

Teacher/Student Resources/High School



Lobsters

Why Did The Long Island Sound Lobster Population Crash?

Topics: Environmental science, math, water quality, scientific method, data analysis, biology, graphs/charts

Materials: computer, internet, pen or pencil

The Problem: Lobster fishing has been a thriving fishery on Long Island for centuries. In 1998, the annual harvest was 3.7 million pounds. Then in 1999, more than half the lobsters pulled from Long Island Sound were dead or dying, and the harvest crashed. Since 1999, researchers have been collecting and analyzing data to try to come up with a cause. Today, the lobster population has increased but not to pre-1999 levels. Researchers have determined some possible causes for the lobster population decrease, but many questions still remain.



Your Role: Scientists and lobster researchers have to collect physical, chemical, and biological data to determine what factors may have lead to the population crash. Analysis of this data is a key component for finding answers as to why the lobsters died. In this activity, you are to review the data from graphs and charts and make your own determination as to what caused or continues to cause the lobster population to decrease so dramatically.

Answer the questions on each page and write a short summary of your findings in a concluding paragraph on the last page. In your concluding paragraph, add your your prediction if the lobster population can rebound. Also include your recommendations how to help rebuild the lobster population if possible.

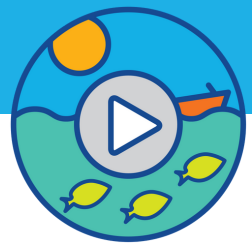
Check out lobster fact sheets and videos for some background information before you proceed.

Video:

<https://www.youtube.com/watch?v=9KJpaUIL1UY>

Fun Facts:

<https://static1.squarespace.com/static/5e78ef8ed7306546006bd503/t/5ede239f41190d45421d2cdc/1591616419015/Lobster-Fact+Sheets+.pdf>



PART ONE.

Data Collecting: To get access to specific lobster data for this project, you will need to e-mail the following address and type in code number listed below and hit send. You will get an e-mail message back with attached an attached file with lobster data for your research.

