

2023 Ocean Literacy Summit Welcome

Welcome to the 9th biennial NEOSEC Ocean Literacy Summit. Our first summit in 2006 introduced the Ocean Literacy Principles. Each of the 7 summits following focused on a specific Ocean Literacy principle. This summit we are focusing on ways to connect climate, community, and coasts across New England, so that we may inspire and learn from one another in ways applicable to the communities we live and work in. Please look for the Ocean Literacy connections handout that lists the Essential Principles and Fundamental Concepts of Ocean Literacy that are addressed by presentations in this Summit.

The Ocean Literacy Summits move around New England and we are proud to bring everyone together this year in Gloucester, MA during their 400+ anniversary celebration that acknowledges that native people have cared for this land long before colonists settled here. NEOSEC is actively working to create inclusive and equitable environments in ocean science and education where multiple ways of knowing are valued and everyone is welcomed to share their connection with the Ocean.

Sincerely,
the Ocean Literacy Summit Planning Committee

Aimee Bonanno
Bob Chen
Linda McIntosh
Holly Morin
Sierra Munoz

Diana Payne
Val Perini
Nina Quaratella
Nicki Rosenfeld
Kristen Smith

Megan Strand
Cassie Stymiest
Meredyth Sullivan
Theresa Torrent
Brian Yurasits

Summit Sponsors

Many thanks to our wonderful Sponsors. You make the work of NEOSEC and promoting ocean literacy possible.



2023 Ocean Literacy Summit Agenda

Date : **November 15 - 17, 2023**

Place : **Gloucester, MA**

Wednesday, November 15

5 - 8 pm

- Come meet and hang out with like minded ocean stewards
- Ocean Trivia at 6:30 pm
- Appetizers provided, cash bar

Great Marsh Brewing Company

99 Main St, Essex, MA

Thursday, November 16

8:30 am - 5 pm

8:30 am	Registration	Registration and Morning Beverages
9- 9:15 am	Welcome & Keynote	Welcome and Keynote Address by Gayle Bowness, Municipal Climate Action Program Manager, Gulf of Maine Research Institute: <i>Assessing Coastal Flood Risk with Communities</i>
10 am	Immersive Diversity Panel	An immersive storytelling session on diverse perspectives in ocean science and their importance. Led by Ryan Campos, Patrick Flanagan, Faye Thomas and Alex DeCiccio from University of Rhode Island.
11 am	Lightning talks Posters	Our networking and poster hour will start with a few short talks in the ballroom followed by time to connect with poster presenters and exhibitors.
12 pm	Lunch	Join us in the Ballroom for lunch and networking.
1 - 4:50 pm	Concurrent Sessions	During the afternoon we will have contributed talks in 3 rooms at once. See detailed schedule on next page.
4:50 pm	Closing Remarks	Ending thoughts, wrap up, and evening suggestions

Beauport Hotel

55 Commercial St, Gloucester, MA

Friday, November 17

- Maritime Gloucester
- Cape Ann Museum
- Gloucester Marine Genomics Institute
- The Trustees - The Crane Estate
- Seacoast Science Center
- Mass Audubon Joppa Flats

Field Trips! Various locations and times - See website for details

Thursday Morning

Date : **November 16, 2023**

Time: **9 am to 11 am**

Welcome & Keynote

Ballroom

9:00 am Welcome to the 2023 Ocean Literacy Summit
Nicki Rosenfeld, NEOSEC Chair, Maritime Aquarium of Norwalk
Aimee Bonanno, NEOSEC Program Manager

9:15 am Assessing Coastal Flood Risk with Communities
Gayle Bowness, Municipal Climate Action Program Manager,
Gulf of Maine Research Institute

Sea-level rise is driving more frequent and widespread coastal flooding along Maine's ~5,400 miles of tidally influenced coastline, and communities face an urgent need to adapt. Maine faces significant barriers to building coastal flood resilience due to (1) sparse tide gauge coverage and observation-based flood thresholds; and (2) the limited community capacity to leverage data to support coastal planning and resilience. To address these barriers, the Gulf of Maine Research Institute is partnering with community-based organizations, educators (students), municipal leaders and resilience practitioners to implement a community-science project that includes innovative technology and intergenerational engagement to generate local data and build capacity for climate action. We believe that all these groups need to be participants in building community resilience – particularly youth, as climate change is a problem that spans lifetimes and thus requires methods that invite intergenerational knowledge and values. We'll share our approach to connecting communities with coastal research and elevating youth voice in the municipal-planning process.

