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REGIONAL ASSOCIATION FOR RESEARCH ON THE GULF OF MAINE

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Navigating Change in the Gulf of Maine: Science, People, and the Next Generation

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Abstract Booklet

This booklet provides abstracts for presentations, lightning talks, flash talks, and posters to be presented during the RARGOM 2026 Annual Science Meeting. Abstracts are listed in alphabetical order by presenter.

A Privacy-Preserving, Open-Source AI Framework for Gulf of Maine Socio-Ecological Data

Format: Poster

Authors: Anas Abuamar (Colby College and Bigelow Laboratory for Ocean Sciences), John J. Bohorquez (Founding Director, Blue Economy Solutions Lab), Johnathan Evanilla (Bigelow Laboratory for Ocean Sciences), Charles S. Colgan (Middlebury College), Nick Record (Bigelow Laboratory for Ocean Sciences)

Presenter: Anas Abuamar (Colby College and Bigelow Laboratory for Ocean Sciences)

Abstract: Evaluating decisions in the blue economy is challenging when data are dispersed across agencies, formats, and scales. We present an open-source AI framework for integrating marine socio-ecological data through the National Ocean Economics Program. The framework links selected federal and local data using an ocean accounts structure to organize socio-ecological information. A web-based interface supports natural-language exploration of datasets, maps, and time series. Retrieval-augmented generation connects each response to its underlying sources, and local models reduce computing requirements for organizations with limited access to cloud infrastructure. The system is designed around data stewardship: user-uploaded documents and locally generated embeddings remain encrypted and access-controlled rather than being incorporated into a shared model. We present a Gulf of Maine case study showing how the framework connects environmental variability with local ocean-economy indicators, identifies evidence gaps, and generates transparent, reproducible questions. We aim to lower barriers to interdisciplinary analysis while preserving the sovereignty of regional knowledge holders.

Intra-Annual Distribution Dynamics of Marine Species: Seasonal Asymmetry in a Rapidly Warming Shelf Ecosystem

Format: Poster

Authors: Andrew Allyn (Gulf of Maine Research Institute), Bart DiFiore (Massachusetts Division of Marine Fisheries), Carly Lovas (Gulf of Maine Research Institute), Nathan Hermann (University of New Hampshire), Nathan Furey (University of New Hampshire), Kathy Mills (Gulf of Maine Research Institute)

Presenter: Andrew Allyn (Gulf of Maine Research Institute)

Abstract: Climate change is redistributing marine species, yet most research overlooks how asymmetric seasonal changes could reshape ecosystems and complicate management. Using NOAA bottom trawl data (1970–2023), we examined seasonal distribution shifts for 43 Northeast U.S. species, comparing spring and fall centers of latitude. Most species showed marching dynamics (n=13; both seasons shifting northward together), while others were converging (n=11), stable (n=10), unclear (n=6), or diverging (n=3). Spring shifts were nearly three times faster than fall among trending species. By feeding guild, planktivores responded most consistently, with 6 of 7 species showing declining seasonal distance between centroids; benthivores and piscivores were inconsistent. Such coordinated planktivore shifts suggest restructured trophic dynamics, while variable piscivore/benthivore responses may buffer functional losses. Understanding these intra-annual patterns is essential to support forward-looking management decisions and anticipate resource shifts under continued ecosystem changes.

Advancements in Atlantic Bluefin Tuna Aging

Format: Poster

Authors: Brian Alper (University of Maine, Orono, ME 04469 USA), Dheeraj Busawon (Fisheries and Oceans Canada, St. Andrews, NB E5B 0L4 CAN), Lisa Kerr (University of Maine, Orono, ME 04469 USA), Jan McDowell (Virginia Institute of Marine Science, Gloucester Point, VA 23062 USA), Walter Golet (University of Maine, Orono, ME 04469 USA)

Presenter: Brian Alper (University of Maine)

Abstract: Atlantic Bluefin Tuna (ABFT; Thunnus thynnus) is an economically important species that undertakes regular large-scale migrations throughout the North Atlantic. International management currently operates under a two-stock hypothesis, with a western stock spawning in the Gulf of Mexico, and an eastern stock spawning in the Mediterranean Sea. Evidence from electronic tagging and otolith geochemistry has revealed substantial stock mixing in prominent foraging grounds, such as the Gulf of Maine (GoM). However, previous age and growth models have not accounted for the presence of two stocks in the GoM or potential sex-specific growth rates within each stock. Accurate estimates of age and growth are essential for effective modeling of population biomass and reproductive output. Here, we develop novel age and growth models for ABFT based on both natal origin and sex to better inform stock assessments and management.

Regionalism in Offshore Wind Energy Acceptance in Maine

Format: Lightning talk

Authors: Harry Nutifafa Arden (Doctoral Student, School of Economics and School of Marine Sciences, University of Maine, Orono, ME), Caroline L. Noblet (Professor, School of Economics, University of Maine, Orono, ME), Teresa R. Johnson (Professor, School of Marine Sciences, University of Maine, Orono, ME)

Presenter: Harry Nutifafa Arden (University of Maine)

Abstract: Maine's energy-transition plan identifies offshore wind in the Gulf of Maine as a critical resource for meeting the state's future energy needs. As energy costs continue to rise, domestically generated clean electricity can offer potential benefits for Maine households. However, prior research shows that community acceptance of offshore wind development is often shaped by perceptions of local ownership, community identity, project impacts, and the development process. This study examines the perspectives of 490 households surveyed in two coastal Maine communities connected to proposed offshore wind development. We explore household preferences regarding a regional transmission of electricity generated by offshore wind projects. Results show that a greater share of surveyed households would accept the project if its electricity would be retained for use within Maine rather than transmitted to other states. These findings underscore the importance of local ownership and prioritizing local benefits in building durable community acceptance of renewable energy development.

Secondary Succession and Blue Carbon Recovery in Historically Disturbed Salt Marshes in New England

Format: Poster

Authors: Kimberly Arlen (University of New Hampshire), Dr. David Burdick (University of New Hampshire), Dr. Tracy Mandel (University of New Hampshire), James G. McKown (University of New Hampshire), Dr. Gregg Moore (University of New Hampshire), Dr. Julie Paprocki (University of New Hampshire)

Presenter: Kimberly Arlen (University of New Hampshire)

Abstract: Salt marshes are highly effective ecosystems for storing carbon, yet historic ditches, dikes and sea level rise have transformed salt marsh areas into large, persistent pools. As these "megapools" naturally drain and revegetate through tidal reconnection (secondary succession), they provide an opportunity to examine whether degraded marshes can rebuild carbon storage through passive recovery. This study investigates vegetation recovery, elevation change, and belowground carbon storage across three revegetated megapools in New England. Transects characterized vegetation and elevation across revegetated pools, and soil cores were collected from pool centers and adjacent marsh platforms. Cores were analyzed for bulk density and organic matter using loss-on-ignition to estimate belowground carbon storage, while rhizome observations provide context for vegetation recovery. Comparing revegetated pool interiors and adjacent marsh will assess carbon loss and recovery across a disturbance gradient. Understanding where carbon storage returns naturally may help identify opportunities for restoration and inform strategies for rebuilding marsh resilience in the changing Gulf of Maine.

Long-Term Range Testing to Inform Acoustic Telemetry Efforts in Coastal Gulf of Maine

Format: Poster

Authors: Sidney Axtell (University of New Hampshire, Durham, NH, 03824), Trevor Banister (University of New Hampshire, Durham, NH, 03824), Nathan B. Furey (University of New Hampshire, Durham, NH, 03824)

Presenter: Sidney Axtell (University of New Hampshire)

Abstract: Acoustic telemetry is widely used to study the movements of marine animals, but acoustic tag detection efficiency is strongly influenced by environmental and physical conditions. Unaccounted for variation in detection efficiency can bias interpretations of telemetry data. In this study, we conducted a long-term acoustic range test in coastal Gulf of Maine, New Hampshire, USA, to quantify how environmental variability affects acoustic tag detection efficiency. Six Innovasea V13 and V16 acoustic tags were deployed at set distances (50-1000 m) from an acoustic receiver during two year-long deployments (2024-2026). Variables investigated included wind speed, sea surface temperature (SST), chlorophyll, turbidity, salinity, dissolved oxygen, temperature at depth, receiver tilt angle, and acoustic noise. Detection efficiency was highest for V16 tags, peaked 150 m from the receiver, and varied seasonally. Generalized linear modeling indicated acoustic noise and SST were the strongest predictors of detection efficiency. These results will improve interpretation of movement data from 104 acoustically tagged Atlantic cod and inform future acoustic telemetry studies throughout the GOM.

Integrating Temperature-Dependent Growth into Population Modeling of American Lobster

Format: Poster

Authors: Miguel Barajas (Gulf of Maine Research Institute, University of Maine), Kathy Mills (Gulf of Maine Research Institute), Lisa Kerr (University of Maine)

Presenter: Miguel Barajas (Gulf of Maine Research Institute, University of Maine)

Abstract: Warming oceans are affecting growth rates and body sizes of species, including American lobster. However, it is unclear how temperature-driven changes in individual growth scale up to shape population dynamics. We use American lobster as a focus species and develop a growth model that incorporates physiological responses to temperature conditions based on information from stock assessments and published literature. The model forms a foundation for integrating temperature-dependent growth into population modeling. We evaluate the population model outcomes across contrasting temperature regimes. In our population model, size influences life history traits like mortality, maturity, and fecundity, thereby propagating growth changes through to influence demographics. By linking temperature-dependent growth to life history processes, the model demonstrates how temperature-driven changes in growth can scale up to influence population trajectories. Integrating temperature-dependent growth into population modeling is important for projecting how shifts in growth rates may alter American lobster population productivity into the future.

Losing Ground? Carbon Storage and Sea Level Rise Response in Gulf of Maine Tidal Flats

Format: Poster

Authors: Ashlyn Oh (University of Massachusetts Amherst, Amherst, MA), Jonathan Woodruff (University of Massachusetts Amherst, Amherst, MA), Hannah Baranes (Gulf of Maine Research Institute, Portland, ME), Marissa McMahan (Manomet Conservation Sciences, Brunswick, ME), Emily Farr (Manomet Conservation Sciences, Brunswick, ME)

Presenter: Hannah Baranes (Gulf of Maine Research Institute)

Abstract: Tidal flats cover vast areas of the Gulf of Maine coast, support livelihoods, lessen coastal erosion, and store considerable carbon, yet they remain understudied. We focus on two elements of a collaborative project integrating harvester knowledge with remote sensing and sedimentology: tidal flat response to sea level rise and carbon storage quantification. Between 2015–2023, mean low water rose 25 cm in the Gulf of Maine, driven by mean sea level rise and variability and a decrease in tidal range. Using satellite-derived historical elevations, we find flats across the region lost elevation over this period, with some shifting from accretional profiles to erosional ones. This erosion, compounded by the rapid rise in low tide, represents a mutually reinforcing threat to flats' persistence. We also present the first regional carbon stock estimate for U.S. Gulf of Maine tidal flats, based on measurements at 20 sites from Wellfleet to Sipayik, assuming 1-meter depth. Though carbon density is only ~20% that of salt marshes, flats' greater extent means total stock rivals marshes in Maine (2.2 Tg C vs. 2.6 Tg C). Across ME/NH/MA, total flat carbon stock is 2.4 Tg C vs. 9.0 Tg C in marshes.

