

Great Bay

MATTERS



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

GET TO KNOW GREAT BAY



HIGH TIDE:

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NH Clam Flat Hotline: **1-800-43-CLAMS**

162

BIRD, FISH AND PLANT SPECIES

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Great Bay was formed by the melting of a glacier

17

oyster farm operations in Little Bay



58 FEET:

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Largest Reserve in the System at **366,100** acres





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.

GBNERR

Manager: Cory Riley

GREAT BAY DISCOVERY CENTER

Education Coordinator:
Kelle Loughlin

GREAT BAY STEWARDS

President: Jack O'Reilly



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manager's corner



This issue of Great Bay Matters celebrates the myriad of ways we can experience, connect and deepen our appreciation for our coast. Bringing science-based information to our communities and citizens is critical to the mission of the Great Bay National Estuarine Research Reserve. But we know that not everyone who cares about this estuary thinks about how salt marshes might react to sea level rise, or how road salt might be impacting water quality, or where the best habitat for woodcock might be. We know that many people are drawn to Great Bay and the seven rivers that feed it, simply because of the natural beauty that calms and inspires so many of us to visit. I have a very non-scientific theory of why so many of us are attracted to water (and paintings of water, and stories about water). I think our subconscious finds coastal areas to be the pinnacle of landscape beauty because we have, in fact depended so deeply on them for survival, for so long, and in so many ways. We may not need statistically sound data that links the coast to food, safety and transportation. Maybe we can just fall in love with Great Bay and simply trust our instincts.

Cory Riley, Reserve Manager, GBNERR

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GREAT BAY

A Natural Place to Play



Quiet ripples extend in infinite circles as the rock skips across the surface. The little boy laughs and quickly picks up another. Dark storm clouds surge across the green sky, fleeing a warm coastal wind. Photographers stop to shoot the scene and hope for a keeper. A freshly tied Lefty's Deceiver dashes through the water and disappears into the mouth of a feisty striped bass... the first of the striper schoolies have arrived!



The Great Bay estuary is a natural playground for everyone. It offers great shellfishing opportunities as well as beautiful vistas for plein air artists and a healthy waterfowl population for the hunting enthusiast.

The hidden gem known as Great Bay holds all of these opportunities like diamonds in the rough. Sitting unassuming in one of the most populated parts of New Hampshire, is the Great Bay Estuary – a tangle of twisted streams and rivers, open waters and fierce currents. For generations, the bay has offered food and means to move goods into interior New Hampshire. Prior to rail and roads, it WAS the way to travel. Today, this important coastal resource continues to provide critical ecosystem services such as flood control and habitat for fish and wildlife, but some have discovered or have always known that Great Bay is just a down right fun place to play!

There are so many things to do in and around Great Bay... have you tried any of these?

Shell fishing: Do you like to eat local seafood? How about spending a Saturday morning harvesting your favorite shellfish from the open areas of the estuary and preparing a gourmet meal that night! Softshell clam, American oyster, blue mussels and razor clams are all open for taking on Saturdays from January through May and September through December. Licenses are required for oyster and softshell clam, however no license is required for the razor clam and blue mussel. Before setting out, Visit the NH Coastal Atlas <http://xml2.des.state.nh.us/CoastalAtlas/Atlas.html> for the latest information on shellfish harvest closures or call the NH Clam Flat Hotline at 1-800-43-CLAMS or for unscheduled updates. Areas labeled as “open” are subject to temporary closures as a result of weather and other factors.

Paddle Boarding: An early morning on a high tide is a perfect time to try a SUP (Stand Up Paddleboard). The bay can be as calm as a tiny pond at this time, and a variety of access points throughout the estuary provide a great opportunity to quickly access the water. The boat launch at the Great Bay Discovery Center is a popular place for paddle boarding, but remember to check the tides before you go. Like kayaking, it is recommended to go no sooner than two hours before high tide and/or two hours after. A more adventurous

paddler can stretch that to view creatures such as horseshoe crabs, mud snails and flounder as they skitter across the bottom.

