Water Quality Wrap-Up
What is Water Quality?

- Water Clarity
- Water Temperature
- Nitrogen
- Phosphorous
- Dissolved Oxygen
- Fecal Coliform
- pH
• We collected water quality data for 3 water bodies in NYC

• Today, we will MAP our data and answer some questions

• We will use the NYC Subway Map as our “Base Map”
# 2012 Urban Ecology Water Quality Data Summary Table

<table>
<thead>
<tr>
<th>Water Quality Tests</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
<th>Description</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
<th>Description</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Temperature</td>
<td>48</td>
<td>62</td>
<td>56.58</td>
<td>warm</td>
<td>0</td>
<td>0</td>
<td>1.92</td>
<td>warm</td>
<td>50</td>
<td>62</td>
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<tr>
<td>Water Temperature</td>
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<td>65</td>
<td>52.96</td>
<td>warm</td>
<td>50</td>
<td>55</td>
<td>1.92</td>
<td>warm</td>
<td>50</td>
<td>55</td>
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<td>warm</td>
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<tr>
<td>Secchi Depth/Turbidity</td>
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<td>60</td>
<td>44.06</td>
<td>fair</td>
<td>0</td>
<td>0</td>
<td>51.92</td>
<td>brackish</td>
<td>15.748</td>
<td>8</td>
<td>6.95</td>
<td>cloudy</td>
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<td>Salinity</td>
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<td>29</td>
<td>23.69</td>
<td>brackish</td>
<td>29</td>
<td>30</td>
<td>29.29</td>
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<td>40</td>
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<td>Coliform Bacteria</td>
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<td>positive</td>
<td>positive</td>
<td>safe for boating</td>
<td>positive</td>
<td>positive</td>
<td>positive</td>
<td>safe for boating</td>
<td>negative</td>
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<td>safe for and swimming</td>
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<td>8</td>
<td>6.60</td>
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<td>7</td>
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<td>7</td>
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<td>Dissolved Oxygen</td>
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<td>5.03</td>
<td>oxic</td>
<td>4</td>
<td>8</td>
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<td>6</td>
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<td>Nitrogen</td>
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<td>0</td>
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<td>Phosphorous</td>
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<td>5</td>
<td>1.12</td>
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<td>adequate</td>
<td>0</td>
<td>2</td>
<td>0.36</td>
<td>adequate</td>
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</tbody>
</table>
Mapping Your Data:

Locations of Water Quality Testing Sites

<table>
<thead>
<tr>
<th>Title</th>
<th>Key</th>
<th>Scale</th>
<th>North Arrow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EXPLANATION</td>
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<td></td>
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<tr>
<td></td>
<td>study</td>
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</tr>
</tbody>
</table>

Locations of Water Quality Testing Sites
Playing with Scale

Using SYMBOLS
Example: Fecal Coliform

+ Positive

− Negative

Using COLOR
Example: Nitrogen

- Depleted
- Adequate
- Excess

Using SIZE
Example: Salinity

- Fresh Water
- Brackish Water
- Marine Water
Mapping Tasks:

DATA ANALYSIS:
• READ Your Group’s Question
• DECIDE What data you need
• FIND and HIGHLIGHT the Data on the summary sheet

MAPPING:
• LABEL Important Locations on your Map
• Add a TITLE to your map
• Make a KEY for your map
• DRAW symbols on map

CONCLUSIONS:
• ANSWER your group’s question based on your map
• PRESENT your results to the class
Urban Ecology: Water Quality Mapping Questions

(1) How did salinity and pH change as we move from site to site?
   • Sub Question 1: Do you notice a general trend?
   • Sub Question 2: Is this the relationship you would expect given what you have learned in Urban Ecology Class? Why/ Why not?
   • Sub Question 3: What other water quality tests could be related to Salinity and pH?

(2) How did Air Temperature, Water Temperature, and Dissolved Oxygen change from site to site?
   • Sub Question 1: How do you think these three tests are related?
   • Sub Question 2: Is this the relationship you expected to find? Why/ Why not?
   • Sub question 3: What other water quality tests could be related to air temperature, water temperature, or dissolved oxygen?

(3) How did fecal coliform detection change from site to site?
   • Sub Question 1: How is fecal coliform related to nutrients (nitrogen and phosphorous)?
   • Sub Question 2: Where would you EXPECT the levels to be highest; is this what you observed?
   • Sub Question 3: Is there a common source of nutrients and fecal coliform to NYC waters?

(4)How did water clarity change from site to site?
   • Sub-Question 1: What water tests would you use to determine clarity at each location?
   • Sub Question 2: Do your observations match up well to the data (think about water depth, waves, and tides).
   • Sub-Question 3: What other water tests might be related to water clarity?

(5) How do the Phosphorous and Nitrogen levels change from site to site?
   • Sub Question 1: Where were the HIGHEST and LOWEST levels of each one?
   • Sub Question 2: Can you think of a source for these nutrients at each site where they were detected?
   • Sub Question 3: What other water quality tests are related to Nutrients?

(6) What water quality test varied the MOST between sites? Which one varied the LEAST?
   a. Sub Question 1: How did you select data to answer this question- did you use averages minimum, or maximum values?
   b. Sub Question 2: Why do you think the test that varied the MOST changes so much from site to site?
   c. Sub Question 3: Why do you think the test that varied the LEAST did not change much between sites?
NYC Water Quality Mapping

Follow the directions below to create your water quality map:

**Analyze Your Data**
- Read your group’s question and decide what data you will need (check-off the data you will use)
  - Nitrogen
  - Phosphorus
  - Fecal Coliform
  - Salinity
  - pH
  - Dissolved Oxygen
  - Secchi Depth (turbidity)
  - Water temperature
  - Air temperature

- Find and highlight the *type* of data you need on the data sheet (choose one of the options below and stick to it for all data)
  - Averages
  - Minimum
  - Maximum
  - Minimum and Maximum
  - Descriptions (example: depleted, fair, adequate)

**Make Your Map**
- Mark important locations: find and label AUP, Jamaica Bay, Atlantic Ocean, Newtown Creek
- Add a TITLE to your map
- Design a KEY for your map
  - Include appropriate SYMBOLS and COLORS
  - Include appropriate UNITS
- Draw appropriate symbols on the map for each locations
  - Newtown Creek
  - Jamaica Bay
  - Atlantic Ocean
Answer your question based on your map

_Tape/glue your question here_

Write your answer here:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Present your conclusions to your class, assign one of these presentation tasks to each group member:

Name(s)
_________________ Read the question
_________________ Explain what data you used
_________________ Explain how data has changed from site to site
_________________ Answer sub question 1
_________________ Answer sub question 2
_________________ Answer sub question 3