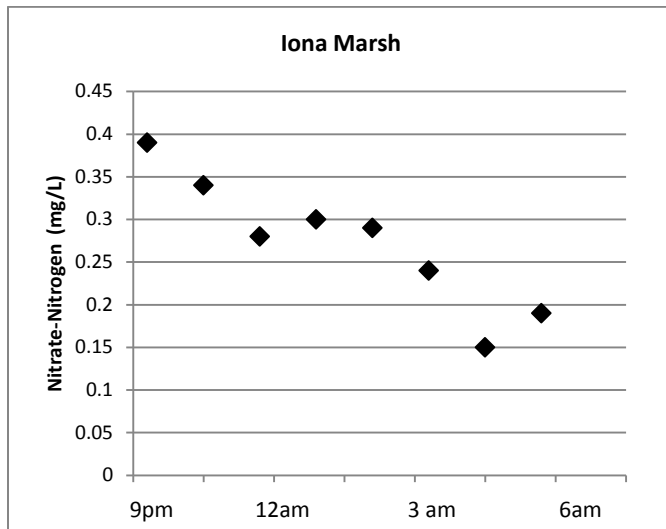Name _____   Date _____

Why are wetlands important?

Part 1: The graph below shows the change in nitrates over a 9-hour period when the tide was primarily ebbing (or leaving) Iona Marsh, a freshwater tidal wetland along the Hudson River. Using the graph, answer the questions below.

1. Describe the trend in nitrate-nitrogen levels.

   _____

   _____

   _____

2. What do you need to know in order to decide what caused the change in nitrate-nitrogen in the marsh? List at least two questions.

   _____

   _____

   _____

Part 2: During this lab, you will design and carry out an experiment that investigates the impacts of plants on nitrogen (in the form of nitrate) in wetlands. You will address one or both of the following questions: Do plants take nitrate out of the water? Do different aquatic plants affect nitrate levels differently?

Available materials: Aquatic plants, terrestrial plants, containers, aged tap water, fertilizer, soil, sand, gravel, measuring spoons, mixing containers, electronic balance, rulers, nitrate-nitrogen test kit

Question: Write your question below.

_____

_____

Hypothesis: Write a hypothesis for your study. This should directly address your question.

_____

_____

_____

Once you decide on the following questions, design your experiment. *Things to think about:*

1. *Setup*: How many replicates will you have? Where will you put the containers? How much water will you use?   What is an appropriate control for your experiment?
2. *Fertilizer*: What kind of fertilizer will you use? How much fertilizer will you add? What concentration of fertilizer will you use? How often will you add fertilizer?
3. *Plants*: What kind of plants will you use? How many plants will you put in each container? How large should each plant be? How will you be sure to use the same number of plants in each replicate?
4. *Measurements*: What will you measure? How often will you take measurements? For how long will you run your experiment?

Procedure: Write your procedure here.

_____

_____

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_____

Design: Sometimes, it helps to create a diagram of your experiment. Use the jars below as an example – you may have more or fewer jars. Draw and label what will be included in each jar. (Don't forget a control – you may have more than one!)

CONTROL	CONTROL	CONTROL			

Part 2: Data collection

Date							

Observations:

Part 3: Analyze results

Using data from your class, answer the following questions.

1. How much nitrate-N in mg/l did you add to your experimental group at the start of the experiment? How much nitrate was left at the end of the experiment?

2. What happened to your ecosystem with the addition of the fertilizer?
    Discuss the growth and general appearance of the plants.

3. Where did the nitrate go? Why do you think this?

4. Look back at the graph on the first page of the handout. Now that you have finished the experiment, explain why the nitrate-nitrogen levels in Iona Marsh changed.

5. Use the graph below to answer the following questions. The black line shows the tidal stage, or height of the water – high levels indicate high tide, low levels indicate low tide. The nitrate-nitrogen levels are shown with blue diamonds.
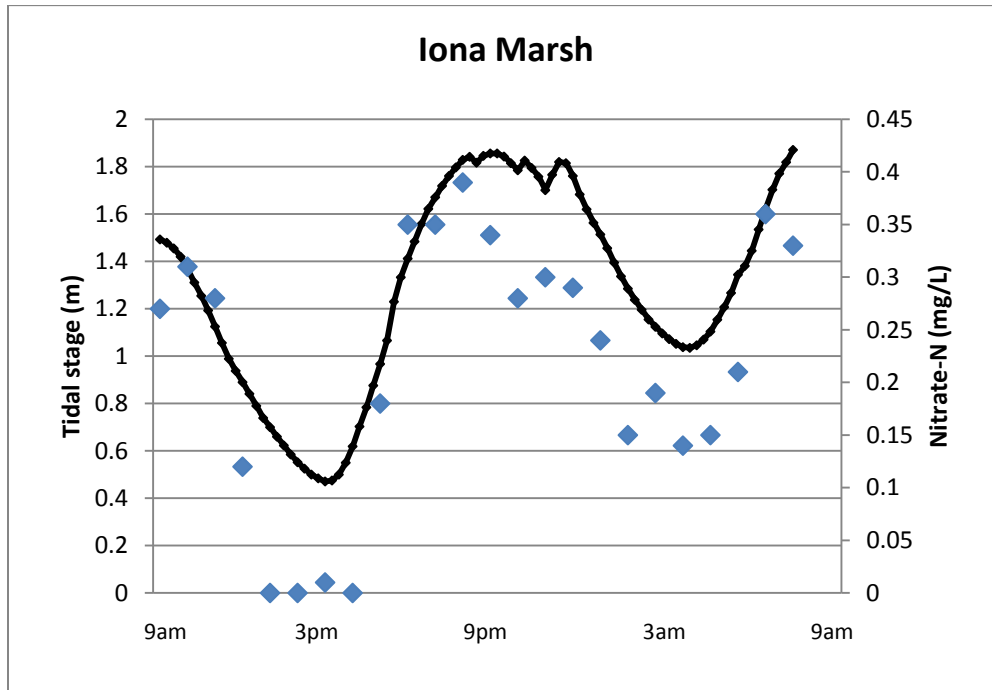
Iona Marsh

