

Great Bay MATTERS

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*Promoting research, education
and stewardship throughout
the Great Bay Estuary*

What's it Worth?



How much is a salt marsh worth to you? We know that salt marshes provide critical habitat for important commercial and recreational fish and shellfish such as striped bass and oysters. We also understand that they are used as crucial respite areas for birds and migratory waterfowl. Salt marshes protect property from storm surge coming from the ocean, and help soak up storm and rain water rushing down our rivers. They absorb excess nutrients and filter sediment to help improve water quality in Great Bay. Emerging research is showing that wetlands can also store carbon, helping to reduce excess carbon dioxide (CO₂).

Articulating how these functions are quantified and assigned a value, is very tricky. If you ask most people about the value of a salt marsh, they would say that they are not worth much – they are too wet for real estate development which is considered the “highest and best” use by professional assessors. Salt marshes support economic sectors like fisheries, but they do not contribute to the GDP or job growth the same way much of the built environment does. Any attempts I have made to work with existing economic data to show the value of salt marshes feels false, as it only captures a sliver of their true contributions to society.

What if we could develop a different set of tools and protocols for assessing the value of natural resources? This is exactly what many natural resource scientists and economists are working on now; a field called “ecosystem service valuation”. Ecosystem services can be thought of as any benefit humans derive

from a natural system, and ecosystem service valuation is an attempt to quantify how important those benefits are to people.

In January, three staff members attended a workshop held at the Waquoit Bay NERR on Cape Cod. WBNERR is leading a research project to gain a better understanding of a salt marsh's ability to sequester carbon. This information could be translated into an economic value that might be used in greenhouse gas policy. The day was dedicated to understanding how we might continue to conduct research that expands our understanding of how people value and interact with our natural systems. Our staff came back energized about the potential for this type of work in the Great Bay region, as we engage with communities on issues like nitrogen reduction, climate adaptation and restoration priorities.

As you read the pages of this issue of Great Bay Matters, I encourage you to think about how you value the salt-marshes around Great Bay. As I wrote this article, I challenged myself to do the same for one small marsh in the Reserve: Bunker Creek Marsh along Route 4 in Durham. I drive over it every day, and it provides a reminder of the tides and seasons, a glimpse of wildlife, a few seconds of wonder and a motivation for the rest of my day. And that is just what it does for one commuter. We need a voice for this value and a more consistent way to communicate what the readers of this newsletter know in our gut to be true: when you add up all the ways individuals and communities are connected to our marshes, the collective value is priceless.

Cory Riley
Reserve Manager, GBNERR



GREAT BAY
NATIONAL
ESTUARINE
RESEARCH
RESERVE

Great Bay National Estuarine Research Reserve (GBNERR) is an estuary comprised of 7,300 acres of tidal waters and 2,935 acres of coastal land. Acquired through land purchases and conservation easements, GBNERR was designated on October 3, 1989 to be preserved for the purposes of education, research, and resource protection.

GreatBay MATTERS

89 Depot Road, Greenland, NH 03840
603-778-0015

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GBNERR

Manager: Cory Riley

Great Bay Discovery Center

Education Coordinator:
Kelle Loughlin

Great Bay Stewards

President: Jay Diener



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Pulling Together

In the Field

Invasive plants can cause significant ecological and economic harm and are changing the face of America. They are a leading threat to native biodiversity, second only to habitat destruction. Native fish and wildlife are impacted as the habitats and ecological processes to which they have adapted, are disrupted. Invasive plant growth can deprive wildlife of essential food sources such as pollen, nectar, and seeds. They can also directly alter habitat structure. Purple loosestrife (*Lythrum salicaria*) inhabits wetlands and may grow so densely it physically blocks the passage of turtles and fish.

Invasive plants have creative mechanisms to spread to new areas and seeds that can stay viable in the soil, ready for the right conditions to send up shoots again, for as long as 50 years. Tenacious Japanese knotweed can send out underground runners for up to 60 feet before resurfacing to start a new colony. Its shoots can even push up through inches of asphalt! Oriental bittersweet's heavy vines can physically bring the tree it is clambering up crashing to the ground.