The Manila Clam (*Ruditapes philippinarum*) (Bivalvia: Veneridae) Arrives in the Northwest Atlantic Ocean

Format: Poster

Authors: Carolina Bastidas (Massachusetts Institute of Technology Sea Grant, Cambridge, MA 02139, USA), Alysha B. Putnam (Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA 01003, USA; Department of Biological Sciences, Smith College, Northampton, MA 01063, USA), Owen C. Nichols (Center for Coastal Studies, Provincetown, MA 02657, USA), Jeff C. Clements (Fisheries and Oceans Canada, Gulf Fisheries Centre, Moncton, NB E1C 9B6, Canada), El Fernekees Hartshorn (Department of Biological Sciences, University of Rhode Island, Kingston, RI 02881, USA), Diana W. Chin (Marine Science Center, Northeastern University, Nahant, MA 01908, USA), Alison Frye (Salem Sound Coastwatch, Salem, MA 01945, USA; Massachusetts Bays National Estuary Partnership, Boston, MA 02125, USA), Renee Gagne (Town of Chatham, Chatham, MA 02633, USA), Megan Lynn Geiger (Department of Environmental Science, Antioch University, Keene, NH 03431, USA), Rachel Hutchinson (Cape Cod Cooperative Extension/Woods Hole Oceanographic Institution Sea Grant, Barnstable, MA 02630, USA), Vania Rivera Leon (Center for Coastal Studies, Provincetown, MA 02657, USA), Alexis J. Neffinger (Massachusetts Office of Coastal Zone Management, Boston, MA 02114, USA), Joshua Reitsma (Cape Cod Cooperative Extension/Woods Hole Oceanographic Institution Sea Grant, Barnstable, MA 02630, USA), Tommy Tucker (Center for Coastal Studies, Provincetown, MA 02657, USA), Isabella C. Yeung (Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA 02139, USA), James T. Carlton (Coastal and Ocean Studies Program, Williams College - Mystic Seaport, Mystic, CT 06355, USA)

Presenter: Carolina Bastidas (Massachusetts Institute of Technology Sea Grant)

Abstract: We confirmed the establishment of the Manila clam, Ruditapes philippinarum, in Massachusetts. Although this is one of the world's most important marine aquaculture species and has been widely introduced elsewhere, its presence in the Northwest Atlantic had not been documented previously. Observations were collected through opportunistic field surveys, community science platforms (i.e., iNaturalist), and correspondence with commercial and recreational shellfish harvesters. These observations revealed the presence of R. philippinarum at multiple locations in Cape Cod and Boston Harbor between 2023 and 2025, with northernmost occurrences reaching Salem Sound. Live individuals from Cape Cod ranged from 31 to 71 mm in shell length (SL). Similar sizes were documented in Boston Harbor, where sediment sampling also identified early settlers (500 µm SL) and young juveniles (1 to 7 mm SL), confirming the species is established and reproducing. Our results highlight the importance of community engagement in early detection, and ongoing work is tracking the species' spread, identifying potential source populations, and advancing understanding of its role in Northwest Atlantic ecosystems.

Shell Shock: Investigating Four Decades of Ocean Acidification and Warming on Atlantic Sea Scallop Shells

Format: Presentation

Authors: Halle Berger (University of Connecticut, Department of Marine Sciences, Groton, CT), Samantha Siedlecki (University of Connecticut, Department of Marine Sciences, Groton, CT), Shannon Meseck (NOAA Northeast Fisheries Science Center Milford Laboratory, Milford, CT), Dvora Hart (NOAA Northeast Fisheries Science Center Woods Hole Laboratory, Woods Hole, MA), Antonie Chute (NOAA Northeast Fisheries Science Center Woods Hole Laboratory, Woods Hole, MA), Sarah Roberts (University of Connecticut, Department of Marine Sciences, Groton, CT), Felipe Soares (University of Connecticut, Department of Marine Sciences, Groton, CT), N. David Bethoney (Commercial Fisheries Research Foundation, Kingston, RI), and Catherine Matassa (University of Connecticut, Department of Marine Sciences, Groton, CT)

Presenter: Halle Berger (University of Connecticut)

Abstract: The Atlantic sea scallop fishery is one of the most valuable fisheries in the U.S., but managers and industry stakeholders are concerned that ocean acidification (OA) and warming will cause declines in scallop populations. OA hinders calcification by reducing seawater pH and carbonate ion availability and can cause shell dissolution, which can reduce bivalve growth and survival and increase vulnerability to other stressors. We measured shell thickness in 3,900 archived specimens collected during annual dredge surveys across Georges Bank and the Mid-Atlantic since 1980. We evaluated spatiotemporal changes in shell thickness and potential environmental drivers using existing habitat datasets and output from a high-resolution regional ocean model. Scallop shell thickness declined over the past four decades, though the rate varied geographically and with local environmental conditions. Thinner shells may increase susceptibility to predators and damage-induced mortality. Understanding how spatial variation in habitat type and changing ocean conditions overlap and influence scallop shells can inform rotational management and help the fishery adapt to changing conditions.

Expanding Adaptive Harmful Algal Bloom Observations Across the Gulf of Maine

Format: Poster

Authors: Michael Brosnahan (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), David Beaudoin (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Mrunmayee Pathare (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Michael Staiger (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Vanessa Haggans (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Cristian Swift (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Dave Kulis (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Tina Mikulski (Kali Horn (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Austin Pugh (NERACOOS, Portsmouth, NH 03801 USA), Nathan Figueroa (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Ryan Govostes (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Ethan Andrews (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Sue Drapeau (Bowdoin College, Brunswick, ME 04011 USA), Jackie Motyka (NERACOOS, Portsmouth, NH 03801 USA), Collin Roesler (Bowdoin College, Brunswick, ME 04011 USA), Mindy Richlen (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Jake Kritzer (NERACOOS, Portsmouth, NH 03801 USA), Donald Anderson (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA), Dennis McGillicuddy (Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA)

Presenter: Michael Brosnahan (Woods Hole Oceanographic Institution)

Abstract: Harmful Algal Bloom Observing Network-New England (HABON-NE) is an adaptive network of automated biological sensors, mobile platforms, and open data systems serving the Gulf of Maine, where harmful algal bloom (HAB) threats are diversifying in response to rapid environmental change. Established in 2019, HABON-NE connects aligned academic, government, and industry teams to advance HAB, monitoring, science, and management. Data are shared through HAB Hub, a platform for visualization and API access to cell and toxin observations. These include real-time observations and products from deployments of Imaging FlowCytobot (IFCB) and Environmental Sample Processor (ESP) sensors. New observing teams are being engaged through development of IFCB Sync and a Teams-enabled IFCB dashboard software. Use of autonomous vehicles and ships-of-opportunity has also expanded. In 2026, the network supported responses to a coastal bloom of the fish-killing dinoflagellate Karenia mikimotoi along the western Gulf of Maine and an unusual Alexandrium catenella bloom on Georges Bank associated with paralytic shellfish poisoning. We welcome partners to expand adaptive HAB observing in the Gulf of Maine.

Bridging the Gap: Building Relationships and Gathering Community Perspectives on Regional Climate Action, Process, and Progress in Southern Maine

Format: Lightning talk

Authors: Jennifer Brousseau (University of New England), Annika Doeppers (University of New England), Edward Iannuzzi-Sucich (University of New England), Cameron Wake (University of New England), Karina Graeter (Southern Maine Planning and Development Commission)

Presenter: Jennifer Brousseau (University of New England)

Abstract: As coastal communities continue to be threatened by climate change, municipal-level climate action planning has emerged as a tool for addressing local risks. In smaller communities, a regional approach to climate planning may address challenges related to capacity and implementation, while fostering opportunities for learning and collaboration. From 2022-2024, a regional planning agency in Maine facilitated a cohort-based climate action planning (CAP) process, supporting four coastal communities in developing CAPs. This social science study examined the outcomes of the cohort to better understand how cohort processes influenced climate planning and early implementation. The project involved plan review and interviews with key individuals. Our findings suggest that cohort-based planning can provide a cost-effective and collaborative pathway for advancing local climate action, while building long-term institutional and regional capacity. Capacity differences also shaped planning timelines and participant experiences, with lower-capacity communities receiving greater benefit. This project offers practical insights for communities seeking to support climate resilience efforts.

Hydrology and Vegetation Responses to Runneling of Degraded, Waterlogged Salt Marsh in New England

Format: Poster

Authors: David Burdick, Grant McKown, Gregg Moore and Jenny Gibson (University of New Hampshire, Durham, NH 03824), Wenley Ferguson (Save The Bay, Providence, RI 02905), Geoff Wilson (Northeast Wetland Restoration, Berwick, ME 03901), Susan C. Adamowicz (Rachel Carson NWR, Kennebunkport, ME 04043), John Herbert (Mass Audubon, Lincoln, MA 01773)

Presenter: David Burdick (University of New Hampshire)

Abstract: Colonial agriculture in New England began in salt marshes via embankments and drainage systems. After abandonment, these legacy features have continued to impair hydrology, leading to the formation of waterlogged basins of short Spartina alterniflora (pannes) or deep pools (mega-pools). Runnels (shallow drainage features) were installed so regular tidal flooding and draining would restore high marsh vegetation. By design, runnels minimize physical impacts using hydrology to restore at the speed of nature. We monitored 23 marshes from ME to RI where runnels were installed 2 to 12 years ago to determine if this technique can restore sparrow habitat. Water level recorders installed in peat near runnels showed deeper drainage during neap tides. We sampled the vegetation community and used space for time substitution of the 23 marshes (runnel, reference, and no-action control plots). Runnels halted pool expansion and supported revegetation, but deeper areas remained bare for years. S. alterniflora colonized bare pannes and areas dominated by short S. alterniflora showed increases in S. patens, Distichlis spicata and Juncus gerardii, preferred nesting habitat for saltmarsh sparrows.