Immersive Diversity Panel

Ballroom

10:00 am Is there an Ethical Process to Co-creating in Communities of Color?
Ryan Campos, Patrick Flanagan, Faye Thomas and Alex
DeCiccio, University of Rhode Island

This session will examine the issue of "parachute science," curation, creation, and other forms of extractive, transactional practices in vulnerable communities. To focus the conversation, the session panelists will share their experiences working on "Oceans Tell Stories Through People" and "Water Tells Stories Through People," which are a series of storytelling events that center local storytellers who examine the intersection between historical racialized oppression and injustice and various environmental problems in their communities. The session participants will hear how the events' creators, artists, and facilitators have evolved their process, intentions, and the philosophical underpinnings, throughout their journey to establish a mutually supportive ethical process towards co-creating storytelling events about scientific and environmental issues in communities and spaces of color.

Lightning Talks and Posters

Date : **November 16, 2023**

Time: **11 am to 12 pm**

All presenters below will be presenting posters. Some of the presenters will be giving a short introduction to their posters with a three minute lightning talk.

3-minute Lightning Talks

Ballroom

- 11:00 am HAB Science in the classroom: improving ocean literacy through educational activities on harmful algal blooms
Mindy Richlen, Woods Hole Oceanographic Institution
- Middle School Curriculum: Models, Food Webs and a Warming Gulf of Maine
Robin Lea, Gulf of Maine Research Institute
- Marine Food Webs on the Web: Online Gamification of Marine Science Through "TinySea"
Sierra Munoz, Northeastern University Marine Science Center
- Visualizing Sea Level Rise on Cape Cod
Cheryl Milliken, Falmouth High School
- Plum Island A Case Study for Sea Level Rise.
Bill Sargent, science writer, Brandeis University Press
- World Ocean Explorer: A Virtual Aquarium Project
Trisha Badger, World Ocean Observatory
- Marching Towards Change: A "Learn – Do – Lead" Approach to Marine Science Education
Kristin Osborne, Massachusetts Maritime Academy

Posters

Ballroom

- 11:30 am Treatment of Frozen Fish Tissue with EDTA Decreases DNA Degradation
Ella Messer, Northeastern University
- EDTA, EtOH, and NaCl: the inhibition of the nucleases for the preservation of marine species DNA
Molly Johnson, Ocean Genome Legacy Center
- Advancing ocean literacy using an oceanarium located in the prairies
Kathryn Hanson, Minnesota State University Moorhead

Concurrent Sessions

November 16, 2023

1pm to 4:50 pm

COMMUNITY CONNECTIONS

BALLROOM



CLIMATE CONNECTIONS

HARBOR ROOM 1

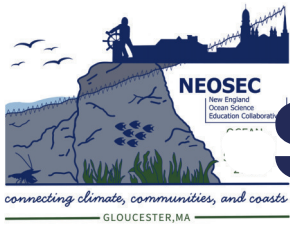


CLASSROOM CONNECTIONS

PAVILLION



1:00	<p>A New Path for Connecting Communities through Research and Education - Samantha McFarland, Center for Coastal Studies, Jesse Mechling, Center for Coastal Studies, and Joseph Dellicarpini, NWS Boston/Norton, MA</p>	<p>Exploring STEAM Careers: the Missing Link - Barbara Passero, Meadowsclaping for Biodiversity</p> <p>Open Inquiry and Urban Waterways - Mollie Thurman, Biobus</p> <p>What does UDL look like in a salt marsh? - Grace Ballou</p>	<p>Student Drifters in the Classroom - Erin Pelletier, Gulf of Maine Lobster Foundation</p> <p>Investigating Plastic Pollution in our Waterways from Four Maine Classrooms - Diana Allen & Kate Strait, Sanford Middle School</p> <p>STREAM to Sanctuary: a collaboration with Stellwagen Bank NMS - Jack Buckley, Cohasset Center for Student Centered Research</p>
2:00	<p>SEA's New Directions: Fully Coastal Undergraduate Programs to Increase Connections with Coastal Communities - Heather Page and Craig Marin, Sea Education Association</p>	<p>The Ship that Wrecked Twice! Using Marine Archaeology to Communicate about our Changing Coasts - David Robinson, MA Board of Underwater Archeological Resources and Val Perini, the Trustees</p>	<p>Seaweed in the Classroom: A Program to Grow Seaweed Aquaculture Literacy in K-12 Audiences in Maine - Keri Kaczor, Maine Sea Grant</p> <p>Climate Change and Seafloor Ecology, bringing the deep ocean into the classroom - Christopher Clauss, Ocean Exploration Trust</p>
3:00	<p>Shellfish aquaculture and wild harvest in Massachusetts - cooperative research and community education - Grace Simpkins, WHOI Sea Grant, and Abigail Archer, Cape Cod Cooperative Extension</p>	<p>Navigating Resources: Using Illustrated Children's Books as Classroom Texts on Climate Change - Lauren Rader, Buckingham Browne & Nichols School, and Rochelle Strauss, Children's author</p>	<p>The NOAA B-Wet Tacklebox: Resources for Teaching Experiential Education in Alternative School Settings - Nina Quaratella & Megan Strand, New England Science & Sailing Foundation (NESS) - UPDATED 11/15</p>
4:00	<p>Waterways: Connecting Residents of Roxbury and Dorchester to Boston's Waterfront - Laila Pearson, The American City Coalition</p> <p>Connecting with community for Gloucester's 400+ celebrations - Miranda Aisling, Cape Ann Museum</p>	<p>Fractured Food Webs: Winners and Losers in the Gulf of Maine - Mary Cerullo, Writer, retired from Friends of Casco Bay - CANCELLED</p> <p>NOAA Ocean Acidification Resources and Listening Session - Natalie Lord, NOAA Ocean Acidification Program</p>	<p>Student Explorations: The Great Marsh and Climate Change - Susan Quateman, SQ & LB Artist Collaboration, Rebecca Schwer, River Valley Charter School, Heather McIntosh, Parker River National Wildlife Refuge, and Lisa Smith, Filmmaker</p>



