A Newsletter for Barnegat Bay Master Naturalists and our Affiliates

Summer, 2021
Volume 1 Issue 4

Barnegat Bay Master Naturalists

Inside this issue:

Volunteering as a Master Naturalist is about giving your time and effort, contributing your knowledge, sharing your passion, and inspiring others to do the same - with the goal of making the Barnegat Bay watershed and surrounding community a healthier, more biodiverse and sustainable place to live for people and wildlife. We recognize and thank all our Master Naturalist volunteers for their service!

The Barnegat Bay Partnership is grateful for the volunteer assistance from a team of Master Naturalists who have offered their time and expertise gathering information, writing articles and compiling photos for *The Naturalist*: Sarah Stewart (2014), Carolann Murphy (2019), Christine Moran (2017) and Rich Biolsi (2013). We are also excited to share additional articles in this Summer 2021 issue from contributing Master Naturalist, Casey Wolf.

If you are interested in contributing your time and talents to *The Naturalist*, please let us know. We welcome and encourage Barnegat Bay Master Naturalists to send us a story and photos describing your volunteer experiences, sharing discoveries you made on a walk in the woods or paddle in the bay. Send us your curiosity questions and share ideas on how to grow this newsletter.

Watershed Ambassador, Haley Kardek, introduces Master Naturalists Carol Ann Murphy and Carol Kondrach to macroinvertebrates in the Toms River.

Please email your stories and curiosities to Becky Laboy, education@soildistrict.org, or call (609) 991-1534.

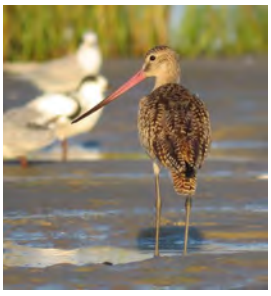
Visit the Barnegat Bay Partnership website to read past issues of *The Naturalist*.

Barnegat Bay is For the Birds!

Photos and text by Becky Laboy

American Oystercatcher has many uses for its long orange bill: a probe to search the sand and mud for clams, oysters and other mollusks; a knife to shuck the shellfish; a lever to pry it open - delicious!

Short-billed Dowitcher - this absurdly named bird breeds in the Tundra. They can be observed feeding in the shallow bay at low tide in August and September, as they fuel-up to continue their long migration south.



A handful of **Marbled Godwits** grace the shores of Barnegat Bay each summer. They plunge their swordlike bill deep into the sand to probe for invertebrates. Often seen with Whimbrels.

Explore the Barnegat Bay Watershed this Summer!

By Becky Laboy

Summer months offer warmth and sunshine, and the Barnegat Bay watershed provides plenty of opportunities for fun and discovery. From the forested headwaters of our many freshwater creeks and rivers, to the estuaries in which they flow, to the gathering of brackish water in the shallow "pool" we call the Barnegat Bay, down to the destined shores of the Atlantic Ocean - nature beckons! Canoeing, kayaking, hiking, fishing, clamming - all offer opportunities for exploration! With binoculars, loupe, camera and field guide in tow - the Barnegat Bay and its surrounding estuaries not only offer adventure, but also an education - revealing the wonders and beauty of our watershed. What will you DISCOVER this summer?

Kayaking: Launch your own kayak and explore the Great Sedge Islands in the Barnegat Bay, at Island Beach State Park. Discover dozens of species of birds that breed within the Sedge Island Marine Conservation Zone, including osprey, herons, egrets, terns and willets. Kayak launch sites are A-15 or A-21. IBSP also offers guided kayak tours throughout the summer season; call the IBSP Nature Center for more information: 732-793-0506, or email IslandBeach@dep.nj.gov.

Master Naturalist, Susan Sansone, explores the Sedge Islands.

Canoeing: Visit Wells Mills County Park in Waretown, and rent a canoe for a self-guided paddle on Wells Mill Lake, within the Oyster Creek sub-watershed. This freshwater ecosystem is nestled within an Atlantic White Cedar forest. Explore the banks of the lake where various species of unique plants can be observed. Canoes can be rented for $3 per person, per half hour for adults, children 7 & under are free. All equipment is provided. Call 609-971-3085 for more information.

Hiking: There are numerous places to hike within the Barnegat Bay watershed, offering opportunities to explore a diversity of habitats.

- Wells Mills County Park, in Waretown, has 20+ miles of hiking trails through Atlantic White Cedar forest; 609-971-3085.
- Enos Pond County Park, in Lacey Township, has relatively short, easy, flat trails through an old American Holly forest that abuts salt marsh; 732-506-9090.
- Double Trouble State Park, in Berkeley Township, has several trails that meander through the Pine Barrens; explore the plants and animals of this unique ecosystem; 609-726-1191.
- Cattus Island County Park, in Toms River, has 7 miles of trails that zigzag flat terrain through diverse habitat, including maritime forest, salt marsh, and bayshore; 732-270-6960.
- Forest Resource Education Center (FREC), in Jackson, offers trails that crisscross the headwaters of the Toms River, through lowland swamps and surrounding pine-oak uplands.
- deCamp Wildlife Trail, part of the Edwin B. Forsythe NWR, in Brick Township, is an out-and-back trail through tall oak forest, reaching brackish shores near Reedy Creek.

Master Naturalist, Larry Buffington, rakes for clams in Barnegat Bay.

Crabbing & Fishing:

- Excellent views of the Barnegat Bay enhance your fishing or crabbing experience at Mantoloking Bridge County Park, in Brick; 732 506-9090. Be sure to know the latest NJDEP regulations.
- Tall oaks and pines surround beautiful trout-stocked Lake Shenandoah in Lakewood, 732 506-9090.

Clamming: The shallow sandy flats of Barnegat Bay provide ample opportunity to dig a toe (or rake) into the sand. A clamming license is required, and no clamming on Sundays. Know before you go - learn the regulations! For more information about clams and other shellfish, read Sarah Stewart's article, "Who's Your Favorite Filter Feeder?" on page 11-12.

Photo: Horseshoe Crabs (Limulus polyphemus) by Greg Breese, U.S. Fish and Wildlife Service

Time Travelers

By Sarah Stewart

The Atlantic or American Horseshoe Crab (HSC) - an animal which can trace its relatives back 200 million years *before* the dinosaurs, somewhere between the Cambrian and Ordovician periods, some 450 million years and possibly more. It is often referred to as a 'living fossil' as it looks very similar to its fossilized ancestors.

