

Student Worksheet

Begin research for the following questions at <http://oceanservice.noaa.gov/topics/coasts/reserves>.

1. What are three primary purposes for which National Estuarine Research Reserves are established?
2. What are eight habitats found in the Great Bay Reserve?
3. Which area within the reserve has the greatest diversity of habitats?
4. Saltmarsh habitats are dominated by which plant species?
5. Are forested areas within the Great Bay Reserve classified as deciduous forests or coniferous forests?
6. The Great Bay Reserve estuary is critical to the wintering of what protected species?
7. Does tidal flow or freshwater flow have the dominant influence on water movement in the Great Bay Reserve estuary throughout most of the year?
8. What geological formation provides an important source of stable substrate for macroalgal attachment and contributes to the beaches in the Great Bay Reserve?
9. The Great Bay Reserve estuary is representative of what type of geological formation?
10. Marsh soils bordering streams within the Great Bay Reserve generally contain high amounts of what substances?

One of the major sources of water pollution in the United States is contaminated runoff. Estuaries in the National Estuarine Research Reserve System provide natural laboratories for studying this problem. From 1997 to 2000, Dr. Frederick Short of the University of New Hampshire led a research program to develop a biological method for detecting excess nutrient inputs to estuaries. Use the CICEET Project Explorer (<http://ciceet.unh.edu/searchprojects.html>) to answer the following questions. (Hint: the Project Profile and Final Report for Dr. Short's project contain all the information you need).

11. What is the major cause of excessive nutrients in estuarine and coastal waters?
12. Why is it difficult to directly measure excessive nutrients in estuaries?
13. What biological species did Dr. Short use as an indicator of nutrient over-enrichment?
14. In addition to Great Bay, what other NERRS sites were used in this project?
15. What responses of the indicator organism were used to create an early indicator of nutrient over-enrichment?
16. How were these responses combined to provide a single measurement of early nutrient over-enrichment?
17. Is the mathematical relationship between these responses positive or negative?
18. Dr. Short's project developed an interactive CD-ROM to explain the step-by-step procedures for what four types of investigation?
19. In samples from Waquoit Bay, were leaf mass and tissue nitrogen highest in plants from the mouth of the estuary (down-estuary) or near the head of the estuary (up-estuary)?
20. During what season was leaf nitrogen content highest in plants from Great Bay Estuary between April 1998 and April 2000?