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Ocean Conservators

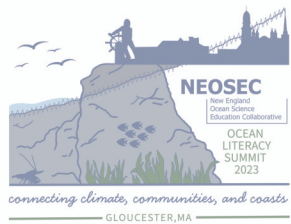


Ocean Stewards



Ocean Literate





Lightning Talks

ABSTRACTS

November 16, 2023

11 to 11:30 am

All presenters below will be presenting posters. Some of the presenters will be giving a short introduction to their posters with a three minute lightning talk.

3-minute Lightning Talks

Ballroom

11:00 am **HAB Science in the classroom: improving ocean literacy through educational activities on harmful algal blooms**
Mindy Richlen, Woods Hole Oceanographic Institution

Life on earth depends on our oceans, which supply most of the Earth's oxygen, regulate weather and climate, and provide food, jobs, and medicine. Given the dependence of human welfare on ocean systems and health, understanding key concepts in ocean literacy is critical for sound decision-making on the management and sustainability of marine resources. Here, we provide multiple examples of K-12 activities that we have developed to teach students about the linkages among HABs, ocean health, and human health. Each activity fulfills multiple science education standards as well as several Ocean Literacy principles. Materials adapted for visually impaired students are described in all activities to facilitate full participation of a community of students often overlooked in ocean science. Specifications for tactile teaching aids include 3D printed models of several dinoflagellate and diatom species associated with HABs, raised-line drawings and graphs for data interpretation, molecular models, and braille captioning. The ultimate goal of these educational efforts is to encourage students to have a greater understanding of the connection between ocean and human health, and to inspire them to consider STEM careers.

Middle School Curriculum: Models, Food Webs and a Warming Gulf of Maine
Robin Lea, Gulf of Maine Research Institute

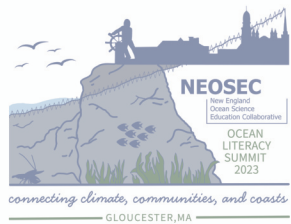
How do scientists use models to understand what is happening in an ecosystem? How is the marine food web changing as a result of warming ocean waters in the Gulf of Maine? Come learn about a new middle school curriculum from the Gulf of Maine Research Institute that asks students to explore some of the potential impacts and consequences that climate change, and specifically warming oceans, will have on marine ecosystems.

Marine Food Webs on the Web: Online Gamification of Marine Science Through "TinySea"
Sierra Munoz, Northeastern University Marine Science Center

"How can we teach students about ocean habitats from behind a screen? Visit our poster to learn about TinySea, a collaboration between the Northeastern University Marine Science Center Outreach team and several research labs to create a browser-based game for middle school students exploring sustainable multitrophic aquaculture systems under changing environmental conditions. Try out the game and give us feedback on how this could be used in your classroom!"

Visualizing Sea Level Rise on Cape Cod
Cheryl Milliken, Falmouth High School

Students in Falmouth High School's Marine Ecology class developed a proposal to install visuals to help the public understand sea level rise (SLR) and its implications in Falmouth. Falmouth can expect to see an increase in frequency and intensity of storms and localized flooding is already a problem, and education and awareness are key to resilience. Students came up with a number of visual representations to install in a few highly visible sites around town.



Lightning Talks

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3-minute Lightning Talks

Ballroom

11:00 am Plum Island A Case Study for Sea Level Rise.
Bill Sargent, science writer, Brandeis University Press

Lecture Plum Island and Beyond; Sea Level Rise in a Warming World. Bill Sargent is a NOVA consultant and award winning author of 27 books about science and the environment. For the past 5 years he has been using Plum Island as a case study for sea level rise. In this talk he will be taking questions and talking about all his books on Plum Island, Cape Cod, New Orleans, Sea Level rise and the Merrimack River.

