

## **2013 Teachers on the Estuary (TOTE) at Great Bay NERR**

**Course Description:** This course is a field-based and research teacher training initiative of the National Estuarine Research Reserve System (NERRS), part of the National Oceanic and Atmospheric Administration (NOAA). This course is offered by the Great Bay National Estuarine Research Reserve, a partnership program between NOAA and the New Hampshire Fish and Game Department.

The goal of TOTE is to provide resources and experiences to support the incorporation of estuary and watershed topics into classroom teaching. The course is also designed to promote stewardship of estuaries and associated watersheds.

This TOTE course is appropriate for middle and high school teachers and will focus on the Great Bay Estuary in coastal New Hampshire. Teachers will participate in field-based research and classroom activities, including the use of on-line data students can utilize for a variety of projects. Course content and activities support Next Generation Science Standards.

**“CEU’s” (16 contact hours)**

**Grade Level:** The course is designed for middle and high school teachers.

**Schedule:** July 9-10 2014 – 8:30 am – 4:30 pm

**Location:** Great Bay National Estuarine Research Reserve/Great Bay Discovery Center, Greenland NH/Jackson Estuarine Laboratory, Durham, NH

**Cost:** \$100 – Checks made payable to : Great Bay Stewards and sent to GBDC, 89 Depot Road, Greenland, NH 03840 – ATT: Kelle Loughlin

**Meals:** coffee/snacks, lunch both days and a traditional New England lobster bake (day 1 beginning at 4:30 pm) \*please let us know if you have allergies or special meal requirements

**Application:** Space is limited 15

**Coordinator:** Kelle Loughlin, Education Coordinator, Great Bay NERR, [KelleLoughlin@wildlife.nh.gov](mailto:KelleLoughlin@wildlife.nh.gov)

(603)778-0015

Partners: University of New Hampshire

**Course Objectives:** Teachers will be able to:

1. Describe the NERRS System and how Great Bay NERR fits into the System.
2. Describe major estuarine processes including: biological, chemical, and physical as well as impacts resulting from anthropogenic causes.
3. Explain the six Estuarine Principles and Concepts.
4. Access and use the Estuaries 101 on-line curriculum with students.

5. Describe at least two research projects underway in the Great Bay NERR that coordinate with the University of New Hampshire and/or other local scientists.
6. Develop and conduct at least one activity with students that support Next Generation Science Standard methodologies.

**Course Expectations: Teachers will be able to:**

- Attend both days of course.
- Complete a pre and post test.
- Participate in field-base and classroom activities and discussions.
- Develop a post course activity with students using estuarine concepts to support a Next Generation Science Standard.
- Participate in evaluation of the course.

**Course Outline**

**DAY 1**

**Tuesday, July 9, 8:30 am – 4:30 pm (Lobster Bake immediately following at Great Bay Discovery Center)**

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| <b>8:30 a.m.</b>  | <b>Introduction/Overview- Great Bay Discovery Center/Hugh Gregg Coastal Conservation Center</b>  |
| <b>9:00 a.m.</b>  | <b>Overview of the Great Bay Estuary – physical, chemical and biological components, Steve Miller, Coastal Training Program Coordinator, NERRS</b>                           |
| <b>9:30 a.m.</b>  | <b>The Teacher Connection – What’s in it for me? The challenges of addressing Next Generation Science Standards</b>  |
| <b>9:45 a.m.</b>  | <b>Estuarine Principles and Concepts</b>   |
| <b>10:15 a.m.</b> | <b>Estuaries 101 Curriculum~ Overview and Activities</b>   |
| <b>11:30 a.m.</b> | <b>Lunch</b>   |
| <b>12:00 p.m.</b> | <b>Carpool to Jackson Estuarine Laboratory, Durham NH (returning for lobster bake)</b>   |
| <b>12:30 p.m.</b> | <b>Overview of Oyster Restoration and Aquaculture, Dr. Ray Grizzle, Research Professor, UNH Department of Biological Sciences and Krystin Ward Research Technician, UNH.</b> |
| <b>12:45 p.m.</b> | <b>Oyster Aquaculture 101 – “Tools of the Trade”</b>   |
| <b>1:00 p.m.</b>  | <b>Board Boats at Jackson Lab pier</b>   |

- 1:15 p.m. Habitat tour around Nannie Island, Great Bay – Ecological Overview of key estuarine habitats**
- 1:30 p.m. Oyster Ecology: Learn how to tong for oysters, shuck and dissect. Enjoy oysters on the half shell from Little Bay oyster companies: “Wagon Hill Oysters” and “Choice Oysters”!**
- 2:00 p.m. Oyster Restoration Site: Underwater Discovery of estuarine habitats**
- Snorkel a variety of habitats and assist researchers with species identification and data collection
  - Learn about past and current oyster research from UNH research professors and graduate students.
  - Become an oyster farmer! – “Shake”, “scrub” and “foul” your way to understanding this resource.
- 3:15 p.m. Head back to Jackson Lab, carpool back to Great Bay Discovery Center**
- 4:30 p.m. New England Lobster Bake**
- DAY 2 – GBDC**
- 8:30 a.m. GBNERR’s System Wide Monitoring Program (SWMP) - Paul Stacey, Research Coordinator, GBNERR**
- 9:00 a.m. E101 Curriculum – Using NERRS Data in the classroom**
- 10:00 a.m. Kayak Exploration – Ecological functions and values of a New Hampshire salt marsh, Dave Burdick, UNH Research Professor, Department of Natural Resources and the Environment (all kayaks and equipment provided)**
- 12:30 p.m. Lunch**
- 1:15 p.m. Tour of Great Bay Discovery Center, Discovery tank and Grounds**
- 2:00 p.m. Putting it all together – Estuaries 101 continued and time to brainstorm and share ideas for using estuarine science to address Next Generation Science Standards.**
- 4:00 p.m. Wrap up and evaluation**