

Celebrate Estuaries in September

North **INLET** & **Winyah** **BAY** Bulletin

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North Inlet-Winyah Bay National Estuarine Research Reserve



FREE PUBLIC PROGRAMS

For more info about these and additional programs and to register visit northinlet.sc.edu/upcoming-events/

We continue to monitor the status of CDC safety recommendations for Covid-19. Currently all programs are virtual or in an outdoor setting with limited registration. Facial coverings are required in the Discovery Center. Program formats may need to be changed or some programs may be cancelled as the situation evolves.

Bike to the Boardwalk

Oct. 8, Nov. 12 & 24,
Dec. 3 & 10

Bike through Hobcaw's forest to the Reserve's beautiful salt marsh boardwalk on North Inlet estuary.

Fall Wildflowers

Sept. 10, Oct. 19

Walk through maritime, forest, and wetland habitats to see our fall wildflowers, butterflies, dragonflies and more.

Family Fishing Clinic

Sept. 29, Oct. 29,
Nov. 30

Kids from ages 4 to adults are welcome to learn fishing knots, rigging a rod and reel, casting, and to try their hand at fishing.

Life in a Pond

Aug. 19 & 26

Discover what life is found at Kimbel pond and bring a picnic lunch to enjoy at our pond shelter.

Sunrise & Seine

Aug. 25

Beat the heat this summer and join Reserve staff on the beach at 6:30AM for a sunrise and seine event!

Fish Printing

Sept. 14

Use a method of printmaking that traditionally utilizes fish and sea creatures to decorate your own bag, shirt, apron, etc.

What's in a Wave

Sept. 20

Explore creatures and critters that live in the intertidal zone and the salt marsh creeks of Pawleys Island.

Monarch Tagging

Nov.22

Join the reserve staff to search and tag Monarch Butterflies as we take a stroll through the pristine property of Hobcaw Barony.

Virtual Field Studies

Virtual programs for grades 3-8

All About Whales Nov.9
Riparian Reptiles Nov. 23
All about Crabs Dec. 6
Fishes of North Inlet Dec. 13

Programs @ Waccamaw Library

Pond Life Oct. 6, Nov. 3
A Day in the Salt Marsh Oct. 27
A Day in the Forested Wetland Nov. 10

Programs @ Black River Cypress Preserve

Story Slam Sept. 18
Movie Night Oct. 23
Biking Oct. 25

Volunteer Training

Phenology Monitoring Sept. 15
Phytoplankton Monitoring Oct. 6
Adopt-a-Stream Saltwater Intro Sept. 1
Adopt-a-Stream Saltwater Field Sept. 11

Steward Skills

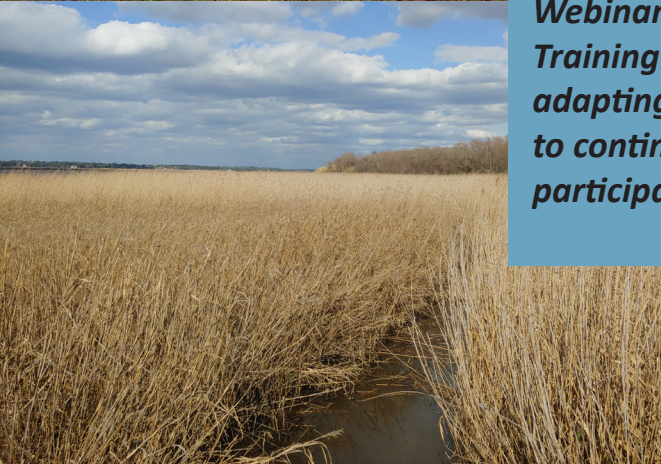
Crowd Source Science Sept. 24
Marvelous Microscopy Oct. 22

TRAINING



A two – part virtual training on Wetland Buffers was attended by over 150 participants including planners, local government officials, and real estate and land use professionals. These webinars described science and design considerations for wetland buffers and provided local case study examples of how they can be used to protect wetlands.

How to connect decision-makers to the science, tools, and training they need when we could not be together? Webinars were the name of the game for the Coastal Training Program during the winter and spring. By adapting trainings to virtual formats, CTP was able to continue providing programs while reaching more participants and broader audiences.



Wetland buffers can provide natural protection for both wetlands and waterways.

Another webinar focused on [Low Impact Development](#) and how to apply it in challenging conditions, such as poor soils or a high water table. This training reached over 100 participants, including engineers and design professionals.

