# Point-Intercept Transects

Introduction

Scientists use a variety of techniques to study the environment. Usually, there is no way for scientists to answer questions like "how many snails live in the marsh?" or "where are the areas with low dissolved oxygen in the Gulf of Mexico?" because they don't have the time or resources to go out and count every snail or measure dissolved oxygen for the entire Gulf. Doing so is impossible, impractical, and potentially harmful (to the scientist, the organism in question, or the environment). Instead, they have ways to take samples or observations from a smaller area and then use that information to create an estimate.

An estimate is a rough judgment or calculation of the number or extent of something. There are many tools for sampling, but some of the most versatile are transects and quadrats; they can be used anywhere from a coral reef, a rainforest, a cave, or even the surface of Mars. Transects are lines that scientists use as a guide through a research area. The line has intervals, like a tape measure, that are sampling locations. In the example below there are 14 transects used to study hypoxia (low oxygen) in the Gulf of Mexico. Each transect has several sampling locations along it shown by the black dots. Using transects allows the teams of scientists to get an accurate idea of where hypoxia is occurring in the Gulf of Mexico without having to sample the entire area.

Bottom-water dissolved oxygen across the Louisiana shelf from July 22-28, 2013
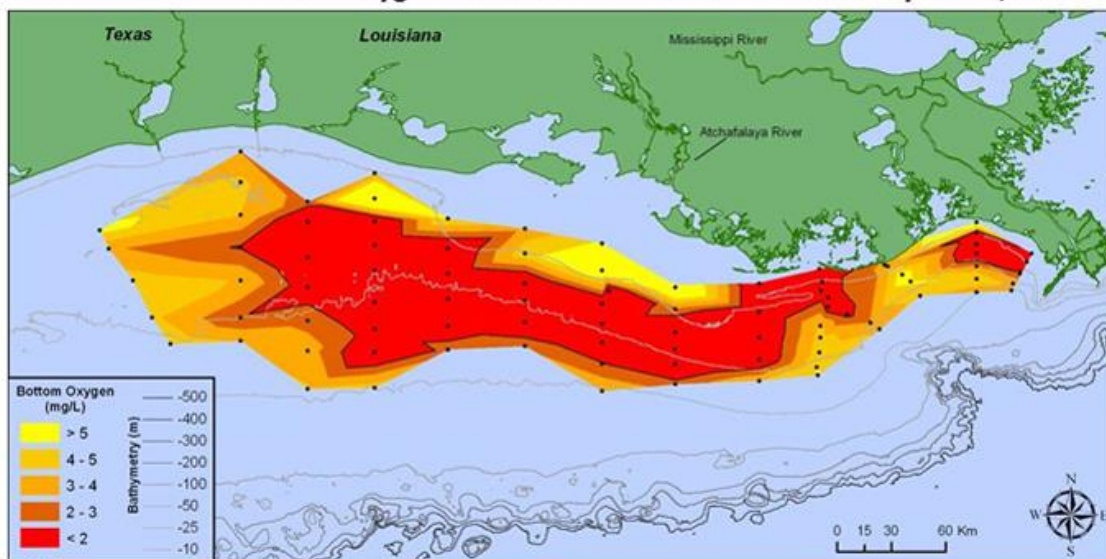
Data source: N.N. Rabalais, Louisiana Universities Marine Consortium, R.E. Turner, Louisiana State University
Funded by: NOAA, Center for Sponsored Coastal Ocean Research

Initial Observation

In this activity you will practice using transects to collect information about an area and draw conclusions about community composition. A community composition is a description of all the species present in a geographical area. The composition could include the number of different species or whether some species are more common than others. The sampling technique you'll use is called the Point-Intercept method. For this, data is collected at intervals along a transect, and only organisms that touch the transect line at the designated point are counted. If there is no organism directly along the transect line at the point being counted, it is considered a "miss".

The study area contains two groups of plants:

Rushes
(*Juncus* sp.)

Cordgrass
(*Spartina* sp.)

Begin by making some initial observations of the plant community in the study area. By just looking at the study area, <u>without counting anything</u>, describe the community in your study area by answering the following questions.

- What is the species richness of the study area (how many species are present)?

- Do some species appear to have larger populations than other species?

- Which species appears to be most abundant?

- Which species appears to be least abundant?