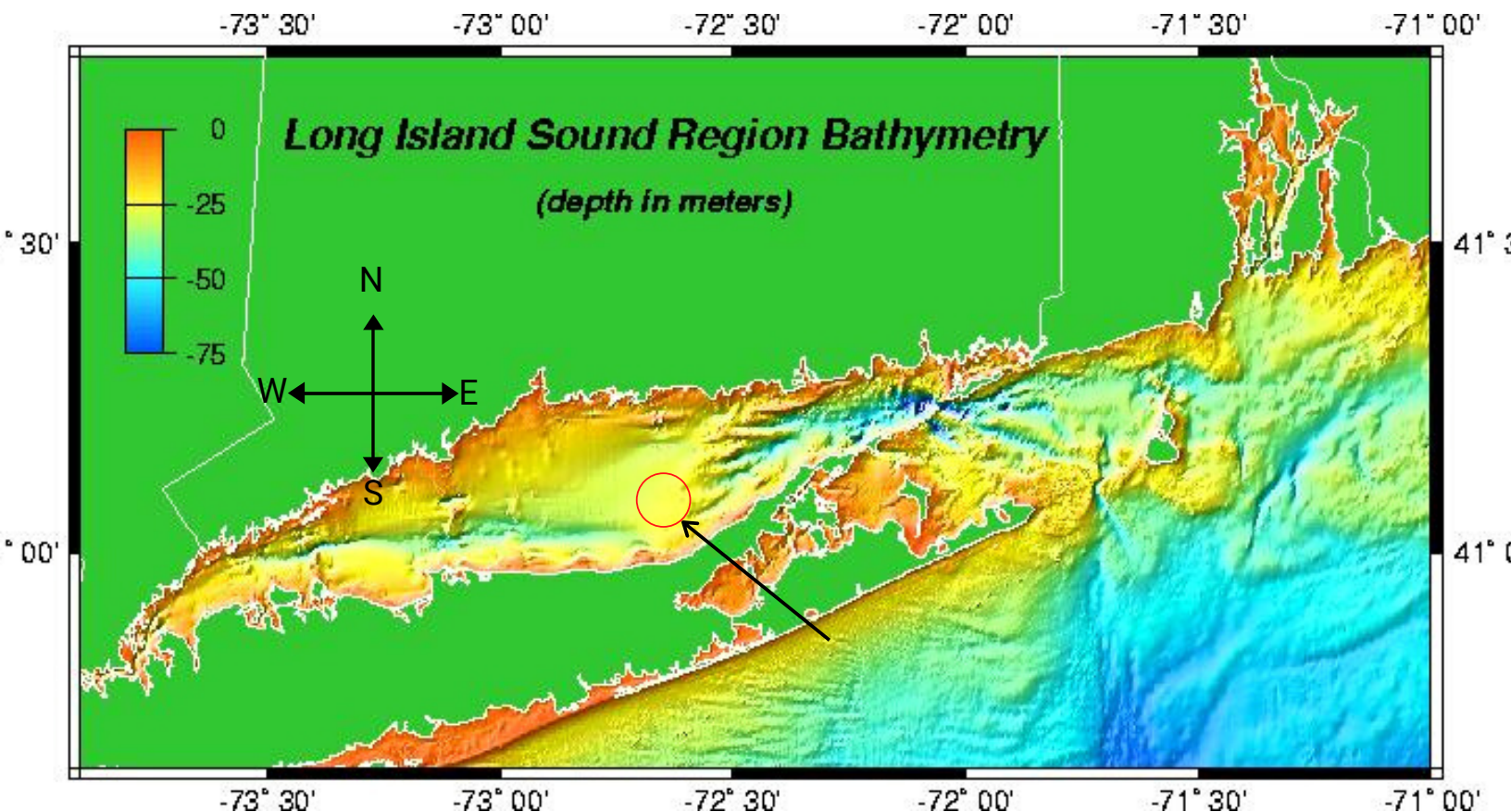
E-mail this address: mec26@cornell.edu

Use code number below to access to lobster data

Code Number: 4478

The Physical Characteristics of Long Island Sound

Long Island Sound has been an important waterbody in the history of Long Island and Connecticut. Fishing for shellfish, fin fish and recreational activities on the Sound have occurred since Native Americans lived on its shores. Water temperature and depth are two factors that determine where lobsters live. Globally lobsters generally are found in depths of 13 to 164 feet but have been found living at 15,790 feet below the surface.



Questions:

#1. What is the approximate water depth in the red circle?

#2 What part of the Sound has the deepest water? Circle answer

North South East Western



**NOAA
FISHERIES**

The national Marine Fisheries works to manage and protect ocean species. Visit the website and answer the following questions about lobsters.

<https://www.fisheries.noaa.gov/species/american-lobster>

Questions:

Status

#1. Status: What is the 2015 stock assessment show?

#2. Since 2012 what does the yearly young surveys indicate?

Appearance

#3. How do you tell a male from a female lobster?

Biology

#4. What are the predators of lobsters?

Management

#5. What does it mean if a lobster has a notch in its tail?

New York State Lobster Landings

Lobster Harvesting: Lobster boats using traps to catch lobsters has been a local fishery for decades in New York State. The use of colorful buoys and lines attached to baited traps on the bottom are the main method catch lobsters. New York State lobsters are marketed locally and shipped out of state. The number of lobsters annually harvested is measured in pounds. To see this data you will need to e-mail the address below and use code number and a pdf file will be sent back to you.

