**Part 3 Transects: Sampling the Community**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_\_\_\_\_\_\_Class:\_\_\_\_\_\_\_\_\_\_

**Background:**

In ecological studies, researchers usually can’t count every individual organism in a given area because of the vast number of organisms or the large space in which organisms can be found. Other difficulties in getting an accurate count include movement of organisms and danger to researchers and organisms involved in capturing subjects of a study. To compensate for these difficulties researchers use sampling techniques to calculate approximate population sizes. In this study the researchers used a grid to break down the area that they were studying into smaller segments. The long lines of the grid are called transects. Along each transect the team stopped at random locations to record observations about specific populations within a smaller space called a quadrat. A quadrat is usually a 1 meter by 1 meter box but it can be larger: 10m x 10m or 100m x 100m.

**Objective:**

In this activity you will use the same grid system that the researchers that you have been learning about used to break down their study areas into smaller segments. By practicing with transects and quadrats you will gain a better understanding of how these methods work in real research. You will also use actual recording techniques and equations that are used are by researchers.

**Materials:**

Transect Tape

Clipboard

Data Sheet

Quadrat

Thermometer

**Field Procedure:**

1. Lay out a transect
   1. Your instructor will take you to the area to be studied, let you know the position and length of the first transect.
   2. Once flagging has been placed to mark the start of the first transect, use the transect tape to measure out the full length of the transect.
   3. Use a second piece of flagging to mark the end point of the transect.
2. Find your Quadrat
   1. Walk and stand to the East or North of the transect tape. Place the quadrat for recording all observations to the West or South of the transect tape. Walking on one side and recording on the other will reduce disturbances in your area of study.
   2. Once the transect has been placed, your team should go to the location on the transect tape that you have been assigned being sure to bring along all of your materials.
3. Complete the data sheet
   1. Answer all questions on the data sheet that your instructor has provided. Label all pictures in your image box so you will be able to understand what it means later.
   2. Your instructor may ask you to complete several quadrats throughout a transect or all of the quadrats on that transect. Whatever the case may be, be sure to use a new data sheet for each quadrat.

**Upper Level Data Sheet:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Team Members:** | | | **Diagram of Quadrat:** | |
| **Date:** | **Class:** | |
| **Transect #** | **Quadrat Location:** | |
| **# of Species found:** | **Quadrat Size:** | |
| **Species Abundances** | **Species Description**  **(include presence of flowers, seeds, & evidence of insects)** | | | |
| **1.** |  | | | |
| **2.** |  | | | |
| **3.** |  | | | |
| **4.** |  | | | |
| **5.** |  | | | |
| **6.** |  | | | |
| **Species Identification** | | | | |
| **1.** | | **2.** | | **3.** |
| **4.** | | **5.** | | **6.** |

**Data Analysis:**

1. Use the field notes, any samples, and pictures taken to identify the species found in your team’s quadrat. Finish the data table by filling in the species names.
   1. Were there any species that you could not identify?
2. Calculate population densities of each species that was found in your team’s quadrat. Use the data to create a data table and bar graph. Show calculations.

Population Density = Total Population ÷ Area population was found in

Example #1: 7 cattails were found in a 1m x 1m quadrat

Population Density = 7 cattails ÷ 1m2

Population Density = 7 cattails per square meter

Example #2: 50 cattails were observed in a 10m x 10m quadrat

Population Density = 58 cattails ÷ 10m2

Population Density = 5.8 cattails per square meter

1. Create a second data table and pie chart of the abundances of the species found in your team’s quadrat.
2. Did any of the plant species in your team’s quadrat show growth patterns such as patches or individual, independent growth? If so, which species showed which patterns?
3. Exchange copies of abundances data from the other teams that recorded data along your transect. Was there a change of abundances along the transect? If so, how did it change? Did one plant species suddenly increase or decrease or was there a new species that came in? Show your findings in a table and line graph.
   1. Which species, if any was most abundant according to your data?

**Conclusions:**

Write a conclusion to your lab: Remember that a conclusion begins with a short recap of the project. This section should include the purpose of the project, your hypothesis and a brief statement about your methods. Next write about questions that the data can be used to answer. Include these topics:

Is there a correlation between population densities and abundances? If so, what is it?

What caused the growth pattern that you found?

Why did the abundances of the species change along the transect?

Be certain that these answers flow in a form that is easy for the reader to understand. The conclusion should then return to the hypothesis statement as either verified or disproven by the data. Finally, the conclusion should end with a statement about what you would do next as a researcher, that is to say, what would be your next step? The length of the conclusion should be approximately 3 to 4 paragraphs, however, length isn’t nearly as important as content.

Explain why the abundances of the species changed along the transect.

Describe why a large population density doesn’t mean that an area has high biodiversity.

Explain why did biodiversity changed along the transect.

Compare how the results of your project would be different if it were repeated in 50 years.