

Introduction and Overview for Bringing Wetlands to Market Curriculum

This site contains a high school STEM curriculum related to the "Bringing Wetlands to Market" project. The "Bringing Wetlands to Market" research studies located in Falmouth and Mashpee on Cape Cod, Massachusetts, examine the relationship between salt marshes, climate change, nitrogen pollution, and the economic value of salt marshes as carbon sinks. This curriculum module, which is linked to the Next Generation Science Standards, introduces many different aspects of this exciting project and provides teaching ideas and activities for sharing it with teachers and students.

Project Introduction

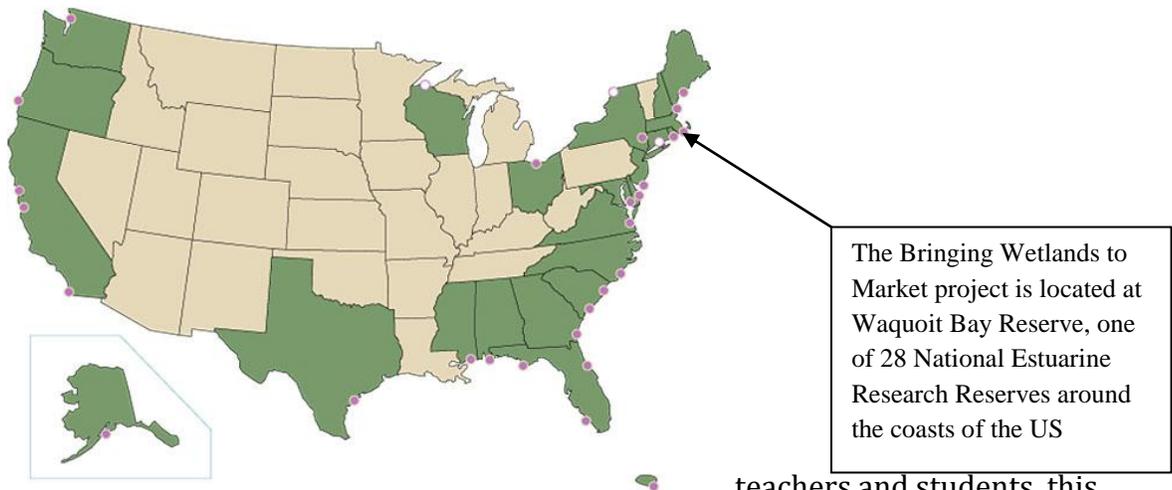
Money does not grow on trees, but it could be growing in our coastal salt marshes and sea grass beds. A team of researchers is working at Waquoit Bay Research Reserve on Cape Cod in Massachusetts on the "Bringing Wetlands to Market" project to study the connections between coastal wetlands, carbon dioxide uptake and storage, and the global carbon trading economy. Wetlands have the potential to serve as valuable assets in carbon trading markets - but only if we protect them, and don't dig up the treasure!



Carbon dioxide is a greenhouse gas that increases global warming by trapping heat in the atmosphere. Recent research indicates that coastal wetlands might capture and store carbon, including carbon dioxide, at rates three to five times greater than forest systems do. They also have the capacity to store carbon over long time periods. That means that they could be extremely valuable as carbon offset areas, which are traded on global markets.

However, pollution from septic systems, stormwater, and airborne compounds can reduce or wipe out a wetland's ability to store carbon. Salt marshes, seagrass beds, and mangrove communities could be of tremendous value to the economy of their coastal communities, but only if they are healthy and functioning well ecologically.

Scientists in the "Bringing Wetlands to Market" project are examining the relationship between salt marshes, climate change, nitrogen pollution, and the economic value of salt marshes as carbon sinks. Through science, modeling, and broad stakeholder input, the research team seeks to generate information and design tools that coastal decision makers can use to manage nitrogen pollution, design effective wetlands protection and restoration projects, and create economic incentives to reduce greenhouse gas.



For teachers and students, this unit offers an authentic context for studies of the carbon cycle, ecosystem functions, the process of science, the engineering and technology design process, calculating economic value for natural resources, and student field studies and stewardship projects.

Preparation

Before beginning this unit, students should be able to

- Explain what an estuary is
- Explain what a watershed is
- Give a general description of the National Estuarine Research Reserve System

If your students are unfamiliar with estuaries and watersheds, the following lessons provide useful background for this unit.

[Lessons and background](#) on estuaries and watersheds

The following lessons are recommended:

High School Estuaries 101

Lessons in the Earth Science Module [E101 Earth Science](#)

E101 Activity 1: Observing Estuaries,
E101 Activity 3: Estuary and Watershed,

Middle School Estuaries 101

MS E101 Activity 1: Where Rivers Meet the Sea

[Where Rivers Meet the Sea](#)

An interactive map of the National Estuarine Research Reserves is at

<http://estuaries.noaa.gov/Teachers/InteractiveMap.aspx>

Estuary Principles and Concepts <http://estuaries.noaa.gov/Teachers/Default.aspx?ID=180>

An interactive tutorial about estuaries [Introducing estuaries](#)

Bringing Wetlands to Market project web site <http://wbnerrwetlandscarbon.net/>

Bringing Wetlands to Market project overview

http://nerrs.noaa.gov/Doc/PDF/Science/NSC_WAQ_Overview.pdf

Acknowledgements:

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Comments? Suggestions? Corrections? This is a beta version of the curriculum. We welcome feedback and plan to put out an updated version in the future. Please use this link to send us comments or suggestions for improvement (including corrections) <https://www.surveymonkey.com/s/WRJWBQB>, for questions, contact Joan Muller, Education Coordinator at Waquoit Bay National Estuarine Research Reserve joan.muller@state.ma.us