The Seacoast is a hot spot for invasive plants in New Hampshire. It is where colonial settlers landed and they brought

with them plants from their European homes valued for their aesthetic or functional qualities. Many invasives are expanding their northern boundary and first reach New Hampshire along the coast. The speed of their influx is likely to be exacerbated by warmer temperatures predicted with climate change.

The importance of minimizing the spread of invasive plants means they are a common focus of control and restoration projects. However, invasive plants know no boundaries and can easily reestablish from surrounding areas unless a landscape-scale strategic approach is taken to prioritizing control projects. Great Bay National Estuarine Research Reserve, New Hampshire Fish and Game Department, and the N.H. Natural Heritage Bureau have teamed up with over 120 community members, natural resource managers, and academics to develop a strategic prioritization plan for the control of upland, wetland, and intertidal invasive plant species throughout the state.

The strategy will soon be available online at <http://wildnh.com/invasives/>. On this page, you will be able to download a customized map for each New Hampshire municipality, showing priority areas where invasive plant removal will have the most immediate impact and most effectively protect our native natural resources for the long term. You'll also find a customized "early detection" list of plant species just coming into each town and a handbook that describes how to use this strategy to prioritize projects right down to the individual property level, whether it's town conservation land, a school ground, or your own backyard.

Only by working together on shared invasive plant "battles" across differing land ownerships and political boundaries, can we effectively protect our native plants and wildlife habitat for the long term.

Rachel Stevens
Stewardship Coordinator, GBNERR



Invasive Plant Removal Tools Available for Free Loan

Groups working to combat invasive plants in Great Bay's watershed can borrow some tough tools to make their efforts more effective. The Reserve hosts a storehouse of specialized tools to be used as a community resource. Called Weed Wrenches, these tools are useful for manual removal of woody stemmed invasive plants such as glossy buckthorn, autumn olive, multiflora rose and honeysuckles. Currently, a total of 26 Weed Wrenches are available in four different sizes – enough tools to equip large work groups. There are also several planting bars, or dibbles, which make planting young native shrubs easy once the invasives have been removed.

The goal of this program is to provide an easy, free way for conservation commissions, land trusts, natural resource managers, restoration ecologists, individual landowners and other conservation partners to carry out community invasive plant control projects.

The tools are housed at the Great Bay Discovery Center and are available on a first-come, first-served basis. Loan of the tools is free but a brief survey must be filled out at www.greatbay.org/programs/Tool-loan-program.htm describing the project for which they will be used.



Caption: Great Bay NERR, NH Fish and Game, and NH Natural Heritage have worked together to develop customized invasive plant control strategies, indicating the most important species and areas to target, for each municipality in New Hampshire.

X-1

Box turtles lived in my neighborhood when I was a kid. My brother Ron and I used to catch them and paint small numbers on their shells. My favorite was X-1, named after Chuck Jaeger's experimental jet, a relished kid joke. Our X-1 could move fast for a box turtle and we occasionally raced the turtles against each other. I loved tracking the turtles in the neighborhood, though finding them was a challenge. They had a way of blending into the neighborhood that seems remarkable to me today. The other night I remembered how we would often find them under my grandmother's peonies. Often I searched for them there and, as I think about it now, I wonder if they were eating the flower petals, perhaps ants or worms, or they provided just the right kind of soil, temperature and shade combination for burrowing.

In a neighborhood full of kids and dogs, roads and cars, I am perplexed now that these individual turtles survived at all. Perhaps they were the wise old sages – the last of their population. Today, the fact I had box turtles in my boyhood backyard seems almost unbelievable. I grew up in Central Ohio, in a house built by my great-grandfather. My dad grew up in the house next door, and he told stories of the farmer who grew and sold vegetables on the land behind these

homes. By the time I was a kid, the farm was long gone and my friends were living in the houses that now occupied the land. Today Central Ohio, or the greater metropolitan area of Columbus, has more people than the whole state of New Hampshire.

The turtles that lived in my neighborhood were the last of their population. In the wild, box turtles can live up to 100 years. The turtles that I knew as a boy were surviving, but not reproducing. I have no proof of their age, but I'd guess the turtles I knew were anywhere from 30 to 60 years old given the land use history of the area. I do not remember ever finding a young turtle, and I would have remembered if we had. I lived to be outdoors, my "home range" growing as I grew. I knew every yard by its features and hiding places, every dog by name, and every fruit tree by when it had ripe fruit.