Witness horseshoe crab spawning: Few creatures still alive on this planet today scream dinosaur more than the horseshoe crab. At the new and full moons during high tides, come down to the edge of Great Bay. You are almost guaranteed to see pairs of horseshoe crabs making their way to shore to continue their ancient spawning ritual. Their tiny green eggs, the size of a large pin head are deposited in shallow depressions and are quickly fertilized by the male who is inevitably attached to the larger female in front.

Waterfowl hunting: Great Bay once attracted market hunters from afar to harvest vast quantities of ducks, geese and even swans for restaurants as far away as Boston and New York City. Effective regulation managed to recover dwindling populations and today, Great Bay is a magical place to hunt for waterfowl such as Canada geese, black and mallard ducks. Waterfowl hunters must obtain a federal duck stamp and a New Hampshire Migratory Waterfowl License, in addition to a New Hampshire hunting license. Waterfowl seasons are open as early as September for Canada geese and remain open till the beginning of January. Check the NH Fish and Game website for open dates on select species.

Plein air painting and photography: The changing seasons and light create a dramatic and dynamic scene wherever you go on the estuary. Summer is the perfect time to take early morning pictures, dig out those watercolors, pastels or oils, and try to capture this magnificent waterbody! Each spring the Art of Great Bay Show and Sale could be your inspiration! Access points at the Great Bay Discovery Center, Adams Point and several locations along the rivers provide easily accessible places to get close to the bay.

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

UP THE CREEK

With a Paddle

If you want a real challenge this summer, try paddling the seven tidal rivers that make up the Great Bay Estuary including five that are within the Great Bay NERR boundary. I have paddled them all and it is a real challenge, although admittedly it took me ten years to complete the task!

You'll want to start with the Squamscott River as this is accessible from the boat launch at the Great Bay Discovery Center. Here you can familiarize yourself with Great Bay first. You can also leave from Chapman's Landing, but to do the entire river you need to leave from the Center or you will miss the "mouth."

The river gets its name from the Squamscott Indians who called it Msquamskook (or kek), translated as 'the big salmon place' or 'big water place.' Fed by the Exeter River – which is fresh water – the Squamscott starts at the Great Bridge in downtown Exeter and is over six miles long.

Known for its expansive salt marshes, the river passes under the former "Singing Bridge" at Chapman's Landing before dumping into Great Bay. This can be a long, round trip especially when leaving from the Center, so you need to plan around the tides accordingly. As others have discovered, the Center's boat ramp is not accessible at low tide.

If you do decide to make the journey, I recommend stopping in Exeter for ice cream at the shop near the ramp at the Phillips Exeter boat house.

Next up is the Winnicut River. Although smaller than all the others, it is the only one without dam restrictions and provides lots of fish habitat. The tidal section is all in Greenland and you can paddle from the Route 33 Bridge crossing – former site of the dam – out to Great Bay. The river is not very deep so be sure to check the tides. You will especially enjoy the lower section as you wind through the salt marsh.

The 50-mile-long Lamprey River rises from Meadow Lake in Northwood and flows through numerous towns before reaching Newmarket. The river gets its name from the American brook lamprey, a type of freshwater jawless fish incorrectly called the 'Lamprey eel.'

Luckily, the tidal portion of the river is much shorter and you can put in right below the dam in downtown Newmarket. Much of the tidal portion is lined with houses, but the river is still beautiful and includes a huge cormorant colony. Near the mouth of the river there is also a viable osprey nest.

Upon your return, you can pull up to the ice cream shop right at the dam.

The tidal portion of the Oyster River is about three miles and features a rich cultural history, including the Oyster River Massacre which took place along its banks near downtown in 1694. The dam



Sunset paddles on the bay are a perfect time to birdwatch.



– known as Old Mills Falls – is located at the Route 108 Bridge.

The river spills out into Little Bay near Wagon Hill Farm and offers a relaxing paddle trip. There is a boat launch below the dam at Jackson Landing and on your return; you can grab a beer and food at the historic frost Sawyer Tavern in the Three Chimneys Inn. Ice cream is optional.

