Name _____ Date _____

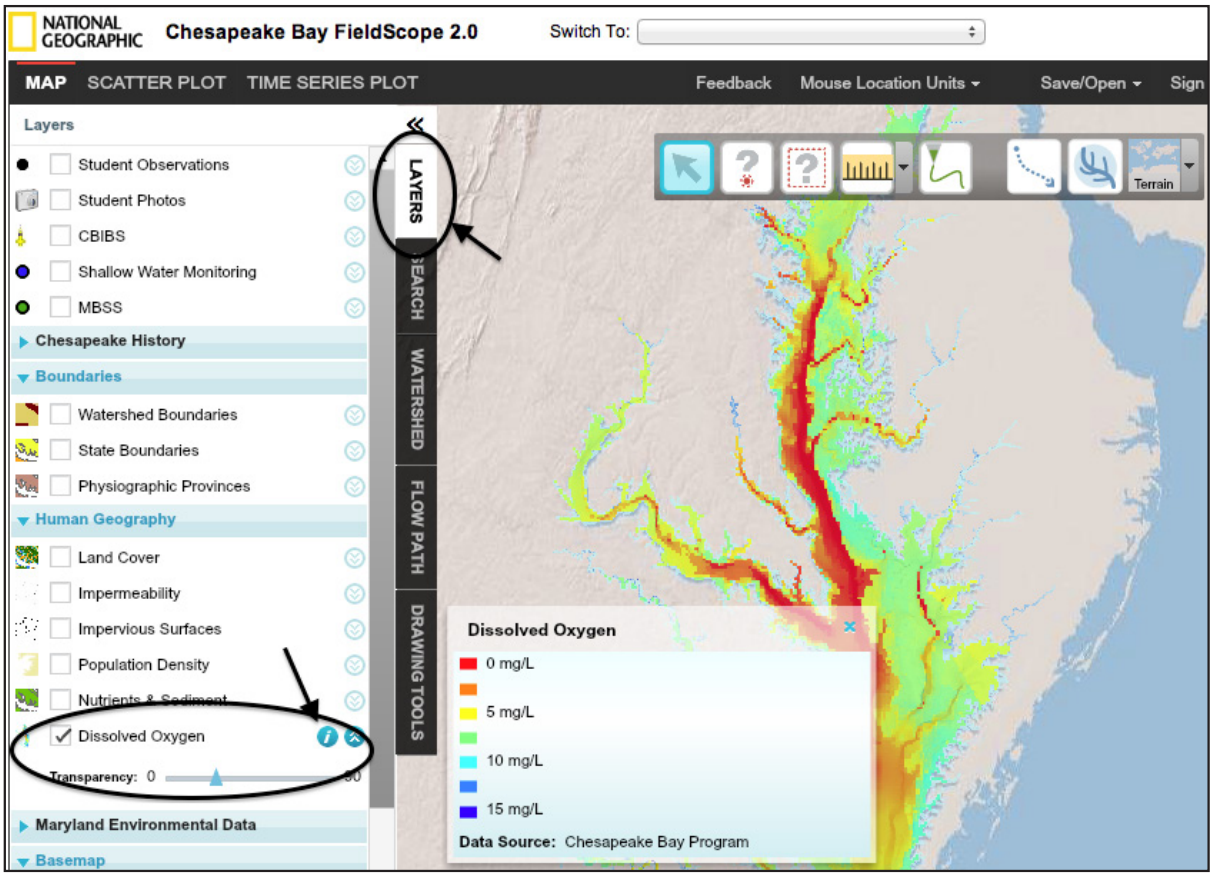
Analyzing Watershed Health: Dissolved Oxygen

Follow the steps below using Chesapeake Bay FieldScope to examine the health of areas of the Chesapeake Bay watershed.

Part 1. Analyze dissolved oxygen levels over 12 months.

Scientists monitor the health of the Chesapeake Bay watershed by measuring levels of dissolved oxygen in the water. Dissolved oxygen levels of 6.0 mg/L or higher are considered healthy for the Chesapeake Bay. Levels below 5.0 mg/L can create stress on the ecosystems.

You can use the FieldScope mapping tool to view and examine data provided by the Chesapeake Bay Program for dissolved oxygen in different areas of the Chesapeake Bay and in its main tributaries. This data has been loaded into the map by National Geographic.