Marine Mammals as Sentinels of Change in the Gulf of Maine: A Top-down View of a Warming Ecosystem

Format: Presentation

Authors: Michelle Caputo (University of New England), Kara Mickiewicz (University of New England), Jillian Bender (University of New England), Emma Christopher (University of New England), Abigail Nelson (University of New England), and Jeremy Kiszka (Florida International University)

Presenter: Michelle Caputo (University of New England)

Abstract: The Gulf of Maine is warming faster than almost any ocean region on Earth, and marine mammals, as long-lived, wide-ranging top predators, integrate those changes across the food web. This makes them powerful sentinels of ecosystem change. Here I outline complementary projects using cetaceans and seals to detect, predict, and interpret change in the Gulf of Maine from the top down. First, we pair marine heatwave records with regional stranding data to test whether anomalous warming shifts the timing, species composition, and causes of strandings. Second, we build habitat suitability models that combine remotely sensed oceanography with visual and passive acoustic surveys to predict where habitat for species such as minke whales will persist, shrink, or emerge. Third, long-term photo-identification and stable isotope analysis of harbor porpoise and dolphins track movements and diet to reveal how a shifting forage fish landscape is reorganizing the prey base. Together, these approaches link physical change, habitat, prey, and predator health into a single sentinel framework: an early-warning system for the Gulf of Maine.

Spectral Changes in Intertidal Macroalgae During Desiccation

Format: Poster

Authors: Melanie Carolan (Center for Coastal and Ocean Mapping/Joint Hydrographic Center, University of New Hampshire, Durham, NH 03824), Michael Routhier (Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH 03824), Jennifer A. Dijkstra (Center for Coastal and Ocean Mapping/Joint Hydrographic Center, University of New Hampshire, Durham, NH 03824)

Presenter: Melanie Carolan (University of New Hampshire)

Abstract: Macroalgae provide food and shelter to mobile organisms, serve as a natural shoreline buffer, and are a valuable resource for human use. Recent efforts to monitor intertidal macroalgae for conservation and management have included the use of multispectral sensing onboard remote sensing platforms. Spectral libraries aid identification and classification by providing laboratory-derived spectral profiles for known species. However, spectral uncertainties can remain even with the consideration of a spectral library due to changes in the spectral profiles of macroalgae when tidal cycles expose them to air, allowing them to dry. In this study, we collected several species of macroalgae from the Gulf of Maine and analyzed their spectral profiles in a laboratory every three hours over a nine-hour drying period. Measurements were also taken at each time interval with species-specific variation in canopy height to simulate variation in vegetation density in the intertidal zone. Here, we reconcile these findings to compare spectral profiles among macroalgae species, dryness, and layering to provide recommendations for future studies that consider spectral properties of intertidal macroalgae.

Cumulative Impacts of Offshore Wind Development on the Marine Environment over the U.S. Northeast Shelf: From Individual Turbines to Regional Scales

Format: Presentation

Authors: Changsheng Chen, Lu Wang, Siqi Li, Junhyung Kim (University of Massachusetts Dartmouth)

Presenter: Changsheng Chen (University of Massachusetts Dartmouth)

Abstract: Rapid offshore wind development over the U.S. Northeast shelf raises questions about cumulative environmental impacts from individual turbines to regional scales. We developed and validated a fully coupled, turbine-resolving WRF-FVCOM-WW3 modeling system nested within NECOFS, with ~1-1.7 m resolution around offshore structures. Model-data comparisons demonstrate reliable simulation of winds, currents, hydrography, stratification, and waves. Numerical experiments show that atmospheric wakes tend toward saturation as turbine numbers increase, whereas ocean current perturbations continue to increase and become more spatially variable. Wind-farm effects modify daily stratification, particularly in summer, but do not significantly alter the seasonal regional Cold Pool. At individual turbines, atmospheric wakes align with winds, whereas oceanic wakes follow ambient currents. Current-monopile interactions and advection dominate local ocean responses, with atmospheric wakes and wave-current interactions providing additional forcing. The results demonstrate the importance of resolving turbine-scale processes within a coupled regional system to assess cumulative offshore wind impacts.

Collaborating with Fishing Communities to Adapt: Codeveloping Actionable Strategies for the Atlantic Sea Scallop Fishery

Format: Lightning talk

Authors: Ludivine Conte, Samantha A. Siedlecki, Felipe Soares, Catherine Matassa and Halle Berger (University of Connecticut); Shannon L. Meseck, Robert Murphy and Dvora Hart (NOAA Fisheries, Northeast Fisheries Science Center); James LaChance (University of Maryland); David Bethoney (Commercial Fisheries Research Foundation); Enrique Curchitser (Rutgers University); Andrew Ross (NOAA Geophysical Fluid Dynamics Laboratory)

Presenter: Ludivine Conte (University of Connecticut)

Abstract: The Atlantic sea scallop fishery generates over $500 million annually, making it the second highest revenue fishery in the United States. However, scallop habitat is changing as New England waters warm, freshen, and experience declining oxygen and pH. These changes are likely shifting scallop landings north on the Northeast U.S. Shelf with impacts for coastal communities that depend on this fishery for livelihoods, culture, and wellbeing. The resilience of fishing communities to warming and ocean acidification requires embracing new tools, approaches, and flexibility. Operationalizing resilience requires responsive as well as adaptive management practices. In response, we present spatially explicit seasonal forecasts of ocean conditions across scallop fishing zones to inform and support management decisions. We are currently working to co-develop forecast products for use by the fishing industry and are planning to run focus groups and interviews to better understand how this tool and various adaptation strategies could improve fishery resilience.

Describing Temporal Changes in Marine Heatwaves and Cold Spells in Casco Bay

Format: Poster

Authors: Zhuomin Chen (Gulf of Maine Research Institute, Portland, ME 04011 USA), Kiran Cremer (Gulf of Maine Research Institute, Portland, ME 04011 USA)

Presenter: Kiran Cremer* (Gulf of Maine Research Institute)

Abstract: Marine heatwaves and cold spells have detrimental effects on marine ecosystems and coastal economies, yet their vertical structures remain poorly understood. To examine the vertical structure of these events in Casco Bay, we reanalyzed ocean temperature data to the 60.5m depth and identified basin-wide marine heatwaves and cold spells across 19 vertical layers and classified them by vertical structure: propagating events stretch the entire water column, while surface-, middle-, and bottom-layer events are confined to those layers.

As expected, marine heatwaves are becoming more frequent while marine cold spells are in decline. However, these trends are inconsistent across vertical structures. Middle-layer cold spells experience the strongest decline, while surface-layer cold spells experience strong seasonal variation. Simultaneously, the proportion of propagating marine heatwaves has risen, and they are increasingly beginning at the bottom layer. Marine ecosystems are not bound to the ocean's surface; as many subsurface marine heatwaves have no effect on surface temperature, studying the vertical structure of these events is vital to understanding the effects of a warming ocean.

Does that Stream Seem Fishy? River Herring Use of an Impounded Skutik River Tributary

Format: Poster

Authors: Rebecca P. Cusick (Department of Environmental Conservation, University of Massachusetts, Amherst, MA & Project SHARE, Cherryfield, ME), Calan Kirkpatrick (Department of Environmental Conservation, University of Massachusetts, Amherst, MA), Adrian Jordaan (Department of Environmental Conservation, University of Massachusetts, Amherst, MA), Allison Roy (U.S. Geological Survey, Massachusetts Cooperative Fish and Wildlife Research Unit, Department of Environmental Conservation, University of Massachusetts Amherst, MA), John Magera (Northern Maine National Wildlife Refuge Complex, U.S. Fish and Wildlife Service, Baring, ME), Chris Federico (Project SHARE, Cherryfield, ME)

Presenter: Rebecca P. Cusick (University of Massachusetts & Project SHARE)

Abstract: Magurrewock Stream, located within the Baring Division of Moosehorn NWR in the Skutik River watershed, has a complex history of federally imposed management. Historically, and through to today, this tributary has been impounded to support migratory waterfowl. Over the past decade, refuge management goals have improved aquatic connectivity and access to spawning and nursery habitat for river herring. To further these improvements, this project seeks to understand how river herring are using Magurrewock Stream seasonally throughout their freshwater ontogeny, and how the current management regime may be impacting those movements. For the last two years, we conducted the first official spawning run counts of adult river herring, and quantified fish movements throughout the system using passive integrated transponder (PIT) tags. Additionally, we sampled the pelagic zones of the system's two headwater ponds to estimate juvenile river herring densities. These data will be used to understand adult and juvenile river herring use of Magurrewock Stream, providing a baseline of metrics to directly inform aquatic connectivity improvements and collaborative management plans.

Spatiotemporal Analysis of Antibiotic-Resistant Genes in Great Bay Watershed, New Hampshire

Format: Poster

Authors: Natalie Danek (University of New Hampshire, Durham, NH 03824 USA), Hannah Holland-Moritz (Syracuse University, Syracuse, NY 13244 USA), Elizabeth Harvey (University of New Hampshire, Durham, NH 03824 USA)

Presenter: Natalie Danek (University of New Hampshire)

Abstract: Antibiotic resistance occurs when pathogenic bacteria develop or inherit the ability to withstand exposure to antibiotics, and is a global concern for both human health and aquatic environments. A significant amount of research has been conducted investigating mechanisms of overcoming resistance and bacterial transfer of resistance genes. However, the spatiotemporal variability in gene abundance and diversity in aquatic systems is less well resolved. Antibiotics enter watersheds through various methods including runoff from agriculture and medical practices, their use in aquaculture, and from wastewater treatment. Here, we used monthly sampling and metagenomic analysis to characterize antibiotic-resistant genes (ARGs) at seven coastal, estuarine, and freshwater sites throughout Great Bay Estuary, NH. Distinct bacterial populations and seasonal variability were observed throughout the fresh-to-saltwater continuum. ARGs were detected in samples from all locations, and variability in ARG composition among sites was observed. This work establishes a starting point by which point sources and sinks of ARGs can be assessed in this watershed.

Satellite Oceanography: Developing Phytoplankton Bloom Indicators from Ocean Color Remote Sensing

Format: Poster

Authors: Grace Davis (University of North Carolina, Wilmington, NC), Kimberly Hyde (National Oceanic and Atmospheric Administration National Marine Fisheries Service Northeast Fisheries Science Center, Narragansett, RI 02874 USA), Haley Synan (National Oceanic and Atmospheric Administration National Marine Fisheries Service Northeast Fisheries Science Center, Narragansett, RI 02874 USA)

Presenter: Grace Davis (University of North Carolina)

Abstract: Phytoplankton are the base of marine food webs and can be vital indicators of ecosystem health and change. Phytoplankton blooms, times of rapid increases in biomass, are a primary source of energy to the marine ecosystem. Changes in bloom timing can create phenological mismatches with higher trophic level species, potentially causing widespread ecosystem impacts. Using satellite ocean color chlorophyll-a data, we defined phytoplankton blooms by using a combination of two bloom detection methods, a threshold- and rate-of-change-based method. We then quantified several bloom metrics, including annual bloom statistics, seasonal bloom initiation and termination dates, peak intensity, and bloom magnitude to identify trends in phytoplankton blooms for the Gulf of Maine and Georges Bank. Our analysis revealed significant changes in timing and duration of the fall bloom. In general, bloom duration is increasing due to later termination dates. This product will provide indicators for the State of the Ecosystem report for the New England and Middle Atlantic regions to monitor trends in bloom phenology throughout the Northeast U.S. Shelf and support ecosystem-based fisheries management.