The Coastal Training Program also partnered on this year’s Waccamaw Conference by organizing “The Source,” a webinar series about the Waccamaw watershed. These webinars covered topics ranging from ecology and biodiversity, culture and history, and conservation and stewardship. CTP is very grateful to all the speakers who shared their expertise and wisdom and showed that the Waccamaw Watershed is home to inspiring individuals and organizations. All the webinar recordings can be found in the [Waccamaw Conference Story Map](#).

Finally, this past year was a good time to gather information on the needs of coastal decision makers and to reflect on how the Coastal Training Program can best serve this audience. A Needs Assessment survey was distributed to gather feedback on how coastal issues and decision-maker priorities have changed. The results of this survey are available in a report at <http://northinlet.sc.edu/services/>.

The Coastal Training Program will continue to monitor CDC guidelines for COVID-19 and will adapt training delivery accordingly.



Maeve Snyder, Coastal Training Program Coordinator
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EDUCATION

Although we could not see as many people on site during this spring due to COVID, a variety of engaging virtual education programs provided the opportunity to reach both K-12 and public audiences with new topics and formats and an expanded geographic outreach.

Virtual programing provided robust interaction with students in their classroom through watershed and estuary education as well as virtual story times for elementary and home school students.

The 'From Seeds to Shoreline' project hosted at NIWB included a weekly virtual classroom program with Holy

Trinity Catholic School second graders throughout April and May. The Reserve's Margaret A Davidson Fellow, Johanna L'Heureux, also presented her work in marshes in Massachusetts and South Carolina and answered a variety of questions for the students. These students also entered artwork for the Waccamaw Conference student art and poster contests depicting river, estuary and ocean ecosystems, and their school year culminated in late May with an in-person field trip and seedling planting with education staff from Sea Grant and NIWB at the Reserve's salt marsh education trail.

In late June, the Reserve also hosted 25 rising 5th and 6th grade students from The Village Group's Plantersville Summer Academy STEM Institute, who interacted with research staff and undergraduate and graduate student interns from USC during their visit.



Students had the opportunity to get out into the mud to plant seedlings in the salt marsh at the NIWB Reserve.

NOAA's 'Teachers on the Estuary' professional development training, 'Explore an Estuary NERR You!' was co hosted by the Reserve and ACE Basin NERR, SCDNR, and SC Sea Grant Consortium on July 20-22. The workshop featured in-person events and activities at North Inlet, Charleston Harbor and Edisto estuaries introducing middle and high school teachers to these ecosystems through hands on field experiences and the suite of NOAA, NERR and Sea Grant marine education resources including a variety of conservation action activities suitable for K12 students.



Beth Thomas, Education Program Coordinator
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RESEARCH & MONITORING

We've continued with an effort to use un-occupied aerial systems (AKA drones) as a way to monitor the health of our salt marshes. We're excited about the possibilities for this technology, and our results could have impacts for marsh monitoring methods in estuaries all over the country.

Porewater sampling is back! In May 2021, we re-started monitoring the concentrations of salinity, nitrogen and phosphorus within the porewater of our salt marsh sediments. The return of porewater sampling (after being canceled in summer 2020) has been helped out by our small army of undergraduate research interns.

The Research & Monitoring team at North Inlet-Winyah Bay NERR continues to investigate the environmental conditions, flora, and fauna of North Inlet Estuary and Winyah Bay. The System-Wide Monitoring Program at NI-WB is back in its entirety after some slight modifications during 2020 to accommodate physical distancing. We have had some exciting research results over the past year.



Top: An adult male blue crab caught during quarterly trap-based surveys in NI-WB NERR. All animals are returned immediately to the water following capture. Bottom: An oyster shellbasket deployed in June 2021 in Sixty Bass Creek, near the mouth of North Inlet.

Quarterly surveys for blue and stone crabs in North Inlet and Winyah Bay continue, with the goal of investigating temporal variation in crab population dynamics within the Reserve and to allow for comparison with other estuaries in the southeast US. These surveys utilize trap-based sampling to collect data on species composition, size, sex, maturity stage, and relative abundance.

Research staff initiated a new study to investigate the effects of harvest ('oyster picking') on the animals that utilize oyster reefs as habitat. Researchers buried small shellbaskets into the reef surface which are left in the field for one month before being brought back to the lab for processing. Summer and winter samples from two sites will be compared- so if you see any odd looking trays on the reef during your holiday oyster picking trips, please ignore them!

We're proud to say that our continuous water quality data collection and weather monitoring, conducted via the NERR System-Wide Monitoring Program, was operational throughout the previous year. Check out a summary of conditions in North Inlet and Winyah Bay between 2010-2019 at the end of the newsletter, and access current water quality and weather conditions using the Real Time Data Application on www.nerrsdata.org.



Robert Dunn, Research Coordinator
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STEWARDSHIP



A pair of American Oystercatchers spotted in North Inlet with brown and white pelicans resting in the background.

Spring just hasn't been the same without a group of Winyah Master Naturalist students to explore outside with. Classes for the spring of 2020 and 2021 had to be postponed, but we are very hopeful that the full course will return for the spring of 2022.

Approximately 38 species of shorebirds and wading birds were recorded during boat surveys conducted in North Inlet this spring. White pelicans were a somewhat unusual sighting at the end of May as they are normally winter visitors. Red Knot, a species of conservation concern, were seen in much smaller numbers in North Inlet than in the springs of 2019 and 2017. This year's Red Knot count in Delaware Bay, a major migration stopover area, was also well below the anticipated numbers. While it is normal for

count numbers to fluctuate year to year, researchers are concerned and are curious if more shorebirds have not made the expected migration to their breeding grounds this year.

An important part of understanding how species such as shorebirds are supported by North Inlet and Winyah

Shorebirds migrating and the marsh grass greening are signs of spring at the Reserve, but for the past two years spring just hasn't been the same without Master Naturalists and project volunteers around. We are looking forward to new courses and volunteer opportunities to reconnect with our community.

Bay is assessing the distribution of habitats on which they depend. Working with the NOAA Office for Coastal Management, the Reserve habitat map was updated using 2017 aerial imagery, elevation data, and low tide imagery to refine the wetland habitat areas from the previous habitat map, completed in 2010 using 2006 imagery. The [updated map](#) provides a finer degree of detail, especially in delineating intertidal creeks and small mud flats.

Another exciting development this past year, the Reserve has joined the South Carolina Adopt-a-Stream Saltwater (SC AAS) program, a statewide volunteer water quality monitoring program. As a program hub, the Reserve will be providing training and monitoring equipment to volunteers who want protect, restore and learn about our waters. Volunteers will play an important role providing baseline data through monthly monitoring of tidal saltwater creeks. For more information on SC AAS, visit the website www.scadoptastream.org.



Volunteers learn how to use kits to measure the amount of dissolved oxygen in the water during a training workshop.



Jennifer Plunket, Stewardship Program Coordinator
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GRAND STRAND HEALTHY POND SERIES

A community-based discussion series to help clear the waters



Do you live in a neighborhood with a stormwater pond? Ponds are a ubiquitous feature along the Grand Strand, but many local residents are unaware that they are not a natural part of the landscape. Stormwater ponds are engineered structures built to control stormwater runoff, protect water quality, and prevent flooding, as well as to provide aesthetic benefits. However, ponds require proper management to provide these important functions and maintain a healthy appearance. The number of stormwater ponds in the Myrtle Beach area has increased over the past 25 years, from roughly 1,000 ponds in 1994 to over 3,000 today. Despite their prevalence, ponds don't come with instruction manuals and proper management can seem mysterious.



To help clear the waters, the NI-WB NERR launched a new educational program focused on pond management. The Grand Strand Healthy Pond Series is an opportunity for HOA/POA representatives, pond owners, and pond managers to increase their knowledge of pond management best practices. This community-based discussion series is a space to learn, connect, and share. The series is organized by the North Inlet – Winyah Bay NERR, Clemson Extension, and S.C. Sea Grant Consortium.

Like many events in 2020, the Healthy Pond Series adapted to the COVID-19 pandemic by going virtual. While this limited opportunities for networking, it still provided a regular source of pond management education through quarterly workshops focused on specific topics. The 2020 – 21 series covered pond design, aquatic plant management, shoreline erosion, and wildlife management. Despite the challenges of the pandemic, over 200 participants attended the first year of workshops.

For the 2021 - 22 Healthy Pond Series, we will continue to monitor COVID-19 conditions and adapt accordingly. We hope that future workshops will include opportunities to visit ponds for hands-on demonstrations. Topics for the upcoming series include nutrient management & harmful algal blooms, pond inspections, and aeration. We look forward to seeing you at the next Healthy Pond Series!

Maeve Snyder, msnyder@baruch.sc.edu

TAKE YOUR FAMILY FISHING

Clinics offered to teach fishing skills

Fishing isn't just about catching fish! Fishing is a great way for families and friends to relax together as they enjoy being outdoors and learning new skills. The North Inlet - Winyah Bay NERR has partnered with the SCDNR to host Family Fishing Clinics at North Inlet. These clinics reel in families all across the state of South Carolina! The volunteer led clinics teach skills on how to tie fishing knots, how to rig a rod and reel, safety procedures, and most importantly ethical fishing practices for future generations of fish and humans!

Please respect our fishery resources:

- Follow all fishing and boating regulations
- Limit the number of fish you take to those to be eaten or mounted and never keep fish just to show off
- Carefully release unwanted fish so they can survive and possibly be caught again
- Properly dispose of litter, garbage and fish remains in public trash, containers or at homes
- **Always discard properly or recycle monofilament line as it can cause harm to wildlife.**
- Respect the rights of fellow anglers by keeping a reasonable distance from other boats and other anglers
- Fish on private property only when you have permission from the landowner
- Always behave in a safe and courteous manner

Participants from across the state attended five spring and summer SCDNR Family Fishing Clinics at the Reserve, where Clambank Landing provides an excellent outdoor classroom on the water and a beautiful place to practice new skills. Catches included red drum (aka spottail bass), black drum, bluefish, whiting, croaker, spot, pinfish, toadfish, and even a lizardfish. There were also a few clumps of oysters captured by hook and line!

The clinics are all free of charge and advertised extensively via SCDNR's social media platforms, and provide instructor-led training sessions, educational materials and fishing supplies through SCDNR's Aquatic Education program. The Aquatic Education Division is also expanding opportunities in Georgetown and Horry counties with surf and pier fishing clinics, and plan to offer freshwater clinics in the future. For more information on upcoming clinics, dates, and locations, please visit: <https://www.dnr.sc.gov/aquaticed/fishingclinic/>



Beth Thomas, beth@baruch.sc.edu; Hayley Fournier, hayley@baruch.sc.edu

MARSH CRABS COUNT

Small-bodied crabs may play a big role in our salt marshes

Salt marshes provide habitat for many different animals, from mammals and birds to fishes, reptiles and invertebrates. Some of the most conspicuous organisms that can be seen when looking out over the marsh, at low tide of course, are crabs! Marshes in South Carolina are home to numerous species of decapod crustaceans (also known as crabs and shrimps, among others), in particular the ones we refer to as fiddler crabs and mud crabs. Marsh crabs can be highly abundant and perform numerous ecosystem functions, including aerating sediments when digging their burrows, eating algae and dead plant material, and serving as food for other predatory species within salt marsh food webs. There is a growing recognition based on research from all over the world that these small-bodied consumers play a vital role in determining the abundance of foundational salt marsh vegetation. This is particularly the case when marshes are faced with sea-level rise, climate change, and other anthropogenic stressors such as nutrient loading and overfishing.



A male sand fiddler crab hanging out at the edge of his burrow.



Nadya Gutierrez, a NOAA Hollings Scholar intern, collects samples of marsh crabs at the NI-WB NERR's Sentinel Site boardwalks in July 2021. An open tennis ball can/pitfall trap waits to collect any unsuspecting crabs.

2020, marsh crabs have been sampled monthly at 50 permanent plots located along six boardwalked transects in the Crab Haul Basin of North Inlet estuary. At the same time, we have made counts of crab burrows at each permanent plot as another metric of crab activity. To collect crabs, we are using pitfall traps, a sampling technique that is common for terrestrial organisms (like bugs!) but rarely used in marine habitats. In our case, pitfall traps are actually just old tennis ball cans that are buried flush with the marsh sediment with the lids on (many thanks to IBIS member Mr. Paul Kenny and his tennis club pals for the generous donation). Each month, we open up the lids for 24 hours to see what crabs fall in. So far, we have collected nine different species of crabs, from fiddlers to mud crabs to juvenile blue crabs. During the summer of 2021, an undergraduate researcher, Nadya Gutierrez, is leading the Reserve's marsh crab sampling effort. Nadya is a NOAA Hollings Scholar and rising Senior at Georgia College. Ultimately, we will be able to pair our data on salt marsh crabs with the numerous other data sets that we are collecting at our permanent "Sentinel Site" transects, including vegetation, sediment characteristics, porewater chemistry, elevation and tidal inundation. If you're interested in getting involved in the Reserve's marsh crab monitoring effort as a community scientist, please get in touch with Research Coordinator Robert Dunn (robert@baruch.sc.edu or 843-904-9026).

Marsh crab population monitoring was recently implemented at the Reserve to better understand spatial and seasonal variability in crab populations, characterize the biodiversity of salt marsh crab communities, and provide insight on the ability of crabs to affect foundational marsh vegetation. Crab species vary in size, diet, and behavior, which may affect their impacts on vegetation and marsh geomorphology. Since July

Robert Dunn, robert@baruch.sc.edu

THE BARUCH MARINE BEE HIVE?

The summer has been busy with students at the Reserve

Graduate Students



Gwen Hopper is a Ph. D. student in the Department of Chemistry at UofSC. Gwen's research investigates how land use and development practices affect the molecular composition and bioavailability of dissolved organic matter in stormwater runoff in the Winyah Bay watershed.



Curtis (CJ) Szewczyk is a M. S. student in the School of Earth, Ocean, and Environment at UofSC. CJ's research examines the interactive effects of increasing temperature, nutrients, and organic matter on dissolved oxygen impairment in the Waccamaw River.



Johanna L'Heureux is a NOAA Margaret A. Davidson Graduate Fellow, and a Ph. D. student at Northeastern University. Johanna's research investigates the interactive effects of sea level rise and nutrient enrichment on plant-microbe interactions within saltmarsh sediments.

Undergraduate Summer Interns



Maggie Pelton is a UofSC Honors College undergraduate, rising senior. Maggie worked with Robert Dunn to improve our understanding of the importance of intertidal oyster reefs as habitat for other animal communities, as well as how this varies across environmental gradients in North Inlet.



Nadya Gutierrez is a NOAA Hollings Scholar intern, and a rising senior at Georgia College & State University. Nadya worked with Robert Dunn to investigate populations of small-bodied crabs (e.g., fiddlers, among others) found in the salt marshes of North Inlet, testing for spatial and temporal patterns across the marsh platform.



Kamari Boyd is a rising junior in the Environmental Sciences Program at UofSC. Kamari worked with Erik Smith to examine the influence of vegetation community and degree of tidal flooding on plant decay and soil stability in the saltmarsh sediments of North Inlet.



Camille Wheeler is a rising senior in the Marine Science Program at UofSC. Camille worked with Erik Smith as part of a nation-wide effort to test the performance of an automated underwater fluorescence sensor for predicting concentrations of chlorophyll (a proxy for the abundance of algae) across diverse aquatic ecosystem.



CELEBRATE ESTUARIES

National Estuaries Day began in 1988 to promote the importance of estuaries and the need to protect them. Estuaries are vital to migratory species, provide habitat for a variety of marine plants and animals, help prevent coastal erosion, are important recreational and tourist destinations, and are critical for our future and the health of the oceans. Because estuaries are so important, the celebration has been expanded to National Estuaries Week (NEW), celebrated every third week in September. Each year, hundreds of organizations across the country host local events in celebration of estuaries, from beach cleanups and marsh restoration events, to kayaking tours. Past events at the Reserve have included Discovery Center Open House, special events such as filling our marine debris sculpture, and a marsh sweep.



Estuaries Week 2021 Celebrate with Stories

Coastal Story SLAM @ Black River Cypress Preserve, September 18

Come listen to the true personal stories of our local community leaders about their connections to the coast, while sitting under the stars at the beautiful Black River Cypress Preserve. Look for more information and registration information soon.

Epic Estuary- Tell us your stories of North Inlet and Winyah Bay

The first time you caught a fish, the time you lost your boot in the pluff mud, the best way to prepare North Inlet oysters, what the sound of clapper rails reminds you of. Please share with us your short stories, poems, or even recipes that celebrate your personal connections to North Inlet and Winyah Bay. [Epic Estuary](#)

IN THE CLASSROOM, FIELD AND ONLINE

Learn More about these and other Opportunities at
northinlet.sc.edu/upcoming-events/

Steward Skills Courses

Want to get involved in conservation and stewardship through volunteering? This series of monthly courses is designed to teach current and potential future volunteers various skills that may be needed in their endeavors. This course is open to adults who want to brush up on field and lab techniques, or try out a new skill, and learn about opportunities to put their knowledge and talents to work to help protect our coastal communities.

Join the Crowd- Intro to Crowd Source Science

Friday, September 24th, 1:00 to 2:30 PM

You can help to address real-world environmental problems while in your yard, out for a walk, at the beach, or even from your living room as a 'citizen scientist'. But with so many projects and ways to contribute, how to get started with joining the crowd can be daunting. Join us at the pond shelter with your device (phone, tablet or laptop) and together we will explore how to participate in projects including iNaturalist and our own soon to be launched Winyah Walkabout.

Marvelous Microscopy

Friday, October 22nd, 1:00 to 2:30 PM

There's more than meets the (naked) eye going on all around us! Microscopes allow us a glimpse into a fascinating universe that exists in the soil, water and vegetation. But if you haven't used a microscope since high school biology, you may have forgotten some of the basics. Get reacquainted with optical principals, learn techniques for finding and preparing samples to view, practice microphotography to record your observations, and even learn how to make your own DIY microscope.

Virtual Field Studies

Teachers, parents, and/or guardians, are you looking for something for your children to do? Join us for a virtual program intended for grades 3-8. Registration required, once you register, you will be sent a zoom link to attend. All classes are from 10:00 to 11:00 AM.

All about Whales- November 9th

Riparian Reptiles- November 23rd

Crabs!- December 6th

Fishes of North Inlet- December 13th



Story Time at the Waccamaw Neck Branch Library

Reserve staff will read stories by children's author, Kevin Kurtz, at the Waccamaw Neck Branch Library. A special guest animal will make an appearance during each program! For more information, please call the Waccamaw Neck Branch Library at 843-545-3623 or go to their website at <https://georgetowncountylibrary.sc.gov/branches/waccamaw-neck-library>. Programs are from 10:30 AM to 12:00 PM. Registration is not required.

A Day in the Salt Marsh- October 27th

A Day in a Forested Wetland- November 10th

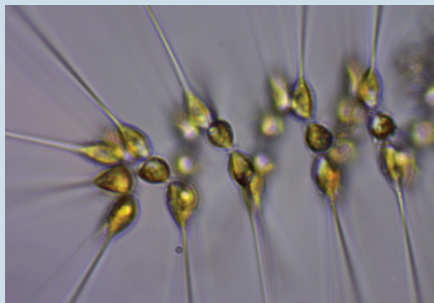
VOLUNTEER TRAINING

We are currently developing and growing our volunteer and community science programs at the Reserve. It is our intent to offer a diversity of opportunities for various interests, skill levels and time commitments. For more information about opportunities to volunteer at the Reserve and to view the volunteer handbook, please visit our web site <http://northinlet.sc.edu/volunteer/>.

EXPLORE AN UNSEEN WORLD

WITH THE NATIONAL PHYTOPLANKTON MONITORING NETWORK

[The National Phytoplankton Monitoring Network](#) (PMN) is a community-based network of volunteers monitoring marine phytoplankton and harmful algal blooms (HABs). Volunteers collect water samples on a bi-weekly basis from North Inlet and surrounding areas and meet at the Baruch Marine Field lab to examine the samples for the presence of harmful algae. Results are reported to the National PMN. This data creates a comprehensive list of harmful algal species inhabiting coastal marine waters and helps to identify general trends where harmful algal blooms are more likely to occur.



Volunteer Training: Phytoplankton Monitoring

Wednesday, October 6th, 1 to 4 PM

Training will cover phytoplankton identification, field sampling, lab analysis and data entry. Format (in person or virtual) is to be determined based on the COVID status at the end of September.

Register at <http://northinlet.sc.edu/events/pmtraining/>

GET INTIMATE WITH NATURE

WITH THE SALT MARSH PHENOLOGY MONITORING PROJECT

Phenology is the study of the timing of seasonal plant and animal life-cycle events, including the flowering of plants, ripening of fruit, the emergence of insects, and migration of birds. The timing, duration and intensity of these events are sensitive to seasonal and long-term changes in temperature and precipitation. Volunteers with this project monitor phenological events to aid in the assessment of the vulnerability of species, populations, and salt marsh ecological communities to ongoing climate change.



Volunteer Virtual Training: Phenology

Wednesday, September 15th, 1:00 to 2:30 PM

Training will include an introduction to phenology, salt marsh plant identification, phenotype identification, field techniques and data entry.

This training will be virtual.

Register at <http://northinlet.sc.edu/events/phenology/>

VOLUNTEER TRAINING

FREE 2 Part WORKSHOP!

Virtual Zoom Presentation:

September 1st

5:30pm – 7:30pm

[CLICK HERE TO RSVP](#)

[for Virtual Session](#)

northinlet.sc.edu/events/scaas-virtual/

Field Training:

September 11th

9:30am – 11:30am

Hobcaw Barony

[Sign up for Field Training](#)

northinlet.sc.edu/events/scaas-field/

Questions?

jen@baruch.sc.edu

843-904-9033

*You must attend the virtual presentation **AND** field training to get certified to become a water quality monitor.*



VOLUNTEER TRAINING FOR TIDAL SALTWATER MONITORING

South Carolina Adopt-a-Stream (SC AAS) is a statewide volunteer water quality monitoring program. SC AAS volunteers can play an important role in monitoring tidal saltwater waterways while sharing information about local water resources with their communities. In providing baseline information about stream conditions, volunteers, local communities, educators and local government agencies can partner to protect, restore and learn about our waters.

This workshop will certify individuals to become SC AAS volunteers who choose to adopt a tidal saltwater site (waterway with a salinity of over 0.5 ppt). Attendees will learn how to collect water samples and test six basic core parameters: dissolved oxygen, air temperature, water temperature, pH, salinity and transparency. Volunteers are encouraged to sample a tidal saltwater site, monthly, to establish valuable data on baseline conditions of your waterbody. Individuals must pass an open book exam to become a certified volunteer and be able to enter data into the publicly accessible database.

The field part of the workshops happen rain or shine. Please bring rain boots/old shoes, a reusable water bottle and snacks if desired.

www.scadoptastream.org



ESTUARY TRENDS

Weather & Water Quality Highlights from 2019

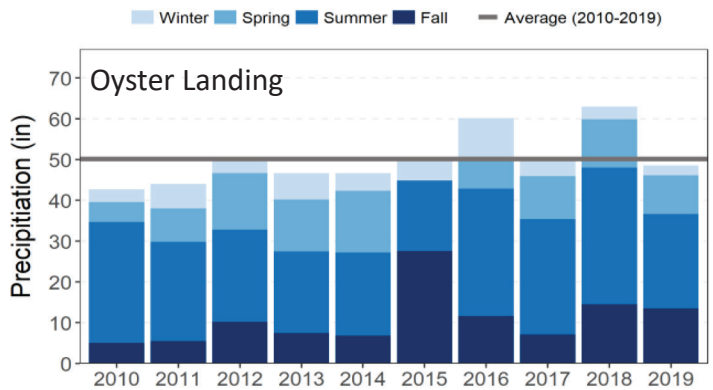
The health of every National Estuarine Research Reserve is continuously monitored by the System Wide Monitoring Program (SWMP). This program is designed to measure changes in estuarine water quality, habitat and land use and provide information on environmental trends. Reserve generated data and information are available to local citizens and decision makers. For more information, go to: <https://coast.noaa.gov/nerrs/>



The NIWB Reserve has five sampling sites, two in Winyah Bay and three in North Inlet. From left to right: Winyah Bay, Thousand Acre, Debidue Creek, Oyster Landing and Clambank Landing.

Analysis of 2019 data showed that...

- ◆ In 2019, we had almost exactly the same amount of rainfall as the long term average
- ◆ Winyah Bay's watershed also had relatively lower rainfall, leading to higher salinity during the Fall
- ◆ pH is decreasing at three of four sampling stations
- ◆ Chlorophyll-a is increasing in North Inlet but not in Winyah Bay



Trends in weather and water quality from 2010 to 2019...

Location ID	Location Name	Air Temperature	Precipitation	Water Temperature	Salinity	Dissolved Oxygen	pH	Turbidity	Ortho-phosphate	Ammonium	Nitrite	Nitrate	Chlorophyll-a
OL	Oyster Landing	↑	—	—	—	—	—	—	—	—	—	—	—
CB	Clambank	—	—	—	↓	—	—	↑	—	↑	—	—	↑
DC	Debidue Creek	↑	—	↑	↓	↓	↓	—	—	↑	—	—	↑
OL	Oyster Landing	↑	—	↑	↓	—	↓	—	—	↑	—	—	↑
TA	Thousand Acre	↑	—	↑	↓	—	↓	—	—	—	—	—	—
CB	Clambank	—	—	—	—	—	—	—	—	—	—	—	↑
DC	Debidue Creek	—	—	—	—	—	—	—	—	—	—	—	↑
OL	Oyster Landing	—	—	—	—	—	—	—	—	—	—	—	↑
TA	Thousand Acre	—	—	—	—	—	—	—	—	—	—	—	↑

*Based on data collected from 2010-2019

= Precipitation is not changing. Rainfall in 2019 was just below the long-term average.

↑ Air Temperature is increasing.

= Dissolved Oxygen is not changing at three station. Most of the measurements vary between the fair to good range with poor values observed in the summer.

↓ Salinity is decreasing at all stations.

Did you Know?

You can see real-time data from any of the NERRS around the country at www.nerrsdata.org/mobile

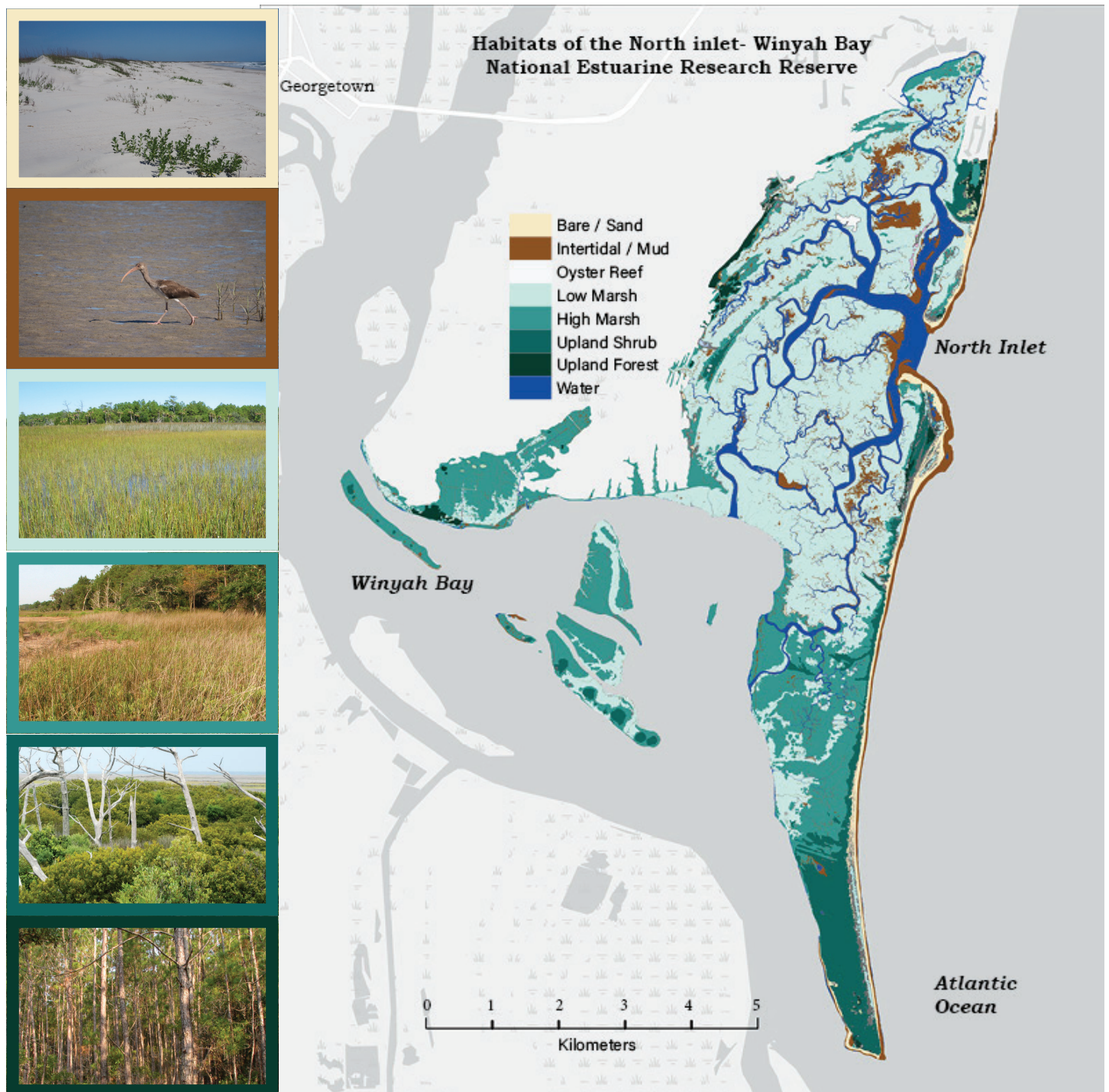
X Insufficient Data ↑ Increasing — Not Changing ↓ Decreasing



HABITATS

Revised Reserve Habitat Map

Working with the NOAA Office for Coastal Management, the NIWB NERR habitat map was updated using 2017 NAIP imagery, elevation data, and low tide imagery to refine and reclassify much of the wetland habitat areas. The 2017 map cannot be used with the previous map to assess habitat change due to differences in methodologies used to create the maps. However, the methods used to create the 2017 map should be replicable with future imagery so that change analysis can be performed. The updated habitat delineations will be used to create new map products for the reserve.



North Inlet-Winyah Bay National Estuarine Research Reserve

The **North Inlet-Winyah Bay National Estuarine Research Reserve** includes North Inlet and lower Winyah Bay and encompasses tidal marshes, oyster reefs, beaches, coastal forest, and open water. This reserve provides habitat for many species, including federally threatened and endangered sea turtles, sturgeon, red knots, and wood storks.



The reserve conducts research and provides education programs needed by communities to conserve and manage coastal resources. Primary focus areas include impacts of urbanization and stormwater management on coastal water quality, effects of climate variability on natural and human coastal communities, and monitoring and actions to protect biodiversity.

The reserve headquarters is located at the Baruch Marine Field Laboratory on Hobcaw Barony. Daily oversight is provided by the Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina. NOAA's Office for Coastal Management provides funding, national guidance, and technical assistance.



The nation's 29 research reserves protect over 1.3 million acres and provide habitat where plants and wildlife thrive. Community benefits include recreation, flood protection, and water filtration.



North Inlet-Winyah Bay National Estuarine Research Reserve

www.northinlet.sc.edu