World Ocean Explorer: A Virtual Aquarium Project
Trisha Badger, World Ocean Observatory

The W2O team would like to come present and share our new virtual aquarium which is a free resource for all educators and their students to learn about ocean systems in a variety of virtual exhibits including DEEP SEA, CORAL REEFS, POLAR REGIONS and more. Through passage among the displays, 3D models and interactive exhibits, the experience of an aquarium visit will be brought into classrooms or home school environments as an accessible, always available and free opportunity for teaching and learning. Ease-of-access sheets and direct links to teacher-tested curriculum will run throughout the aquarium.

Marching Towards Change: A "Learn – Do – Lead" Approach to
Marine Science Education
Kristin Osborne, Massachusetts Maritime Academy

Massachusetts Maritime Academy (MMA) is one of the nation's top maritime undergraduate institutions. The foundation of the MMA motto "Learn – Do – Lead" is the regiment of cadets. Students can pursue bachelor of science degrees in Marine Science, Emergency Management, Marine Engineering, and more while also participating in the "leadership laboratory" of the regiment, which provides them invaluable professional and interpersonal skills required in the workplace. The Marine Science, Safety, and Environmental Protection (MSSEP) curriculum enables students to build their resume before graduation, making them highly sought after in many fields. MMA's 79% graduation rate and 85% employment rate 6 months after graduation is strongly tied to the "Learn – Do – Lead" approach that we employ to prepare our environmental leaders of tomorrow.

All presenters below will be presenting posters. Some of the presenters will be giving a short introduction to their posters with a three minute lightning talk.

Posters

Ballroom

11:30 am Treatment of Frozen Fish Tissue with EDTA Decreases DNA Degradation
Ella Messer, Northeastern University

As anthropogenic threats endanger marine species and ecosystems, preserving DNA from marine organisms has become increasingly important. Cryostorage is perceived as the most reliable and versatile storage method for preserving biomolecules in tissue samples. We tested whether thawing tissues into chemical preservatives improved either the percent of high molecular weight DNA recovered (%R) or the normalized yield of high molecular weight DNA (nY), as compared to extracting DNA directly from frozen tissues. The results suggest that treatment of frozen fish tissue with EDTA prior to DNA extraction may improve the quality of DNA recovered. This finding will help to preserve the wealth of information contained within the DNA of frozen specimens.

EDTA, EtOH, and NaCl: the inhibition of the nucleases for the preservation of marine species
DNA

Molly Johnson, Ocean Genome Legacy Center

Many research applications require high molecular weight (HMW) DNA, here defined as fragments of DNA over 10 kb in length. However, common preservatives are variable in their ability to prevent degradation of HMW DNA in tissue samples. Some common preservative components include EDTA, EtOH, and NaCl. These three components were tested both independently and in combination to determine which gives the best yields of HMW DNA. Eight samples were collected from ten individuals of three marine species (*Mytilus edulis*, *Glycera capitata*, *Alitta virens*). The results suggest that treating tissue samples with solutions containing EDTA may improve the quality of DNA extracted from stored samples. As EDTA is stable at room temperature, this method of preservation is beneficial for scientists conducting research with limited resources as it provides an inexpensive and non-intensive option for yielding HMW DNA from marine samples.

Advancing ocean literacy using an oceanarium located in the prairies
Kathryn Hanson, Minnesota State University Moorhead

Understanding human reliance on a healthy biosphere and the negative impacts that human activities have on ecosystem function is the basis of environmental literacy. Oceanic processes are integral to ecological interactions that sustain the planet's biodiversity, including human life. Thus, the foundation of environmental literacy is Ocean Literacy. The Moorhead/Fargo community located on the state border between Minnesota and North Dakota (1427 miles east of Seattle, 1622 miles west of Boston, 1450 miles north of New Orleans), is perhaps an unlikely place to initiate a public education effort about ocean literacy, but inland locations are critical to the national effort because local residents do not often interact with a marine ecosystem directly. Here, we report the results of a summer program for youth aged 9-14 called Junior Aquarists Camp for Kids (JACK) offered at the Minnesota State University Moorhead Oceanarium that reinforced the tenets of ocean literacy. Before-after assessments of their knowledge showed a 26% increase in performance on a standardized questionnaire about ocean literacy.

Community Connections

Ballroom

1:00 pm A New Path for Connecting Communities through Research and Education
Samantha McFarland, Center for Coastal Studies
Jesse Mechling, Center for Coastal Studies
~~Joseph Dellicarpini, NWS Boston / Norton, MA - UNABLE TO ATTEND~~

Coastal resiliency can be weakened when conflicting strategies to shoreline management are implemented by neighboring communities. Since 2019 four adjacent towns have been working together to maximize the resiliency of Eastern Cape Cod Bay by pursuing a regional shoreline management approach focused on synergistic techniques. As a result, multiple resources have been developed to support local coastal managers, including an open data hub integrating fine-scale local data related to shoreline stabilization, sediment transport, low-lying roads and flooding hazards, salt marsh migration, beach nourishment activities and dredging. The Outer Cape Shoreline Management Data Hub is built around the idea that a basic understanding of the science associated with local and regional coastal processes is fundamental to a resource-based approach to shoreline management and that the ability to visualize and communicate that science clearly will assist town staff in their assessments of current shoreline conditions. This will be a joint presentation by Data Hub creator, Samantha McFarland and marine education director, Jesse Mechling on how the Outer Cape Shoreline Management Data Hub can be brought into classrooms.