Decline of Green Sea Urchin (*Strongylocentrotus droebachiensis*) Population in the Quoddy Region of the Bay Of Fundy, Canada

Format: Lightning talk

Authors: Jessica Desaulniers (Huntsman Marine Science Centre, St. Andrews, NB E5B 2L7, Canada), Ellen Fanning (Huntsman Marine Science Centre, St. Andrews, NB E5B 2L7, Canada), Aidan McDiarmid (Huntsman Marine Science Centre, St. Andrews, NB E5B 2L7, Canada), Claire Goodwin (Huntsman Marine Science Centre, St. Andrews, NB E5B 2L7, Canada), Monica Finley (Fisheries and Oceans Canada, Dartmouth, NS B2Y 4A2, Canada)

Presenter: Jessica Desaulniers (Huntsman Marine Science Centre)

Abstract: Long-term datasets are essential for assessing population status, trajectories, and identifying ecologically significant changes in marine ecosystems. Green sea urchins (Strongylocentrotus droebachiensis) are a keystone species of coastal ecosystems and support a commercial fishery in the Passamaquoddy region of the Bay of Fundy, management boundary of Lobster Fishing Area (LFA) 36, yet comprehensive population surveys in the region have been limited. We assessed changes in urchin population density, size structure, and fishable biomass in LFA 36 by conducting SCUBA transect surveys for comparison with the most recent surveys, undertaken in the 1990s and 2000s. In 2025, 45 transects were completed across Campobello, Deer Island, L'Etete and Maces Bay. Since the historical surveys, estimated urchin population density and biomass had declined significantly. The results also showed a variation in size structure among regions, with evidence of reduced recruitment and substantial declines in sublegal and legal-sized urchins in most areas. These findings underscore the importance of repeated population surveys to inform population assessment and sustainable fisheries management actions.

Understanding Coastal Resilience Through Physical and Social Science: Integrating Geomorphic Change and Community Perspectives in Camp Ellis, Maine

Format: Lightning talk

Authors: Katelyn DeWater (University of New England, Biddeford, ME, 04005 USA), Dr. Will Kochtitzky (University of New England, Biddeford, ME, 04005 USA), Dr. Jennifer Brousseau (University of New England, Biddeford, ME, 04005 USA), Liz O'Brien (University of New England, Biddeford, ME, 04005 USA)

Presenter: Katelyn DeWater (University of New England)

Abstract: Camp Ellis, Maine is among the most erosion-prone communities in the Gulf of Maine and has experienced more than 150 years of shoreline change driven by jetty construction, storms, beach nourishment, dredging, and ongoing coastal management interventions. This study pairs geomorphic analyses with stakeholder perspectives to better understand coastal change and resilience. Topobathymetric lidar, UAV photogrammetry, and aerial imagery collected from 2010 to 2026 are used to quantify changes in beach and dune morphology, including dune extent, dune toe and crest positions, dry beach width, and signatures of beach nourishment. These physical measurements are paired with semi-structured interviews of residents, business owners, and municipal officials to assess awareness, understanding, and attitudes toward coastal erosion, management strategies (including a current jetty extension project), and future adaptation. By integrating physical and social science, this research provides a more comprehensive understanding of how coastal systems and communities respond to change, informing more effective coastal resilience planning and management.

Overwintering Physiology and Dormancy Behavior in New Hampshire's Eastern Oyster (*Crassostrea virginica*) Aquaculture

Format: Poster

Authors: Maggie M. Dillon (University of New Hampshire, NH 03824 USA), Linas Kenter (New Hampshire Sea Grant, NH 03824 USA), Kaila Frazer (University of New Hampshire, NH 03824 USA), Selina Cheng (University of New Hampshire, NH 03824 USA), Brittany M. Jellison (University of New Hampshire, NH 03824 USA)

Presenter: Maggie M. Dillon (University of New Hampshire)

Abstract: Eastern oysters (Crassostrea virginica) are a valuable aquaculture crop in New England but experience recurring overwinter mortality that can significantly impact production. The physiological factors and farming practices that impact cold-season survival are not fully understood. To better understand drivers of winter behavior and survival of eastern oysters in New Hampshire this study utilizes flow-through aquaria, cold storage (pitting), and on-farm monitoring to examine how stocking density, overwinter storage, cohort age, and prewinter condition impact dormancy behavior and overwinter survival of eastern oysters. Biosensor data collected indicates a cessation of gaping between 2-5°C. Overwinter storage method, age, and oyster size entering winter may also play a role in cold-season survival outcomes, with the highest mortality observed in year-one oysters during late winter and early spring. Ongoing biochemical analyses quantifying glycogen, lipid, and protein reserves will provide further context for the energy allocation and physiology of overwinter oysters.

Low Flows, High Stakes: Exploring the Interactions of Drought, Water Demand, and Diadromous Fish

Format: Flash talk

Authors: Reese C. Dorroh (University of Massachusetts-Amherst, Amherst, MA 01002 USA), Adrian Jordaan (University of Massachusetts Amherst, Amherst, MA 01002 USA), Allison H. Roy (U.S. Geological Survey, Massachusetts Cooperative Fish and Wildlife Research Unit, University of Massachusetts Amherst, Amherst, MA 01002 USA)

Presenter: Reese Dorroh University of Massachusetts-Amherst)

Abstract: We're documenting how drought and shifting flow regimes affect streams, fish, and water managers across New England and the Gulf of Maine. We welcome examples—data-based or anecdotal—of unusual streamflow, fish passage problems, or water-allocation conflicts.

Mapping Offshore Maine: High-Resolution Seafloor Surveys in the Gulf of Maine

Format: Poster

Authors: Rebecca Fernandez, Dane Fegely, Anne Simpson, Karl Koehler, and Jesse Minor (Maine Coastal Mapping Initiative, Maine Department of Marine Resources, USA)

Presenter: Rebecca Fernandez (Maine Department of Marine Resources)

Abstract: Maine DMR's Maine Coastal Mapping Initiative (MCMI) conducted a two-year offshore mapping project in the Gulf of Maine in 2024-2025 with support from the Maine Offshore Wind Research Consortium. The project expanded high-resolution seafloor data in offshore areas. Surveys aboard the F/V Titan used Kongsberg EM2040P and EM2042 multibeam echosounders across survey areas covering 776 nmi^2. Wildlife observations were also collected during daylight hours over 80 days at sea.

The resulting bathymetric and backscatter surfaces provide detailed information about seafloor depth, shape, and hardness characterization in areas where modern high-resolution data were lacking. These datasets, combined with sediment sample analyses from benthic grab sampling and stationary video, can be used to interpret seafloor data, identify geological features, and characterize benthic habitats. Wildlife observations included 397 marine mammals, 4,611 seabird observations, and 198 bat detections. Together, the hydrographic, benthic, and wildlife data contribute to a growing understanding of offshore environments and support research, habitat characterization, and informed management of the Gulf of Maine.

Vessel-Based Bat Acoustic Monitoring in the Gulf of Maine and Probable Vessel-Following Behavior

Format: Poster

Authors: Brianna Frankina (Biodiversity Research Institute, Portland, ME USA), Nate Fuller (Biodiversity Research Institute, Portland, ME USA), Ethan Gilardi (Biodiversity Research Institute, Portland, ME USA), Joshua M. Guilbert (Biodiversity Research Institute, Portland, ME USA), Wing M. Goodale (Biodiversity Research Institute, Portland, ME USA), Paul Knaga (Canadian Wildlife Service, Environment and Climate Change Canada, CAN), Cory Stearns (Maine Department of Inland Fisheries and Wildlife, ME, USA), Marian Howe (Biodiversity Research Institute, Portland, ME USA)

Presenter: Brianna Frankina (Biodiversity Research Institute)

Abstract: Bats are known to use the offshore environment in the Gulf of Maine (Gulf), but there are data gaps surrounding migration routes, phenology, and behavior of bats traveling offshore. As part of the Gulf of Maine Bat Research Program, we deployed ultrasonic acoustic detectors on vessels transiting through the Gulf. Deployments occurred between Spring and Fall, beginning in 2024 and continuing through 2026. Bats were detected offshore across all years. Detections indicate species composition of predominantly migratory species, with detections up to 133 km off the coast. Across several deployments, consecutive detections identified to the same species on transiting vessels suggest bats may exhibit vessel following behavior in the offshore environment. These detections occurred within a maximum of 5 minutes of each other and there was no evidence of multiple bats in these recordings. Following behavior could indicate that bats are attracted to transiting vessels, treating them as roosting habitat or foraging opportunities. Continued monitoring will facilitate increased understanding of bat occupancy patterns and behavior in the Gulf with the capacity to inform future management plans.

How Unique Were the January 2024 Storms? Sou'easters and their Coastal Impacts in the Gulf of Maine

Format: Flash talk

Authors: Katherine Giannakopoulos (Gulf of Maine Research Institute, Portland, ME), Hannah Baranes (Gulf of Maine Research Institute, Portland, ME), Justin Arnott (National Weather Service, Gray, ME), Derek Schroeter (National Weather Service, Gray, ME), Donald Dumont (National Weather Service, Gray, ME), Gregory Venarsky (Central Michigan University, Mt. Pleasant, Michigan), James F. Booth (City Univ. of New York, City College and the Graduate Center, New York, NY)

Presenter: Katherine Giannakopoulos (Gulf of Maine Research Institute)

Abstract: Between December 2023 and January 2024, three winter storms devastated Maine's coast with southeast winds. While Nor'easters are well-documented, Sou'easters remain understudied. We identify Gulf of Maine Sou'easters and examine their atmospheric and coastal impacts.

Eelgrass Seed Settling Locations in Canopy Flows

Format: Poster

Authors: Theresa Oehmke (University of New Hampshire), Will Goddard (University of New Hampshire), Tracy Mandel (University of New Hampshire)

Presenter: Will Goddard* (University of New Hampshire)

Abstract: Despite the importance of eelgrass seed transport in maintaining genetic diversity and promoting meadow growth, the physical mechanisms governing seed dispersal dynamics, are poorly understood. Here, we describe seed dispersal experiments performed in the Environmental Flows Water Tunnel at UNH. Using eelgrass vegetation and seed mimics, we track seed motion when released from mean canopy heights in three different meadow conditions under five field-scaled flow speeds. We observe that seed behavior is strongly governed by release location. Seeds released at the leading edge of the meadow exhibited the largest horizontal travel distances, widest spatial landing distributions, and highest along-ground rolling rates compared to seeds released in the trailing edge or interior of the meadow. Across all meadow configurations, higher flow speeds increased post-settling seed rolling distances. Ultimately, we connect mean flow rate and meadow geometry to establish a predictive framework for seed settling location based on easy-to-obtain field values, offering coastal restoration practitioners a tool in targeting seed placement under specific estuarine conditions.