NYS Lobster Landings in Pounds

Source: National Marine Fisheries Service

E-mail this address: mec26@cornell.edu

Use code number below to access to lobster Landing data

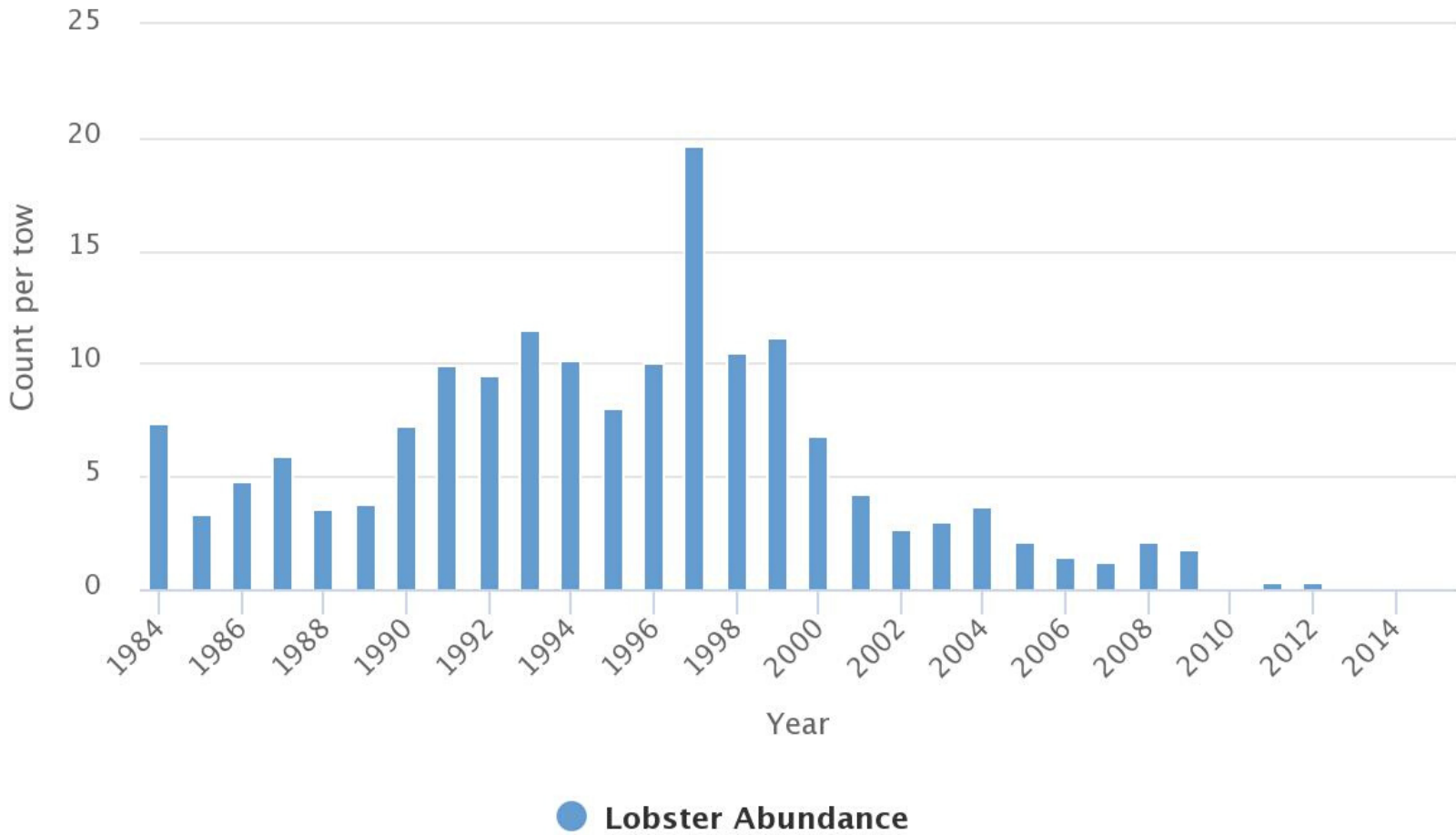
Code Number: 4478



Questions:

- #1. What year was the lobster landings the highest?
- #2. What factors could determine the number of lobsters harvested each year?
- #3. How many years was the harvest over 8 million pounds?