a. Describe what happened to nitrate-nitrogen levels over the course of the 24-hour tidal cycle at Iona Marsh.
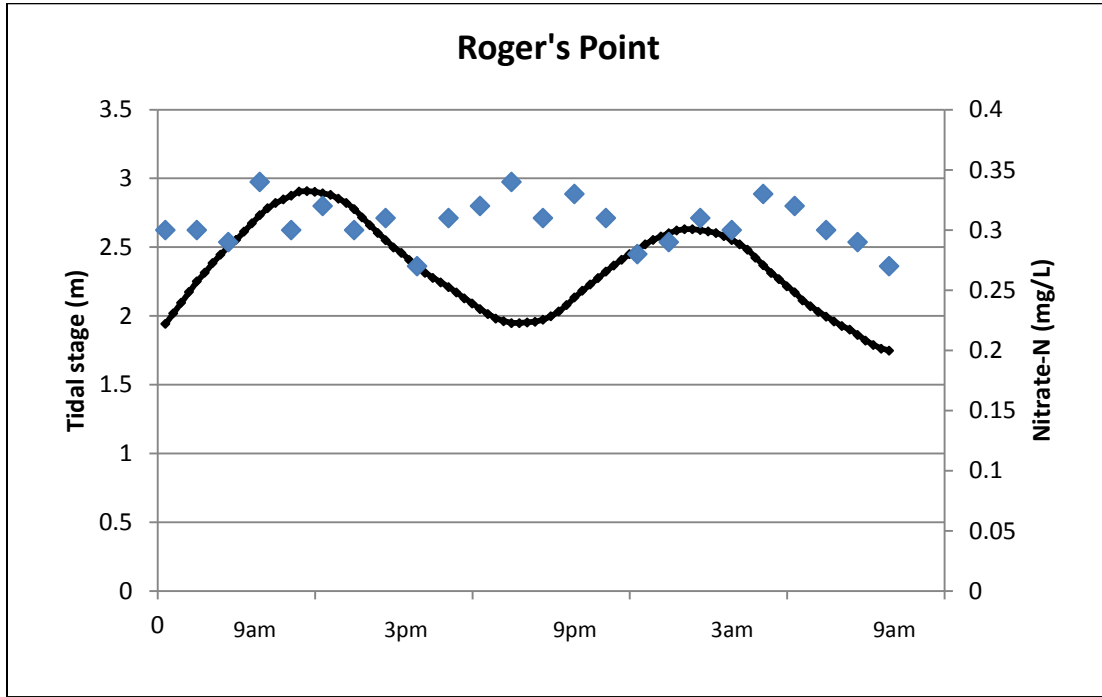
_____

_____

_____

b. Explain why you think this happened, based on what you learned during the lab investigation.

_____

_____

_____

6. Now, compare these data from Iona Marsh with data from Roger's Point.

Roger's Point

a. How do the nitrate-nitrogen levels at Roger's Point differ from those at Iona Marsh?

_____

_____

_____
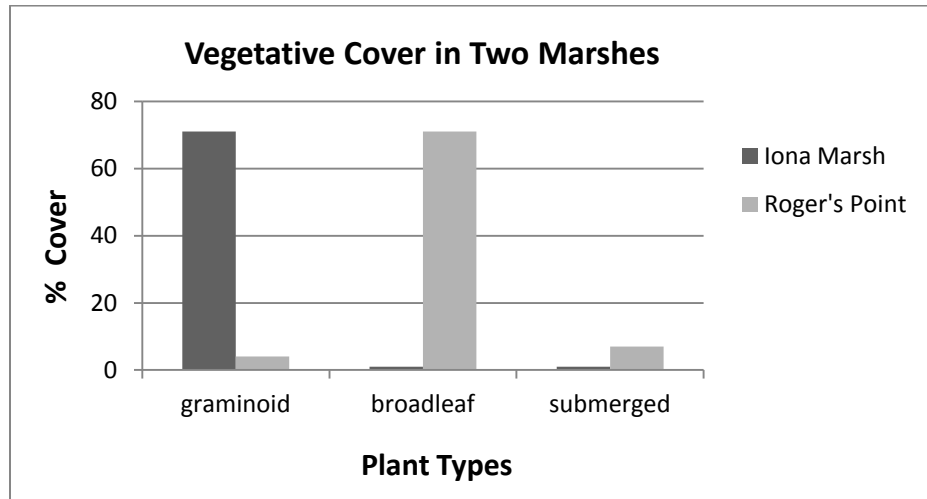
b. What might cause these differences?

_____

_____

_____

7. Here are some additional data about the two marshes in the graphs above:

Vegetative Cover in Two Marshes

% Cover (y-axis: 0, 20, 40, 60, 80)

Plant Types (x-axis: graminoid, broadleaf, submerged)

Legend: Iona Marsh, Roger's Point

a. How does this information help explain the differences you noticed between the two marshes?

b. Relate these results to what you learned from your own investigation.

8. Imagine you are managing a local watershed. You need to make sure that the reservoir within your community remains viable as a drinking water source without building a new water treatment plant. What would you recommend your town do? Explain your recommendations.