Temporal Shifts in American Lobster Research Themes Since 1994 Seen Through Publication Trends

Format: Poster

Authors: Jason Goldstein (Wells NERR, Wells, ME 04090 USA), Benjamin Gutzler (Wells NERR, Wells, ME 04090 USA)

Presenter: Jason Goldstein (Wells NERR)

Abstract: Scientific research on the American lobster (Homarus americanus) has expanded substantially, with hundreds of peer-reviewed papers published since 2000, advancing almost every aspect of our understanding of their biology. Recently, our group published an extensive review of this research, as it became apparent that research foci had shifted notably over time. We conducted a meta-analysis of publication trends based on Web of Science data from 1994-2023 by assigning each of 1006 peer-reviewed lobster-focused publications to its most relevant theme or discipline. Between 1994-2008, topics were often dominated by foundational aspects of lobster biology including descriptive physiology, sensory biology, and shell disease. Since 2009, there has been a shift to a more integrated focus on applied physiology, genomics, population modeling, climate change, and socio-economic studies of the fishing industry and human dimensions. Remarkably, little about lobster science appears to have reached the status of “a settled question,” especially in the context of current rapid environmental changes, and it may be that many of the findings of previous years are becoming ripe for reevaluation.

Climate-Related Shifts in Lobster Behavior Reshape Coastal Larval Supply in the Gulf of Maine

Format: Poster

Authors: Damian Brady (University of Maine), Andrew Goode (University of Maine)

Presenter: Andrew Goode (University of Maine)

Abstract: The Gulf of Maine has experienced rapid environmental shifts over the 21st century, partially attributable to large-scale changes in ocean circulation. Among the species affected by changing conditions in the Gulf of Maine is the American lobster, Homarus americanus, that supports multi-million dollar fisheries between the U.S. and Canada. The future of this resource is at a crucial tipping point as declines in juvenile recruitment portend future declines in harvestable adults. To better understand the mechanisms affecting lobster recruitment, we investigated the impacts of changing oceanography and lobster behavior on larval connectivity within the Gulf of Maine using a larval transport model. Adult lobsters were found to have shifted into deeper habitats and hatch their eggs more quickly during warmer conditions. Together, these factors have decreased the supply of lobster larvae to shallow, coastal habitats. These results demonstrate the sensitivity of lobster population to changes in adult behavior and ecosystem conditions, highlighting the importance of integrating ecosystem shifts and population-level responses to more accurately track the status of upcoming year classes.

A Collaborative Approach to Tackling the Threat of *Didemnum vexillum* in Atlantic Canada

Format: Lightning talk

Authors: Claire Goodwin (Huntsman Marine Science Centre), Anais Lacousiere-Roussel (Fisheries and Oceans Canada), Scott Pavey (University of New Brunswick), Kelly Mackarous (Coastal Action), Aidan McDiarmid (Huntsman Marine Science Centre) Julia Dupuis (Huntsman Marine Science Centre), Christy Carr (Huntsman Marine Science Centre), Emily Blacklock (University of New Brunswick and Fundy North Fishermen's Association), Gregory Santangeli (McGill University), Melania Cristescu (McGill University), Peter Lawton (Fisheries and Oceans Canada), Sarah Kingsbury (Fisheries and Oceans Canada) Claudio DiBacco (Fisheries and Oceans Canada)

Presenter: Claire Goodwin (Huntsman Marine Science Centre)

Abstract: Didemnum vexillum, known colloquially as pancake batter tunicate or sea vomit is an emerging threat in Atlantic Canadian waters. This colonial ascidian can form large patches over both natural seabed and manmade structures presenting a threat to both native communities and economic activities such as aquaculture and fishing. It had recently become re-established around Deer Island (New Brunswick, Canada) but its wider distribution in the Bay of Fundy and off Nova Scotia was not known. We present results from a multi-partner project working to establish its distribution and invasion pathways in Atlantic Canada. A multi-pronged approach combined surveillance using eDNA, eRNA, SCUBA surveys, ROV surveys, settlement plates, marina surveys, and records from fishers and citizen scientists. We share the results from our surveys and make suggestions for best practices for surveillance of this widespread invasive species based on our experiences.

The Influence of Coastal Acidification and Ocean Warming on Biotoxin Depuration Time in Commercially Valuable Bivalves

Format: Poster

Authors: Hannah Gossner (University of New Hampshire, Durham, NH), Elizabeth Harvey (University of New Hampshire, Durham, NH), Brittany Jellison (University of New Hampshire, Durham, NH)

Presenter: Hannah Gossner (University of New Hampshire)

Abstract: As benthic, generally sessile filter feeders, the health of bivalves and the ecosystem are intertwined. These two lifestyle traits, however, make bivalves susceptible to environmental stressors. Their limited capacity for escape from suboptimal conditions and filter feeding exposes bivalves to a variety of particles, including toxic phytoplankton. Exposure to toxic phytoplankton frequently occurs during Harmful Algal Blooms (HABs). HABs occur nearly annually in the Gulf of Maine (GoME) and are often attributed to the dinoflagellate Alexandrium fundyense. A. fundyense produces saxitoxins (STX) which can cause Paralytic Shellfish Poisoning (PSP) in humans. Teasing apart the relationship between toxin accumulation, depuration rate, warming, and acidification will provide insight into the effectiveness of current monitoring efforts and help forecast impacts of HABs and climate change on bivalve ecosystem services. In order to do this, this study exposes three species of bivalves- Eastern Oyster Crassostrea virginica, Blue Mussel Mytilus edulis, and Atlantic Sea Scallop Placopecten magellanicus- to a cross of warming and acidification, and measures STX accumulation and depuration.

Wikpiyik naka Welimahaskil Kehkikemuwakon: Moving Towards Indigenous Research Methodologies

Format: Keynote

Presenter: Dr. Suzanne Greenlaw

About the Presenter:

Suzanne Greenlaw, Ph.D., is a citizen of the Houlton Band of Maliseet Indians and a Postdoctoral Scientist at Schoodic Institute. Her work focuses on supporting Wabanaki land access, maintaining and re-energizing cultural practices throughout Waponahkik, and advocating for the importance of Wabanaki practices and knowledge in scientific research and restoration.

Seal Molting Phenology in the Gulf of Maine

Format: Poster

Authors: Tacy Guest (Princeton University, Princeton, NJ 08544), Isabella Peterson (Shoals Marine Laboratory, Appledore Island, Kittery Point, ME 03905), Nadine Lysiak (New England Aquarium, 1 Central Wharf, Boston, MA 02110), Corina Tarnita (Princeton University, Princeton, NJ 08544), Lisa Sette (Center for Coastal Studies, 5 Holway Ave, Provincetown, MA 02657), David Buck (Shoals Marine Laboratory, Appledore Island, Kittery Point, ME 03905), Andrea Bogomolni (Shoals Marine Laboratory, Appledore Island, Kittery Point, ME 03905)

Presenter: Tacy Guest (Princeton University)

Abstract: Harbor seals are a sentinel species for the health of ecosystems in the rapidly-warming Gulf of Maine. Phenology of seal life history events, such as metabolically costly processes like molting, can reflect changes in the ecosystem around them. Eleven years of photo surveys from Shoals Marine Laboratory were combined with bottom trawl datasets from the Northeast Fisheries Science Center to build a generalized additive model that tracked changes in molting timing and identified the environmental predictors of these changes. Additionally, three years of seal scat data were used to assess hormonal and isotopic markers for physiological health in the seals. Seal molting was found to be shifting earlier, which was best predicted by spring surface salinity and abundance of silver hake, a prey species, in the prior fall, suggesting that a seal's nutritional reserves may play a role in molting timing. The scat dataset found year-to-year differences in stress and metabolic hormones. This work is the first of its kind to document long-term change in seal molting phenology. The year-to-year differences in these metrics indicate that seal health may be used to track environmental change.

Physiological Responses of Eelgrass (*Zostera marina*) Under Elevated Temperatures in the Gulf of Maine

Format: Flash talk

Authors: Aslan Gustafson (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME 04544), Ariana Raschid Farrokhi (Colby College, Waterville, ME 04901), Jessica Nordengren (Southern Maine Community College, South Portland, ME 04106), Melissa Rocker, Brittney Honisch, Maya Groner, Reyn Yoshioka (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME 04544)

Presenter: Aslan Gustafson (Bigelow Laboratory for Ocean Sciences)

Abstract: Climate change has increased seawater temperatures, creating environmental stress for seagrasses and contributing to declines in eelgrass, a habitat-forming marine plant with diverse ecosystem services. To assess thermal tolerance, eelgrass was collected from three Maine sites: Upper Flag Island, Great Salt Bay, and Sand Cove. Shoots were placed in seawater tanks at 15, 20, 25, and 30°C. Stress was assessed weekly through reduction in photosynthetic efficiency (using pulse amplitude modulated fluorometry), declines in growth rate, survival, and progression of eelgrass wasting disease. Photosynthetic efficiency decreased as visible stress (diseased lesions) increased with temperature. Eelgrass from Great Salt Bay showed the greatest thermal tolerance, with 40% survival in the warmest tank after 5 weeks, compared to no survival in Sand Cove. These results imply that eelgrass populations vary in resilience to warming. Of the sites tested, Great Salt Bay may be the most suitable for restoration due to its higher heat tolerance. Future research should examine the physiological factors and trade-offs driving thermal tolerance to improve eelgrass conservation and restoration strategies.

Investigating the Diet of the Invasive Shrimp Palaemon Elegans: A Multi-Tool Approach

Format: Poster

Authors: Luc Harrison (University of Southern Maine, Portland, ME, 04103 USA), Karen Wilson (University of Southern Maine, Portland, ME, 04103 USA), Catherine Miller (University of Southern Maine, Portland, ME, 04103 USA), Zoe Latil (University of Southern Maine, Portland, ME, 04103 USA), Sydney Marston (University of Southern Maine, Portland, ME, 04103 USA), Jack Harrison (University of Southern Maine, Portland, ME, 04103 USA), Rachel Lasley-Rasher (University of Southern Maine, Portland, ME, 04103 USA)

Presenter: Luc Harrison (University of Southern Maine)

Abstract: Palaemon elegans is an invasive shrimp species that was first documented in the western Atlantic in New England in 2010, and has since become dominant in the tide pools of southern Maine. Despite their growing abundance, little is known about the ecological role of P. elegans in the Gulf of Maine. To gain understanding of their ecological impact, we surveyed their abundance across multiple rocky intertidal sites in Casco Bay, along with various environmental and biological factors. Additionally, diet samples were collected and will be analyzed using microscopy, δ13C and δ15N stable isotopes analysis, DNA metabarcoding. Preliminary results indicate a varied diet of crustaceans and algae while stable isotope analysis showed them feeding around a tertiary trophic level with varied isotopic niches. Integrating these approaches will provide the first detailed assessment of P. elegans diet in Maine and establish a foundation for understanding its potential effects on coastal food webs.