The last river that is included within the Research Reserve is the Bellamy, which originates from Swains Lake in Barrington and flows east through the City of Dover. Seacoast residents might be most familiar with the mouth of the Bellamy where it flows under the Scammell Bridge on Route 4 and into Little Bay.

You can leave right from the Scammell Bridge Access Point and head up river. Other than the occasional truck noise from nearby Spaulding Turnpike that runs parallel to the river, the Bellamy offers

one of the best wilderness-like experiences in all of Great Bay.

Wildlife is abundant, in part due to the presence of two large conservation areas. At Royalls Cove is NH Audubon's Bellamy River Wildlife Sanctuary and just above it is the Bellamy River Wildlife Management Area (WMA), managed by the NH Fish and Game Department. In addition to great blue herons, you can expect to see lots of other bird species especially during the fall and spring migration seasons. All the Bellamy is missing is an ice cream stop!

The last two rivers, Cocheco and Salmon Falls, are outside the Reserve but are also great paddles. If you would like to know more about any of these rivers, please email at p.wellenberger@greatbaystewards.org.

Peter Wellenberger, Executive Director, Great Bay Stewards



Estuary Almanac

Northern Pipefish - (*Syngnathus fuscus*)

Great Bay is home to a variety of unique, diverse and well-known species of fish, such as smelt, striped bass and herring. But few are aware that a relative of the seahorse lives among the waters of the Great Bay Estuary. This interesting species of fish looks perhaps more like an eel, or clam worm than it does a fish, but it is surely at home living and blending into eelgrass, one of the Bay's largest habitats.

Natural History

This unique fish is a cousin to the seahorse and is native to the Great Bay Estuary. Different species of pipefish live in estuary waters all around the world. They are migratory fish, living in grass beds and feeding off tiny aquatic animals found there, moving out to deeper channel waters in the winter.

Eelgrass beds found in Great Bay are a perfect place for the pipefish to live, allowing them to be hidden from both predator and prey. Pipefish feed on small aquatic animals such as fish eggs, copepods and amphipods.

Spawning begins in spring and ends in fall, with the peak season occurring from May to June. Like the seahorse, the female deposits her eggs into the male's brood pouch where they incubate for about two weeks. Once the eggs hatch, the young



Northern pipefish

pipefish are released from the pouch and become independent immediately.

Unique Adaptations

The pipefish has a long slender body with a snout resembling a tube. It grows to be about 12 inches long, with a body marked by brown bars and many white dots. Its back is a greenish-brown with a golden-yellow belly. The shape, structure and color of the fish makes it easily camouflaged in the Bay's eelgrass. Nestled in amongst the grass, it wriggles its body to resemble the natural flow of the blades to further blend in.

Population Status in New Hampshire

Although the pipefish is not currently in danger of extinction, the species is in critical danger from habitat loss and

degradation. Currently in Great Bay, eelgrass is being closely monitored, as its distribution throughout the estuary has been in a steady decline in recent years. While the pipefish population has not sustained any significant decrease, loss of eelgrass beds could prove catastrophic to pipefish, as well as all other aquatic animals that call this habitat home.

Where to See Around Great Bay

You will be lucky to spot a pipefish and likely will only do so if you are underwater with a mask and snorkel. As pipefish are generally found in and around eelgrass beds, extra care and a sensitive approach to looking should be followed.

Colleen McClare, Naturalist, GBNER



NERRS NEWS



Program News and Events From GBNERR

NH COASTAL RISKS AND HAZARDS COMMISSION DRAFT REPORT AND RECOMMENDATIONS RELEASED FOR COMMENT

In recognition of the need to prepare for existing coastal hazards and the increased risks associated with climate change, the NH State Legislature established the Coastal Risk and Hazards Commission in 2013 to “recommend legislation, rules and other actions to prepare for projected sea level rise and other coastal watershed hazards such as storms, increased river flooding and storm water runoff, and the risks such hazards pose to municipalities and state assets in NH”. The draft document includes a summary of the best science available, current understanding of vulnerability, and where state and municipal actions are needed to protect our built structures, our economy, our natural resources and our



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heritage. Public comments are due on June 30th, 2016. The report, information about how to submit public comments, and back-

ground information on the Commission can be found at <http://nhchrhc.stormsmart.org/draft-for-comment>.