2:00 pm SEA's New Directions: Fully Coastal Undergraduate Programs to Increase Connections with Coastal Communities
Heather Page and Craig Marin, Sea Education Association

SEA has been taking students to sea for over 50 years to educate and inspire the next generation of ocean scholars and leaders. The undergraduate semester-long study abroad programs include interdisciplinary courses in ocean studies and experiential learning through independent and collaborative oceanography research at sea. While at-sea programs offer invaluable hands-on learning experiences in oceanography, there are limited opportunities to engage with local coastal communities and develop meaningful, long-lasting collaborations (i.e., to minimize parachute science). Additionally, undergraduate students increasingly express desire to do research that benefits coastal communities. This year, SEA will be offering a fully shore-based undergraduate program called Coral Reef Conservation: Caribbean. This program will include interdisciplinary courses with a primary focus on scientific research, connections between coastal communities and coral reefs, and environmental communication. This new model of ocean field-based programs at SEA will promote equity and inclusion through connections between communities and coasts.

3:00 pm Shellfish aquaculture and wild harvest in Massachusetts – cooperative research and community education
Grace Simpkins, WHOI Sea Grant
Abigail Archer, Cape Cod Cooperative Extension

Shellfish such as oysters, quahogs, and scallops are valuable resources on Cape Cod that are recreationally harvested as well as farmed. We recognize the important role of science education in supporting, promoting, and coordinating formal and informal educational activities at all levels to enhance public awareness and understanding of these valuable coastal and marine resources. Come try out the shellfish matching game of sustainably harvested shellfish species on Cape Cod. Hear about our Fundamentals of Shellfish Farming Class that has been offered to prospective farmers for over 2 decades. Take a sneak peek at the informative signage that will be placed around the Cape to give insider information about the aquaculture farm you are viewing. All of these efforts help promote sustainable use of our coastal resources.

Community Connections

Ballroom

4:00 pm Waterways: Connecting Residents of Roxbury and Dorchester to Boston's Waterfront
Laila Pearson, The American City Coalition

The American City Coalition (TACC) is a non-profit based in Boston's Roxbury neighborhood. TACC interweaves community-based research with programming to inform advocacy and shape policy. Launched in 2018, Waterways: Connecting Residents of Roxbury and Dorchester to Boston's Waterfront is one such interconnected programming initiative, which seeks to increase the connection that Black and brown Bostonians, specifically from Dorchester and Roxbury, have with Boston's waterfront. By developing community relationships, targeting resident-identified barriers to accessing the waterfront, and fostering resident advocacy, TACC works to better ensure the waterfront is a more inclusive space and that the waterfront's evolution reflects the needs and interests of Black and brown Bostonians. TACC's Community Engagement Coordinator will share the origin and methods of the initiative, as well as its impacts and future directions.

Connecting with community for Gloucester's 400+ celebrations
Miranda Aisling, Cape Ann Museum

Hear about two initiatives from the Cape Ann Museum that use local maritime histories to engage audiences: Native Waters; Native Lands, a public art installation featuring a wetu (traditional home) and mush8n (traditional canoe) and Cassie the Sea Serpent, a family-friendly gallery guide based on the legend of the Cape Ann Sea Serpent.

Climate Connections



Harbor Room 1

1:00 pm Exploring STEAM Careers: the Missing Link
Barbara Passero, Meadowsaping for Biodiversity

Since historical times, along the coasts of North America including the United States and Canada, people have worked in hundreds of STEM careers. But finding out about these careers, their background requirements and benefits, can be difficult. Exploring Careers provides the "missing link" for middle school students between looking for a career and finding one. Attend this workshop to find out what the "link" is.

Open Inquiry and Urban Waterways
Mollie Thurman, Biobus

Over a decade of working at BioBus in New York City and now Boston has provided opportunities to iterate on curriculum ideas for incorporating student voices into a classroom designed to ask questions about the urban waterfront. The presentation will include student and scientific outcomes as well as best practices for using space and scientific tools to inspire open inquiry.

What does UDL look like in a salt marsh?
Grace Ballou

NH Sea Grant Extension have collaborated with a team of middle school teachers to bring students to the salt marsh surrounding their school to gain hands-on research experience and connect with their local salt marsh. While there are many aspects of this project I'd like to talk about, I'll focus on how we've integrated Universal Design of Learning (UDL) framework into our classroom and field programs. (UDL aims to create an inclusive and accessible learning environment for everyone). I'll share specific techniques and practices during my presentation that we have used in the field or classroom with students.