Hard to Swallow: Northeast Fisheries Species Under Acidification Stress

Format: Flash talk

Authors: Geir M. Hartl (NERACOOS Portsmouth NH 03801 and Middlebury College, Middlebury VT, 05753 USA), Austin Pugh (NERACOOS, Portsmouth NH 03801 USA), NECAN Steering Committee

Presenter: Geir M. Hartl (NERACOOS and Middlebury College)

Abstract: A new database compiling biological impacts of OCA on Northeast fisheries priority species to improve OCA information access for researchers, managers, and coastal community members. The database will inform the creation of decision support tools, such as an infographic and/or interactive website.

Analyzing Shifts in Zooplankton Biomass Across Spatiotemporal Gradients in the Gulf of Maine

Format: Poster

Authors: Julia Hobbs (University of New England, Biddeford, ME 04005 USA), Shea Leary (University of New England, Biddeford, ME 04005 USA), Jessie Mahowald (University of New England, Biddeford, ME 04005 USA), Patricia Thibodeau (University of New England, Biddeford, ME 04005 USA)

Presenter: Julia Hobbs (University of New England)

Abstract: Zooplankton are a key component of marine food webs and serve as indicators of ecological health. Changes in zooplankton biomass can provide insight into how shifting environmental conditions influence ecosystems and food web dynamics. Using three years (2014-2016) of sampling data collected across the Gulf of Maine (GoM), this project analyzed spatial and temporal patterns of zooplankton biomass and combined in situ observations with satellite data to examine how environmental factors, including chlorophyll a, temperature, and salinity, relate to zooplankton biomass shifts. Results indicate that zooplankton biomass is modulated by both spatial gradients, with greater biomass observed in the Southern GoM, and temporal gradients, with the greatest biomass during summer of 2014. Understanding these relationships provides insight into broader ecosystem changes occurring in the Gulf of Maine and helps improve our ability to anticipate how marine food webs may respond to ongoing environmental variation and climate-driven shifts in ocean conditions.

The Gulf of Maine Bat Monitoring Program (GOMBAT)

Format: Presentation

Authors: Megan Ferguson (Biodiversity Research Institute, Portland, ME, USA), Nathan Fuller (BRI, Portland, ME, USA), Brianna Frankina (Biodiversity Research Institute, Portland, ME, USA), Michael Getz (BRI, Portland, ME, USA), Ethan Gilardi (Biodiversity Research Institute, Portland, ME, USA), Wing Goodale (Biodiversity Research Institute, Portland, ME, USA), Joshua Guilbert (Biodiversity Research Institute, Portland, ME, USA), Merra Howe (Biodiversity Research Institute), Paul Knaga (Canadian Wildlife Service, Halifax, NS, CAN), Cory Stearns (Maine Department of Inland Fisheries and Wildlife, August, ME, USA), Michael Whity (Bat Conservation International, Austin, TX, USA)

Presenter: Merra Howe (Biodiversity Research Institute)

Abstract: Bats are known to occur offshore in the Gulf of Maine, but information on how, when and where animals use the offshore habitat is limited due to challenges in data collection. Building off prior bat monitoring in the region, we designed a community-supported bat acoustic monitoring approach across the Gulf, leveraging partnerships to deploy acoustic detectors on vessels, weather buoy stations, islands, and at coastal baseline sites. We aim to assess the relationship between species occurrence and distance from shore across time to ground truth the hypothesized negative correlation between bat presence and distance from shore, and evaluate the effects of environmental covariates. Bat passes were fairly common offshore, but species diversity and rates of occurrence were relatively lower offshore compared to baseline coastal sites. Our results indicate that bats are using offshore habitats during migratory movements and that weather influences migratory behavior. We also highlight the value in close coordination with a broad array of ocean users to collect data in new ways.

Twenty Years of Coastal and Ocean Acidification Monitoring in the Gulf of Maine

Format: Presentation

Authors: Christopher W. Hunt (Ocean Process Analysis Laboratory, University of New Hampshire, Durham, NH 03824), Douglas Vandemark (Ocean Process Analysis Laboratory, University of New Hampshire, Durham, NH 03824), Adrienne Sutton (Pacific Marine Environmental Laboratory, National Oceanic and Atmospheric Administration, Seattle, WA 98115), Shawn Shellito (Ocean Process Analysis Laboratory, University of New Hampshire, Durham, NH 03824)

Presenter: Christopher W. Hunt (Ocean Process Analysis Laboratory, University of New Hampshire)

Abstract: In 2006 the nation's first coastal CO2 buoy was deployed in the Gulf of Maine, off the shore of New Hampshire. Observations around this sentinel coastal acidification site have expanded to include seasonal cruises and an additional shoreside time series facility at the UNH Coastal Marine Laboratory. While atmospheric CO2 levels continue to steadily rise, our monitoring efforts have documented dramatic shifts in coastal ocean conditions which reflect both local and regional dynamics. These shifts reflect the complex nature of acidification in the coastal zone, as well as spatial differences among sites. As regional conditions continue to change new models and data products offer opportunities to leverage our historical dataset to help develop and test indicator forecasts, provide actionable information to a variety of users, and further our understanding of the acidification pressures faced by this important ecosystem.

Microplastics in the Gulf Of Maine: Comparative Microplastic Deposition Across Five Coastal Habitats in Great Bay Estuary, NH

Format: Presentation

Authors: A. Gabrielle Jarrett (University of New Hampshire, Durham, NH 03824 USA), Ashley N. Bulseco (University of New Hampshire, Durham, NH 03824 USA), Sophie A. Comer-Warner (University of Maryland, Baltimore County, Baltimore, MD 21250 USA), Gregg E. Moore (University of New Hampshire, Durham, NH 03824 USA)

Presenter: Anna Gabrielle Jarrett (University of New Hampshire)

Abstract: Estuaries, located at the terrestrial-aquatic interface, are experiencing increasing microplastic (MP) pollution (plastics < 5mm). Estuarine sediments are known MP sinks, due to sequestration through particulate deposition. However, the extent of MP variation among estuarine habitats is unclear. This study examines sediment MP concentrations in the Gulf of Maine's Great Bay Estuary (GBE) across five unique habitats: high salt marsh, low salt marsh, mudflat, eelgrass meadow, and oyster bed. These habitats all have characteristics that suggest they may be hotspots for MP sequestration but their comparative potential as sinks is unknown. Sediment MP abundance, size, morphology, and polymer type were quantified via Laser Direct Infrared (LDIR) spectroscopy from sediment cores 10-30cm deep. While MPs have been reported in intertidal and subtidal sediments of GBE, this is the first direct comparison of the different capacity of estuarine habitats to sequester and retain MPs within a single estuarine system. Results will describe MP presence, types and distribution in critical coastal wetlands and more broadly inform the fate of MP in intertidal and subtidal estuarine habitats.

An Evaluation of the New Entrance Programs in the Maine Lobster Fishery

Format: Poster

Authors: Joelle Kilchenmann (University of Maine, Orono, MA 04469), Theresa Burnham(University of Maine, Orono, MA 04469), Alexa Dayton (Maine Center for Coastal Fisheries, Stonington, ME 04681), Joshua Stoll (University of Maine, Orono, MA 04469)

Presenter: Joelle Kilchenmann (University of Maine)

Abstract: Since 1996, entrants to the Maine lobster fishery have joined through one of two pathways: a student license program (under 18, enrolled full-time in school) or an adult apprentice program. Both require a period of mentorship, but entry into the student program is predicated on generational ties to fishing communities, which can confer mentoring and material resources from a very young age. Since the establishment of these entry pathways 30 years ago, there has been no broad-scale evaluation of the programs. Linking 30 years of licensing records to a 2025 economic survey (n=158), we find student entrants earn roughly $54,000 more in annual profit, stable across zone and gender treatments. The difference is not uniform: indistinguishable from zero through the 60th percentile, it climbs to $92,021 at the 90th. The student pathway raises the ceiling for earning potential rather than lifting the typical outcome, and the gap does not close with experience. Further, licensing histories show differentiation between career trajectories by entrance pathways.

Development and Application of an FVCOM-3DVAR System to the Northeast Coastal Ocean Forecast System (NECOFS)

Format: Poster

Authors: Ki-Hwan Kim (UMassD), Qichun Xu (UMassD), Siqi Li (UMassD), Lu Wang (UMassD), Changsheng Chen (UMassD)

Presenter: Ki-Hwan Kim (University of Massachusetts-Dartmouth)

Abstract: An FVCOM-based three-dimensional variational data assimilation (FVCOM-3DVAR) system was developed and applied to the Northeast Coastal Ocean Forecast System (NECOFS). Its analyses are compared with those from existing nudging and optimal interpolation (OI). It assimilates tide gauges, temperature-salinity profiles, and daily gridded surface products. Unlike nudging with prescribed relaxation weights, 3DVAR uses estimated background and observation errors. EOF-based vertical covariance and a Gaussian horizontal filter represent spatial and vertical background-error correlations without storing the full covariance matrix. In a profile test, OI temperature corrections were concentrated near the observation depth, while 3DVAR yielded a smoother vertical adjustment. In a five-day tide-gauge test, water-level RMSE against assimilated observations fell by about 80%. A daily SST test produced a spatial pattern similar to nudging and captured the observed subdaily SST variability. We assess computational cost using analysis-cycle time, iteration counts, and convergence. Together, these preliminary results demonstrate the potential of FVCOM-3DVAR for regional ocean prediction.

Incorporating Inshore Data Reveals Spatial Variation in Winter Flounder Age and Growth

Format: Lightning talk

Authors: Ben LaFreniere (Maine Department of Marine Resources), Rebecca Peters (Maine Department of Marine Resources, West Boothbay Harbor, ME 04575), Adrian Jordaan (Organismic and Evolutionary Biology, University of Massachusetts Amherst, Amherst, MA 01003), Paul Nitschke (Northeast Fisheries Science Center, Woods Hole, MA 02543), Eric Rollibard (Northeast Fisheries Science Center, Woods Hole, MA 02543), Katrina Zarrella-Smith (Organismic and Evolutionary Biology, University of Massachusetts Amherst, Amherst, MA 01003), Robyn Linner (Maine Department of Marine Resources, West Boothbay Harbor, ME 04575)

Presenter: Ben LaFreniere (Maine Department of Marine Resources)

Abstract: Winter flounder (Pseudopleuronectes americanus) supported major recreational and commercial fisheries until the 1980s, when abundance declined across three U.S. stocks. Abundance indices and demographic structure have changed little despite sustained reductions in fishing mortality while stock assessments remain challenged by gaps in biological sampling. The Maine Department of Marine Resources recently aged 6,800 winter flounder otoliths collected during spring 2002–2024 by the Maine–New Hampshire Inshore Trawl Survey in the Gulf of Maine (GOM). Multivariate and univariate testing of age composition varied significantly with depth: shallow areas (5–70 m) were dominated by juveniles, while deeper areas (>70 m) contained all ages. Sex-specific von Bertalanffy growth models from three fishery-independent surveys revealed heterogeneous growth among stocks. The GOM stock had the slowest growth, likely reflecting colder developmental habitat. Within the GOM, ME/NH samples showed slower growth and smaller maximum length, potentially indicating lower productivity and resilience. Integrating surveys across spatial scales improved detection of variability and informs sustainability efforts.