NEW ENGLAND RESERVES PARTNER TO OFFER TEACHER TRAININGS

In the summer of 2015, the education programs of the four New England Reserves: Wells NERR (ME), Great Bay NERR (NH), Waquoit Bay NERR (MA), and Narragansett Bay NERR (RI) learned they were the recipients of a substantial

grant. The “Science Transfer” grant was awarded by the National Estuarine Research Reserve System Science Collaborative, a program that supports collaborative research addressing coastal management. The award was given to support a national Reserve initiative called Teachers on the Estuary (TOTE). The Research Reserve’s

Science Collaborative is jointly administered by NOAA and the University of Michigan.

Four TOTE workshops titled “Investigating a Changing Environment” will be held in July and August this summer at the New England Reserves. The

workshops are designed for middle and high school teachers and will provide field and research-based professional development, integrating STEM core ideas, practices and activities. Lessons will be aligned with Next Generation Science Standards and will provide teachers the opportunity to incorporate national NERRS data into their classrooms. Most courses provide experiences on the water either through kayak trips or aboard research boats.

TOTE workshops are free to teachers, and also provide them with a \$200 stipend as well as program materials and supplies. Space is limited in all courses. For more information contact Kelle Loughlin, (603)778-0015 or email Kelle.Loughlin@wildlife.nh.gov or visit <http://estuaries.noaa.gov/Teachers>.





Educational Offerings



SUMMER BAYVENTURES 2016

Summer program schedule for kids entering 1st-6th grade

Bayventure programs are held on Wednesdays. Sign up for one or the super summer series of seven!

June 29th

Sweet Trail Trek

Grab your lunch, backpack and water bottle and join us for an adventure to begin your summer. We will hike the 4-mile Sweet Trail that starts near the Great Bay in Newmarket and ends in Durham. We'll search for signs of local wildlife, complete a scavenger hunt and play games along the way. Note: This is an off-site, all-day adventure. There will not be pre-care or after-care for this program. Drop off will be at 9:30 at beginning of trail. Pick-up will be at 3:00 at end of trail. Directions for drop-off and pick-up will be provided at registration.

July 6th

Geology Rocks!

How did Great Bay form? How has it changed over thousands of years? We will explore the shale beach of Sandy Point and start your own rock collection to take home.

July 13th

Estuary E.T.s

Are there alien invaders in the estuary? Are they green with lots of legs and claws? Come find out the answers to these questions as we search for some of the invasive species in and around the Great Bay. Make a "Grow your Own Alien" craft to take back to your planet.



July 20th

Much Ado About Mammals

Mammals come in all shapes and sizes. What characteristics do mammals have? What is the strangest mammal that comes to mind? Learn about the mammals around Great Bay and craft a hedgehog pencil holder to take home.

July 27th

Mystery on Great Bay

Join us for a day of mystery indoor and outdoor games and activities. If you like surprises, or even if you don't, you will be sure to have a super day near Great Bay! Make a mystery craft to take home.

August 10th

Tidally Awesome!

Low tide reveals the mudflats of Great Bay twice every day. On this day, the tides are just right - allowing us to explore low tide and high tide! Come enjoy these amazing habitats at Sandy Point and uncover some of the fantastic animals and plants that live there. Be prepared to get wet and muddy!

August 17th

Colonial Kids

There were certainly a lot of Colonial kids that lived in the towns around Great Bay. How were their lives different from kids' lives today? Try your hand at some Colonial chores like butter making, games like fencing and crafts like candle making. Travel back in time with us!

Kayak Great Bay!

The Great Bay Discovery Center's Kayak Program is back this summer with new and exciting program offerings! Visit greatbay.org for trip information.



Pre-care and After-care available. Regular camp hours are from 9:30 a.m. - 3:00 p.m.