1. In the Layer tab, turn on Dissolved Oxygen. Click the "i" next to Dissolved Oxygen to view the legend.

Analyzing Watershed Health: Dissolved Oxygen, continued

a. Which colors represent low dissolved oxygen? _____

b. Which colors represent high dissolved oxygen? _____

2. Look at the bottom of the window, and find the timeline. Scroll through the timeline to view the data through a 12-month period.

   a. In which months do you observe the lowest dissolved oxygen levels? Why might this happen? _____

   _____

   _____

   _____

   b. In which months do you observe the highest dissolved oxygen levels? Why might this happen?

   _____

   _____

   _____

   c. How do dissolved oxygen levels in the Chesapeake Bay change over the course of a year? What is the range? _____

   _____

   _____

   d. Are there areas where dissolved oxygen is very low? If so, describe the geographic setting of those areas. (Hint: Use other base map layers to see the types of land surrounding the bay.)

   _____

   _____

   e. When dissolved oxygen is low, how do you think aquatic life is affected? _____

   _____

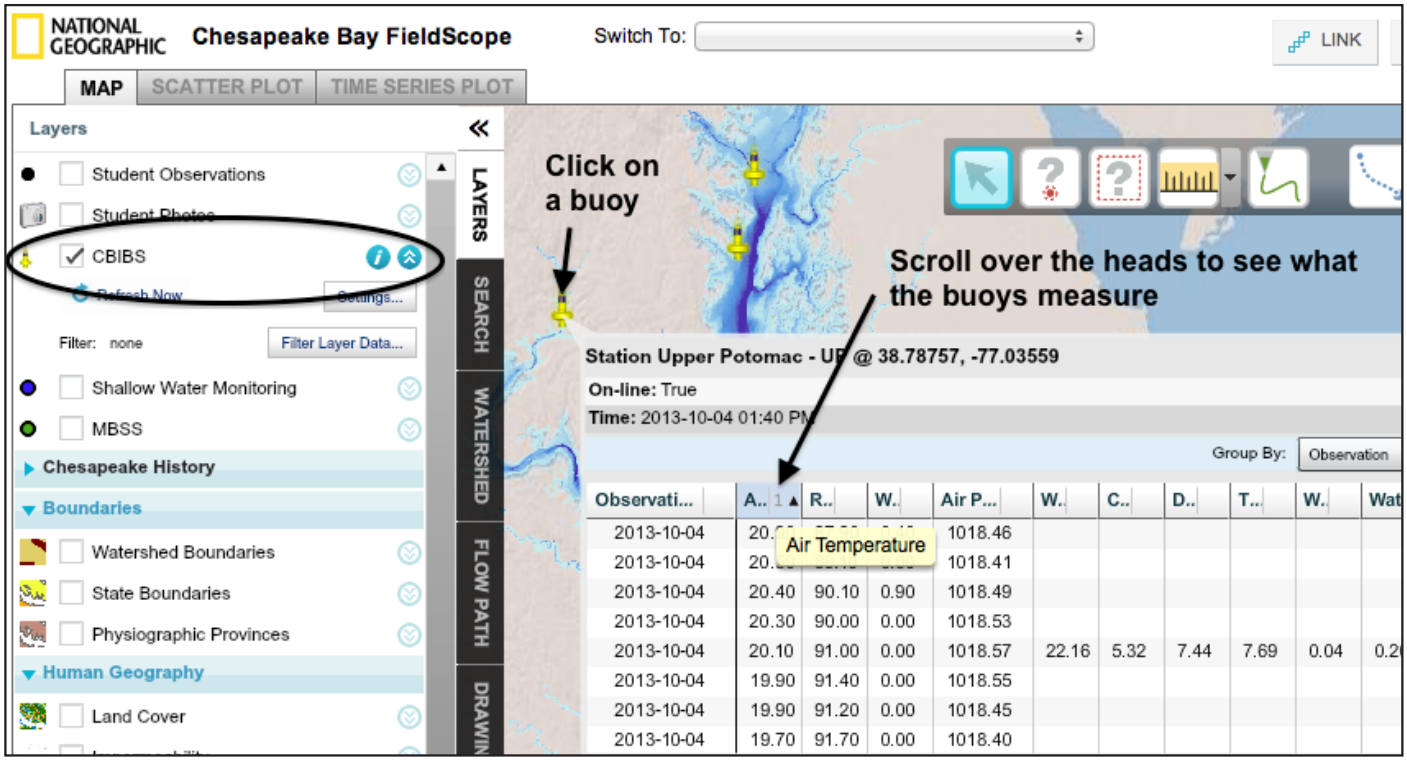
   _____

Analyzing Watershed Health: Dissolved Oxygen, continued

Part 2. Examine NOAA data for dissolved oxygen

1. Continue to use your current location. In the Layers tab, turn off Dissolved Oxygen. Turn on CBIBS. Click the "i" for information.