Spatiotemporal Dynamics of Nearshore Fish Communities in Casco Bay

Format: Poster

Authors: Katie Lankowicz (Gulf of Maine Research Institute, Portland ME), Courtney Swenson (Hobart and William Smith Colleges, Geneva NY), Zachary T. Whitener (Gulf of Maine Research Institute, Portland ME), Aaron Whitman (Gulf of Maine Research Institute, Portland ME), Samantha Bengs (Gulf of Maine Research Institute, Portland ME), Graham Sherwood (Gulf of Maine Research Institute, Portland ME)

Presenter: Katie Lankowicz (Gulf of Maine Research Institute)

Abstract: Nearshore Gulf of Maine habitats support fish growth, reproduction, and migration. We used beach seine data to examine how temperature affects growth, abundance, and community structure, using Atlantic silversides and Atlantic herring as warming-tolerant and warming-sensitive representatives. Warmer temperatures correlated positively with silverside growth but not herring growth. Generalized additive models revealed strong seasonal habitat-use patterns: week of summer and temperature significantly predicted silverside catch, with strong positive effects in warm, late-summer conditions. Herring catch declined through summer regardless of temperature. Community structure analysis showed no clear trends at whole-Bay, annual scales, though herring-dominated communities occurred only in anomalously cool summers. Results suggest nearshore warming has not adversely affected silversides, but herring may be unable to shift phenology to altered temperature patterns. Changes to this forage-rich community's growth, abundance, and phenology will likely affect multiple trophic levels. Continued monitoring is needed to track shifts in Gulf of Maine community and trophic ecology.

Following the Atlantic Marsh Fiddler Crab (*Minuca pugnax*) into the Gulf of Maine—and Down Its Burrows

Format: Presentation

Authors: Lori LaPlante (Saint Anselm College, Manchester, NH, 03102), Patrick Driscoll (Saint Anselm College, Manchester, NH, 03102), Eleanor Posanka (Saint Anselm College, Manchester, NH, 03102), Thomas Walker (Saint Anselm College, Manchester, NH, 03102)

Presenter: Lori LaPlante (Saint Anselm College)

Abstract: The Atlantic marsh fiddler crab (Minuca pugnax) is rapidly expanding its range into the Gulf of Maine. We report results from our 2024 population density study, the first to document M. pugnax populations in NH. We used standard burrow counts to facilitate comparisons with previous studies throughout the species' historic range and introduced an innovative burrowscope-based approach to improve M. pugnax density estimates. The burrowscope is an inexpensive, non-destructive tool that identifies burrow occupants in real time. Surveys at two sites in Great Bay, NH revealed small but established populations. We also found the standard burrow count method overestimated M. pugnax density, averaging 2.4 burrows per crab. Using a burrowscope, we identified occupants with 91.7% accuracy and sex with 75% accuracy while in the field. These findings demonstrate that incorporating burrowscopes into monitoring protocols provides more accurate estimates of M. pugnax than burrow counts alone. As M. pugnax continues its northward expansion, accurate baseline population estimates are critical for tracking abundance changes and assessing its ecological impacts on Gulf of Maine salt marsh ecosystems.

Evaluating the Impacts of Climate-Mediated Prey Shifts on Common Tern Chick (*Sterna hirundo)* Energy Budgets in the Gulf of Maine

Format: Poster

Authors: Kimberly A. Lato (Department of Biological Sciences, University of New Hampshire, Durham, NH 03824 USA), Elizabeth Craig (Shoals Marine Laboratory, University of New Hampshire, Durham, NH 03824 USA), Nathan B. Furey (Department of Biological Sciences, University of New Hampshire, Durham, NH 03824 USA)

Presenter: Kimberly Lato (Department of Biological Sciences, University of New Hampshire)

Abstract: Rapid warming in the Gulf of Maine is altering the abundance, distribution, and quality of marine prey. These changing prey fields can have consequences for marine predators via alterations to their bioenergetic budgets. Leveraging six years of data collected from the Isles of Shoals, we are creating bioenergetic models for common tern (Sterna hirundo) chicks to investigate the relationship between annual prey abundances, prey quality, and chick survival. These growth-based models integrate empirical diet data from fecal DNA metabarcoding, energetic density data of prey species via bomb calorimetry, and chick provisioning rates to estimate daily consumption, energy spent, and net energy gained. By comparing various model scenarios, we will be able to disentangle the link between warming-induced alterations in regional prey communities and predator reproductive success. Findings will be placed in the context of adult tern foraging behavior and bioenergetic budgets to gain a more holistic understanding of potential population-level impacts. Our flexible modeling framework can be adapted for other seabirds in the Gulf of Maine that may be similarly impacted by changing prey fields.

A Proposed National Marine Sanctuary in the Cashes Ledge Area

Format: Flash talk

Authors: n/a

Presenter: Gareth Lawson

Abstract: Cashes Ledge harbors a wide range of habitat types, including the most pristine kelp forest in the Gulf of Maine. Conservation Law Foundation recently led the nomination of the Cashes Ledge area for consideration as a National Marine Sanctuary to protect its remarkable diversity.

Building a Spatial and Temporal Record of Climate Change and Human Impact in the Gulf of Maine: Seeking Collaborators

Format: Lightning talk

Authors: R. Mark Leckie (Department of Earth, Geographic, and Climate Sciences, University of Massachusetts Amherst, MA), Serena N. Dameron (Department of Earth, Geographic, and Climate Sciences, University of Massachusetts Amherst, MA)

Presenter: R. Mark Leckie (Department of Earth, Geographic, and Climate Sciences, University of Massachusetts Amherst)

Abstract: Benthic foraminifera are ubiquitous in marine environments. They are sensitive to environmental changes, which is why forams are go-to proxies in paleoclimate research. Species abundance, community structure, and shell geochemistry change are compared against sediment grain size, total organic carbon, water column properties, and sea level.

A 1946 study in the western Gulf of Maine produced a comprehensive distribution of foram species along the ME coastline to northern MA. In 2005, a small pilot study examined box core samples near the mouth of the Merrimack River and offshore Plum Island, MA. Despite its limited scope, the study clearly revealed changes in species distributions, perhaps due to changes in the sediment load, nutrient supply, or runoff chemistry from the Merrimack River. Some species shifted landward, others seaward, while others showed little change in their distribution. How have foram populations changed over the 80-year period between the 1946 study and today, and what can these changes tell us about the impacts of climate change and human activity in the GoM? We seek ecology, fisheries, and oceanographic collaborators to help address this broad question.

A Comparison of Wind Models from ERA5 Re-Analysis and Offshore Buoy Observations for Predicting and Hindcasting Winds in a Gulf of Maine Bay

Format: Poster

Authors: Olivia Leighton and Charles Tilburg, Ph.D. (University of New England, Biddeford, ME)

Presenter: Olivia Leighton (University of New England, Biddeford, ME)

Abstract: Anecdotal reports of shifting wind patterns in the Gulf of Maine have grown over the past decade, but these changes are difficult to quantify due to a lack of long-term, localized wind records. This project compares a climate reanalysis product (ERA5) and a linear regression model to characterize wind conditions in Saco Bay, Maine. By combining these models with offshore buoy data, we developed a 30-year hindcast of wind speed and direction for the region. Our findings demonstrate the value of localized hindcasting for detecting wind trends that broader models may miss, with implications for future coastal conditions in Saco Bay.

Social-Ecological Science in Support of Community-Led Marine Stewardship

Format: Lightning talk

Authors: n/a

Presenter: Heather M. Leslie (University of Maine)

Abstract: The Damariscotta River estuary is emblematic of many coastal marine systems. The impacts of climate change and demographic shifts are visible from the village centers to the working waterfronts of this part of the Gulf of Maine region. Residents and visitors of the communities surrounding the estuary are connected to the ecosystem in diverse ways, including sea farming and wild fisheries; tourism and recreation; and coastal development. Many people have strong attachment to this place. I will report on the results of a 10-year community science program motivated by the deep and varied connections within this coastal marine social-ecological system. Working together, a collaborative group of researchers, students, municipal officials, shellfish harvesters, and other community members identified issues of common concern and developed a series of research, education, and community engagement projects to address them. As a result, the Damariscotta River Estuary Community Science Program generated new knowledge; supported community-led stewardship of intertidal shellfish; and demonstrated innovative ways to bring local ecological and scientific knowledges together.

Surviving the Cold: How the Temperate Coral *Astrangia poculata* Survives New England's Winters and Implications for Range Expansion in a Changing Ocean

Format: Lightning talk

Authors: Taylor Lindsay (Tufts University, Medford, MA 02148, USA), Jack Girard (Department of Biological Sciences, University of Rhode Island, Kingston, RI 02881, USA), Sean Grace (Department of Biology & Werth Center for Coastal and Marine Studies, Southern Connecticut State University, New Haven, CT 06515, USA), Randi Rotjan (Department of Biology, Tufts University, Medford, MA 02148, USA)

Presenter: Taylor Lindsay (Tufts University)

Abstract: The temperate coastal waters of New England are inhabited by a single species of hard coral: the northern star coral, Astrangia poculata. At the northernmost edge of its range, A. poculata experiences dramatic seasonal shifts in water temperature, food availability, wave energy and more. To survive these challenges, it employs a host of unique characteristics including facultative symbiosis and winter dormancy called quiescence. However, the winter ecology of corals is severely understudied due to the challenges of winter fieldwork. To explore the possible drivers of winter quiescence, we documented A. poculata's dormancy behavior for the full winter of 2025. Both water temperature and nutritional cues drove the onset and duration of quiescence. Compared with past records of quiescence, we found evidence that warming waters were associated with shorter dormancy periods, which have a variety of biological implications for this species. Under projected regimes of warming waters and shortening winters, A. poculata is expected to be a 'climate change winner'. We expect that this will lead to a northward range expansion into the Gulf of Maine in the very near future.