As a kid I never thought about the slow changes taking place in my town, the normal process of progress. The building of new homes, the squeezing of homes into smaller lots, the loss of the woodlot and farm stand, the loss of any open or green space, and the slow but steady change of the land from natural to man made. I know these things had a dramatic effect on me. The Ohio landscape I grew up in had not been wild for generations, and I saw the subtle connections it still held with the natural world quietly disappearing. As a kid, I would



Ron and Steve Miller, Bexley, Ohio, 1966.

look at the landscape and could tell it had been through many hard uses that had changed it, and it was not natural. But when you are a kid in the middle of it, it is just what happens. It is just what is.

Today, I lament how humans have changed the earth on such a massive scale. I understand that I am part of this process, and accept that change is a necessary part of life. But I truly worry about what we are losing and I work for a better balance. I know that I can make choices that can benefit the natural world around me and restore some of its ecological function. I am still that kid who tracked the turtles in his backyard, and I am thrilled when I see wildlife in my neighborhood. I don't use model paints to number them, but I register them in much the same way. I search for sign of skunks, opossum, and grey fox. I yearn for a peek into the lives of the voles who live behind my house. It makes me smile to see waxwings enjoying the fruits of the mountain-ash or holly in the yard. I need these things in my life and I try not to take them for granted.

Steve J. Miller
CTP Coordinator, GBNERR



Meeting the needs of Teachers

The Next Generation Science Standards have just been released. Over the last several years, evidence throughout our nation of sub-par science and technology student and workforce performance, has led to the development of these new standards.

In a 2009 standardized assessment, the US ranked 14th in reading, 17th in science and 25th in mathematics. Over a third of our eighth-graders scored below basic on 2009 NAEP Science Assessment. Half of all patent applications in 2010 were filed by foreign competitors.

Because of this and extensive work by distinguished researchers, public and private leaders, the need for new science standards was blatantly obvious. In what has been a national and international effort, the new Next Generation Science Standards (NGSS) are rich in content and practice, arranged in a coherent manner,

across disciplines and grades and will provide nationally and internationally benchmarked science education. The NGSS are based on the Framework for K-12 Science Education developed by the National Research Council.

In order to better meet the needs of our teachers and students who come to the Great Bay Discovery Center for field trips, the Reserve will begin the process of conducting a needs assessment and market analysis throughout the region. Understanding what teachers and students need in environmental science content will improve our ability to develop new programs and enhance existing ones, allowing a more seamless dovetail into the new standards.

Currently, all of the school programs offered in both the spring and the fall have been developed with K-12 sci-



ence and social studies curriculum standards in mind. Better understanding what teachers need and who in the Seacoast region is offering what, will help to guide future initiatives and work plans for the education programs at the Reserve.

If you would like to become more involved in this process, please contact Kelle Loughlin at Kelle.Loughlin@wildlife.nh.gov.

Kelle Loughlin
Education Coordinator, GBNERR
Director, Great Bay Discovery Center

Spotlight

An Education Hero Retires

People like Sheila Roberge are few and far between. She joined the Discovery Center as a volunteer, soon after retiring from Sanborn Regional High School as an English teacher. Staff soon discovered what a gem she was and hired her on as Volunteer Coordinator for the Reserve in 2001.

It wasn't long before we all realized that Sheila had a heart of gold, the energy of a teenager and interest in just about everything the Reserve does! As Volunteer Coordinator, Sheila recruited volunteers, helped train them, organized recognition events, dinners and brown bag lunches, and was the first one to say I can do that, anytime she was asked! Her familiarity with high school aged students meant teachers

from various local high schools found Sheila to be a welcoming presence for their community service projects.

Sheila brought a spirit to the Center that volunteers immediately were drawn to. She embodied a genuine caring and love for all kinds of people, and would show that through birth-

day cards, poems, sympathy cards and phone calls with well wishes for volunteers who were injured or ill.

She was a jack of all trades and certainly a master of many! We will all miss her professionalism and enthusiasm, but are thrilled that once again, she will be joining us as a volunteer!