Lobster Abundance



Highcharts.com

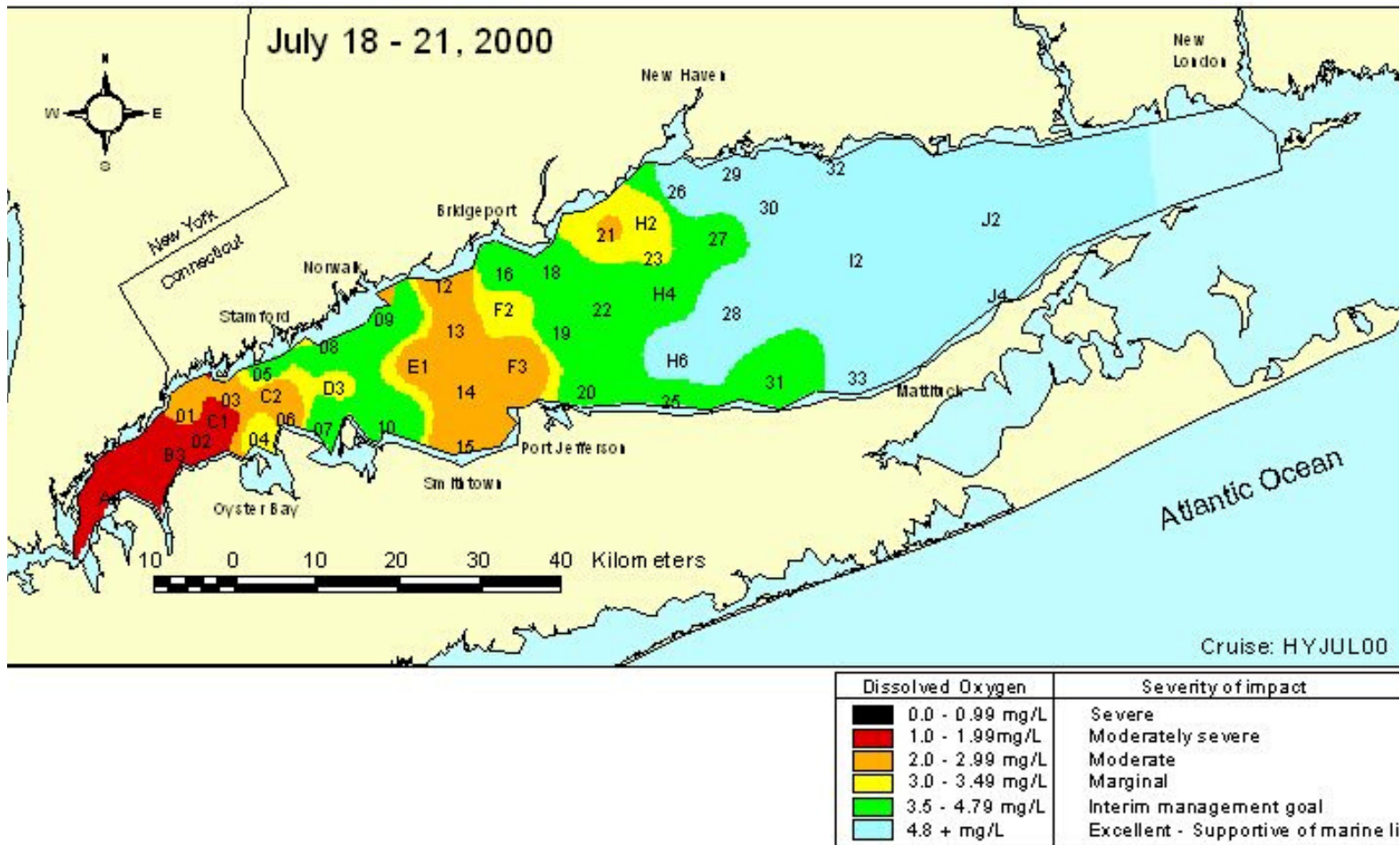
Questions:

- #1. What year was the lobster tow count the highest?
- #2. What two years had the same number of tow counts?
- #3. How many years was the tow count over 10?

Long Island Sound Water Quality

Dissolved Oxygen: The amount of oxygen dissolved(DO) in water determines what life forms can live there. Fish for example generally need higher oxygen levels than say worms. Dissolved oxygen is measured in milligrams per liter(mg/L). If oxygen levels get really low a dead zone is created. A dissolved oxygen level of 2 mg/L or less is considered a dead zone or hypoxia zone.