Pre-care will be supervised activities in the Discovery Center from 8:30 a.m. - 9:30 a.m. After-care will be an extension of the Bayventure program called Let's G.O.! (Let's Get Outside) on the grounds of the Discovery Center from 3:00 p.m. - 5:00 p.m.

"Once Upon an Estuary"

For 2-5 year olds on Thursdays from 9:45 a.m. - 11 a.m. \$3 per child or \$5 per family. Children, with an adult, are invited to come listen to a story, play games and make a craft. Most activities will be outside so please come dressed ready for some outdoor fun! Pre-registration is required. Please call 778-0015 and ask for Jay or Beth or email Beth.Heckman@wildlife.nh.gov. Featured stories are listed at right.

July 7th - "Rocks: Hard, Soft, Smooth and Rough" by Natalie M. Rosinsky

July 14th - "Green Bean! Green Bean!" by Patricia Thomas

July 21st - "What is a Mammal?" by Lola M. Shaefer

July 28th - "Around One Log: Chipmunks Spiders and Creepy Insiders" by Anthony D. Fredericks

August 11th - "Water can be..." by Laura Purdie Salas

August 18th - "Salt Marsh Farm Boy" by Karen Acerno and Beth Heckman

BAYVENTURES are for children entering grades 1st-6th in the fall of 2016. Please have children bring a lunch, change of clothes and a towel. Call (603) 778-0015 or email beth.heckman@wildlife.nh.gov to register. Each Bayventure program is \$35 (or \$225 for all 7 programs) for Great Bay Stewards members and \$40 (\$280 for all 7 programs) for non-members. There is a \$5/sibling/day discount for the normal program hours. Pre-care is \$5/day. After-care is \$10/day. The camper to staff ratio is a maximum of 7:1. Inquire about how to become a member to get children's program and other discounts.

Make checks payable to **GREAT BAY STEWARDS** and send to the following address marked ATTN: Beth.

A National Perspective: *Unmanned Aerial Vehicles Take Off at Research Reserves*

It is not uncommon now to be out enjoying a hike or a paddle anywhere, and see an Unmanned Aerial Vehicle (UAV) hovering overhead. Backyard enthusiasts can now purchase UAVs for less than one hundred dollars. In the last decade, recreational use of UAVs has grown exponentially. However, their value to land managers and biologists has also taken flight.

Be it wildfire, oil spill or hurricane, when disaster strikes a coastal area, first responders, land managers and others need to know the extent of the damage. Getting that information through satellites and flyovers, however, can be cost prohibitive. That's one reason National Estuarine Research Reserves around the country are exploring the use of Unmanned Aerial Vehicles, but there are many more.

"This is a great example of how research reserves use new technology to push the boundaries of our knowledge; a UAV is one more tool to help us get the data



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National Estuarine Research Reserves across the nation are exploring the use of UAVs.

we need to tell a more complete story about what's happening in coastal environments," observes Susan Bickford, a natural resource specialist at the Wells Reserve in Maine.

"The sensors they carry can capture data or videos that either can't be collected in other ways or may be too expensive to collect via satellite or manned vehicles."

Across the national system, reserves are exploring the use of UAVs for many purposes. For example, Mississippi's Grand Bay Reserve joined partners, including the National Oceanic and Atmospheric Administration's (NOAA) Unmanned Aircraft System Program and the Northern Gulf Institute, to fly missions to provide data

for high-resolution elevation maps, collect imagery on a simulated chemical spill and to survey damage from a local wildfire.

"UAVs position reserves to be more flexible in how they manage their lands," says Rebecca Roth, the Executive Director of the National Estuarine Research Reserve Association. "They are helping reserves better understand and protect their local estuaries so that their benefits may be enjoyed for many generations to come."

Reprinted in part from Unmanned Aerial Vehicles Take Off at Research Reserves, by Rebecca K. Roth, Executive Director, National Estuarine Research Reserve Association

Remembering our Volunteers

The volunteer section of this issue of Great Bay Matters normally describes all the wonderful ways you can get involved at the Great Bay Discovery Center. However, two of our beloved long-time volunteers passed away this year and so this issue is dedicated to these two wonderful women.



