 160 of these pieces, which will mark 80 quadrats.)
- If there are many porcupine or beaver in the area, may need to use stakes made of other materials, such as .5 in. Plexiglas or even metal.
- Paint all stakes red or blaze orange. If you use Plexiglas stakes, add a wrapping of flagging tape or reflective red adhesive tape as the paint may not adhere properly to the Plexiglas.
- Also prepare 160 6" nails to serve as spikes.



### Video

*Cutting stakes from boards, cutting points.*

*Samples of stakes unpainted and painted blaze orange.*

*Numbering the stakes with permanent marker.*

### Script notes

In order to prepare the 160 transect markers you will need to obtain twenty 8 ft. long 1 x 2 boards. Cut these into 1 ft. lengths, then make two cuts to make a pointed stake.

If there are a lot of porcupines or beavers in your area, you may want to make the stakes out of .5 in. Plexiglas or plastic, or even of metal.

Paint all of these in a blaze orange colour. You can number them in the shop or in the field. BIG permanent markers work best, but be sure the paint is dry before you try to mark on the stake with the marker. You will need four sets of numbers 1 through 20, one set for each transect. The second stake that delineates each quadrat does not need a number.

Also prepare 160 6 in. spikes (nails) by painting the top 2" of each nail with the blaze orange spray paint. Allow to dry.

### 3) Preparing the transect boundary marker: (at shop)

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- Cut a 7 m length of mason line or any kind of cord (we have used a bright orange line)
- Tie loop of elastic or bicycle inner tube in for stretch to accommodate uneven terrain (the bicycle inner tube will add about 1 ? - 2 in when stretched slightly).
- Working in a flat area, place two stakes 10 ft. apart. It is important to measure 10 ft. from the *inside* of the two stakes. Apply the string boundary marker to establish the approximate stretch of tube to make a quadrat 10 ft 2 in.long x 2 in. wide. (Doing it this way on a measured quadrat will help prevent over-stretching it in the field.)]

#### Video

*Closeup of inner tube cross-section being tied into the line to make circular loop 6.2 m in circumference.*

*Calibrating the loop by putting the loop around two stakes 10 ft. apart and tightening to slightly stretch the inner tube cross-section.*

*Using the loop to establish the distance between stakes.*

*Using the hip chain device.*

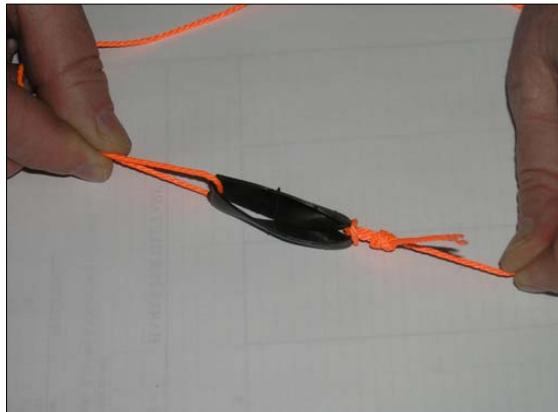
*Pacing off 50 m.*

*Photo of assembled equipment.*

*Photo of substitute clipboard.*

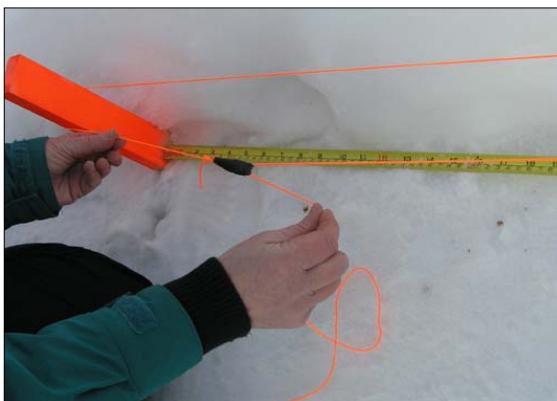
#### Script notes

Cut a cross section of bicycle inner tube about 1/2 in. wide. Tie the end of the line to this but don't cut the line yet.



