

## Sampling Efficiencies in a Synthetic Community Exercise 15

In this laboratory we will examine several synthetic populations of plants on a scaled map that was created in a GIS program. Our artificial community is composed of four shrub species that are represented by different colored shapes; black, blue, red, and green. Each “species” has a different population in our artificial community which has a surface area of 59 m by 59 m. The scale of our paper representation is 1 cm on the map equals 1 m on the ground (1:10). I built this community so we would know the true population of each “plant species”, their distributional pattern, and their cover values. We will determine sample statistics that can be compared to population parameters.

Because these population parameters are known, we can also evaluate the relative efficiencies of various sampling protocols. Our task is to find which techniques provide us with an acceptable estimate of the mean and variance quickly and easily. We will examine several quadrat sampling methods with varying size and shaped plots, point sampling as with a 10-point frame and line intercept. Each of these methods will be executed using our glass covered population located on a table in the third floor hall of Strand. Our quadrats and point frames are printed on transparencies that are located on the table. I have also provided you with a 1 cm grid on a transparency and a 30 cm rule.

Your first task will be to determine the size of each of our sample quadrats. I printed them on transparent sheets so you could use them as we would use plot frames in real sampling. There are:

- A. 3 - Square quadrats of different sizes
- B. 2 - Rectangular Quadrats of different sizes
- C. 2 - Round quadrats of different sizes

Each lab group will sample 20 random locations with each of these 9 sample quadrats. Please count the plants in each quadrat and estimate their cover values by species. Keep track of the time you spend from beginning your sampling with each size and shape until the end so we can determine how long it takes to sample with each technique. I have prepared a sampling data form that you can use.

You will also measure the canopy cover of our “plants” using the line intercept method. Do 5 line transects using a metric ruler 30 cm long as your “stretched tape.” This will represent a distance of 30 m on our map. Be sure to align your line from a random starting point in a random direction. The coverage of each “plant” is measured along the line by recording the start and stop values on the ruler and subtracting the larger from the smaller. After you have read the transects, the intercept distance of each shrub is calculated and summed to get the meters of coverage and coverage percent. Plant or shrub coverage/line length) x 100 is the percent cover for that sample. Because the whole line is read for the cover value each line represents 1 sample.

Your last task will be to use our “10 point frame” to estimate the cover values of our 4 species and percent bare ground. Please count 20 frames (200 point readings total) and report your percent cover values. Remember to keep track of the time you spend for each of the sampling techniques so we can make a decision about relative sampling efficiency.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Quadrat sizes (Area in cm<sup>2</sup> and m<sup>2</sup> on out community map)

Round 1 \_\_\_\_\_

Round 2 \_\_\_\_\_

Square 1 \_\_\_\_\_

Square 2 \_\_\_\_\_

Rectangular 1 \_\_\_\_\_

Rectangular 2 \_\_\_\_\_

### Quadrat Sampling

Time Required for Quadrat Sampling:

Quadrat	Start Time	End Time	Duration	Notes
Round 1				
Round 2				
Square 1				
Square 2				
Rectangle 1				
Rectangle 2				

Plot the running mean of density values (number of plants per meter vs. sample number) for each quadrat size and shape.



## Line Intercept Sampling

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Transect	Centimeters of Intercept	% Cover
1.	_____	_____
	_____	_____
2.	_____	_____
	_____	_____
3.	_____	_____
	_____	_____
4.	_____	_____
	_____	_____
5.	_____	_____
	_____	_____

Calculate:

Shrub Cover by species: Black = \_\_\_\_\_%, Red = \_\_\_\_\_%, Blue = \_\_\_\_\_, Green= \_\_\_\_\_%

