

Oceans of Research



Lesson 2

https://web.uri.edu/gso/files/N-Dawn_Back_View_sm.jpeg

OVERVIEW OF THE DAY (DAY 1)

- Review data collection methods
- Remember: good science is all about communication and collaboration!
- Form Science Party groups (3-4 people per group)
 - CTD Groups
 - Plankton Groups
 - Marine Mammal Groups



Laptop photo. Retrieved from <https://www.fastweb.com/student-life/articles/tips-to-work-effectively-in-group-projects>

ACTIVITY SETTING: *R/V Narragansett Dawn* Cruise

- A crew of different kinds of scientists
 - Physical Oceanographers: currents, stratification
 - Chemical Oceanographers: water chemistry
 - Marine Biologists: Plankton, Marine Mammals
- Different forms of data collection
 - CTD (conductivity, temperature, depth)
 - Plankton Tow
 - Marine Mammal Surveys

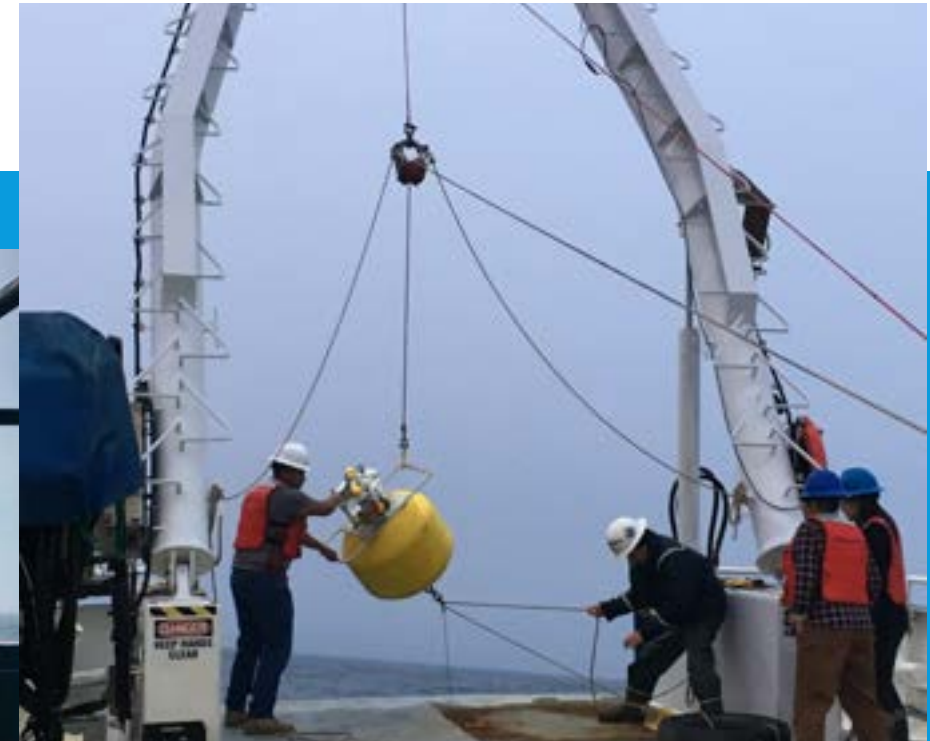




Researchers cast net for a plankton tow on the R/V Endeavor, April 2018



A researcher participates in a marine mammal survey on the R/V Endeavor, April 2018



