General Ecology 310
Fall 2005
Field Lab 1—Urban Ecology Center

Biological Inventories

Introduction

In order to begin work on our semester research project, this week we will be conducting biological inventories at a moderately disturbed field site. Specifically, we will be carrying out surveys of trees and birds at the Urban Ecology Center and Riverside Park properties. From these surveys we will be able to ascertain the species richness (i.e., the number of unique species present), species abundances, community composition, total biomass, and other aspects. Thus, the surveys you conduct this week will be used for more than just simple counts of species.

Objectives

Because this lab is the first in a series of laboratories designed to collect field data, there are a number of major objectives. These objectives include:

1) Setting-up plots and transects to conduct inventories and censuses.
2) Identifying to species (if possible) all trees and birds in a given plot or transect.
3) Entering all relevant field data into your field notebooks. This includes abiotic measures (e.g., temperature, time of day, cloud cover, etc.).

Methods

Prior to arrival at the field site we will have randomly assigned you to a group. This is the group that you will be working with the entire semester as part of your project. Each lab section will have four groups of students, with different groups collecting different types of data.

Once at the field site we will be conducting two types of surveys, one for trees and one for birds. We are considering these as model (i.e. representative) taxa of plants and animals. Two of the groups will be collecting the tree information while the remaining two groups will collect the bird information. Over the course of the four laboratory sections a total of 16 groups will collect data at both upland and riparian habitats. Thus, even if your group or lab section does not work in both locations, we will be sharing around the data next week.

Before you start collecting any census data, you will need to do the following. Record the date, location, time of day you begin collecting data, the temperature (in degrees C), wind and cloud cover (using the Beaufort scale and sky index, respectively). Also, record any other interesting or important information in your notebook. Sometimes the most important or interesting phenomena are discovered later by keeping detailed notes!

Tree Census

The two groups that are censusing the trees will need to do the following. First, with the help of Dr. Lepczyk, Neil, or Brianna, you will need to layout a 10 m by 10 m plot using a compass and measuring tape provided. The plot should be as close to square as possible. Next, the two groups will need to begin identifying all tree species in the plot to species level (if possible) using the keys and field guides provided. For each species you need to record the common and scientific names as well as the diameter at breast height (dbh). To measure dbh simply find the point on the tree trunk where you sternum would touch if you stood next to it. Then using a tape measure, determine the diameter to the nearest mm (if possible). Although this portion of the exercise may seem easy, in fact identifying all the trees in the plot may take the entire lab time! If we are able to collect the data quickly, then we will layout a second plot. Both groups should collect data in the plot so as to ensure all trees are recorded.

As we will see with birds, we can also census trees along a transect. The primary difference is that transects may cover a gradient or can follow a narrow corridor. Ultimately the same data is collected, so may also use this technique if time allows

Bird Census

When ecologists or ornithologists census bird species they use two major approaches, point counts and transects. Each method has certain advantages, depending upon where the census is taking place and who is collecting the data. However, more census tend to use point counts.

Point Counts:

We can track changes in breeding bird abundances over time or make comparisons between sites with similar habitats by conducting point counts. Ecologists and ornithologists favor point counts because they are objective, standardized, reputable, and least biased of the methods. They provide us with a comparative index of occurrence, not a complete inventory. Points are laid out at regular intervals along a transect, and the surveyor spends a certain amount of time at each point and records all birds detected during the time period within a specific radius.

Bird Transects:

Transects are imaginary lines drawn through the site to be surveyed. The surveyor simply follows the transect or transects through the site, recording all birds detected along the way. The surveyor should cover the transect in the same amount of time on each visit. A transect provides a "snapshot", an index of abundance of birds at a site.

Initially we will carry out our bird censuses using point counts, following the standards established by BBIRD. Under this protocol we will survey birds for 10 minutes within a 50 m fixed-radius circle. We use a 50 m circle in order to allow comparability among widely different habitat types and to maximize the probability that bird counts reflect vegetation measured at the point. However, all birds detected beyond 50 m should also be recorded to allow total detection of species. Record male, female, or unknown for each individual bird detected. Distinguish between birds inside and outside of the 50 m radius circle. Points should be established using markers (stakes) and these points should be

totally contained within the plot (center of survey plots should be 100 m from the edge of the nest search plot). Once the survey is complete, we will move to a new location that is a minimum of 200 meters away.

Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.

Sky Condition

Codes Sky	Code Description
0	**Cclear sky, few clouds**
1	**Partly cloudy (scattered) or variable sky**
2	**Cloudy (broken) or overcast**
3	**Rain**
4	**Fog or smoke**
5	**Fog or smoke**
7	**Snow**
8	**Showers (intermittent rain)**

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Tree Census

Lab Section_____ Group Number/Name_____
Date_____ Time_____
Wind_____ Sky_____ Temperature_____
Time Started_____ Time Finished_____
Plot Number_____ Field Site Name_____

Common Name	Species Name	dbh (cm)

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Bird Point Counts

Lab Section_____ Group Number/Name_____
Date_____ Time_____
Wind_____ Sky_____ Temperature_____
Time Started_____ Time Finished_____
Point Count Number/ID_____ Field Site _____