Answer Key - Handout: Water Temperatures Data Search

OSS References: 1.11 *Global Winds and Ocean Surface Currents*; 1.12 *Ocean Currents, Global Winds, and El Niño*; some reference to 1.4 *Temperatures around the World*.

Overview: Students use archived data from multiple NERRs and compare coastal water temperatures from east and west coast estuaries, which reveals the influence and stabilizing effect of the ocean on west coast water temperatures compared to the more variable temperatures on the east coast. Students take note of annual variability in temperature, including max, min and range of temperature recorded at each location. Reserves from east and west coast of the US are compared that have similar latitudes. Students could also compare water temperatures on the same coast (but different latitudes) to show the effect of distance from the equator on water, air and/or land temperatures.

The west coast sites are Tijuana River and Elkhorn Slough and east coast sites are Winyah Bay (SC) and Jacques Cousteau Reserve (NJ).

Student Data Table:

Reserve Name	*Jacques Cousteau Reserve*	*Winyah Bay/North Inlet*
Station:	*Lower Bank*	*Oyster Landing*
Location	*East Coast (New Jersey)*	*East coast (South Carolina)*
Nearest ocean	*Atlantic Ocean*	*Atlantic Ocean*
Highest temperature recorded	*31.4 ℃*	*34 ℃*
Lowest temperature recorded	*0 ℃*	*2 ℃*
Annual temperature range (high – low)	*31.4 ℃*	*32 ℃*
Other observations?	*Looks like the water froze in January and there was a spike in water temp in September*	*Similar to Jacques Cousteau reserve, but water never got to freezing*

| Reserve Name	*Elkhorn Slough*	*Tijuana River*
Station:	*Vierra Mouth (Water Quality)*	*Boca Rio*
Location	*West Coast (CA)*	*West Coast (CA)*
Nearest ocean	*Pacific Ocean*	*Pacific*
Highest temperature recorded	*20.8 ℃*	*28.5 ℃*
Lowest temperature recorded	*10 ℃*	*11.5 ℃*
Annual temperature range (high – low)	*10.8 ℃*	*17 ℃*
Other observations?	*We noticed two low temperature events in the month of May*	*Data seem more variable on a daily basis compared to the east coast estuaries.*

Data Visualizations – Northern estuaries:

Below is a comparison of annual variability in temperature at Elkhorn Slough (CA) vs. Jacques Cousteau Reserve (NJ)
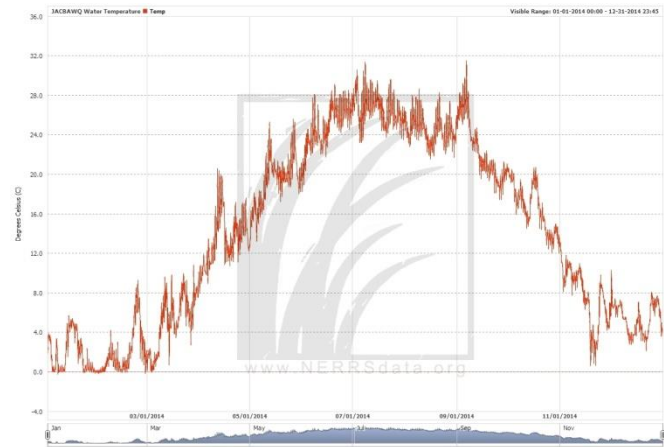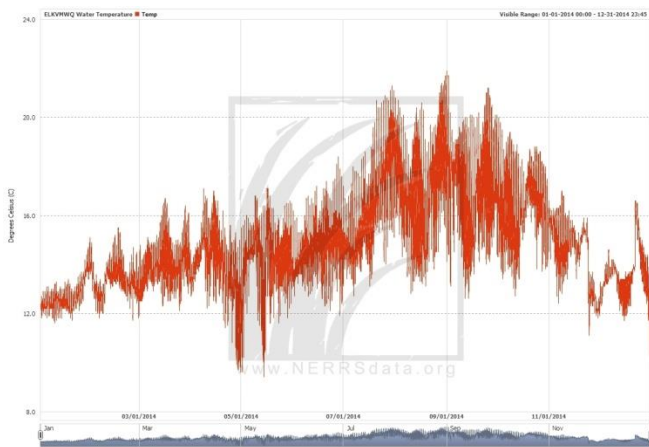
Data Visualizations – Southern estuaries:

Below is a comparison of annual variability in temperature at Tijuana River (CA) vs. North Inlet/Winyah Bay (SC)
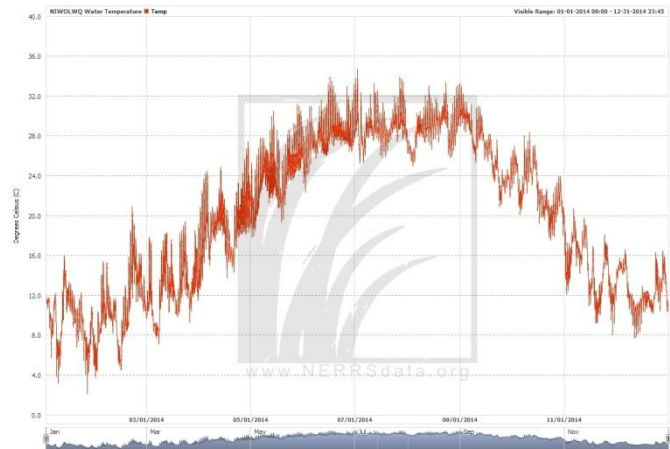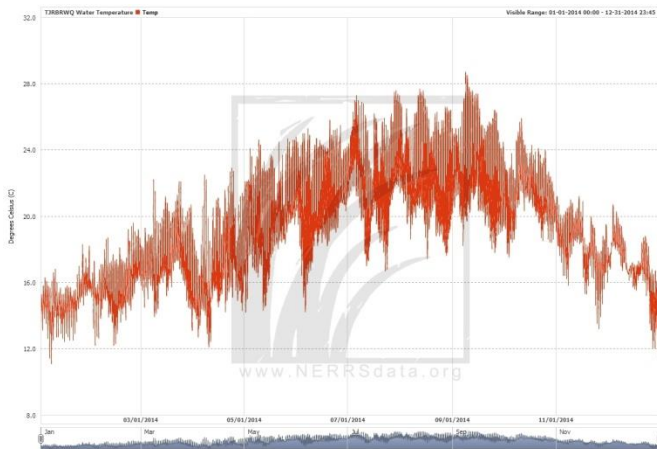
Data Engagement Questions – Orientation:

- What type of data is being measured at each of these stations? How is water temperature being measured?
- Describe the values on the X and Y axis of the figure.
- Where are these data collected? What do you know about the ocean currents in these parts of the world?

Data Engagement Questions – Interpretation:

- Describe the pattern that you see in the temperature data.
- How much time is represented by the X axis? Can you point to data that was collected during summer? Winter?
- What is the highest value of temperature collected for each dataset? What is the lowest?
- Calculate the range of data (high minus low) and record this in your data table.
- Compare data from the east and west coast reserves. What do you notice about differences in water temperature at these reserves?

Data Engagement Questions – Synthesis:

- What other information could you use to explain these differences in temperature?
- What do you predict will be the annual variability in air temperature at these reserves?