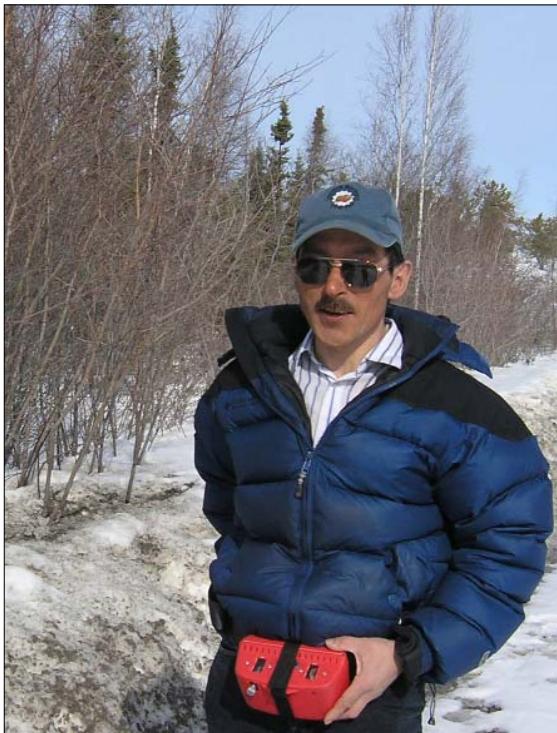


To calibrate this loop, pick an open area, perhaps a mowed lawn where you can pound the stakes in firmly. Place two stakes 10 ft. apart (inside measurement), and hammer them in well so they will hold.



Put the line around both pegs, tighten slightly to barely stretch the inner tube ring, and tie the other end of the line to the inner tube. You will now have a loop of line that can be used to make a quadrat 10 ft. 2 in. by about 2 in. wide. This loop will be used over and over when you install the stakes the first time.

If two technicians will be working on the project, make at least two of these loops so each can use one.



A hip chain device can be used to measure increments of 50 m along the transect line. To work the hip chain device, you tie the thread to a bush or tree and walk, allowing the unit to pay out thread until the numbering display reads 50 m. (Make sure you reset the counter to 0 before starting.)

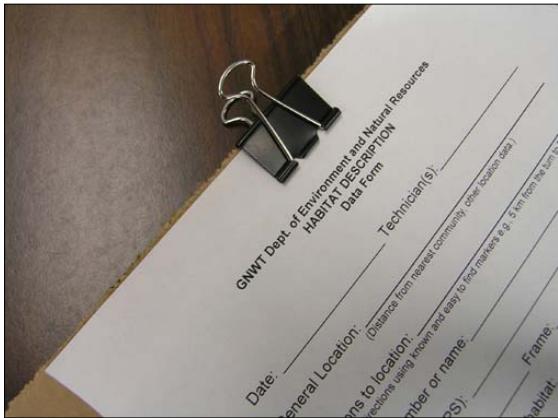


If you do not have a hip chain unit, you will simply pace off the 50 m instead of having to measure each distance. It is not as exact, but is certainly sufficient for this study.

To calibrate the number of steps in 50 m., you will measure off 50 m along a flat area and mark both ends. Walk this three times, counting the number of normal steps you take to do the 50 meters. Average the three to get your usual number of steps in 50 meters.



Collect all needed equipment, including clipboard and data sheets, pencil, flagging tape, aluminum tags, boundary marker, stakes, GPS unit, hip chain device, etc.



If you do not have a clipboard, you can make one easily by using a piece of cardboard or thin plywood and a clip or even large paperclips.

#### 4) Selecting transect area: (in the field, study area)

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- **How to select the area for the transects/quadrats,**
- **Setting up initial transect:**
  - GPS recording of locality
  - Completion of data sheet for ecological description
  - Other transects set up a minimum of 50 m from the closest transect.

#### Video

*Standard habitat shot to represent a sample of a transect area, pan across general habitat.*

*Placing aluminum tag and flagging tape (3 flags) in tree at start of transect.*

*Filling out data sheet for habitat.*

*GPS use.*



#### Script notes

A transect area in a series of habitat types typical of the general locality should be selected, in an area not slated for development for 10 years. This should not be in an area with lots of traffic as the stakes are intended to remain in place for a number of years.



Mark the start of each transect with an aluminum tag wired to a nail in a tree or fastened loosely around a branch.



Flag a branch of the same tree with *three* flags to make it easier to find. Don't change the habitat while installing the quadrats, don't move rocks, cut brush, etc.



Fill out the habitat data sheet and don't forget to make clear notes as to where your transects are located, in addition to getting the GPS coordinates for each.



Take a general photo of the habitat and write the roll and frame number in the habitat sheet.

## 5) Marking quadrats: (in the field, study area)

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- Laying out transect by pacing or measuring with measurement device or tape
- Placement of stakes to mark each quadrat (each is 50 m from the first stake of the preceding quadrat)
- How to use the boundary marker (stretch over stake, draw other stake out to end of marker, insert stake)
- Placing of the nails: one nail at each stake, inside measured off quadrat, at middle of the stake.
- Once quadrat is established, the stakes remain in place
- Remove all pellets at the time the quadrat is established]

### Video

*Use of compass to determine a straight line.*

*Laying out transect by pacing and/or measuring with hip chain device. Show pacing through the bush, and/or tying thread and then walking with the hip chain unit paying out thread.*

*Hammering in the numbered stake, stretching boundary marker, and placing second stake.*