Dissolved Oxygen in Long Island Sound Bottom Waters



Questions:

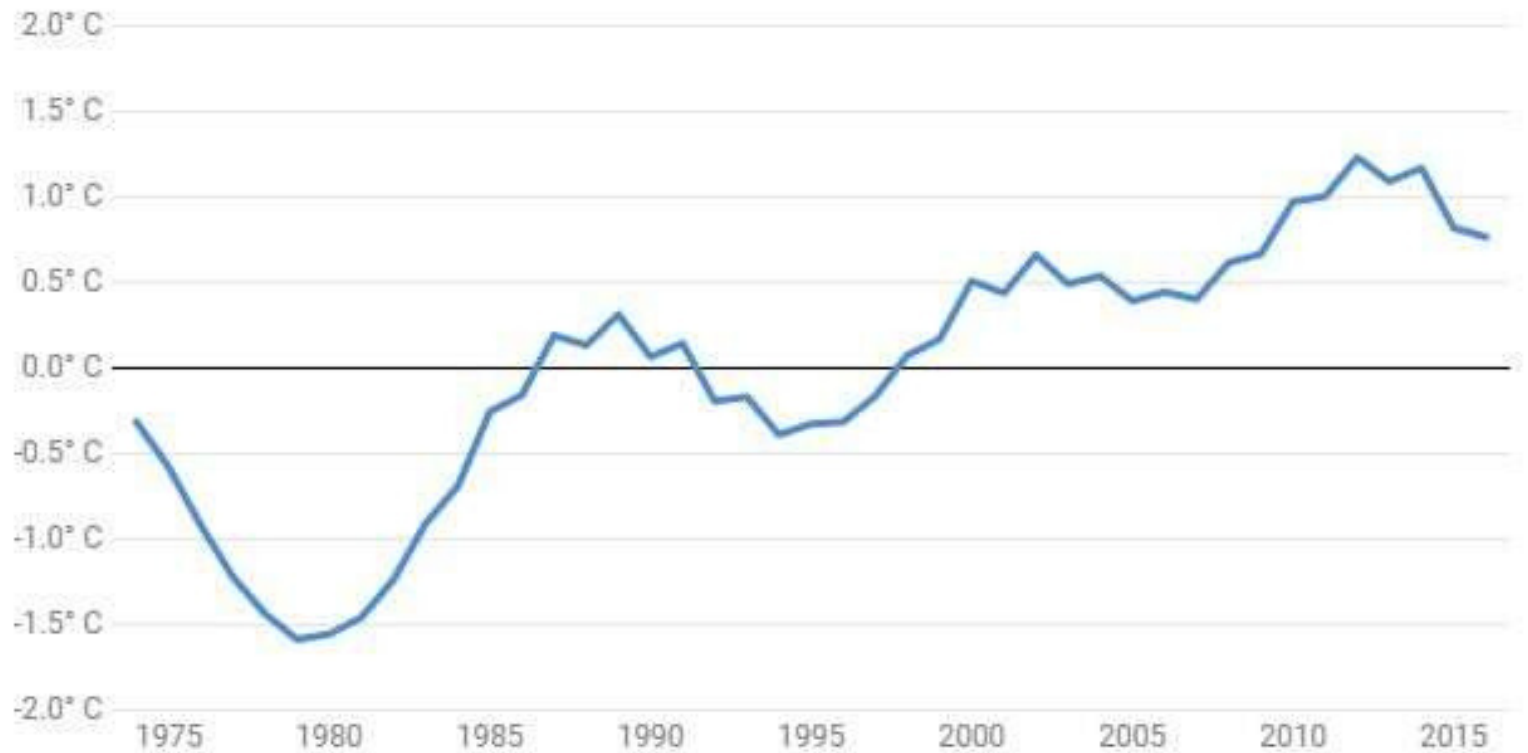
- #1. What color on the map has the lowest dissolved oxygen levels?
- #2. What color on the map has Excellent dissolved oxygen level?
- #3. Why is water quality excellent near shoreline in most of the sound even in the red areas?

Long Island Sound Water Quality

Water Temperature: The water also determines what life forms can live there. We do not see coral reef fish normally in Long Island Sound due to water temperature. In Long Island Sound animals have to survive in winter and summer temperatures by adjusting to temperature or migrate south or to deeper waters.