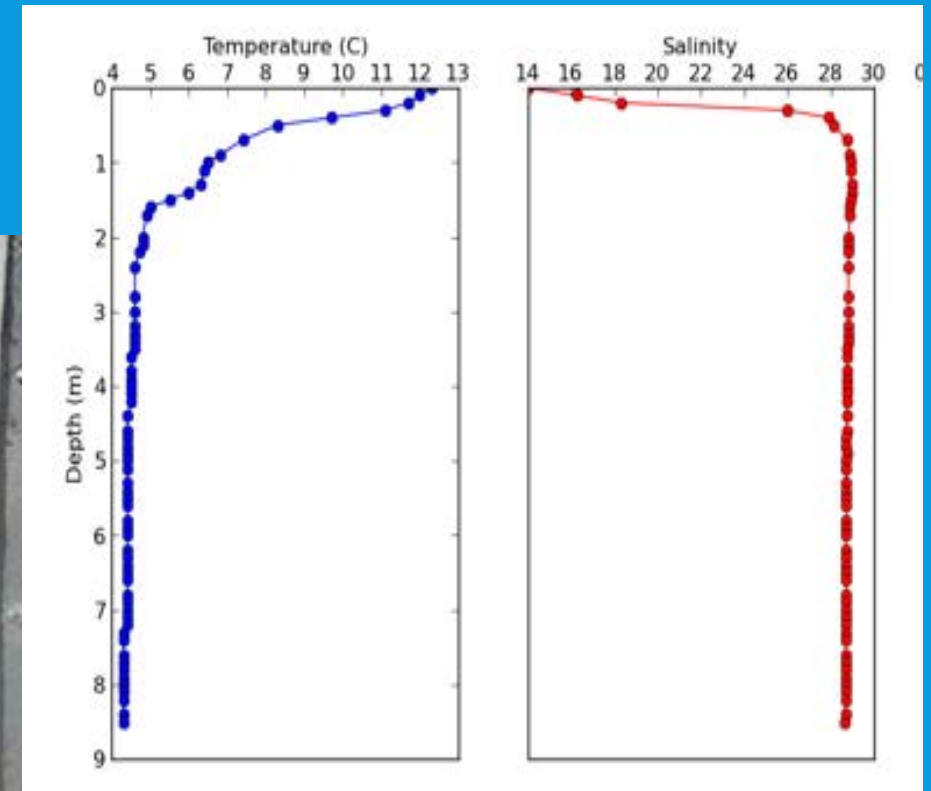
Researchers launch a buoy to deploy cameras on the R/V Endeavor, April 2018

CTD LAUNCH AND DATA COLLECTION

- Conductivity
- Temperature
- Depth



Technicians launch a CTD device aboard the R/V Oceanus, September 2018.



CTD Example. Retrieved from https://oceanpython.files.wordpress.com/2013/02/ctd_profile2.png

PLANKTON TOW

- ❑ Bongo Net: a cone shaped net made of fine mesh
- ❑ Can be towed throughout the water column
- ❑ Gathers small fish and other animals
- ❑ Who eats this stuff?



Krill. Retrieved from <https://en.wikipedia.org/wiki/Krill>



Calanus finmarchicus. Retrieved from <http://www.marinespecies.org/copepoda/aphia.php?p=image&tid=104464&pic=29575>



Researchers deploy a plankton net aboard the R/V Endeavor, April 2018.

VIDEO PLANKTON RECORDER

- ❑ In-situ recording device
- ❑ Device is towed through the water at a specific depth
- ❑ Uses a strobe and camera to capture and record images of the plankton passing through the device
- ❑ Organisms are subsequently identified using a variety of software



Video Plankton Recorder. Retrieved from <https://www.whoi.edu/what-we-do/explore/instruments/instruments-sensors-samplers/video-plankton-recorder-vpr/>

MARINE MAMMAL SURVEYS

- Observing ocean through the naked eye and binoculars.
- Some surveys also use drones
- Record details about the marine mammal
 - Species/Age/Male or Female
 - Number of Animals in group
 - Their behavior: eating, travelling, etc.



