

OCEAN CLASSROOM

Oceans of Research

Lesson 2: Plankton Tow Science Party

STUDENT GUIDE

THE
UNIVERSITY
OF RHODE ISLAND
GRADUATE SCHOOL
OF OCEANOGRAPHY

Instructions

Make sure your party has copies of the plankton background sheet, plankton tow data sheet, a plankton tow map, a blank graph sheet, different colored pens or pencils, and access to a computer.

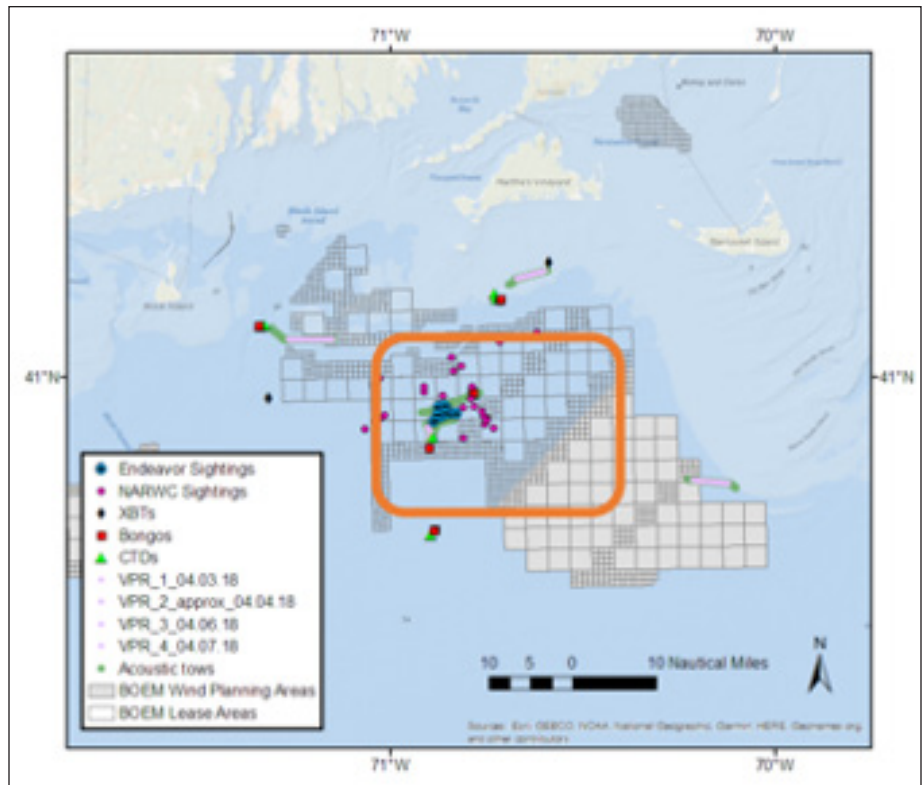
1. Read your background sheet.
2. Your science party will be looking at a set of real plankton tow data. The data are from a single plankton sampling tow conducted with a bongo net. The bongo sampling location we are working with is represented by a red square near the east end of the long green line on the study area map. Take a look at the map.
 - a. What do you notice about the tow location?
 - b. What do you think the ocean conditions (depth, wind, etc.) are in this location?
3. Now take a look at your data sheet. The table lists the plankton species/ types that were identified in the bongo tow, along with the total number of each that was collected.
 - a. Within your group, divide up the species found and spend a few minutes researching the plankton on the Internet, including its scientific classification, range, life cycle, etc.; record your notes on the data sheet below the table.
 - b. On the data sheet, complete the table for percentage of each species/ type. First add up the total number of organisms found. Then divide the number of each type by the total and multiply by 100. Record each percentage in the table.
 - c. Using your graph sheet, make a bar graph showing the percentage of each type of plankton. On the x-axis add the species names and label the axis "Plankton species/Types". Label the y-axis "Percentage" and label it from 0 to 100.

Instructions *(Continued)*

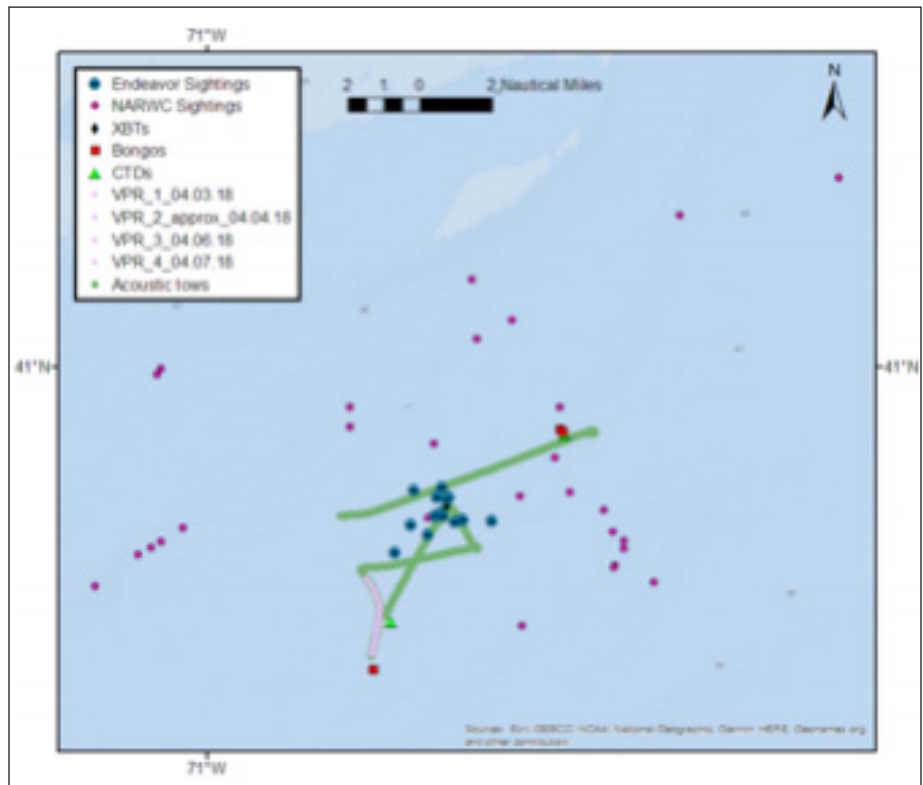
4. Once you have completed your research and graphs, answer the following questions:
 - a. What patterns do you notice in the graph?
 - b. What is the primary type(s) of plankton collected and why might this be important?
 - c. Why do you think it's important we have real, recent data for things like plankton?
5. Be prepared to give a brief overview to your classmates about what your party did and found with the data. You should be prepared to talk about the following:
 - a. What your data set was
 - b. What your analysis task was
 - c. What the results were
 - d. Discuss any hypotheses you have or any questions
 - e. Why you think it's important

Maps

General Study Area



Zoomed-in Map of Focus Area
(Orange rectangle)



Background

What are plankton?



The word plankton comes from the Greek word for “wanderer.” Plankton are free-floating animals in the water column. There are phytoplankton, which photosynthesize and produce oxygen, and zooplankton, which are predators of phytoplankton and other zooplankton. Some examples of zooplankton types commonly found off the Southern New England Coast:

- Copepods
- Decapods
- Amphipods
- Ostracods
- Cnidaria
- Fish larvae

Why are plankton important?

They form the basis of the food chain, as well as provide oxygen and other nutrients.

What is a plankton tow?

A plankton tow is the process of dropping a plankton net into the water column and towing it for a specific period of time, then brought back up to get an integrative view of the water column. The plankton is trapped between the fine mesh of the net and transferred into a cannister (or “cod end”) at the end of the net. The nets used for this study are called bongo nets because their shape resembles that of a bongo drum.

How does a Video Plankton Recorder (VPR) collect data?

A VPR is deployed off the side and towed aft of the ship. The VPR captures images of plankton and particulate matter from 50 μm to a few cm in size passing through the unit using a paired strobe and camera. The resulting images represent a certain amount of seawater per frame, depending on the tow speed. Upon retrieving the VPR the compressed video data is downloaded and regions of interest (ROI) from each image frame are extracted. Each ROI is hand processed to remove duplicate images and those with air bubbles. Organisms in the ROIs are classified to general taxonomic groups and estimated density (counts and volume) per m³. The data are then further hand-processed for finer organism identification and measurement.