Water temperature in Long Island Sound

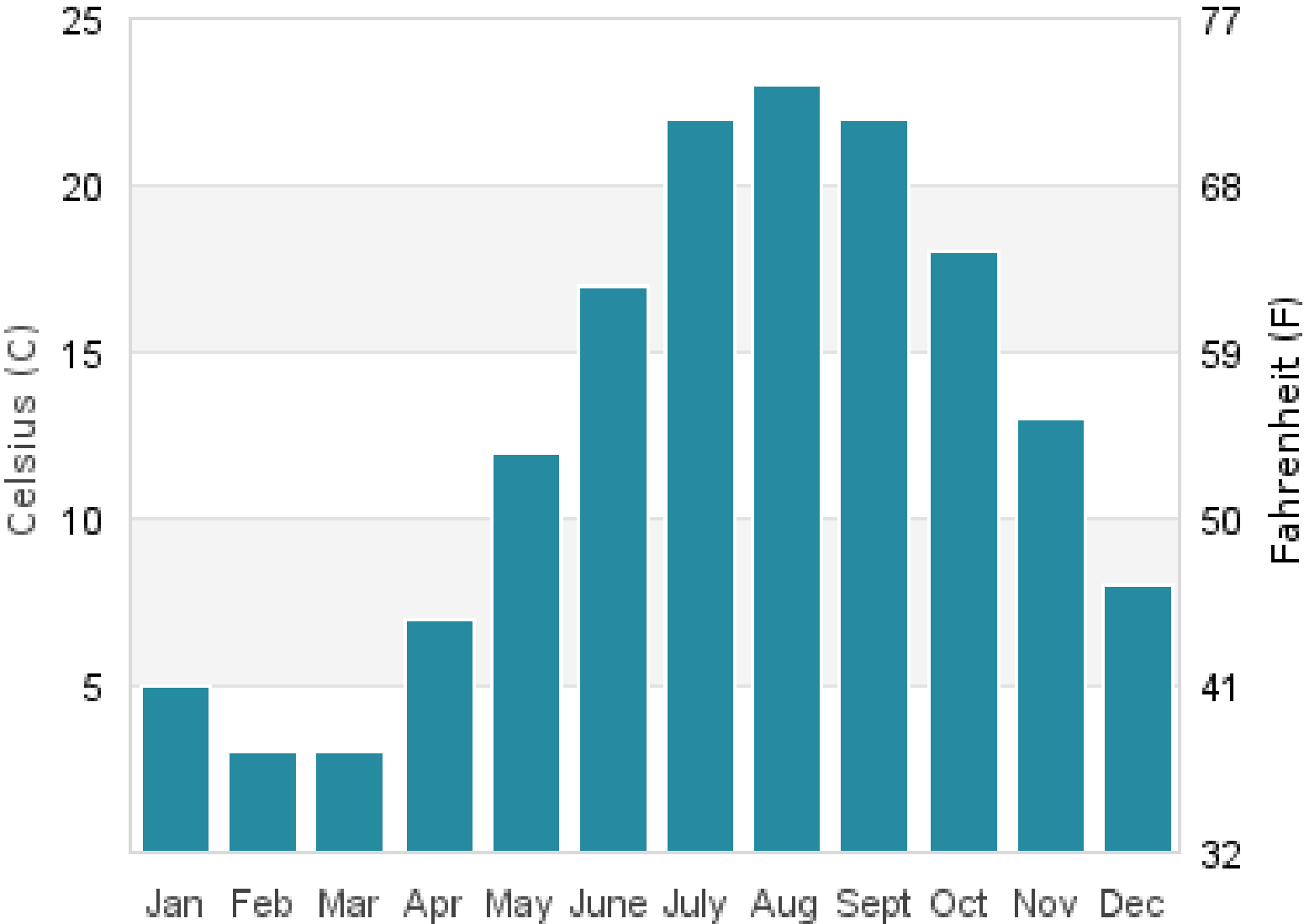
Citizen science data was used to compare the difference between the average temperature of the Long Island Sound in a given year and the long-term average over the course of the entire study. Since 1998, water in the Long Island Sound has been warmer than average.



Questions:

- #1. In 1980 what does the graph show?
- #2 True or False. Since 1998 the waters of Long Island Sound have been getting warmer?
- #3. What is possible reason for waters in Long Island Sound to be warmer since 1998?

Water Temperature: During summer months water temperatures naturally increase. Warmer water can not hold as much dissolved Oxygen and cold water.



Questions:

- #1. Which months have the coldest waters?
- #2 True or False. November has colder water then April?
- #3. What two months have the warmest waters?

Write your summary paragraphs below: