

# Snowshoe hare survey protocol

## Stand Descriptions

Each stand has 5 transects with 9-10 plots each, for a total of 45-50 plots. Within each stand, count pellets in small (56.4 cm radius) circular plots. The center of each plot is 50 meters from the next plot along a transect. Transects are parallel and also 50 meters apart. The number and length of transects may vary by stand depending upon stand dimensions. Transects are buffered at least 70 m from stand boundaries that are delineated by other stand types, hiking trails, and Forest Service roads to avoid edge effects (Figure 1). Labels for each plot are listed by scale and indicate the grid #, stand type #, and plot #. For example, Grid 106, contains 3 spruce-fir wave stands that each have 50 plots. If a surveyor counted pellets in the 44<sup>th</sup> plot of the 2<sup>nd</sup> spruce-fir wave in Grid 106 it would be written as G106\_SFW2\_44.

**BLUE** (New Hampshire) and **PINK** (Vermont) flagging and aluminum/plastic tree tags mark each plot and the center stakes are spray painted blue on the top.

Depending on the stand type it typically takes one day for two people to establish a stand (i.e., mark, clear, and count), and when stands are established >4 can be cleared and counted per day.

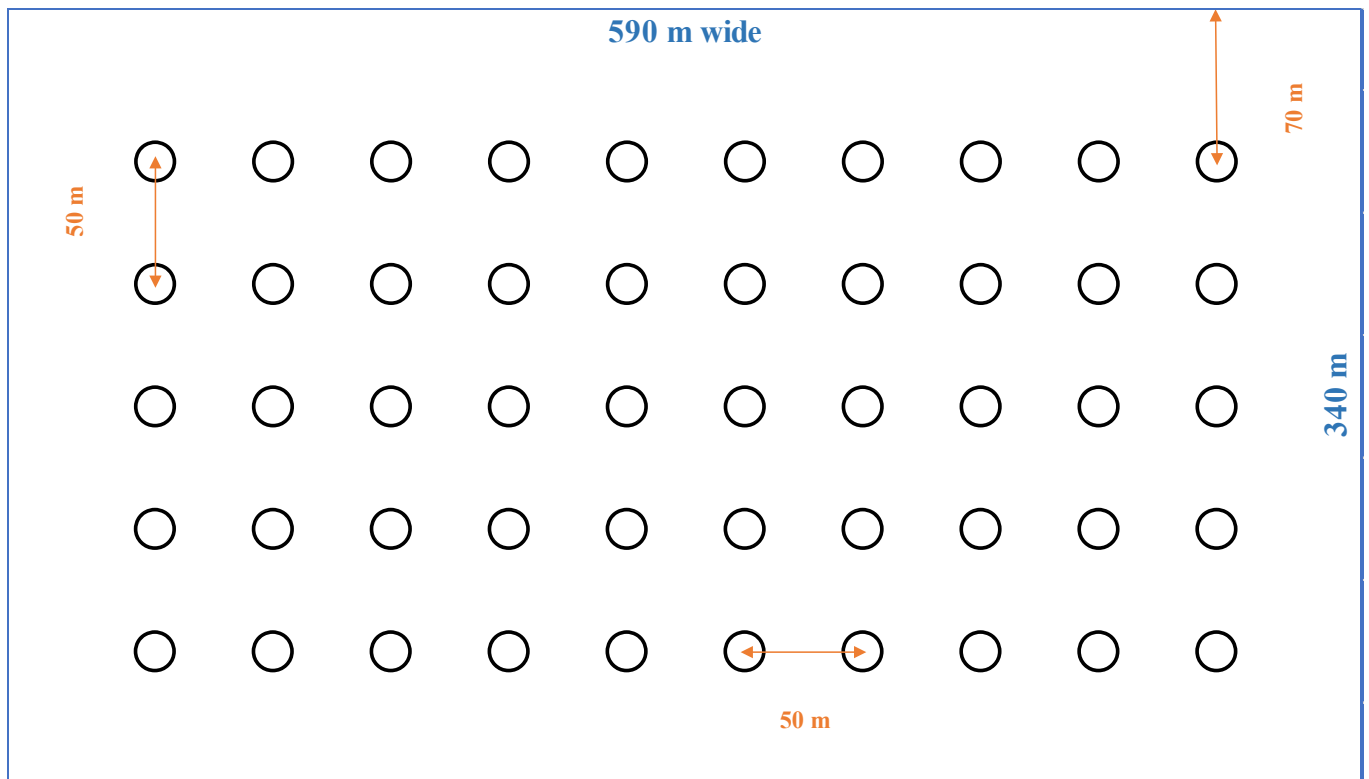


Fig. 1. Standard layout of stand plots. Nine to ten plots per transect are spaced 50 m along 5 parallel transects that are also spaced 50 m apart.