Let's dig (horseshoe crab humor) into this species! Remarkably, it has survived multiple ice ages, planetary crises and mass extinctions, which have eradicated over 95% of marine species on the planet. It remains a critical link to the survival of many others.

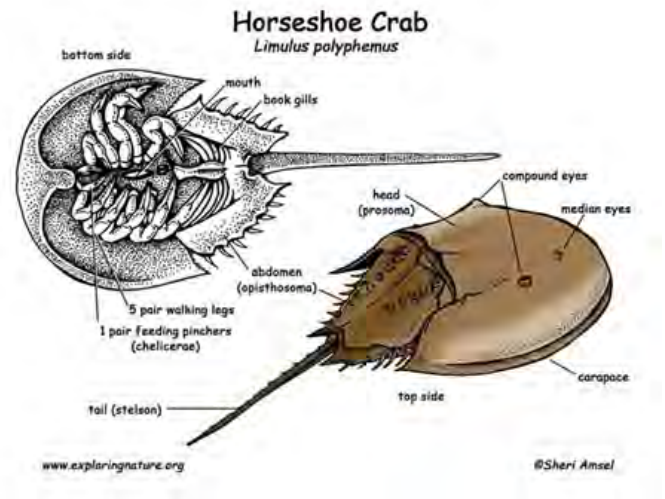
Background

Four species of horseshoe crabs exist in the world, 3 species in Asia, and our Atlantic Horseshoe Crab (*Limulus polyphemus)*, whose range is on the east coast of North America. The common name is attributed to the shape of the front shell, called the "prosoma," which resembles the shoe of a horse, as well as its original (erroneous) classification as a crab.

The horseshoe crab is not a crab, but is more closely related to arachnids (spiders, scorpions, ticks). Along with insects, spiders and crustaceans, it belongs to the phylum Arthropoda where the 4 species occupy their own class, Merostomata, which means "legs attached to mouth."

Anatomy

Horseshoe crabs have 3 distinct body parts: prosoma, opisthosoma and telson. They have numerous eyes and light sensory organs: 2 eyes are compound that compare closely to ours; 5 more on the top of the prosoma detect UV light and lunar reflection, which guide it through the lunar cycle - critical during spawning; another two eyes are on the underside of its prosoma, near its mouth. There are also photoreceptors on its telson (tail). These aid in the synchronization of cycles of light and darkness. 12 appendages, or "legs," provide different functions. The first pair, "chelicera," push food towards its mouth. The next set, "pedipalps," are modified on males to look like "boxing gloves," allowing them to clasp onto females when spawning. The rest are used for mobility. Book gills under the opisthosoma are used to propel themselves through the water, and also to filter oxygen.



Life History

Horseshoe crabs migrate to coastal waters during May and June, males arriving first. Females arrive and the mating ritual begins. Females will only lay eggs once a male has attached himself to her rear shell - the opisthosoma. She will lay about 4,000 eggs in 4-5 clusters in one night, and can lay between 80,000 to 100,000 eggs over several nights in one season. Males release their sperm in the water and it becomes attached to the sticky exterior of the eggs. The success of these mating events depends on availability of good beaches composed of wet, well-oxygenated sand, and calm waters. Horseshoe crabs will avoid coming ashore during turbulent, rough surf. The egg and larval stages are the most vulnerable of the HSC life cycle, losing up to 90% of each generation.

Green Eggs and Sand

Starting out as a tiny green egg in sand, the horseshoe crab hatches in 14 days. They molt about 17 times before reaching maturity, at about 10 years. The female grows significantly larger than the male, resulting from an extra molt. The HSC can live as long as 20 years. The delay in reaching sexual maturity affects research analysis in interpreting population and ecosystem trends for the horseshoe crab and its community.

Tiny green eggs of the Atlantic Horseshoe Crab
(Photo: U.S. Fish & Wildlife Service)

Once eggs hatch on the beach, the larvae make their way to the water, then swim and feed for 6 days before settling in shallow intertidal flats. Here they spend about a year before moving to deeper water, where they spend most of their time, until they are ready to return to the beach to spawn. Adult horseshoe crabs feed on many invertebrates including worms, clams, and occasionally algae. Adults often become a walking hotel for species such as barnacles, slipper shells, mussels and worms. The more epifauna on the shell, the older the crab.

Horseshoe Crabs can survive outside of water for up to 4 days, as long as their book gills are moist.

Who Needs Horseshoe Crabs?

Shorebirds: At least 11 species of migratory shorebirds depend on the horseshoe crab's protein-rich, fatty eggs to replenish their energy reserves during migration. The birds arrive on the Jersey shore for a critical 2-week rest stop before continuing their long-distance journey to their Arctic breeding grounds. The survival of the endangered Red Knot, which migrates over 9,000 miles from the tip of South America to the Arctic, is directly linked to the abundance and survival of the horseshoe crab. The Delaware Estuary is the largest stopover site in the Atlantic Flyway with an estimated 400,000 – 1,000,000 migratory birds arriving to 'bulk-up' for the final leg of their journey.

Marine animals: All crabs, many finfish such as striped bass and flounder, reptiles including sea turtles and diamondback terrapins, as well as sharks feed upon the horseshoe crab larvae and juveniles.

Humans: We utilize horseshoe crabs in many ways, from food to pharma.

- **Fisheries**: Fisherman use HSC as bait for commercial eel and whelk
- **Pharmaceutical Industry**: The unique quality* of the HSC blood to clot in the presence of certain bacteria is used by FDA mandate for testing of all injectable and intravenous drugs produced in the U.S. Horseshoe crabs are harvested to have 30% of their blood drained, then are returned to the harvesting site. *Limulus Amebocyte Lysate (LAL) is the blood compound
- **Vision Research**: The horseshoe crab's compound eyes have provided researchers with a great model to study how vision works, with specific advances in retinal functioning in higher animals, including humans.

Threats & Concerns

- **Overharvesting.** Currently NJ is the only state within the Mid-Atlantic region which bans the harvesting of horseshoe crabs with the exception of harvesting for pharmaceutical use. Delaware, Maryland and Virginia have reduced quotas, and ban the harvesting of egg-laying female crabs. New York has no limits. Currently, the horseshoe crab is listed as '**Vulnerable**' status by the IUCN. Mortality rates of horseshoe crabs returned to ocean after partial bleeding procedure by biomedical industry is estimated at 30%.
- **Shoreline loss** due to coastal development, erosion and sea level rise all contribute to a loss of necessary beach for nesting and egg incubation. Changes to the shoreline that prevent the HSC from reaching sandy areas or strand them once they reach the spawning areas negatively impact populations.
- **Female HSC population has plummeted** over the past several years in the NY/NJ waters. Factors contributing to this phenomenon likely include the higher value placed on female crabs for harvesting.
- **Population declines of dependent marine species and migratory birds.** The survival of Ruddy Turnstones, Semi-palmated Sandpipers and Red Knots are directly linked to the abundance and survival of the Horseshoe Crab. Current Horseshoe Crab population in neighboring New York is at 30% of the Delaware Bay's capacity with substantially fewer eggs than required to support these migratory birds listed as **Threatened Species** by the IUCN.

Ruddy Turnstone and Red Knot feeding on Horseshoe Crab eggs.
(Photo: Greg Breese, U.S. Fish & Wildlife)

Horseshoe Crab Monitoring Program


Photo: Wikipedia by Asturnut

Currently, two organizations within the NJ and Delaware Bay areas survey horseshoe crabs, employing citizen scientists during the horseshoe crab spawning season (May-June) usually for 4 survey events. The programs focus on counting the HSC population during peak high tide events during this period and some also tag the crabs, as well. Volunteers are always needed, see links below for more information.

What is the Fate of Horseshoe Crabs?

The fate of the horseshoe crab has improved - the more we understand how much we and many other species rely on this ancient animal. Policies are still required that support a balance between human needs and the needs of the horseshoe crab and the ecosystems in general. Adopting use of the synthetic LAL now available, and eliminating the practice of harvesting this animal for its blood, with its associated mortality, would help support sustainable populations. Whether to you, it looks like a moving armored box, or a refugee from a bad science fiction movie set, the horseshoe crab has survived asteroids, ice ages and other planetary crises. The question remaining may be how well this species survives its encounter *with humans*.

How You Can Help:

- Just 'Flip'n' – If you see upside-down horseshoe crabs on the beach, turn them over. Note: pick-up the crab **by the shell**, **never by the tail**, which they rely upon for righting themselves in water.
- Never pick-up or handle joined crabs (interrupts critical spawning activity)
- If you see a tagged crab, report the siting using the contact info on the tag (telephone # or website)

Japanese mythology reveres the Horseshoe Crab as the reincarnation of warriors who died in battle.

Horseshoe Crab Resources:

Video: Facts: The Horseshoe Crab

Video: National Geographic: Horseshoe Crabs Mate in Massive Beach "Orgy"

Article: National Geographic: Horseshoe Crabs are Key to Making a COVID-19 Vaccine, but the Ecosystem May Suffer

References:

- Atlantic State Marine Fisheries Commission
- Chesapeake Bay Journal
- Delaware Museum of Natural History
- Maryland Department of Natural Resources
- The Horseshoe Crab


Photo: Shorebirds at Cape May National Wildlife Refuge U.S. Fish & Wildlife Service

JC NERR Education Programs Adapt to COVID Times

By Christine Moran

Jacques Cousteau National Estuarine Research Reserve, 130 Great Bay Blvd., Tuckerton, NJ 08087

While the Jacques Cousteau National Estuarine Research Reserve (JC NERR) has always had an online and social media presence, these forms of communication have become more important in the past year. How does an education coordinator keep the public interest and continue outreach in a pandemic? Kaitlin Gannon, Education Coordinator for JC NERR, provided some answers to this question.

Creature Feature, Ecological Evenings, Family Fun, Lunch n' Learn and Teachers on the Estuary (TOTE) are some of the programs she facilitates. These programs rely on in-person contact. Since March 2020 they have become virtual. While this format has reached a wider, even non-local audience, it does pose some problems to those who do not have access to teleconferencing platforms.

Kaitlin has hosted many talks in the last year and became proficient in Zoom meetings and webinars. She reaches out to each speaker before the program to adapt the format to their preferences and acts as host. Attendance was high last spring but has fluctuated with the new format.

Last August she conducted the TOTE program remotely for the first time. She incorporated breakout rooms, an online collaborative tool called "Padlet" and guest speakers into the program. The highlight of the course was the virtual tours of 3 National Estuarine Reserves - sister-reserves to JC NERR. One program included a live virtual boat tour of the Rookery Bay Reserve in Florida. It turned out to be an amazing way to visit a different environment during a pandemic.

Grassle Marsh Trail winds through the maritime forest behind the Jacques Cousteau National Estuarine Research Reserve

One of the Ecological Evenings talks this past year featured a virtual tour and presentation about the Hawaiian He'eia Reserve on the island of Oahu on Kaneohe Bay. This reserve is attempting to revive an ancient fish farming site using traditional Hawaiian practices. This program brought the audience a blend of science and culture.

2021 is a changing landscape compared to 2020. This spring brought an opportunity to plan creatively for socially distanced Earth Day cleanup events, for example. Participants recorded pictures using the smartphone app Marine Debris Tracker to document trash in the environment. Kaitlin's team at the Reserve also sponsored self-guided activities such as scavenger hunts, and a BioBlitz event last year at the Grassle Marsh Trail, adjacent to the JC NERR headquarters in Tuckerton.

Anticipating the lifting of pandemic restrictions, many of the programs may become hybrid (live+online) events. Kaitlin continues to work with the JC NERR team and the National Estuarine Research Reserve education coordinators on ways of adapting programs during the pandemic while trying to improve outreach to local teachers, students and the community at large.

Thanks to Kaitlin for her time and expertise. To get on the mailing list for future programs or provide program suggestions, contact Kaitlin at: gannon@marine.rutgers.edu

Grassle Marsh Trail

Hike this easy 1/2 mile loop trail that winds its way through maritime forest, leading to a boardwalk and observation platform overlooking the saltmarsh. Discover the diversity of plants and animals that thrive in these unique habitats. Red-winged blackbirds flit about the reeds, proclaiming their territories throughout the summer. Winter ushers in ducks, geese and other waterfowl to protected coastal wetlands, such as Grassle Marsh.

Jersey-Friendly Yards "Enrolls" at Ocean County College

By Becky Laboy

A new Jersey-Friendly pollinator garden was recently installed on the Ocean County College campus, where the Barnegat Bay Partnership (BBP) is headquartered. It is located next to the John C. Bartlett Building, and is the latest Jersey-Friendly demonstration garden in the Barnegat Bay watershed.

Karen Walzer, Public Outreach Coordinator, BBP, applied and received a generous grant from Xerces Society for Invertebrate Conservation, which included a pollinator habitat kit containing 750 native plants from Pinelands Nursery. Barnegat Bay Master Naturalists, Ocean County Soil Conservation District, and AmeriCorps New Jersey Watershed Ambassadors collaborated with Barnegat Bay Partnership and the Ocean County College grounds crew to install the Jersey-Friendly pollinator garden on May 19.

Master Naturalist, Susan Slim, prepares the plugs before planting.
(Photo: Becky Laboy)

Master Naturalist and seasoned native plant gardener, Susan Slim, addressed the unusually warm temperatures that day by demonstrating the technique of pre-soaking the 12-inch plugs in buckets of water to ensure their best chance for survival. Susan "cut and tickled" the roots before the plants were transplanted into the prepared bed. A thorough hand watering followed.

A variety of natives were pre-selected by Xerces Society based on the plant's value to pollinators in their adult stage, as well as in their larval (caterpillar) stage. Varied bloom times of these perennials ensure flowers persist throughout all 3 growing seasons.

Cutleaf Coneflower
(Rudbeckia laciniata)

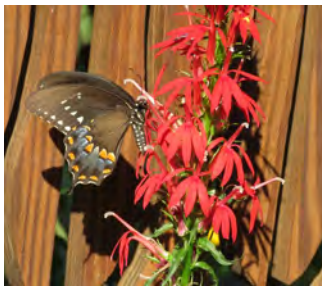
Great Blue Lobelia
(Lobelia siphilitica)

Swamp Milkweed
(Asclepias tuberosa)

Blue Vervain
(Verbena hastata)

New England Aster
(Symphyotrichum novae-angliae)

Helens' Flower
(Helenium autumnale)

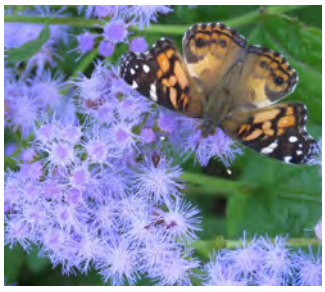


Cardinal Flower
(Lobelia cardinalis)

Blazing Star
(Liatris spicata)

Foxglove Beardtongue
(Penstemon digitalis)

Purple Coneflower
(Echinacea purpurea)



Purple Mistflower
(Conoclinium coelestinum)

Seaside Goldenrod
(Solidago sempervirens)

Photo of Cutleaf Coneflower by Klausronja. All other native plant photos by Becky Laboy.

Species ID Quiz

By Sarah Stewart

Are You a Bird Brain? How's your bird ID skills?
Can you identify the 4 birds below? Click the pic to hear their calls!
(Answers on the last page of the newsletter.)

Photo: Becky Laboy

Photo: Becky Laboy

Species #1 & 2: We are definitely related, can you discern who's who?

Species #1: In my younger days, you might mistake me for a snowy egret, as I am completely white. My plumage becomes more grayish blue as I mature, with a purple head and neck.. I prefer wetlands and am amenable to fresh, brackish or saltwater. I may be "little", but I hang-out with "greats" and other like-minded relations. I forage for food by wading in water and spearing fish, as well as various aquatic invertebrates. My breeding season is from April through August or mid-September. I build my nest in tall trees, in colonies with other waders. In NJ, I am listed as a ***Species of Special Concern***.

Species #2: My white belly contrasts with my blue, gray and lavender-colored plumage above. My dark-tipped bill and yellow lore (area between the eye and bill) helps birders identify me in the field. Like others in my family, I wade around in coastal estuaries all year, and am adaptable to freshwater, saltwater and brackish water. I am graceful but will take to a fast chase through the water to catch my favorite small fish, quickly changing direction on the run, and using my wings for balance. Bowing between my mate and demanding youngsters is common behavior to keep the peace! Like my cousin, I am listed as a ***Species of Special Concern*** in NJ.

Photo: Becky Laboy

Wikimedia Commons, Gary L. Clark

Wikimedia Commons, Gavin Keefe Shaefer

Species #3: I look and behave a lot like many of my relatives whom I hang-out with on barrier beaches, rocky islands, saltmarshes and sometimes inland lakes. Due to a gland in my nasal cavity which filters salt, I drink saltwater as easily as freshwater, dipping down to take a sip as I fly over 'the drink'. I dive and catch (no release) small fish, and I will follow the tuna that help corral a meal for me and my buddies. I'll also eat crustaceans, squid and insects, and I'm not above stealing fish away from other birds, either. My plumage changes depending on my age and the season. Non-breeding plumage provides a key field mark to discern between me and my look-alike cousin who sports black "ear-muffs", while I have wrap-around coverage of my nape. In the photo above, a full head of black shows I'm ready to breed. I also have dark wingtips. I am listed as a ***Species of Special Concern*** in NJ.

Species #4: Aerial gymnastics are my specialty. I can cruise the skies and then make a steep dive to impress a mate or establish and protect territory. Those nearby will hear a loud whooshing or booming sound as I pull out of the dive a few feet from the ground. Almost exclusively an insectivore, I hunt at dawn and dusk wherever flying insects (mosquitoes, wasps, beetles, moths) congregate, such as streetlamps and other sources of light. My intricate color pattern makes for excellent camouflage, as well as my compact build, so I am hard to spot when resting on a branch or nestled on the ground. A nest-builder I am not. My eggs are laid on the ground whether its dirt, sand, gravel, or rocks. My city kin may lay eggs on flat gravel roofs. Unfortunately, these habits leave us vulnerable to numerous mammalian and avian predators. Usually solitary, I join a flock to make one of the longest migrations, arriving in Argentina for winter.


Photo Becky Laboy

Invasive Species Removal and Living Shoreline Projects at Berkeley Island

By Casey Wolf

There is no doubt the year 2020 changed people. Everyone experienced some kind of loss, change in lifestyle, or came to a realization of the way the world runs. It was and still is quite overwhelming at times. On the bright side, the pandemic forced us to slow down and look around where we live. Personally, I became more in tune with local bird species. Gardening became a welcomed hobby. Exploring the local flora and fauna replaced going to bars and parties to socialize. Now 2020 has passed and we are well into 2021. I am dubbing this year, "The Year of Action." One of my first actions to take this year was invasive plant removal at John C. Bartlett Jr. County Park at Berkeley Island. As a Barnegat Bay Master Naturalist, I regularly receive emails with opportunities to volunteer for local environmental projects.


Master Naturalist, Casey Wolf, removes invasive Mugwort at Berkeley Island. (Photo: Becky Laboy)

Invasive plant removal is exactly what you think it is. Our task was to remove a plant commonly called Mugwort, *(Artemisia vulgaris)*. It was originally tackled in the fall by the first few groups of Master Naturalists who participated in this project. This tenacious invasive plant needed more attention. What does it mean for a plant to be considered "invasive"? Invasive plants come from another region of the world, and have a tendency to take over with growth. In many instances, an invasive species will dominate an area, creating a monoculture. Monocultures are typically not good. Mono, meaning one. Having only one type of plant take over an area can have a cascading effect on the species that rely on a diversity of plants. Mugwort has a tendency to take over, leaving little resources for the native plants that benefit our ecosystem. In addition, native pollinators rely on native plants. The caterpillar stage of many butterflies and moths are "specialists". Through evolutionary processes they evolved the ability to process chemicals in certain native plants that can be toxic to animals. They cannot survive without these native species. A monoculture of non-native species is a double whammy for many pollinators. However, natives such as Common Boneset and Seaside Goldenrod are a couple of plants that greatly benefit our local pollinators. By removing the Mugwort, we are now giving native plants a chance to flourish.

"They thought to call upon nature for some help"

Our invasive plant removal project ties into another project at Berkeley Island – the Living Shoreline Project. I was fortunate enough to chat with Jason Hoger, who is heavily involved with this ongoing endeavor. He works for Ocean County Parks and has spearheaded many projects in different parks throughout Ocean County. Jason pointed out that John C. Bartlett Jr. Park at Berkeley Island is unique to the Ocean County Parks system, in that it is a peninsula, receiving lots of wave energy from passing boats, and it experiences tidal flushing, which can prove tricky when trying to foster new plant growth. The Living Shoreline Project was conceived after Superstorm Sandy ravaged the coast. Plans to renovate the park had been underway prior to the storm, but they did not include the Living Shoreline. However, Sandy made it clear that bulk heading alone would not be enough to protect the park from future storms and sea level rise, so they thought to call upon nature for some help.

The majority of the project was funded by the New Jersey Department of Environmental Protection (NJDEP) which covered much of the stone used to dissipate wave action. The remainder, including design, plants and implementation, was paid for by Ocean County Parks. Getting the shoreline going proved difficult with many design do-overs, and storms washing away progress. Jason used the word "hydrology" a couple times throughout our conversation, referring to how much water plants need to be able to flourish, and it's a fine line to walk. Attempts to plant Red Cedar and American holly failed from high winds drying them out. Local Canada Geese also liked to make a meal of the fresh plant plugs, so fencing needed to be put in place to protect them. After all these attempts and pitfalls, some plant species started to take root. Saltmarsh Cordgrass *(Spartina alterniflora)*, is among the plants that now grow along the living shoreline. The goal is to get plants growing to create reliable root systems that will stand up to all the pressures the shoreline faces from storms and human activity. Jason would like to see more *Spartina* take over the shoreline, as well as more attractive species like Seaside Goldenrod establish within the upland berm. Along with functionality of the native plants, there is value in the park also being aesthetically pleasing for visitors.

After hearing all the hard work it took to get the shoreline to start re-forming, I wondered how our invasive plant removal could have such an impact. Jason pointed out that having Master Naturalists who are able to discern one species of plant from another is very valuable. We were able to literally hand select the invasive plants we didn't want and pull them out, and leave the ones we did want to flourish. It is tedious work, but it's a huge help for the living shoreline to grow. Jason believes education is key. He believes that the more the Master Naturalists can teach others about projects such as this, and inspire others to help, the more successful the Living Shoreline project, and other future projects, will be.

I found the removal itself very simple. A couple spots required shovels for digging, and I broke a bit of a sweat, but the job was done before lunchtime. The day was sunny and beautiful. I watched people enjoy the park, and people in boats enjoy the bay. As always with these events, you meet people who care. Talking with people who care about the Barnegat Bay, and the world in general, can be a great uplifting force. I talked to a man named Rich Tomasik, a fellow Master Naturalist, who you may know from his research on our local American Eel population. He told me of a tradition his family has. Rather than buying gifts for his grandkids during the holidays, he would save up and take everyone on a family trip every couple of years. He wanted his grandkids to experience the world, rather than accumulate material things. As I dug my hands into the dirt and pulled the Mugwort and its roots, I was given hope knowing that this man has passed on his passion for the earth not only to his children, but to his children's children. Although pulling weeds one morning from a park seems like a small action to take, small actions add up. The Boneset, Goldenrod and *Spartina* have been given a chance to grow. Once the native plants re-establish themselves, the pollinators will rejoice. If pollinators are living good, humans are, too. Everything is connected. The more we slow down, look around, and take care of the ecosystem we live in, the better our world will be.

Invasive Species Removed at Berkeley Island

Photos by Becky Laboy

Common Mugwort
(Artemisia vulgaris)

Chinese Bush Clover
(Lespedeza cuneata)

Common Reed
(Phragmites australis)

Bull Thistle
(Cirsium vulgare)

Native Species Thriving at Berkeley Island

Seaside Goldenrod
(Solidago speciosa)

Common Boneset
(Eupatorium serotina)

Common Evening Primrose
(Oenothera biennis)

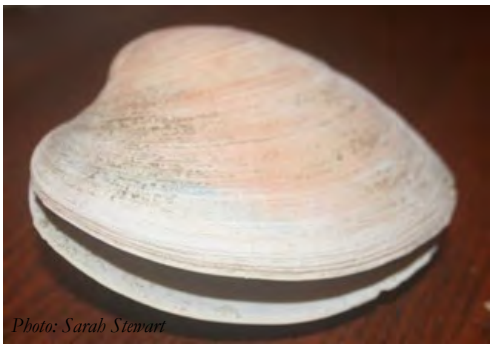
Frost Aster
(Symphyotrichum pilosum)

Who's Your Favorite Filter Feeder?

By Sarah Stewart

Most walks on a beach (bayside or ocean) will bring a myriad of mollusk remnants into vision. How much do you know about what makes a **clam** and **oyster** different? They're both invertebrates and bivalves, but how do they stack-up to one another? Let's take a quick look at four common species.

Surf Clam *(Spisula solidissima)*



Hard Clam or Quahog *(Mercenaria mercenaria)*

Soft Shell Clam *(Mya arenaria)*

Eastern Oyster *(Crassotrea virginica)*

Habitat: Both clams and oysters inhabit marine environments and the brackish waters of estuaries. Only a few clam species live in freshwater (for example, fingernail clams).

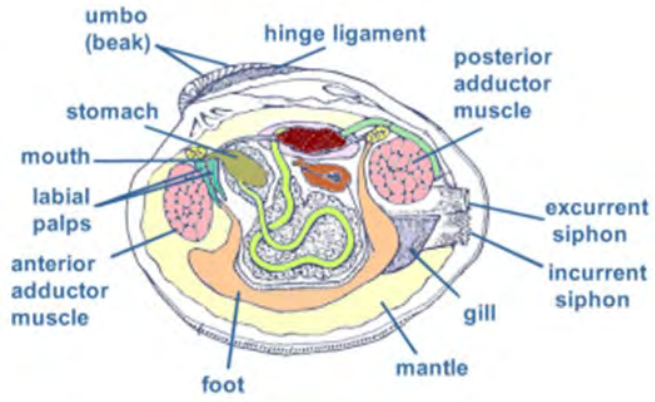
Behavior:

- Both clams and oysters are temperature sensitive with different trigger points for hibernation and spawning, generally shutting down in temperatures below 40 degrees Fahrenheit.
- Both clams and oysters are suspension feeders, pulling in ambient water into their bodies, feeding on phytoplankton, and returning cleaner water to the environment. Both mollusks absorb suspended particulates and nitrogen which they use to build their shells and tissue as they grow. Clams can filter up to 24 gallons of water per day, and oysters can filter 50 gallons of water per day!

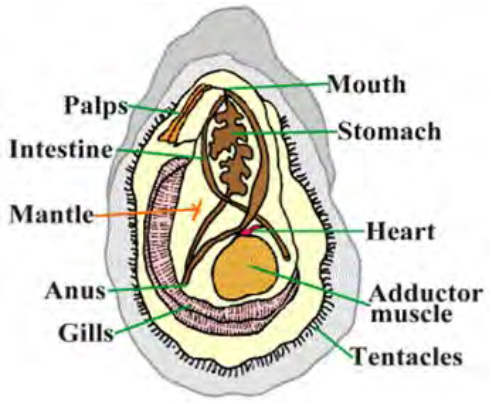
Clams are infaunal in that they burrow into the mud for protection from predators, wave action, and desiccation from heat and low tide. They move slowly, extending their foot outside of their shell to inch their way into and onto the marine floor. Clams extend 2 siphons which allow it to filter nutrients and also oxygen from the surrounding water.

Oysters are epifaunal; they grow a foot to explore and find a suitable hard surface to settle on. The larvae use a sticky secretion to cement themselves to their chosen surface and remain there for the rest of their lives. The hard surfaces can be rocks, or most often, the shells of older oysters which eventually become oyster beds or reefs. These settled juvenile oysters are called "spat".

Anatomy: As bivalves, both clams and oysters sport their 2 calcium carbonate shells with some differences. The shells of most clams are smooth and broad, with a round or oval shape. Oyster shells are elongated and have an irregular rough texture.



www.barnegatshellfish.org



www.ehamptonny.gov

Life History: Both clams and oysters spawn by releasing sperm and eggs into the water column where fertilization occurs. One oyster can release both sperm and eggs, whereas clams require male and females for reproduction. Clam species range in size from microscopic to giant clams weighing over 400 pounds, with an average lifespan of 3 - 10 years, and the giant clam 150 years and more. Oysters average in size up to 10 inches and can live up to 20 years in the wild.

Threats: Both clams and oysters share similar threats, both natural and man-made. Multiple crab species especially the Blue Claw Crab prey upon oysters and clams. Other natural threats include gastropods (moon snails, whelks), echinoderms (sea stars), skates, rays, worms, horseshoe crabs and birds. Infectious diseases carried by parasites, viruses and bacteria are extremely serious threats to both clams and oysters, requiring vigilance by the aqua farming industry. Threats from humans to both these animals include over-harvesting and ocean acidification - in connection with climate change and ocean warming, which results in shell degradation.

With the grill ready, Master Naturalist, Barbara Benz, eyes her next clam! Sedge Island Natural Resources Education Center, 2019. *(Photo: Becky Laboy)*

Culinary Delicacy: Both oysters and clams are highly prized for their food value. The Quahog is queen. Countneck, littleneck, topneck, cherrystone and chowder are all the same species of Quahog *(Mercenaria mercenaria)*, at various stages of growth. Smaller clams are best served raw, medium clams such as the coveted cherrystone, are for grilling and sauces, and larger clams, such as the chowder, is commonly used in clam chowders, as it can be a bit tough and chewy. Soft Shell Clams *(Mya arenaria)* are "steamers". The darker the shell, the more flavor. Oysters *(Cressotria virginica)* are often served fresh, raw and in the half-shell with garlic and butter - shuck and slurp. Grilled oysters are also a local favorite. Share your favorite shellfish recipe on the Barnegat Bay Master Naturalist Facebook page!

Northern Quahog *(Mercenaria mercenaria)*
(Photo: Becky Laboy)

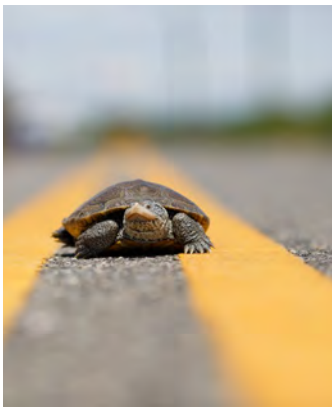
Summary: The oyster's exceptional ability to filter and clean water has led to the construction of oyster reefs to help clean-up water in bays and rivers by absorbing excess nutrients, serve as a "wave speed-bump" during storms, reduce coastal erosion, and provide habitat for other marine species. The next time an oyster or clam comes into view, whether on the beach or on your plate, take a moment to reflect on the heavy-lifting these 'quiet' little marine animals do to help us remediate the considerable damage to our coastal environments caused in large part by ….us.

Check-out these local organizations invested in shellfish recovery and restoration:

- ReClam the Bay
- SPARC Project (Sustainable Practices for Aquaculture Resources Conservation)
- NY/NJ Baykeeper Restoration Program

Northern Diamondback Terrapin (Malaclemys terrapin terrapin)

By Christine Moran



Female Diamondback Terrapin crosses a road to find a suitable place to lay eggs. *(Photo: Ben Wurst, CWFNJ)*

A common sight in June on Great Bay Blvd in Little Egg Harbor is female Northern Diamondback Terrapins crossing the road in search of nesting sites. Many road kills occur. Since 2009, Ben Wurst of the Conserve Wildlife Foundation of New Jersey has been on a mission to prevent that. Ben has made the public aware of nesting terrapins through the use of road signs, newspaper articles and social media. A common sight now is to observe motorists stop and assist the females across the road.

Natural History

The females dig nests and deposit eggs from May through July, after hibernation ends in late April. They seek out sandy areas above the high tide line in estuaries along the east coast. The eggs hatch approximately 60-90 days later.

Malaclemys terrapin are found from Cape Cod to Cape Hatteras and along the Gulf Coast in brackish (low salinity) water. Mature males reach 4 to 5.5 inches long and females 6 to 9 inches. Females reach sexual maturity at about 10 years of age and can produce 4-20 eggs.

Terrapins are primarily carnivores that eat mollusks, crabs, small fish, worms and carrion. They feed mostly at high tide. Predators of the hatchlings and eggs include birds, foxes and raccoons.

> "If you help a terrapin across the road, keep it moving in the same direction, don't move them long distances, and never take it home as a pet."

Great Bay Terrapin Project

Each summer Ben Wurst recruits interns and volunteers to conduct surveys to determine the number of terrapins observed on roads and to reduce the road mortality rate, as part of the Great Bay Terrapin Project. They also monitor nesting throughout the Great Bay region. Ben collects data from Ocean, Atlantic and Burlington counties. In 2020, 1078 terrapins were observed and 80 road kills (5% fewer) were observed. In cooperation with NJ Fish & Wildlife biologists and Dr. John Wnek of Project Terrapin, 30 adults females were briefly captured and sampled to look at blood profiles and diseases. This was the first study of its kind, which was being conducted to determine the health of the wild population. Results will help guide the future release of terrapins who were once in captivity and need to be released back into the wild.

Volunteers and interns assist with terrapin conservation efforts each summer. *(Photo: Ben Wurst, CWFNJ)*

Over 3,000 tons of sand was used to establish this Terrapin Garden in 2020. *(Photo: Ben Wurst, CWFNJ)*

2020 was the first year for the Terrapin Garden on Great Bay Blvd. This area had been a marina which was decimated by Superstorm Sandy. Conserve Wildlife Foundation and NJ Fish & Wildlife (with NJDEP supplemental funds) built a fenced enclosure filled with 3,000 tons of sand to create a more suitable nesting place. More than 500 plants were established at the site to provide cover for the hatchlings. In addition, metal cages were used to cover the nests to protect them from predation. 61 total nests were protected in the Turtle Garden beginning with the first documented nest on June 10. Learn more from Ben Wurst about Gardening for Terrapins.

The volunteers use a smartphone app called iNaturalist to record a photo, the location and carapace markings of individuals seen on roads in southern Ocean, Atlantic and eastern Burlington counties during peak nesting season. This app was especially effective during COVID restrictions in 2020. A Facebook group also keeps volunteers up to date on special projects.

Terrapin Tips

1) If you help a terrapin crossing the road, keep it going in the same direction. 2) Don't move them long distances. 3) Never take one home to keep as a pet. 4) Use terrapin excluders on crab traps to prevent animals from being caught in lost traps - they will drown.

Resource Links:

- Conserve Wildlife Foundation of NJ
- Gardening for Terrapins webinar with Ben Wurst
- Project Terrapin
- iNaturalist Great Bay Terrapin Project
- Ben.Wurst@conservewildlifenj.org

Chris Claus, Chief Naturalist of Ocean County Park, Lakewood

By Rich Biolsi

I took the Master Naturalist course in the spring of 2013, just a few months after Super Storm Sandy did its best to decimate the Jersey Shore. Guest speakers spoke of dire predictions for the Barnegat Bay environs. (One chart showed my house, near the Beaver Dam Creek, completely under water by the end of this century.) There were many stories of devastation, but also many of heroic efforts.

One such effort was at Cattus Island County Park, where Chris Claus was the chief naturalist at the time. On the night of Sandy's arrival, he was on patrol as an auxiliary policeman. He drove into the Cattus entrance, but could go just so far because the bay water had rushed in, covering the road and destroying much of the infrastructure of the environmental center, the freezer, a generator, office equipment, a utility vehicle and other items. A number of trees were also killed. Chris told me how the next day staff and volunteers, a number of whom could not get into their own homes, came to the park, first to save the reptiles, amphibians and fish that lived in the center and then to try to limit the damage to the building. The salt water fish were let out into the bay, the fresh water fish were taken to streams and rivers and the reptiles and amphibians were taken to Jakes Branch County Park, where they stayed in the prep room for several years until the environmental center at Cattus was restored. Chris gives great credit to the folks who helped with the animal evacuation, often not knowing how their own homes had faired.

Credentials

Chris graduated from Cook College of Rutgers University with a BS in biology. He has worked in various capacities with the Ocean County Park system for more than 25 years, starting as a volunteer Jr. naturalist at Cattus Island. He is currently the Chief Park Naturalist at Ocean County Park, 323 acres of beautiful trees, open fields and three lakes, one for swimming. It contains an 18 hole disc golf course, tennis courts, playgrounds, picnic areas which can be reserved for groups, an off leash dog park, forests for semi-secluded walks and even a great blue heron rookery. While Chris's office, which has the appearance of a cabin in the woods, with a large picture of Charles Darwin hanging inside, is located at Ocean County Park, he also has a number of other hats, including naturalist duties at Lake Shenandoah County Park, across route 88 from Ocean County Park, and Mantoloking Bridge County Park on Mantoloking Road in Brick. At each of these sites, he does a great deal of ad hoc contact with the public, educating people about the environment in that particular setting. I viewed this first hand as I tagged along with him at Mantoloking Park and he explained the life cycle of a crab to people who were fishing and crabbing there.

Philosophy

Chris Claus rescues a Great Blue Heron at Ocean County Park.
Photo: Pat Korotky

This approach is reflective of Chris's philosophy on environmental education, with the goal of broadening people's minds about the expansiveness and beauty of nature. While he says that a naturalist is a jack-of-all-trades, he takes a holistic approach to education, giving people a bigger view of our environment. This being the case, some might liken him to being a Renaissance person. In his words, "Nature is everything." One of the things I heard about Chris from some of his naturalist colleagues is his love of Latin terms for various species. When I asked him about that, he explained that Latin is not a dead language in biology, especially botany, and in fact will help one to determine the common but less obvious derivations of various species.

The jack-of-all-trades handle is reflective of Chris's many activities, including rescuing injured birds, scheduling the use of the county pontoon boat at the park offices in Toms River (including leading some of the boat tours), building trails at Patriot's Park in Jackson and, as a state certified firefighter, participating in prescribed burns of the more than 25,000 acres of natural lands in the county. At Ocean County Park he maintains two gardens with a variety of plants that produce flowers for pollinators. They are next to arbors and benches built by Eagle Scout candidates. He also runs outreach nature walks at various schools around Ocean County, having worked with preschoolers through college students. Chris has received awards as an outstanding educator from both the Association of New Jersey Environmental Educators and the New Jersey Marine Education Association.

Chris Claus assists with banding young Osprey.
(Photo: Pat Korotky)

Ocean County Park

My favorite short walk is around the smallest of the three lakes. Named Lake Fishigan by a ten year old girl who won a fishing contest in 1965, a slow walk along its shore will reveal a wide diversity of wildlife, including the likes of songbirds, herons, turtles, frogs, garter snakes and an occasional deer. I also like the fact that there is a diversity of humans walking in the area, and it struck me that if Chris were to dig into the Latin terminology of humans, he would confirm a commonality in our species also.

Are You a Botanical Genius? Plant ID Quiz

By Sarah Stewart

Roots, stems, leaves, flowers, fruits and seeds - all parts of the plant provide botanical clues for identification. Habitat is also an important component of field ID. Can you guess the common name of each of these species? How about the scientific name? *(Click on photos to reveal each plant's identity. Answers also found on the last page of the newsletter.)*

Plant Species #1: This shrub is a fixture along dunes, especially secondary and older dune systems where salt spray is less intense. It forms dense thickets of multiple stems often with other common maritime plants, providing a protective habitat for small mammals and birds. The root system is extensive, spreading vertically and horizontally, which helps stabilize and strengthen dunes. Young bark is smooth, reddish-brown and becomes darker and rougher with age. Clusters of white flowers bloom in April/May providing nectar for bees and other pollinators. The edible round, purple fruit (drupe) ripens in August to the delight of wildlife and humans alike.

Plant Species #2: You can find my long sprawling vines across stony or sandy beaches, along with other perennial dune-loving-protecting flora. My deep roots help stabilize dunes. My pretty pink or purple flowers can be seen June through August and attract bees and butterfly pollinators. Seed pods are reminiscent of a garden variety plant which hint at some of my more common names. Reproduction occurs with seed germination (requires optimal conditions) and through underground rhizomes which is more common. Leaves and seed pods are edible; young shoots are preferable.

Plant Species #3: This native plant is tolerant of many types of soil except for very wet locations. It grows as a large shrub or small tree up to 35 ft tall and spreads by root suckers. Its yellowish-green flowers bloom in summer in dense panicles* from July to September. Its rachis is wide contributing to its common name. Autumn foliage is marked by dark red leaves and dull red hairy fruit clusters ("bobs") which persist through winter providing food for many birds and mammals. A popular plant for foragers who grind the fruit to make red lemonade (see recipe on next page) or use as a spice.

A Newsletter for Barnegat Bay Master Naturalists and our Affiliates

Barnegat Bay Partnership
Ocean County College
College Drive
Toms River, NJ 08754

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We're on the web!
www.BarnegatBayPartnership.org

LEARN, PROTECT, EXPLORE

The Barnegat Bay Partnership, through Ocean County College, offers a program to train Barnegat Bay Volunteer Master Naturalists (BBVMNs). Participants learn not only about the wildlife and natural resources of the estuary, but also about the latest scientific research and the challenges ahead. The program includes training in the skills volunteers need to help educate others about the bay and about good stewardship of its valuable resources. For more information, please contact Karen Walzer kwalzer@ocean.edu

- *Connect with other Barnegat Bay Master Naturalists through our Barnegat Bay Master Naturalists Facebook Group.*
- *Join the Barnegat Bay Master Naturalist iNaturalist group and share photos of your nature sightings with fellow BBVMNs.*

Answers to Species ID Quizzes

Are you a Bird Brain?: Species A: Little Blue Heron, B: Tricolored Heron, C: Common Tern, D: Common Night Hawk

Are you a Botanical Genius?: Species 1: Beach Plum *(Prunus maritima)*, Species 2: Beach Pea *(Lathyrus japonicus)*, Species 3: Winged Sumac *(Rhus copallinum)*

Photo: Becky Laboy

Recipe for Sumac Red Lemonade

Sumac berries are edible, and have a tart citrus-like flavor. Brew them into a delicious beverage, add ice and sip on a warm September afternoon, or drink as a hot tea to keep you warm on a chilly October morning. Steeped in American culture, sumac berries were used by indigenous people as an herbal remedy for stomachaches, and early pioneers used them to treat cough, sore throat and fever. Birds also eat the berries! *(Reference: Farmer's Almanac)*

Ingredients:

1 pint fresh sumac (Rhus copallinum) berries (about 6 to 8 clusters)
1/2 gallon water
Sugar to taste

Add the berries to the water and use a potato masher or a spoon to crush, so they release their flavor. Let the crushed berries steep for 10 to 15 minutes. Once the sumac lemonade is flavored to your liking, pour it through a strainer or cheesecloth to remove the flesh and seeds. Then add enough sugar to sweeten the drink, but not so much that you lose the tangy flavor. Pour your sumac red lemonade over ice, or drink it warm. Enjoy!