Laura Flynn~ In February, we said goodbye to long-time volunteer and friend Laura Flynn. Laura and her husband Peter volunteered for years at the Center, educating kids, working on special events, and serving as board members of the Great Bay Stewards. Laura was a passionate volunteer and always kept us laughing. She was an educator, comedian and true friend. We will remember Laura with a smile and can still hear her saying, "Let's Go Peter!"

Anne Taylor~ In March we also sadly lost Anne. Anne began volunteering at the Great Bay Discovery Center in 1994, and was one of our very first volunteers. Anne continued to teach almost weekly well into her 80's, walking to "work" every day. Anne's experience as a kindergarten teacher was evident as her way of connecting with children was remarkable. Whether working as a board member of the Great Bay Stewards, or planting a tree for wildlife, Anne was always there when you needed her. We will miss her positive "can-do" attitude.





Enjoy Great Bay This Spring

Just before sitting down to write this I checked the outside temperature and it looked like spring was getting closer, then it got cold again. It's amazing how many times I've felt it this winter. What's encouraging though is to see at last there are baseball players on the field again, and another season of the education programs at the Discovery Center

have started up. It's a great program and fun to do. I can't wait to look for horseshoe crabs and watch the kids' faces when they get to hold a live one!

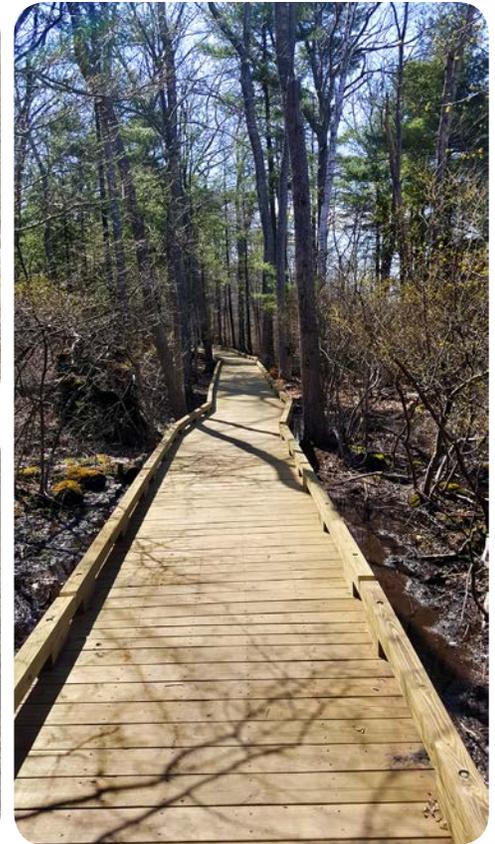
As I walked along the bay this morning my thoughts turned to all the upcoming things I can be doing soon; boating, fishing, swimming and just walking along the shore admiring the views. The bay has something for everyone to enjoy, including walking along the new boardwalk at the Discovery Center. Also new to the boardwalk is a fixed telescope trained on the pair of ospreys that have returned to Sandy Point to nest for the second year in a row. Be sure to make it a point to visit and enjoy it.

The mission of the Great Bay Stewards is to "protect and preserve the vitality of the Great Bay estuarine ecosystem". Come join us in this effort so the estuary can continue to be the enjoyable wonder that it is.

Jack O'Reilly, President, Great Bay Stewards

We couldn't have done it without you!

Thanks to our incredible board members, executive director, extremely hard-working Reserve staff and all of your very generous donations, the boardwalk at the Discovery Center is complete! It couldn't look better, and we can't wait for you to come by and see it. Visit us in June to see the new beautiful recognition exhibit at the beginning of the trail!



Meritime Construction engineers and staff began installation of the "helical tiles" in mid-January. The entire project was completed as planned, before the first group of school children arrived in April.



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: GBS Membership Committee, 89 Depot Road, Greenland, NH 03840

- Guardian \$150
- Protector \$75
- Steward/Family \$35
- Student \$20
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We ALL Support
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Great Bay Stewards Annual
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Portsmouth Location
Tuesday, August 9th, 2016
From - 5:00 to 9:00 pm.



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