Interpreting Your Data

Data interpretation is an important part of any data collection program.
Learning to collect the data correctly is important, but determining what the data means is also important. Once the data is recorded it is important to analyze what it is telling us.

• **Visualizing:** Start by making sure all the data you have collected is recorded on one simple sheet. This allows you to review all your results quickly and any trends that exist are more evident.

• **Physical Influences**: Do not forget to look at your physical survey. Physical conditions can have **significant impacts** on the data and will help you in understanding what it all means. Pay careful attention to the weather (both present and prior few days), time of day, tide, time of year, and how these conditions may have contributed to your results.

Some suggestions on how to organize your thinking:

WATER QUALITY SAMPLING:

1. Review your data collection sheets. Be careful when transferring data from individual sheets to poster board and master sheets to avoid posting data in the wrong place, with the wrong decimal location etc.

2. Look at consistency or trends in the data recorded. Examine each individual parameter tested throughout the day looking for any trends. Next examine the tests in combination to look for any trends. Then look to see if there are interrelationships with the tests? For example…
   a) Does the DO level seem to change during the day? What would cause the DO levels to change during the day?

   b) How might the physical conditions have affected the results? Did the wind pick up during the testing period? Would this affect the level of DO in the water? Why?

   c) DO is critical for survival of aquatic organisms. Did temperature or salinity affects the level of oxygen in water?

   d) What about the weather? Rain today or in the last few days?

3. Nutrients - The primary nutrients we are concerned with are nitrate-nitrogen and phosphorous. Nitrate is the form of Nitrogen that is an essential nutrient for plants and animals as building blocks for protein. Nitrates are transported in the Hudson River primarily from organic decomposers and from nonpoint sources – such as fertilizers, wastewater treatment facilities and atmospheric pollution from burning fossil fuels. Nitrate in the form of Nitrogen is an essential nutrient for plants and animals as building blocks for protein. In saltwater Nitrogen is considered the limiting nutrient as it is less abundant than in freshwater. While the state of New York does not have a numeric standard for nitrate (anything less than 10 ppm is considered

acceptable), for practical purposes anything greater than 1.5 ppm to 2.0 ppm would be considered of interest. Does the level of Nitrate-Nitrogen you recorded seem to be within expected ranges? Would one expect a level in this range to lead to excessive plant growth such as an algae bloom? Are there plant materials in the area that might be available to reduce the levels of Nitrate-Nitrogen by using them as food resources?

4. Phosphorous comes from industrial effluent, detergent wastewater and can leach from natural deposits. Phosphorous levels of 0.03 ppm can contribute to increased plant growth (eutrophication). Total phosphorous levels of 0.1 ppm may stimulate plant growth sufficiently to surpass natural eutrophication rates. How will the levels you are finding affect plant growth? Phosphorous in the brackish sections of the river would be expected to be lower than in the freshwater sections.

5. Is the alkalinity reading you are recording typical for saltwater systems (check your chart to see what would be defined as typical for saltwater)? Will this level provide for good buffering? Remember alkalinity is what keeps the water from reacting quickly to changes in pH. This is very important for fish and marine life.

6. Is the pH more acidic or base? (Remember 7.0 is neutral) 6.5-8.2 is considered optimal for most organisms. See chart – If pH is between 6.0 and 6.5 it can be harmful to fish if CO_2 is in excess of 100ppm. Changes in water pH can also affect water organisms indirectly by changing other aspects of the water chemistry. For example metals trapped in sediments are released into the water at lower pH level. Could this be a concern with your sample reading?

7. Is there data that doesn't seem to fit? Were your collection methods correct? Did you wait the proper time on each test?

   What gaps are there in your information?

8. Compare the results with each of the other stations. Are there connections that can be made between the different data collected?

9. If comparing data over time do you see differences? Are there seasonal differences in water quality tests? What about levels of conductivity? What would account for this?

FISH

1. Would the physical conditions impact the fish sampling?

2. Would you expect to find different samples depending on the tide? Why or why not?

3. How might the habitat affect the benthic community? (level of turbidity?, water temperature? Amount of algae etc.? Open water sampling versus next to a rock wall?

4. Would you expect there to be seasonal differences in your sampling? Explain.

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5. Does a single fish family appear to dominate the catch? If so, what might be the cause?

6. If you were unable to identify the fish did you provide enough descriptors so that someone might be able to identify it later?

BENTHIC SAMPLING:

1. Would the physical conditions impact the benthic macroinvertebrate sampling?

2. How might the habitat affect the benthic community? (level of turbidity?, water temperature? Amount of algae etc.?

3. Would you expect there to be seasonal differences in benthic sampling?

4. Does a single macroinvertebrate appear to dominate the sample? If so, what might be the cause?

5. If you were unable to identify your sample did you provide enough descriptors so that someone might be able to identify it later?

PLANT INVENTORY:

1. Does the plant inventory tell you anything about the salt water level of the water?

2. Does there appear to be a balance in the plant inventory or does one species dominate?

3. If one species is dominant does this appear to be a positive ecological balance or an invasive occurrence?

4. Were you able to describe plants in several different levels of the ecosystem?

5 Other observations -

Further Questions:

1. What further questions arose from your analysis?

2. Are there more detailed studies you would like to conduct?