

President's Corner



At the October, 2012 Annual Meeting of the Great Bay Stewards, some changes were made to the Board of Trustees. The officers for the new year are President, Jay Diener; Vice President, Jack O'Reilly; Treasurer, Edward Caito; and Secretary, Joe Stieglitz. Bill Kath and Wes Elmer retired from the Board after many years of dedicated service to the Great Bay Stewards. We will miss their thoughtful and enthusiastic contributions. We also welcomed Bruce Addison to the Board of Trustees. Bruce is a Greenland resident, and works in the financial community in Portsmouth. We look forward to working with Bruce, and to his input and ideas about ways that we can continue to strengthen our organization.

The 14th running of the Great Bay 5K road

race was on October 27th. The race was won by Nate Jenkins, who had set a new course record in 2011, and Heidi Westover, who is one of the most highly-regarded female runners in New Hampshire. Stephan Mayeux and Brenda Donroe were winners of the competitive walking division. 957 runners and walkers finished the race, which is 140 more than in 2011. After expenses, the race generated over \$20,000 in revenue for the Great Bay Stewards! We are very grateful to the sponsors for this year's race, including Sprague Operation Resources, Coca-Cola Bottling Co. of New England, Federal Savings Bank, The Exeter Area New Car Dealers Association, and Durham Marketplace. Sprague has been the lead sponsor for all 14 Great Bay 5K races. Coca-Cola not only provided financial support for the race, but they also donated all the bottled water for the race, a van to



shuttle racers clothing bags from the start area to the finish line, and two bicycles that were awarded in a raffle at the race's award ceremony. We are also grateful to First Student Bus Company for providing the shuttle bus at the race, and to Domino's Pizza of Stratham for providing dozens of pizzas for the racers, especially as they are just coming back from a devastating fire earlier this year. We are very grateful to all the volunteers who donated their time on race day to ensure that all of the racers had an enjoyable and a safe race.

Every year, after the race, we hear comments about how friendly and enthusiastic the volunteers were, and this year is no exception. Lastly, we owe credit for the success of this race to the hard-working members of the race committee, including Wes Elmer, Carolyn Fetter, Peter and Laura Flynn, Natalie Fortin, Kelle Loughlin, Joe Stieglitz, Paul St. Pierre, Kathleen Leavitt, Marie Hussey and Peter Wellenberger.

Your Board of Trustees is working hard to improve and increase the Great Bay Stewards' community outreach efforts, to improve and strengthen our relationship with the Great Bay National Estuarine Research Reserve, and to streamline and strengthen our organization. We will continue to provide you with updates on these efforts through this column, as well as through the monthly electronic newsletter that is sent to all members.

Jay Diener
President, Great Bay Stewards



PLEASE JOIN US!

All interested parties are cordially invited to become Great Bay Stewards. Members receive Great Bay Matters and other pertinent mailings.

Annual dues may be paid by check made payable to the **Great Bay Stewards** and sent to: Membership Committee, 89 Depot Road, Greenland, NH 03840

- Guardian \$150 Protector \$75
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Journey of the American Eel

Until recently, eels, seeming to live in the depths of mud and sediment, have been mysterious creatures. Lately, however, scientists have unlocked the dynamic lives of these enigmas and they are anything but boring.

American eels (*Anguilla rostrata*) have been important in the commercial fishing industry for hundreds of years, but well before that, Native Americans relied on eels for food as part of their diet. During the time of the Abenaki and other native tribes, eels saturated Great Bay. Today, however the American eel is in trouble. Since the 1970s, the population has declined by a staggering 99% in parts of their range. Factors devastating the population are pollutants, parasites, over-harvesting and climate change as well as significant habitat loss due to artificial obstacles in waterways (i.e. dams and culverts).

The American eel begins its life in the Sargasso Sea, a 2-million square-mile area near Bermuda where they spawn. Eggs hatch into small transparent larvae and drift with the Atlantic currents for about a year, until they reach the Atlantic coast. This journey can bring larvae anywhere from Brazil, to the Gulfs of Mexico and Maine, or as far north as Greenland. By this time, larvae have developed fins and appear similar to adult eels, although still transparent. “glass eels”, as they are called are highly prized on the Asian market and were over-harvested in the United States in the 1970s (Maine and South Carolina are the only states that still have glass eel fisheries.)