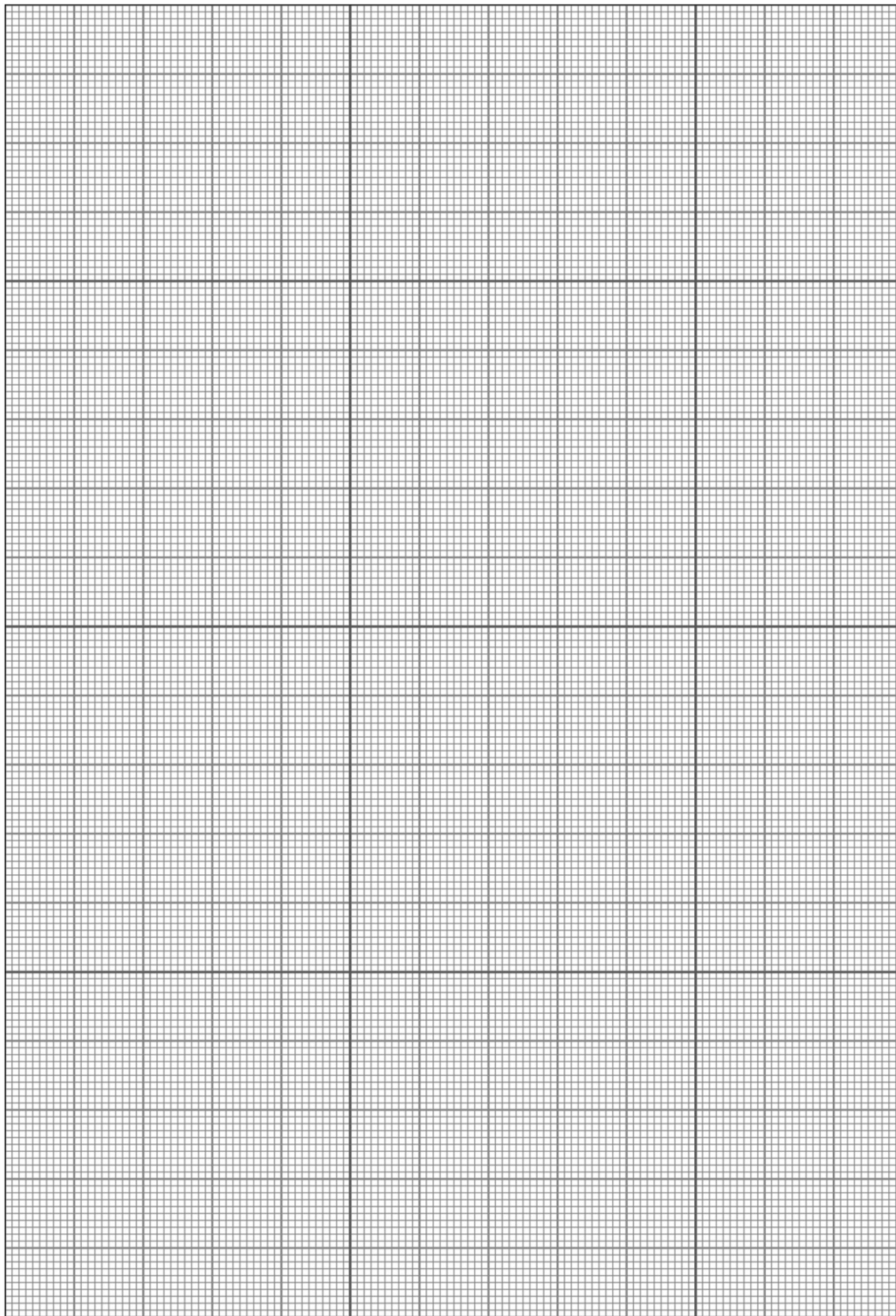
Data

During the Endeavor research cruise, plankton data was collected by two different methods: using bongo net tows and by video plankton recorder (VPR) tows. The VPR data included many of the organisms identified in the bongo net casts, but also included a large percentage of a fragile ctenophore, *Mertensia*. Scientists believed the lack of *Mertensia* in the bongo net sample was due to the fragile gelatinous organisms not surviving the intensive rinsing needed to flush the zooplankton to the cod end of the net.

The table below lists the species/types of plankton collected in the bongo net tow. Follow the instructions given above to complete the table and graph.

Organism	Count	% of Total Count
<i>Oithona</i>	13	
<i>Calanus finmarchicus</i>	104	
<i>Metridia</i>	19	
<i>Barnacle Nauplia/Cyprid</i>	18	
<i>Medusa</i>	6	
<i>Unknown</i>	3	
<i>Fish Larvae</i>	1	
<i>Centropages</i>	3	
<i>Pseudocalanus</i>	205	
<i>Gammarid</i>	2	
<i>Temora</i>	8	
<i>Ostracod</i>	1	
<i>Cumacean</i>	1	
<i>Euphausiid fucilia larvae</i>	1	
<i>Decapod</i>	1	
TOTAL:		

Plankton Tow Graph Sheet



Domaine public