### In the office:

1. Load GIS maps of each stand on the GPS and make sure that the stand id #'s are labeled so that you'll know exactly which stand you're at. **It is inevitable that you won't be exactly on the plot point due to position error from the GPS but that is okay!**
2. Get flagging and tree tags to mark each site.
3. Use 1" x 1" x 2' or 3' stakes that are painted blue on the top. They are typically in bundles of 25 so all you'll need is 2 bundles. Have a ratio of 10:1 smaller stakes to larger stakes as larger stakes are only needed when the ground vegetation is high or there are rocks.
4. Make a 56.4 cm stake that can butt up to the stake.
5. Bring notebook for taking notes at each plot.
6. Plenty of Sharpies, pencils, blue flagging, extra GPS batteries, and tree tags.

### In the field

This is the core of our research program and it is extremely important that the protocol is followed exactly. For us to compare different stand types, different locations (Telos & Clayton Lake) different years and seasons, all of which had different technicians, we standardize the procedure for counting. It is our best attempt to minimize observer bias and it *depends on you!*

1. Walk to the plot on GPS map and when GPS settles and is <10 m EPE then identify the place to drive in stake. You'll need to drive it in anywhere it seems to land. The exceptions are streams, huge blowdowns, or cliffs! Even if it is in dense thicket it needs to go in there!
2. Once stake is driven in, get out blue flagging and mark the plot as noted earlier (e.g., G106\_SFW1\_44). Then scribe a tree tag and put in tree that is visible and next to blue flagging. Then mark in notebook the date, Grid #, stand id, and plot number. Then write to the right of this, "#pellets", "Browse/in or out", "browse species", and "notes"
3. **Be careful to not step** inside each plot. When the plots are being established this is inevitable due to working with GPS. Carefully clear each plot using the 56.4 cm stake and count pellets. If any are decomposing or have moss on them don't count but note.
4. People **MUST** crouch, kneel, or sit to be close enough to the ground to see pellets unless you are very, very short.
5. Because you are kneeling, *you will get wet* - raining or not. Wear quick dry pants.
6. When it's a close call of a pellet in or out of plot, carefully line up the midpoint on the string/stick with the string. If the pellet is exactly ½ way in, then *for the whole stand*, count the first ½ way one in, the second out, 3<sup>rd</sup> in, ... continue as you go plot to plot.
7. Carefully remove twigs and branches first. Peel up layers of leaves carefully, one at a time. Search especially carefully **between layers** of deciduous leaves, or layers of pine needles. Pay attention to very slight differences in texture and in color shades of brown, some pellets have moss growing all around them. Most people don't wear gloves, but latex exam gloves and garden gloves are both available for you.
8. Search small divots, ditches, etc. Pellets may roll downhill.
9. Throw pellets far out of the plot in a DOWNHILL direction.
10. Literally comb the ground lightly with your fingers, LOOK and FEEL for round objects. Feel in moss, grass, and part the vegetation to look carefully. Clear the plot of all things spherical, round,

cylindrical – pebbles, twigs, grouse and moose scat, seeds, acorn shells, cedar cones, small mushroom caps. Pellet in moss:



11. If there is standing water, **look in the water** – use gloves and feel in the mud at the bottom of the puddle. Many pellets have been found underwater – especially in spring.



12. When done, record # pellets and anything interesting or strange you see. Take pics!
13. CHECK flagging and stakes. Pull any brittle flagging and replace. Remove all old flagging and stakes, *on ground* or anywhere else. Plot maintenance is a **very important part** of your job. Take time to do this.
14. Example comments to write: % of plot that has standing water. Whether the microsite (plot, a few plots or part of a plot) has a very different character from the rest of the stand. If there are many pellets just outside the plot, write: > 5, >10, >30, >50 pellets just out of plot. If trees fall on a plot. Whether a pellet looks like it belongs to last season (in fall – A large fat-M&M shaped light brown pellet with wood chips in it – could be a winter pellet that was missed. In spring – a small dark brownish green pellet with a slight nipple, could be a summer pellet missed.) Pellets: Summer on left, winter on right.
15. Be very careful navigating in the stands with rugged terrain!
16. If it is too late at night to finish a stand, come back first thing in the morning to complete the plots in that stand.
17. If you are unable to complete a plot or stand for any reason, write why.

## FAQs

What if I lose my string or measuring dowel? Use the spare string reel, improvise with a stick for the dowel. Improvise with flagging for the measuring string.

What if I can't find the stand? Use the GPS with maps. If it's been logged, then go do the next closest one.

What if I can't find the flagging? Move 2 or 3 steps left or right to search, look up for flagging tied high, look down for fallen flagging on the ground. Trust your compass bearing 1<sup>st</sup>, your GPS bearing 2<sup>nd</sup>, your feet LAST. Re-flag.

What do I do if I can't find a plot? Use the GPS and compass to navigate to a point that you can find, such as the closest Plot 1 or Plot 7; work backwards. Still can't find it? Finish all the ones you can find, then work with your partner to find it.

What do I do if I can't find a stake? Walk 2.5 meters from the midpoint and walk a slow arc. Inspect the ground to find the trail of cleared vegetation. Inspect the ground to find bits of old flagging or evidence of a stake. If all else fails, choose the most cleared looking ground trail and put in a new stake at the other end of it. Then clear that path of pellets.