As soon as the glass eels arrive at an estuary, they begin their ascent up a freshwater river where they soon begin to develop a yellow-green pigmentation. These juveniles are referred to as yellow eels and are found in rivers, lakes and estuaries. Interestingly, eels do not display male or female characteristics until

the yellow eel stage and new research has discovered that density drives sex determination within this species. Densely populated areas tend to support males, while less densely populated areas support females. Loss of habitat and consequently an increase in population density will likely have a long-term impact on the reproductive success of the American eel.

The transformation of yellow eels into sexually mature “silver eels” is one of the most fascinating of all stages. This final metamorphosis is a gradual process, changing eels from freshwater-inhabiting fish into marine travelers. During this mutation, an eel’s fat reserve increases to fuel the impending ocean journey and their gut begins to degenerate, as they do not eat during migration. Blood vessels that feed their swim bladders increase in number, which allows for increased gas absorption and reduced gas loss, both of which are important for buoyancy. An eel’s eyes double in size and become more sensitive to blue, thereby improving their vision in deep waters. On dark, rainy nights from September to December, silver eels begin their migration downstream towards the Sargasso Sea, back to the warm water spawning grounds where it all begins and ends; for American eels only spawn once in their lifetime.

This migration downstream is by far the most important and unfortunately, the most treacherous leg of their journey. Hydropower plants have created a gauntlet of turbines and dams in waterways. Half of all eels passing through certain types of turbines die, and it is estimated that 80-100% are injured. These injured eels are unable to survive the long migration and do not contribute to the breeding population. Climate change has altered the strength of westerly winds that affect ocean currents and precipitation in the North Atlantic. Larvae that are carried back from the Sargasso Sea rely solely on



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Top: A single yellow eel mingles with a croud of early stage “glass eels.”

Above: Fisheries biotechnician Tyson Morrill holds a silver eel killed in a N.H. dam turbine in August 2010.

ocean currents to deliver them safely to the coast. If these currents are altered due to climate change, this could have a devastating effect on the population. Also, variability in ocean current makes the migration of silver eels that much more strenuous and unpredictable. With a limited fat reserve and a degenerating gut, an adult eel has a very small time frame to reach the Sargasso Sea to reproduce.

It is imperative that local, regional and international groups work together to protect the American eel through conservation of migratory waterways and a focus on mitigating climate change. Collectively, we can ensure that these incredible creatures are protected and able to do what we are all trying to do: Survive.

Nicole Andrews
Naturalist, GBNERR

Destination: California

Tijuana River National Estuarine Research Reserve

The Tijuana River National Estuarine Research Reserve (TRNERR) is located 15 miles south of San Diego and immediately adjacent to Tijuana, Mexico. This Reserve covers 2,531 acres and preserves one of the few salt marshes remaining in southern California. Most of the land within the Reserve is held in public ownership for resource conservation with three quarters of the watershed in Mexico. The diversity of habitats and the range of human and physical problems facing the Reserve make it rich in both biological and social science study opportunities. TRNERR is also recognized as a “wetland of international importance” by the Ramsar Convention.

The TRNERR was designated in 1982 and is managed by California State Parks. The estuary connects fresh water from the Tijuana River and salt water from the Pacific Ocean along the Pacific Flyway, providing a sanctuary that gives shelter to over 370 species of birds, 320 of which are migratory. The Reserve is also home to four federally listed endangered birds, the light-footed clapper rail, least bell’s vireo, California least tern and the California brown pelican.

Stream flow in the San Diego region is the most variable in the nation. There are some months where the Tijuana River does not flow at all; causing drought for the surrounding area. At other times of the year, the very same area may flourish with the extensive stream flow.

The Reserve’s Coastal Training Program understands that intense pressures in communities on both sides of the U.S./Mexican border result in significant impacts to coastal resources. A strong program to deliver sound information to the local decision makers has been crucial to this delicate coastal management challenge.

The Reserve boasts an ecologically sustainable visitor center, which houses the primary education center for the public and school groups. There is also a training center, research laboratory and a shaded outdoor amphitheatre for exhibits.



The visitor center is free and open year-round from Wednesday through Sunday. Four miles of trails will lead you through the Tijuana Reserve, either on foot or by horseback. If you would like, docents will happily escort you along the trails and binoculars are provided free of charge.

A number of trails at TRNERR provide excellent wildlife viewing opportunities within the estuary. The North and South Beach Trails are wonderful for taking leisurely strolls, where you are likely to see dolphins, pelicans and terns. Make sure to take in the breathtaking view from Monument Mesa while you are there!

Whatever you choose to see while visiting TRNERR, you are sure to be impressed by this unique and diverse estuary along the southern California coast. For more information about Tijuana Estuary, visit their website at www.trnerr.org.

Nicole Andrews
Naturalist, GBNERR