A researcher scans for marine mammals aboard the R/V Endeavor, April 2018



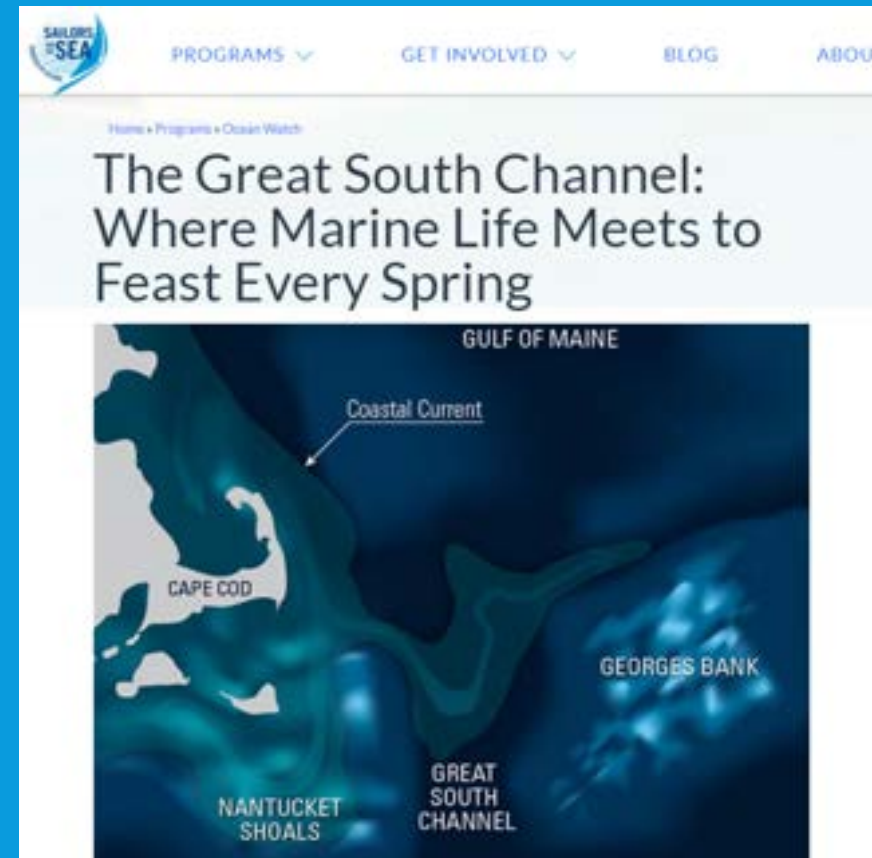
<https://www.youtube.com/watch?v=pNu7dv1Rp78>



<https://youtu.be/RGYhvMmKHmw>

WRAP-UP

- Assign Science Party groups (3-4 people per group)
 - CTD Groups
 - Plankton Groups
 - Marine Mammal Groups
- Homework: reading about a previous study conducted in the Great South Channel



Source: <https://www.sailorsforthesea.org/programs/ocean-watch/great-south-channel-where-marine-life-meets-feast-every-spring>

OVERVIEW OF THE DAY (DAY 2)

- Form Science Party groups
 - CTD Groups
 - Plankton Groups
 - Marine Mammal Groups
- Review data collection methods
- Remember: good science is all about communication and collaboration!
- Activity



Laptop photo. Retrieved from <https://www.fastweb.com/student-life/articles/tips-to-work-effectively-in-group-projects>

RESEARCH QUESTION

As you are working through your team's activity, keep in mind the research question you will be collaborating with other teams to answer at the end of the activity:

How does the oceanographic data (CTD, depth) relate to the plankton survey results, and in turn to the presence of marine mammals (in this case, North Atlantic Right Whales)?

ACTIVITY TIME

- Look at the top of your instructions sheet to see what materials you need
- Work through the activity – double check with your teacher once you complete each step.
- Make sure to ask for help if you get stuck!



Seal of Approval. Retrieved from: <https://imgur.com/gallery/tjDlxN1>

OVERVIEW OF THE DAY (DAY 3)

- Form new Interdisciplinary Science groups (1-2 from each science party)
- Members from each discipline share their findings and answer the research question
- Groups prepare a poster and brief presentation of their findings



Laptop photo. Retrieved from <https://www.fastweb.com/student-life/articles/tips-to-work-effectively-in-group-projects>

RESEARCH QUESTION

How does the oceanographic data (CTD, depth) relate to the plankton survey results, and in turn to the presence of marine mammals (in this case, North Atlantic Right Whales)?



Image Source: <https://acb0a5d73b67fccd4bbe-c2d8138f0ea10a18dd4c43ec3aa4240a.ssl.cf5.rackcdn.com/10063/RightWhale-NOAA.jpg?v=1583855433000>

OVERVIEW OF THE DAY (DAY 4)

- Interdisciplinary Science group presentations
- Wrap-up discussion



Laptop photo. Retrieved from <https://www.fastweb.com/student-life/articles/tips-to-work-effectively-in-group-projects>

PRESENTATIONS

- What data set did your group have?
- What did you do with your data?
- What important things did you find?
- Why do you think this data could be important?

WRAP-UP DISCUSSION

- What did you learn about marine science research?
- What did you learn about marine science data?
- Do you feel like you have a better understanding of research and data?
- Why is it important to be able to find and understand data?
 - What kind of things can data help us do?
- How do you think this information relates to you?

EXTENSION QUESTION

What additional information do you think would help scientists better understand what is happening here, or might happen in the future, given the potential for additional offshore wind turbine development in the area, as well as ongoing ocean warming and global climate change?



Image Source: https://upload.wikimedia.org/wikipedia/commons/7/72/Block_Island_offshore_wind_farm_P6290638m.jpg