

LTER Point Bar Vegetation Monitoring Procedures

1.0 Introduction

The point bar system measures the frequency and height of vegetation in meter squared plots at each LTER site in the Bonanza Creek Experimental Forest. The point bar frame crosses the plot at a diagonal and rests on three adjustable legs. After the frame is leveled, a laser is placed in each of ten holes in the point bar and whatever the red light touches (referred to as a "hit") is measured and recorded, moving down through the canopy. If a species occurs in large amounts it will show up in the data as occurring very frequently, if it occurs low to the ground, the data will reflect that also. Likewise if a species occurs very little it may not be touched by the laser, however if it is inside the plot it will be recorded separately. The point bar is meant to be an objective way of carrying out species surveys and it replaces the old system of eye-balling percent cover, which is often subject to personal bias.

2.0 Equipment and set up

2.1 Set up the Point Bar

There are two point bars, which are identical in use except for a few hardware exceptions. The parts you will need are:

For point bar 1:

- 1 large rectangular tube (it has the holes in it)
- 1 smaller rectangular tube
- 1 round insert (it will be on one end of the larger tube)
- 3 legs
- 3 screws with (hopefully) pink plastic heads
- 2 screws with metal heads
- 1 laser

To assemble bar 1:

The larger tube and the smaller tube fit together like a capital "T," and the two metal headed screws are used to hold it all in place. Place the 3 legs in the 3 holes at the end of each arm, and then use the screws with plastic heads to keep them from sliding up and down. Make sure the "T" is right side up: the leveler should be on top. Now you can place the laser in the first hole.

For point bar 2:

- 1 big metal "T" (the big and small tubes are permanently attached)
- 3 metal clamps, marked by pink ribbons
- 1 laser

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To assemble bar 2:

Bar 2 is preassembled in the shape of a “T” so the legs just slide into the three available holes, one on each end, keeping the level face up. The clamps slide onto the legs under the body of the point frame. Once you have the point bar in place on the A side, you will need to level it by adjusting the clamps/bolts on the legs. When the bubble on the level is in the center, the point bar is level.

2.2 Other necessary equipment:

- Site specific species list
- Plot Layout Map
- Field Species Identification books (Plants of the Western Boreal Forest & Aspen Parkland and Willows of Interior Alaska, and depending on the site, Mosses Lichens and Ferns of Northwest North America, and Lichens of the North Woods).
- Extra Laser Batteries
- Tool kit for putting point bars together
- Meter stick(s)
- Hand held computer(s) for entering data
- Vegetation data sheets (backup)
- Shrub survey data sheets
- Double meter stick for shrub surveys
- Clipboard for shrub surveys

3.0 Procedure

3.1 Identifying the plot and orientation of A and B transects

After arriving at the site, find the first plot. Plots are marked by a white fiberglass stake; check the stake for a tag with the plot number. If no tag can be found, the plot number can be determined by comparing the plot layout map with a plot that does have a tag nearby. The point bar transects the vegetation plot from two points; A and B. Point A begins at the plot marker (white fiberglass stake) and point B begins at the PVC in line with the B side. There are 6 PVC tubes (3 for A and 3 for B) with pink or orange tops at every plot to mark where the legs should be set. The point bar legs fit into the PVC tubes. Ideally, the A transect PVC are pink, and the B transect PVC are orange, however this is not always the case. Some PVC will be all pink, all orange or a mix. Side A will always start with the single leg of the point bar next to the fiberglass stake plot marker. During set up, try not to step inside the plot, as trampling the vegetation will adversely affect the data.

3.3 Collecting Vegetation Data

Now you are ready to begin recording vegetation data. The first step is recording the start and end heights. The point bar has ten holes, numbered one through ten beginning at the single leg side. To obtain start and end heights, place the meter stick next to hole number one, and with 0 cm on the ground, record the distance from the ground to the bottom of the point bar. Repeat for the end height next to point number ten. When using the laser,

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all measurements should be taken from the hit (or ground) to the bottom edge of the point bar. Every hit is measured from 0 and rounded to the nearest whole centimeter.

Place the laser in the first hole on A side, and observe what the red dot of the laser touches (the hit.) Take the height from the hit to the bottom of the point bar. Record the distance and species for point one. Continue recording hits all the way down to ground level. You may need to move vegetation out of the way as you work your way down to ground level. For instance, if the hit is on a broad leaf, hold the leaf out of the way of the laser so you can see the next hit.

Vegetation data should be entered using the species code for the scientific name. The code version uses the first three letters of the family name and the first three letters of the species name. For example, common horsetail, *Equisetum arvense*, would be recorded as "EQUARV" in the data.

Every hit is designated either "good" or bad": a good hit is described as the round dot of the laser completely touching an object. A bad hit is described as the laser touching half the object or less. When recording data, a good hit is a number "1," and a bad hit is a number "2."

Repeat the process until you have recorded data for points one through ten on the A side. Then move the point bar to the B side, level, and repeat the process. After you have recorded all the data from points A and B, the last step is to look in the plot and identify any other species that are present that did not come in contact with the laser. These species are recorded as point "99," or other species.

If you encounter a plant you can't identify, first review the species list for the site. Often times, reviewing the species list is very useful, as it shows you what species have been historically present. Reviewing the field identification books is also very helpful. If after reviewing the species list and I.D. books you are unable to identify the vegetation, collect a specimen (outside of the plot, if possible) and bring it back to the lab for further investigation.

Please see section 4.0 for descriptions of non vegetation hits.

3.3 Recording Vegetation Data

Data should be recorded on the Allegro hand held computer. Paper data sheets should also be brought to the site as back up in case the Allegro can't be used. To enter data on the Allegro, select the point number, then the species. Enter height and comments if any (new species, etc). Hit next to continue. A message will pop up on the Allegro that says "did you mess up", as a check to make sure you entered the data correctly. If your entry looks good, select no. If you need to correct your entry, click yes, and you will be able to edit your entry. When finished, select point "99" to list the other species.

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If you discover you have made a mistake entering the data, it is often easiest to make a note in the comments section of the current entry rather than trying to correct it in the data table. The comments can be easily incorporated into the data back in the office.

4.0 Non Vegetation Descriptions

CHARCOAL – Bits of burned wood >1cm in diameter.

CHARORG – Lightly burned organic soil.

COARSEWOOD- Non-living woody stems and trees no longer attached to the ground and/or not self supporting. Coarsewood is all such wood greater than 1 cm in diameter on the large end.

DECLIC –This category is for decomposing lichens commonly found on woody material such as tree stems and branches and fallen tree parts. Not really non-vegetation, but a commonly used general code.

DISTORG – Disturbed Organic Soil. Organic material that has been dug or torn from soil and redistributed on the surface. This is common on plots with high vole activity.

FINEWOOD – Non-living woody stems and trees no longer attached to the ground and/or not self supporting. Finewood is all such wood less than 1 cm in diameter on the large end.

LITTER – All dead, non-woody plant material that is attached at the stem.

ROCK – Surface rocks.

SURFMIN – Surface Mineral Soil. Any exposed mineral soil on the plot.

STDEAD – Standing Dead. Dead plant stems that are still standing under the support of their own base. A hit on standing dead is a hit on any dead part of the plant, whether the plant is living or not. Standing dead is identified by species.

WATER – Surface water.

