MARSH METHODS

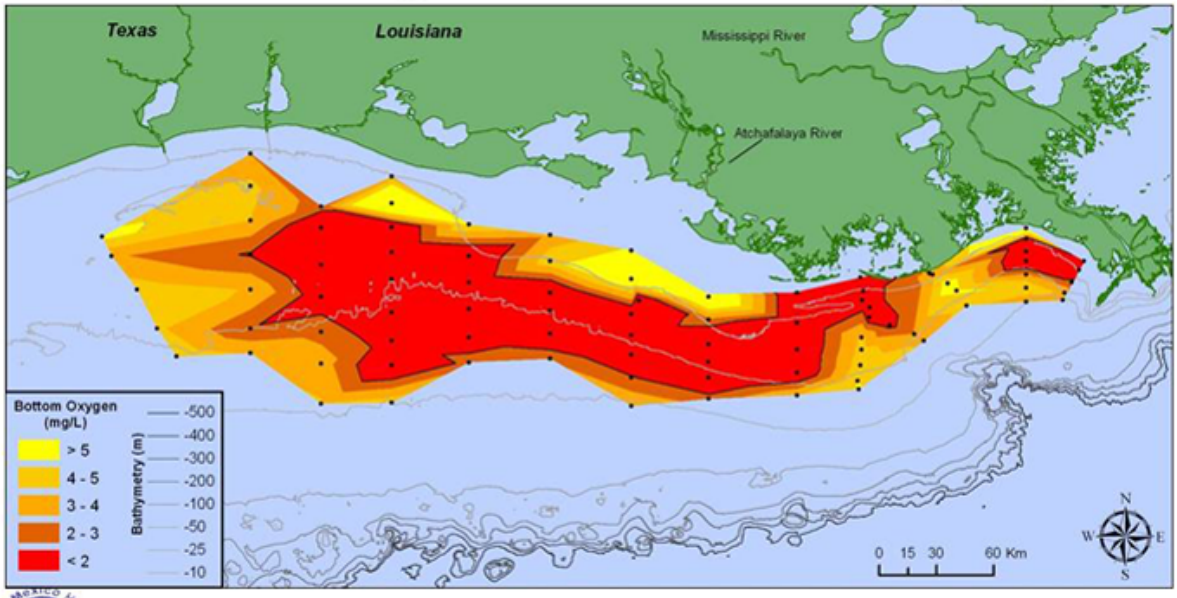
Louisiana Universities Marine Consortium

TRANSECTS

Scientists collect information about the environment. Have you ever wondered how? Transects allow scientists to collect information "in the field". That could be anywhere from a coral reef, a rainforest, a cave, or even the surface of Mars. Transects are an essential method for collecting information about an environment without having to count everything in that environment.

Transects are lines that scientists follow through their research area. The line will have sampling locations at regular intervals, like a tape measure. In the example below the are 14 transects used to study hypoxia (low oxygen) in the Gulf of Mexico. Each transect has several sampling locations (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 of Mexico without having to sample the entire water body.

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
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Making a Desk Top Transect

To make a desk top transect (can also be done on the floor) you will need:

- A large desk top or a group of tables pushed together. If you are using the floor make some room by pushing desks out of the way.
- Some "organisms" to count. You can use foam shapes, pencils, books, shoes, or just about anything you have on hand.
- A tape measure
- A roll of painter's tape
- 3-4 plots per group. You can use hula-hoop or something you construct with plastic pipes or drinking straws (ecologists tend not to have a lot of funding, and often do use drinking straws and duct tape).
- 1 data sheet per group

Before student enter the room arrange your "organisms" on the desk tops. "Organisms" can be arranged randomly or less randomly if you want your students to find and explain a possible relationship.

Divide your class into groups. Explain to them what a transect is and how scientists use them to collect information about environments and organisms. Tell them that their table top is their sampling location.

1. Have them decide how long their transects should be. *Make sure to emphasize that transects need to be long enough to capture a good representation of what it is you're sampling.* Have them fill in the blanks to quest 1 on the worksheet.

2. First, estimate the number of different "species" (items) found within 6 inches on both sides of the transect line for its entire length just using just your eyes. *Note: Estimate means take your best guess – do not count everything!*

3. Have your groups lay their transect line down straight across the desk & count the "population" of every thing they find under the line at each interval. Do not count anything on the floor that is not situated on an interval transect point even if it's just an inch away. Have them answer the second question on the worksheet.

4. This time have student lay down a plot frame at each interval and count and identify "organisms" that are within the plot frames. The "organism" must be located entirely within the plot to be counted.

5. On one side for the transect line have student randomly place three plot frames and count the "organisms" in each plot. Plots do not have to be places along the transect line.

TRANSECT WORKSHEET

1. We will make our transects _____ centimeters long & sample every _____ centimeters.

2. Fill in the table below:

Species	Estimate Population	Actual Population

3. If you only used this data to describe your classroom, would it be useful? Explain why or why not (in class discussion or write answer on a piece of paper).

4. Did this method better describe the population? Explain why or why not.

5. Did randomizing without a transect line change the data we collected for the population? Explain.

6. Did you notice any patterns or relationships among species? If yes, describe them.

7. What could be the reason for this relationship?

8. Draw a graph to show the population of organisms along your transect.

9. Did anyone see data outside the areas sampled by our transects and plot frames? Why would it be important to write field notes about this in a report? What does this tell you about error in sampling?

10. When you chose your transect line, did you look for a place where there was probably more interesting data to record? What does this tell you about bias in ecological sampling? ***Bias*** *– a personal preference that causes unfair judgment. In science, a sampling error caused by systematically favoring some outcomes over others.*

Transect Data Sheet

Date: _____

Transect Length: _____

Transect Interval: _____

Intercept Location: _____

Species:	**Number:**

Let's calculate the species richness.

Species Richness - is simply the number of species in a community.

Species Richness for our sampling area is _____.

Now let's consider Species Evenness

Species evenness - refers to how close in population size (number) each species in a community are.

Community A	
Species	Abundance
1	20
2	20
3	23
4	27
5	23

Community A is more "even" because the abundance of each species is about the same. Communities with evenness are generally more diverse.

Community B	
Species	Abundance
1	102
2	3
3	4
4	7
5	1

Community B has the same number of species (species richness) as Community A but there is a big variation in the abundance among the species.

Let's calculate how diverse our population is.

Biodiversity Index = $\frac{\text{the number of species in an area (species richness)}}{\text{The total number of individuals in the area (total count)}}$

The closer to 1 the answer is the higher the biodiversity index.

Understanding how diverse an environment can become important when studying an environment and the organisms that live there. A community that is more diverse is less at risk if environmental changes or disaster occurs. A more diverse population consisting of many species of plants has a better chance of including individuals that might be able to adapt to changes in the environment.