2:00 pm The Ship that Wrecked Twice! Using Marine Archaeology to Communicate about our
Changing Coasts
David Robinson, MA Board of Underwater Archeological Resources
Val Perini, the Trustees

New England is home to hundreds of shipwrecks, and these archaeological resources are under threat as our climate and coast changes. Join marine archaeologist David Robinson and coastal educator Val Perini to learn the fascinating tale of the schooner Ada K Damon which wrecked on Steep Hill Beach in Ipswich in 1909. After laying buried in the sand for nearly a century, the ship emerged around 2000 and was used as an educational tool before being wrecked again by Hurricane Teddy in 2020. Since then, The Trustees and BUAR have collaborated to develop educational programs that share the story of this historic schooner and the eroding coastline it calls home.

Climate Connections



Harbor Room 1

3:00 pm Navigating Resources: Using Illustrated Children’s Books as Classroom Texts on Climate Change

Lauren Rader, Buckingham Browne & Nichols School
 Rochelle Strauss, Children’s author

Children’s science writers specialize in making STEM accessible and engrossing. Their books illuminate complex topics surrounding nature and the environment, educating readers of all ages while empowering action. In this session join award-winning author Rochelle Strauss (*The Global Ocean, One Well: The Story of Water on Earth*, and *Tree of Life: The Incredible Biodiversity of Life on Earth*) as she shares how to build ocean literacy through narrative non-fiction children’s books and inspires educators to explore non-fiction books as a valuable educational resource. As a joint session with educator Lauren Rader, participants will also hear first-hand how successful collaborations can be fostered between classroom educators and authors, to create effective and meaningful educational experiences that build awareness about the ocean and climate and empower young people to take ocean and climate action.

4:00 pm ~~Fractured Food Webs: Winners and Losers in the Gulf of Maine~~
~~Mary Cerullo, Writer, retired from Friends of Casco Bay~~

SESSION CANCELLED, BUT MARY HAS PROVIDED LINKS TO SHARE

~~Climate change is already impacting our marine life through warming temperatures, increasing acidity, new predators, and changes in food supply. Those changes may be good for some and bad for others. This activity introduces the marine food web and why it is changing through a Bingo game on Winners and Losers in the Gulf of Maine.~~

NOAA Ocean Acidification Resources and Listening Session
 Natalie Lord, NOAA Ocean Acidification Program

The NOAA Ocean Acidification Program (OAP) advances ocean acidification science, education and outreach. This presentation will cover three main components. First, the NOAA ocean acidification resource collection, with curriculum specific to New England marine ecosystems. Second, a brief presentation on evaluating marine science education materials and finally a brief listening session to hear from our audiences about their needs for ocean acidification education. As our knowledge about our changing oceans has advanced, so has the needs of audiences around the nation. We are assessing nationwide stakeholder needs via listening sessions to identify gaps, priorities, and the ways in which we can support people impacted by ocean and coastal acidification. The listening sessions help us understand your priorities and needs, how ocean acidification and ocean change intersect, and how we can best support you through education and outreach projects and initiatives!

Classroom Connections

Pavillion

1:00 pm Student Drifters in the Classroom
Erin Pelletier, Gulf of Maine Lobster Foundation

Student Drifters is an educational program for formal and informal learning that investigates ocean circulation through hands-on science! Students take an active role in understanding basic oceanography by building a drifter, collecting its real-time data across the ocean, and mapping the drifters track. The educational program includes a kit with supplies, construction manual and lesson plans to use with your students.

Investigating Plastic Pollution in our Waterways from Four Maine Classrooms
Diana Allen & Kate Strait, Sanford Middle School

Four teachers from Maine with a passion about educating our students on climate change, plastic pollution and keeping our waterways healthy used the Marine Debris Tracker app to collect pollution data. Other forms of investigation were also performed. This will be an ongoing and expanding investigation.

STREAM to Sanctuary: a collaboration with Stellwagen Bank NMS
Jack Buckley, Cohasset Center for Student Centered Research

Semester at C

2:00 pm Seaweed in the Classroom: A Program to Grow Seaweed Aquaculture Literacy in K-12
Audiences in Maine
Keri Kaczor, Maine Sea Grant

Maine's working waterfronts are diversifying, and forging innovative businesses and dynamic supply chains are key to the future resiliency of Maine's marine economy. This collaborative project, led by the Maine Aquaculture Innovation Center (MAIC), and funded by the World Wildlife Fund, increases seaweed aquaculture literacy and builds career aspirations into K-12 classrooms. Project themes include the history of seaweed use globally, seaweed biology and ecology, how seaweed is a sustainable, highly-nutritious food source, its role in providing income and food security, its contributions to solutions for a changing climate, and how seaweed stabilizing our fishing communities and helps preserve our working waterfronts. Activities include an Educator's Webinar, Professional Development Workshop, and distributing books, curriculum, activities and other relevant resources to all 5th grade science teachers in Maine. The project's impacts and accomplishments, including lessons learned and future directions will also be shared.