   What does the acronym "CBIBS" mean? _____



   These buoys, developed by the U.S. National Oceanographic and Atmospheric Administration (NOAA), are set throughout the bay and its main tributaries. Each buoy has sensors that collect information about the water at that location. This data is transmitted to NOAA using cellular communications. It is then shared with a variety of people and organizations.

2. On the map, zoom in to find the buoy icon nearest your location. Click to find the name for this location. The nearest CBIBS buoy to my location is _____

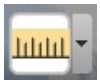
   _____

3. Roll over the column heads to see the different data that the buoy monitors.

a. List three types of observations made by this buoy: _____

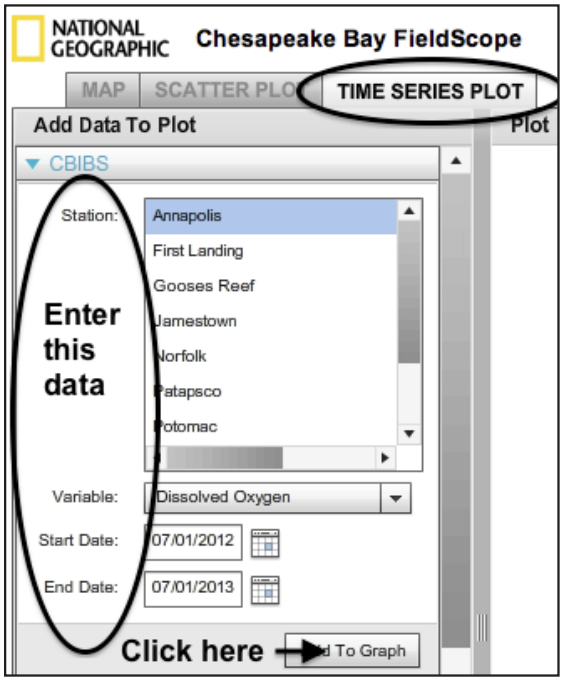
_____

_____

b. What is the distance in miles and kilometers to this buoy from your location? Use the measure tool for this.  _____

_____

c. How many CBIBS buoys are present in the bay, according to this FieldScope map? _____



4. Next, you will use the CBIBS data to create a graph to see the dissolved oxygen levels measured at this location.

   At the top left of the FieldScope map, click on the Time Series Plot tab. Under Add Data to Plot, choose CBIBS. Enter each of the following:
   - Station—your nearest CBIBS buoy
   - Variable—dissolved oxygen
   - Start Date and End Date—July 1 for the two previous years, e.g. July 1, 2012 to July 1, 2013

   Click Add to Graph. Be patient; you may need to wait while the data loads.

   a. What general range does this buoy show for dissolved oxygen in a year's time?

   _____

   b. During which months are dissolved oxygen levels the highest? _____

   _____

   c. In which months are they lowest? _____

   _____

Analyzing Watershed Health: Dissolved Oxygen, continued

Part 3. Zoom in to examine dissolved oxygen at the local scale.

1. Now go back to the FieldScope map and zoom in to the area of your selected buoy. Select again the Dissolved Oxygen layer. View the area near the buoy from July 2006-07 using the timeline scroll.

   a. What range does the Dissolved Oxygen layer data show for the area near your buoy?

   _____

   _____

   b. How does this compare with the more recent CBIBS data you saw graphed? _____

   _____

   c. Which visualization of the dissolved oxygen data do you like best, the map or the time series plot graph? Why? _____

   _____

   d. Are the dissolved oxygen levels near this buoy healthy or unhealthy? How do the levels look farther downstream? _____

   _____

   e. What human actions can help to keep dissolved oxygen levels healthy in your local area?

   _____

   _____