*Searching and removing pellets.*

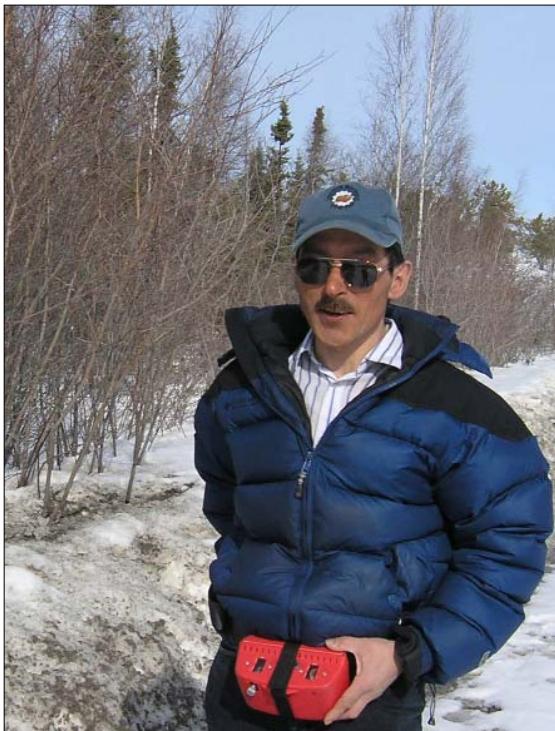
*Pacing or using hip chain device to measure from the second stake of the quadrat to the start of the next quadrat.*

### Script notes

Each transect will be **about** 1060 m. in length. This is one 3 m quadrat plus 50 m between quadrats x 20 quadrats equals 1060 m.

Use a compass to establish a general direction for your transect, and use the compass while walking the transect. Record the starting direction and any major directional changes in the field notebook or on the data sheet under this transect.





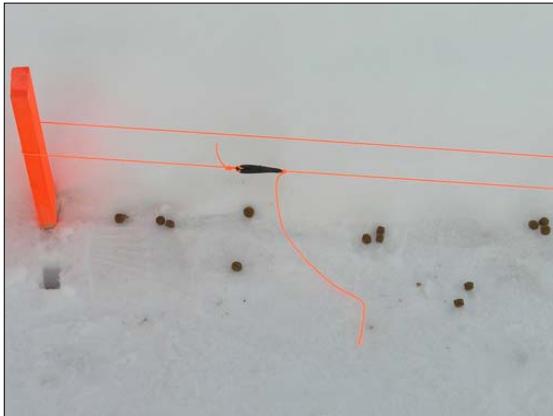
Measure the transect by tying the thread of the hip chain to a tree and walking until you get to 50 m, lay out the first quadrat, then walk another 50 m (your hip chain will show about 103 m ( 50 + 3 + 50). (This puts you 50 m into the habitat and away from the road or cutline.) Carry on until you have installed all the quadrats. Try to stay in a straight line and try to stay in the same habitat.



Each quadrat is installed by hammering in a stake until there is about 10 –12 cm showing. Stretch the line loop and then place the second stake. You will now have a quadrat that will measure about 10 ft. x 2 in.



Write the number of the quadrat on the stake (you can pre-number the stakes in the shop if you prefer) and put two flags on a branch or tree above the quadrat so you can find it again. (Two flags together mean to look for the quadrat markers.)



Install your spikes inside the quadrat markers. Push them into the ground at the middle of each stake. If the stake is removed, the spikes will still be there and will enable you to find the quadrat again.



Using the hare data sheet, record the date the quadrat was established, and any evidence of hare populations in the area, such as bones, fur, or feeding damage to vegetation.

Now, remove the loop (you will use it to measure the next quadrat) and continue on. Go 50 m and install another quadrat. The first stake of the next quadrat should be placed where your foot ends up after you measure the distance between the previous quadrat and this quadrat. Don't forget to number the first stake with the number of this quadrat, or to use the next number in the sequence if you pre-numbered the stakes. Search the second quadrat thoroughly and remove hare scats.

Continue on to the next quadrat. If the forest is dense, you can put a series of single flags between quadrats to mark the direction of your transect. Use just enough to be able to follow your line. Don't put a whole lot of flags out as it will attract attention and your quadrats may be disturbed.

Use your compass to maintain the general direction for the transect.

In your field notebook or on the habitat data sheet, make notes as to changes in terrain (reference these to the nearest quadrat), or where you need to change the orientation of the transect to detour around a lake or pond. Be sure to note if your transect crosses a bare rock outcrop, a stream, or a completely different habitat type.

Where the ground is rocky, you can use your spikes to mark the actual quadrat if you can't hammer the stakes in. You can wire the stake to the spike so the boundary marker will work. Or, move the quadrat laterally until you find terrain where you can get the stakes or spikes into the ground. Be sure you note any deviations on your notes and make the two flags that mark this quadrat quite long so they can be seen.