Climate Change and Seafloor Ecology, bringing the deep ocean into the classroom
Christopher Clauss, Ocean Exploration Trust

Ocean Exploration Trust with E/V Nautilus explore locations of the seafloor never before seen, allowing scientists first hand access to data and video of remote areas with vastly different ecosystems. Using ROV exploration and live streaming the dives, OET provides invaluable information to researchers worldwide and gives the public a view into deep sea exploration through live streams and ship-to-shore interactions with classrooms and science centers with the Corps of Exploration. The Nautiluslive.org website provides free ocean education curriculum materials appropriate for learners at the full range of learning levels, as well as providing ship-to-shore interactions with explorers in the field, in which the symposium audience will be able to participate. Depending on the language backgrounds of each expedition's crew, interactions can be offered in a number of languages, including 'Ōlelo Hawai'i and American Sign Language. In recent years interactions have been opened up to Deaf audiences, and in 2023 ASL resources were produced, including an "ocean sign of the day" series on social media and an ASL video educational tool describing the mosaic of elements and careers involved in making deep sea exploration possible.

Classroom Connections

Pavillion

3:00 pm The NOAA B-Wet Tacklebox: Resources for Teaching Experiential Education in Alternative School Settings

Nina Quaratella & Megan Strand, New England Science & Sailing Foundation (NESS)

This session will highlight developed resources and best practices identified through a partnership between NESS and Natchaug Clinical Treatment Day Schools. Through a research cohort of alternative school teachers, in tandem with hands-on student programming in-school and on the water, we have identified best practices of delivering experiential programming focused on academic growth and social and emotional learning. We will dive into the activities and free lesson plans that have come out of the teacher research cohort, as well as review the program takeaways.

4:00 pm Student Explorations: The Great Marsh and Climate Change

Susan Quateman, SQ & LB Artist Collaboration

Rebecca Schwer, River Valley Charter School

Heather McIntosh, Parker River National Wildlife Refuge

Lisa Smith, Filmmaker

The 'Student Explorations: the Great Marsh and Climate Change' science and art project is a collaboration between a science teacher and an art teacher. It involves 7-8th grade students from the River Valley Charter School and scientists from the Parker River National Wildlife Refuge, and Greenbelt. A filmmaker produced a 13 minute film on the entire project, 'Charting Student Explorations: the Great Marsh and Climate Change,' to which will be shown during the presentation. The students' own voices, approach to science and understanding of how to communicate science through art, shine throughout the film. The goal of the project is to inspire other schools/art and science teachers, to create art/science projects on the Great Marsh.

Field Trips

Date : **November 17, 2023**

Time: **between 9am to 6pm**

Cape Ann Museum Two tours: 9 -11 am or 11 am - 1 pm

Description: A fishing museum as well as an art museum, join docents from The Cape Ann Museum for a tour of the Maritime & Fisheries galleries. The collection includes Jim Hooper's portraits of Gloucester's Working Waterfront, a First Order Fresnel Lens, Howard Blackburn's ship, Alfred Johnson's modified dory, and much more! A hands-on activity will complement the tour - fish-prints! Located in the oldest fishing port in America, Cape Ann Museum is committed to preserving the stories all relating to a single remarkable place.

Capacity: 40 (min. 6)

Notes: The Museum is fully wheelchair accessible with ramps, two extra chairs on site, and elevators.

Getting there: 27 Pleasant Street, Gloucester, MA
The Cape Ann Museum is a 0.5 mile walk up a gentle hill from The Beauport Hotel, or a 4 minute drive.

<https://home.capeannmuseum.org/>

Maritime Gloucester Two tours: 9 -11 am or 11 am - 1 pm

Description: The mission of Maritime Gloucester is to inspire students and visitors to value maritime heritage, marine science, and environmental stewardship through hands-on education and experiences. Take a guided tour of Maritime Gloucester's campus (some outside, weather permitting), Museum, and brand new Maritime Science Education Center (~30-45 min); Partake in a Plankton Lab where you will observe and identify different species of local marine plankton under microscopes (~15-20 minutes) and a guided dissection of either squid or oysters (~30min).

Capacity: 30 (min. 10)

Notes: Some of the tour will take place outdoors, weather permitting. Most of the facility is wheelchair accessible.

Getting there: 23 Harbor Loop, Gloucester, MA

If the weather is nice, Maritime Gloucester is within walking distance of the Beauport Hotel (0.6 mile, mostly flat); There is a parking lot and parking along Harbor Loop for those with a car; Cape Ann Transportation Authority (CATA) offers an on-demand transit service for a small fee.