Study Area
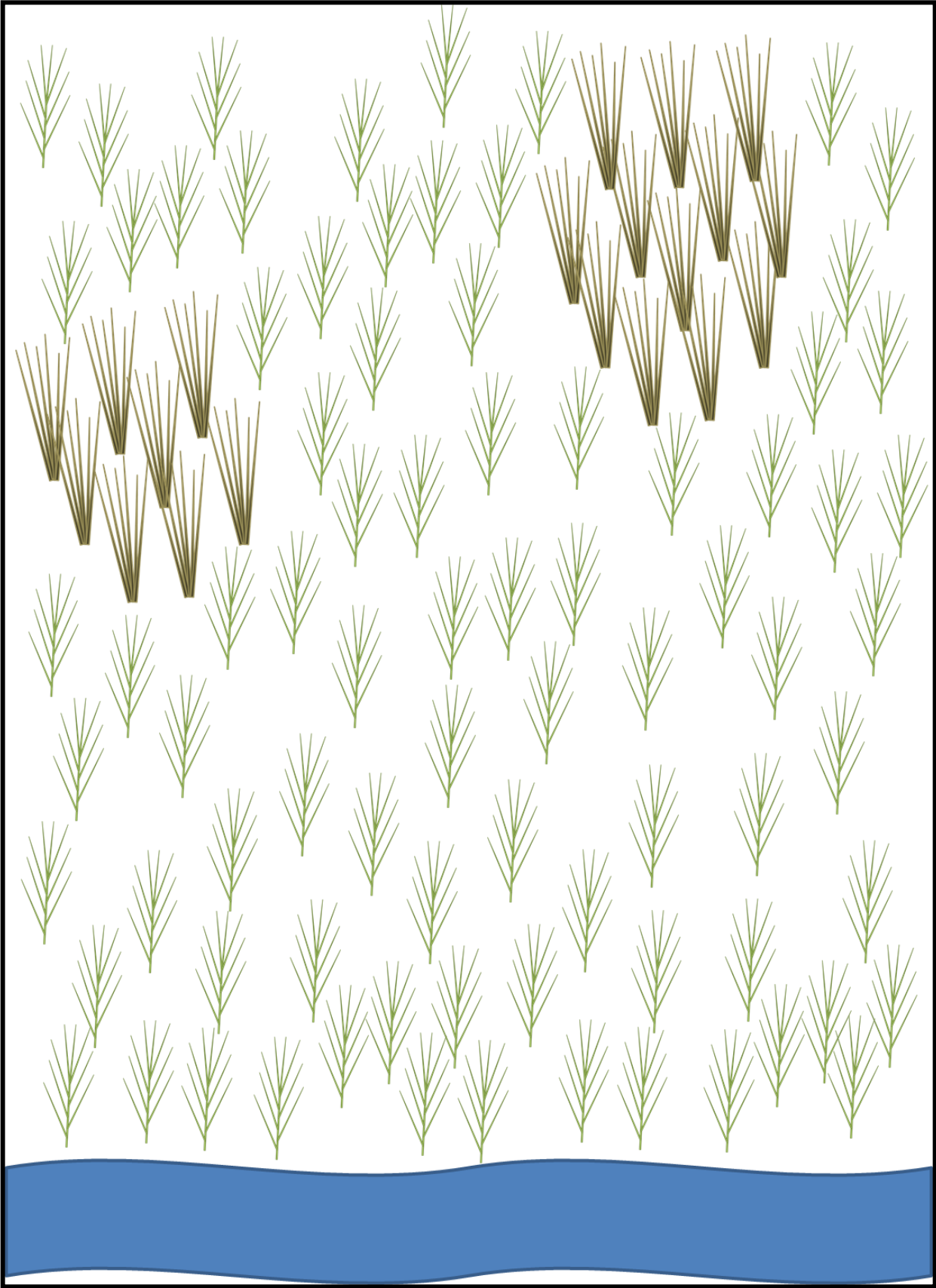
How to do your transect

Now, use transects to collect data about the community in the study area by following the steps below. You will record the data you collect on the datasheet provided. Use the data you collect to in order to answer questions on the next page.

Step 1: Lay a measuring tape, ruler, or a string (marked with intervals) through the study area that extends from the water's edge to the top of the study area. This will be your first transect.

Step 2: Decide what interval along the transect you want to sample in order to collect information about the different species in the study area. Your intervals should be close enough together to collect data that represents the study area, but not so close together that it will take you too long to complete your transect. Fill in the statement below.

The transect is _____ centimeters long & will be sampled every _____ centimeters.

Step 3: Sample your study area using the Point-Intercept method by looking at the beginning of your transect (0 cm). Record 0 cm in the first row of the "Intercept location (cm)" column on the datasheet for Transect 1.
- If there is a plant under your transect line at 0 cm, record it in the "Species at intercept" column of the datasheet. If there is no plant present at that point record "miss". Remember, very close, to the line doesn't count. It must be touching to be counted.
- If more than one species touches the transect, record them both for that interval.

Step 4: Repeat this process for each interval to the end of your transect.

Step 5: Move your transect to a different part of the study area and repeat the data collection process for Transect 2.

Step 6: Pick a different part of the study area and repeat the data collection process for Transect 3.

Summarizing your data

Let's summarize the data so we can describe our marsh plant community. Use data from all three transects for each plant species and record the total number of intercepts in which they occurred below.

**Cordgrass
(*Spartina* sp.)   Total # of Intercepts _____**

**Rushes
(*Juncus* sp.)   Total # of Intercepts _____**

Calculating percentages: Take the number (you just found) of the intercepts each species was found in and divide that by the total number of intercepts completed in the three transects. Then, multiple the result by 100.

- What percentage of intercepts were cordgrass?

- What percentage of intercepts were rushes?

- In your opinion, did you get a good estimate of the community composition using Point-Intercept sampling?

- If you were to redesign your study, what changes would you make to your survey technique? Why?

- How close were your initial observations to what you found using transects? Is that surprising to you?

- In real life, unlike in this example, you will probably never be able to see every species and organism in an area of interest so clearly. How would that make preforming this method more difficult?

Point-Intercept Datasheet

Name:_____

Date:_____

Transect length:_____ Transect interval:_____
[from step 3]

Transect 1								
Intercept location (cm)								
Species at intercept								
Transect 2								
Intercept location (cm)								
Species at intercept								
Transect 3								
Intercept location (cm)								
Species at intercept								