If you need to detour around a pond, do so. The transect does not need to be straight. If you need to detour only slightly, step off the needed number of paces perpendicular to the line of your transect, continue laying out the line, establishing quadrat or quadrats in the deviated line, and then returning to the original line once the obstruction is passed.

Continue until you have established 20 quadrats on this transect.

Establish three more transect lines, using the same methods. Each transect should be at least 500 m from any other. Taken as a whole, the transects should cover a good representation of typical habitat in your area.

## 6) Checking quadrat, ONE YEAR LATER:

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- Replace boundary marker to delineate quadrat
- Systematically search the quadrat, remove and count all pellets [IMPORTANT: count all pellets that are in the plot, including those at are halfway in or more, but not those that are more than halfway out.]
- Record info on data sheet
- Throwing pellets away a few meters from the plot.

### Video

*Flipping calendar pages to show year passing.*

*Locating transect – vehicle drives up, people get out and locate markers, check aluminum tag, walk into bush.*

*Finding first stake, pan from two flags to the stake.*

*Replacing boundary marker.*

*Searching quadrat, vertical shot to demonstrate how to tell if pellets are in or out.*

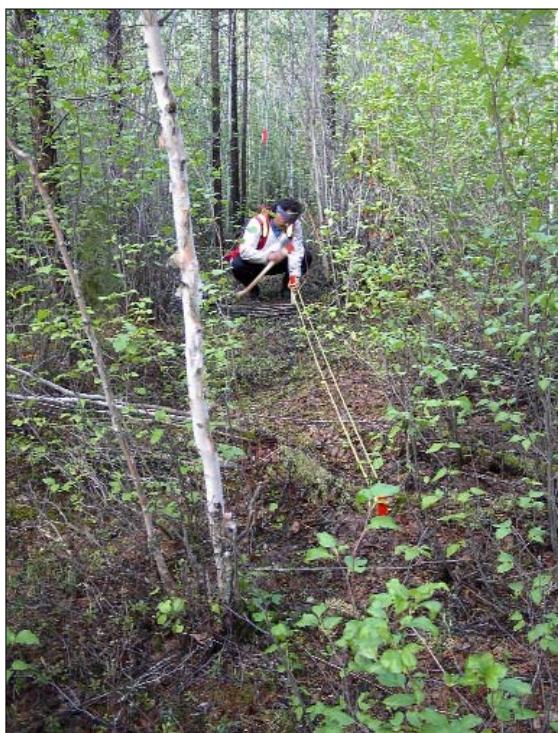
*Counting and discarding pellets.*

*Re-numbering stake.*

### Script notes

ONE YEAR LATER, in JUNE, return to transect area and locate the transect by finding your three flags and the aluminum tag. Check number to make sure it is correct. Replace the three flags if they have faded.

Hike into the bush to the first quadrat, which you should be able to find by the two flags in a tree. Replace these flags if they have faded. Look for the stakes under the flags. If the stakes are gone, look for your spikes and reestablish the quadrat.





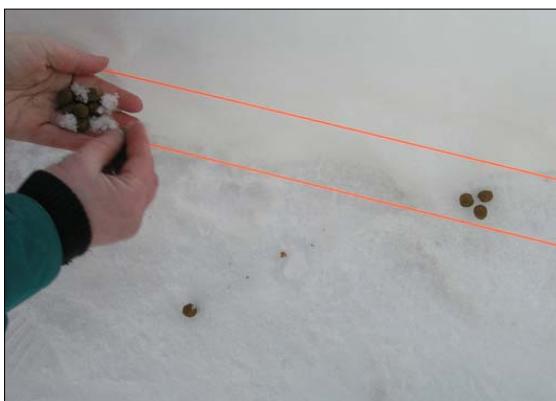
Install the string boundary marker to delineate the quadrat.



Systematically search the quadrat, counting and removing pellets.



Include pellets that are halfway in, but not those more than halfway out of the quadrat as seen under the cord. Once all “qualifying” pellets have been counted and removed, go back along the outside of the quadrat and remove all pellets within 20-30 cm of the boundary marker. You don’t count these; just throw them away. This prevents old pellets from rolling back into the quadrat.



Record info on data sheet. Also record any anecdotal information on hares which you may have observed along the way, such as sightings, fur, skeletons, evidence of feeding, etc.

Discard pellets by throwing them away a few meters from the plot.



Take a big felt tip permanent marker with you as you will need to redo the number on each quadrat each year.

Repeat this procedure at each quadrat along the transect, and at each transect.

## 7) Data sheet (complete data sheet and submit once all four transects are done)

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### Video

*Person looking at data sheet.*

### Script notes

As you complete each transect, review your data sheet as you return to the start, making sure you have completed it.