<https://www.maritimegloucester.org/>

Field Trips

Date : **November 17, 2023**

Time: **between 9 am to 6 pm**

Gloucester Marine Genomics Institute

9 -10:30 am

Description: *This field trip will visit two different sites* GMGI addresses critical challenges facing our oceans, human health and the environment through innovative scientific research and education. Meet and begin the tour at Gloucester Biotechnology Academy, the educational entity of GMGI. Learn about the unique biotechnology and biomanufacturing learning environment where students with a high school diploma or equivalent receive hands-on training for professional careers as lab technicians (30 minutes). Then head to GMGI's headquarters and Research Institute on the Harbor (less than 5 min drive) where a research scientist will lead a tour through their marine genomics laboratory (30 minutes).

Capacity: 15

Notes: Both buildings are ADA accessible.

Getting there: Gloucester Biotechnology Academy (55 Blackburn Drive Gloucester, MA) and GMGI headquarters (417 Main Street, Gloucester MA, 01930)

The Gloucester Biotechnology Academy is about 2.4 miles from the Beauport Hotel, and about 1.6 miles from the Research Institute. Driving, carpooling, or taxi are recommended. Ample parking is available.

<https://gmgi.org/>

The Trustees - The Crane Estate

11 am - 2 pm

Description: The Trustees of Reservations is here to protect and share the Massachusetts places people love for their exceptional scenic, historic, and ecological value. Join us for a 2.5-hour guided hike with hands-on activities, exploring the salt marsh, dunes, and beachfront habitats of our 2100 acre outdoor classroom at The Crane Estate in Ipswich. Participants will learn techniques for engaging learners in the outdoors, and get an overview of the coastal management strategies The Trustees are implementing to increase coastal resilience on our properties. Participants should dress for the weather and be prepared for a 2-3 mile hike across unpaved trails and soft sand with moderate elevation gain.

Capacity: 20 (min. 5)

Notes: This field trip is mostly outdoors (weather permitting) and involves hiking 2-3 miles. We will start with an indoor presentation then head outside. The facility and indoor presentation portion are ADA accessible.

Getting there: 290 Argilla Road, Ipswich, MA 01938. The Crane Estate is a ~30 minute drive from Gloucester.

<https://thetrustees.org/program/group-visits-at-crane/>

Field Trips

Date : **November 17, 2023**

Time: **between 9am to 6 pm**

Seacoast Science Center

4 - 6 pm

Description: Join Seacoast Science Center naturalists and guest community partners after hours for Nature @ Nite – family-friendly event with S.T.E.A.M. activities and a guided nature program. Activities are designed to build confidence and empower participants of all ages in learning through science play and discovery. Stations will engage you in science, technology, engineering, art, and mathematics learning. Harvest Time Program: Fall is a time for giving thanks for nature's bounty and for one another. Come make a quill pen and learn how to share your thanks using traditional calligraphy. Test your game skills and see how far you can launch acorns with a catapult. And, make a cornhusk doll to take home to don your Thanksgiving table.

Capacity: No limit, everyone welcome

Notes: Dress for outdoor exploration, and remember it is typically cooler at the shore!

Getting there: 570 Ocean Boulevard Rye, NH 03870-2104

SSC is at Odiorne Point State Park, 51 miles North of the Beauport Hotel. It will take approximately 1 hour and 15 minutes to get there. Driving or carpooling is recommended.

<https://www.seacoastsciencecenter.org/>

Mass Audubon – Joppa Flats

9 am - 12 pm

Description: Come birding out at Parker River National Wildlife Refuge with our team of educators and learn how to integrate hands-on science-based birding lessons in your institutions to use both in the field and in your classrooms. Back in our education center we will show you abridged activities & the animal husbandry of our tide pool touch tank programs and will wrap up with a guided (BYO) lunch to reflect on our learnings from the day. Our team will meet you at 9:00 at the Mass Audubon Joppa Flats Sanctuary to split up into vans for our low-mobility birding session on the PRNWR and will conclude touch tanks back at Joppa for an informal lunch at 12:00. There will also be a chance to view Susan Quateman's [Student Explorations: The Great Marsh and Climate change](#), a project combining art and science created by students from the River Valley Charter School in Newburyport.

Capacity: 18

Notes: Please make sure you are on time, dress in layers, bring binoculars if you have them (otherwise we can provide), and have a spirit for adventure that is ready to learn. Bring your own lunch to enjoy with others at the end of the tour (optional).

Getting there: 1 Plum Island Turnpike Newburyport, MA 01950
24 miles North of the Beauport Hotel, about a 45 minute drive.

<https://www.massaudubon.org/places-to-explore/wildlife-sanctuaries/joppa-flats>