

SWMP Scenarios Using the Graphing Data Application

More scenarios can be found here: <https://www.coast.noaa.gov/estuaries/science-data/graphing.html?content=swmp-scenarios>

Example scenario:

NH, Great Bay NERR

Station: Great Bay water quality

April 28-June 10, 2006

Question: What happened?

Parameters that the group highlighted: Dissolved oxygen, turbidity, and salinity

Answer: Big storm! Drops in salinity which hold throughout tidal changes, crashes in dissolved oxygen, and spikes in turbidity. Goal of these is to get them graphing and looking at each parameter and finding the ones that seem affected. Then figuring out what may have caused those changes....so a good thing to include on this and other examples is going to the weather station data to look for answers.....which in this case would have been **crashing** barometric pressure, high wind speeds, and lots of rain.

Group #1:

CA, Tijuana River NERR

Station: Oneonta water quality

March 12-April 14, 2016

Question: What happened?

Parameters of note: dissolved oxygen, level, (optional: turbidity)

Group #2:

SC, North Inlet-Winyah Bay to ME, Wells Reserves

(*use map*) (SC, NJ, ME)

Weather data

August 26-29, 2011

Question: What happened?

Parameters of note: precipitation, air temp, max wind speed, barometric pressure

Group #3:

MS, Grand Bay NERR

Station: Bang Lakes

(both water quality and nutrients)

Water quality: April, 2005 (full month)

Nutrients: March –December 2005

** this data is taken monthly, so you will need to zoom in a little.*

Question: What happened?

WQ Parameters of note: pH crash, DO spikes, ~~(salinity crash, turbidity spikes, and conductivity crash).~~

Nutrient Parameters of note: nitrites + nitrates, and ammonium

Group #4:

CA, Tijuana River & Elkhorn Slough NERRS

Stations: Boca Rio & Vierra Mouth (water quality)

March 9-13, 2011

Question: What happened?

Parameters of note: depth and turbidity

TRAINING BREAKOUT GROUPS

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ANSWERS

Example scenario:

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Group #1:

CA, Tijuana River NERR

Station: Oneonta water quality

March 12-April 14, 2016

Question: What happened?

Parameters of note: dissolved oxygen, level, (optional: turbidity).

Answer: Rivermouth closure!

The tidal signal seen in level data will start to flatten out (and rise at the end from freshwater input from rain and sewage break) and eventually dissolved oxygen levels will crash. When the mouth opened again tidal signal returned and DO starts to come back. Also of interest is salinity, it stays mostly constant until the mouth is reopened. Then there is a huge drop in salinity as fresh water and salt water are again remixing. It rained April 7, 9, and 10. Around that time there was also a sewage break (which brought extra nutrients into the system). The freshwater layer on top (stratification of fresh and saltwater) and dropping oxygen levels (any oxygen would have been restricted to a thin layer on top) led to the mass die off of leopard and smooth-hound sharks, as well as shovel-nosed guitarfish.

Group #2: (same as Task#3 in homework)

SC, North Inlet-Winyah Bay to ME, Wells Reserves (use map) (SC, NJ, ME)

Weather data

August 26-29, 2011

Question: What happened?

Parameters of note: precipitation, air temp, wind speed, barometric pressure

Answer: Hurricane Irene! This one is pretty self-explanatory but I think it emphasizes how cool it is to have a network of stations up the coast to capture this kind of data from the entire eastern seaboard. This is the one where if you graph barometric pressure from all the east coast reserves you can not only see the storm travel up the coast but also estimate how fast it was moving by the time stamps associated with the data.

Group #3:

MS, Grand Bay NERR

Station: Bang Lakes (both water quality and nutrients)

Water quality: April 2005 (full month)

Nutrients: March – December 2005

Question: What happened?

Water Parameters of note: pH crash, DO spikes (concentration), ~~salinity crash, turbidity spikes, and conductivity crash???~~

Nutrient Parameters of note: nitrates and nitrites, ammonium (*note: these are taken monthly, so there will only be one data set in each month, zoom in accordingly*)

Answer: Fertilizer spill! Big algae bloom resulting that really messed up the water chemistry. This one gets people looking outside the CDMO to the local news to find the story about the chemical spill then relate it back to what they are seeing in the data.

This is the one I borrowed from the Estuaries 101 high school curriculum. (PS3: Human Impacts on Estuaries: A Terrible Spill in Grand Bay - <https://coast.noaa.gov/estuaries/curriculum/human-impacts-on-estuaries-terrible-spill-in-grand-bay.html>). *Page 12 has a good summary.* The Massive Spill: Bangs Lake along the western border of Grand Bay NERR, MS. The spill occurred in April 2005 when the walls of retaining ponds filled with wastewater collapsed at a fertilizer manufacturing company located 1.1 km from the lake. Approximately 17.5 million gallons of polluted water were released from the ponds and subsequently flowed into the estuary. The released wastewater had the following characteristics:

- a pH of 2.2–2.4
- elevated levels of phosphorus (4000-5000 ppm)
- high levels of aqueous ammonia (280-350 ppm).

The spill was sudden and organisms in the estuary felt the effects immediately.

Group #4:

CA, Tijuana River & Elkhorn Slough NERRS

Station: water quality – Boca Rio & Vierra Mouth

March 9-13, 2011

Question: What happened?

Parameters of note: depth and salinity

Answer: Tsunami in Japan on March 11, 2011! “It’s like the Pacific Ocean was ringing like a bell.” – Jeff Crooks. Salinity doesn’t really factor in but you would want to check it just to rule out any other explanations such as rainfall (increased turbidity would also show rainfall).