Trials of Novel Biodegradable Lantern Net Covers for Biofouling Mitigation

Format: Lightning talk

Authors: Madison Maier (Hurricane Island Center for Science and Leadership, Rockland, ME 04841 USA), Erin Adams (Ocean Farm Supply, Brunswick, ME 04011 USA), Phoebe Jekielek (University of Maine, Darling Marine Center, Walpole, ME 04573 USA), Hannah Nigro (Hurricane Island Center for Science and Leadership, Rockland, ME 04841 USA)

Presenter: Madison Maier (Hurricane Island Center for Science and Leadership)

Abstract: In the Gulf of Maine, rising ocean temperatures are expected to increase the diversity and abundance of fouling organisms (biofouling) on aquaculture farms, which increases labor demands and can reduce a farm's productivity. This project trialed biodegradable mesh covers intended to decrease the settlement of fouling organisms on lantern nets, a common grow-out method for cultured Atlantic Sea Scallops (Placopecten magellanicus). The mesh lantern net covers are a novel use of a beechwood fiber sustainably sourced from Forest Stewardship Council certified forests and developed by the Ocean Farm Supply company. Through deployments on two Penobscot Bay farms, we tested for impact on (1) farmer labor and time, (2) biofouling accumulation and community composition, and (3) scallop health and condition. Gear deployment occurred for 4-6 week periods from May through early October in 2024 and 2025, covering the settlement times of a variety of common fouling species. This project seeks to provide insight into applications for effective, low cost, and sustainable mitigation of biofouling across the Maine scallop aquaculture industry.

FIShBOT - A Gridded, In-Situ Bottom Temperature Dataset for the Northeast

Format: Poster

Authors: George Maynard (NOAA/NEFSC), Linus Stoltz (Commercial Fisheries Research Foundation), Sarah Salois (NOAA/NEFSC), Mike Morin (NOAA/NEFSC)

Presenter: George Maynard (NOAA/NEFSC)

Abstract: Bottom temperature data are collected through many different research efforts around the region. However, these data often exist on disparate servers in different formats, making them challenging to incorporate into analyses. The new FIShBOT data product aggregates bottom temperature data from long-term monitoring programs around the region into a 7km square grid and serves daily summary statistics for any cells that were observed on a given day. FIShBOT also includes in situ data on bottom salinity and dissolved oxygen where available. The dataset updates with new information daily, but also provides stable snapshots with DOIs to enable reproducible science and is hosted on a machine or human accessible ERDDAP server.

Thirty-Three Years of Long-Term Water Quality Monitoring Reveal a Regime Shift in Boston Harbor

Format: Lightning talk

Authors: Claudia Mazur, Christopher Goodwin, David Wu (Environmental Quality Department, Massachusetts Water Resources Authority, Deer Island, Boston, Massachusetts 02128)

Presenter: Claudia Mazur (Massachusetts Water Resources Authority)

Abstract: In 2000, the Deer Island Treatment Plant diverted its effluent from Boston Harbor offshore to Massachusetts Bay, leading a major recovery effort for what was once known as the "dirtiest harbor in America." Over 33 years of long-term water quality monitoring before and after outfall diversion, the Massachusetts Water Resources Authority (MWRA) observed a 50% decrease in dissolved inorganic nitrogen loads and a 43% decrease in dissolved inorganic phosphorus loads to the Harbor, relieving a degraded coastal ecosystem from eutrophic and hypoxic conditions. A 25 year period of stable nutrient and chlorophyll-a concentrations suggest a shift from a degraded, wastewater driven state to a new stable state that is characterized by estuarine mixing, internal biogeochemical coupling, and overall improved water clarity. However, these changes can be disrupted by rapid warming in the Gulf of Maine, which could force the ecosystem into yet another regime shift. Overall, the Boston Harbor recovery story is evidence that strategic infrastructure investments can help improve degraded urban marine ecosystems and a heavily polluted harbor can come back after decades of wastewater influence.

Elevating Maine's Marshes: Preliminary Data on Salt Marsh Recovery Following the First Sediment Placement Project in Maine

Format: Lightning talk

Authors: Marjorie Mednikova (Department of Biological Sciences, University of New Hampshire, Durham, NH 03824 USA), Bri Benvenuti (Ducks Unlimited), Ashley Bulseco (Department of Biological Sciences, University of New Hampshire), David Burdick (School of Marine Science and Ocean Engineering, University of New Hampshire), Brittany Jellison (Department of Biological Sciences, University of New Hampshire), Kenneth Raposa (Rhode Island Department of Environmental Management, Providence, RI 02908 USA), Gregg Moore (Department of Biological Sciences, University of New Hampshire)

Presenter: Marjorie Mednikova (University of New Hampshire)

Abstract: As climate change threatens coastal habitats, managers in the Gulf of Maine require innovative approaches to restoration. Sediment placement (SP) is a restoration method used to mitigate salt marsh habitat loss from sea level rise. Though SP has been used successfully in other U.S. regions, it has been rarely implemented in New England. Maine's first SP project, led by Ducks Unlimited, took place in 2025 at the Rachel Carson National Wildlife Refuge in Wells. The following parameters were monitored pre- and post-SP: vegetation cover, porewater chemistry, hydrology, benthic infaunal diversity, and soil microbial diversity. Preliminary post-restoration data have shown consistency with early results from similar SP projects in other regions, including early successional stages of vegetation regrowth as well as changes in salinity and redox potential. Soil microbial and benthic infaunal data initially reflect the disturbance caused by the sediment placement itself, but changes in these communities over time provide insight into expected post-restoration trajectories. Continued monitoring at this site will be used to inform the use of SP on a larger scale in Maine in the future.

Co-Charting the Course: Harnessing the Power of Science and Fishing Partnerships

Format: Keynote

Presenter: Dr. Anna Mercer

About the Presenter:

Anna Mercer, Ph.D., is Director of the Narragansett Laboratory and Chief of the Cooperative Research Branch at the NOAA Northeast Fisheries Science Center. A marine scientist with deep roots in New England fisheries, she has dedicated her career to advancing collaborative research between scientists and fishing communities, helping improve fisheries management through innovative data collection and industry partnerships.

Assessing Resilience of Shellfisheries in Casco Bay to Ocean Acidification

Format: Poster

Authors: Katherine E. Mills, Jay Kim, Kanae Tokunaga, Jared Wildwistle, Carissa Maurin, Ben Cotton, Sarah Risley (Gulf of Maine Research Institute); Emily Whitmore (Maine Aquaculture Innovation Center); Curtis Bohlen, Janelle Goeke (Casco Bay Estuary Partnership); Will Everett, Mike Doan, Ivy Frignoca (Friends of Casco Bay); Damian Brady, Kate Liberti (University of Maine); Susie Arnold (Island Institute)

Presenter: Katherine Mills (Gulf of Maine Research Institute)

Abstract: Shellfish account for 84% of Maine's seafood landings and generate over $534 million in revenue for coastal communities. Both traditional wild-harvest fisheries and a rapidly growing aquaculture industry are highly reliant on shellfish. However, shellfish are particularly vulnerable to the combined effects of multiple environmental stressors, including ocean and coastal acidification. To better understand how these interacting stressors affect shellfisheries, we used a participatory stakeholder process to co-develop fuzzy cognitive maps representing the stressors, impacts, and risks facing shellfish harvesters and growers. The resulting maps revealed key drivers of change and interconnected sources of risk in these fisheries. These stakeholder-informed insights provide a foundation for synthesizing relevant literature and datasets to address critical information needs related to acidification and other stressors. Ultimately, this information will be integrated into a vulnerability and resilience assessment framework for Casco Bay shellfisheries. The framework will help identify priority actions to support adaptation and strengthen the resilience of shellfisheries in Maine.

Western Gulf of Maine High-Resolution Surficial Geology and Sediment Maps

Format: Poster

Authors: Rachel Morrison, Larry Ward, Michael Bogonko, Paul Johnson (University of New Hampshire Center for Coastal and Ocean Mapping, Durham, NH 03824 USA)

Presenter: Rachel Morrison (University of New Hampshire Center for Coastal and Ocean Mapping)

Abstract: The Western Gulf of Maine (WGOM) was shaped by interactions of marine processes, riverine sediment input, sea level fluctuations, and multiple glaciations, which dramatically altered the onshore and offshore landscape. As a result, the seafloor is extremely complex with bathymetric highs, muddy basins, sandy shoals, exposed bedrock, cobble boulder complexes, and extensive marine-modified glacial deposits. Over the last decade, UNH CCOM has conducted numerous studies in the WGOM focused on seafloor characterization, surficial geology mapping, and assessing potential sand and gravel resources. This work led to the development of high-resolution surficial geology maps, improved sediment and geoform classifications for paraglacial environments using CMECS, and an extensive ground truth database with sediment grain size (over 1,000 samples), seafloor photographs, and vibracores. The maps were developed by utilizing high-resolution bathymetry compilations and backscatter where coverage exists, along with associated bathymetric derivatives. The surficial geology maps cover ~3,230 km2 in the WGOM from the nearshore seaward to Jeffreys Ledge. Both the maps and databases are available online.

Integrating Sound into the Northeast Ocean Observing System

Format: Poster

Authors: Xavier Mouy (Woods Hole Oceanographic Institution, Woods Hole, MA), Cameron Thompson (Northeastern Regional Association of Coastal Ocean Observing Systems, Portsmouth, NH), and Jackie Motyka (Northeastern Regional Association of Coastal Ocean Observing Systems, Portsmouth, NH)

Presenter: Jackie Motyka (Northeastern Regional Association of Coastal Ocean Observing Systems)

Abstract: Passive acoustic monitoring (PAM) provides continuous information about marine ecosystems, but the growing volume and diversity of recordings make it difficult to integrate data across instruments and observing programs. The Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS), in partnership with the Woods Hole Oceanographic Institution, Tetra Tech, and data providers, is developing PAMHub, a cloud-based infrastructure for managing, processing, and sharing PAM data. PAMHub combines standardized metadata, quality control, secure data access, scalable processing, and archival with interoperable soundscape and species-detection products. We are testing the system with passive acoustic datasets from the Gulf of Maine. Automated workflows generate one-minute hybrid millidecade soundscape metrics and support additional acoustic analyses, enabling comparisons across sites and time periods and integration with environmental data. This presentation will describe the PAMHub workflow, demonstrate its potential for soundscape research, and present soundscape patterns and visualizations to help researchers, managers, and stakeholders investigate ecosystem change.

A Novel Method for Acoustic Detection of Harbor Porpoise (*Phocoena phocoena*) in a Noisy Estuary

Format: Poster

Authors: Jill Munger (UNH Department of Biological Sciences), Erika Fuery (Commander, Navy Installations Command), Jessica Bassi (Naval Facilities Engineering Systems Command Atlantic), Ian Jones (UNH Center for Acoustics Research and Education at the Institute for the Study of Earth, Oceans, and Space), Jessica Veo (UNH Department of Biological Sciences), Michelle Fournet (UNH Department of Biological Sciences)

Presenter: Jill Munger (UNH Department of Biological Sciences)

Abstract: Harbor porpoises (Phocoena phocoena) are increasingly vulnerable to anthropogenic disturbance in coastal New England, where high metabolic demands require near-continuous foraging. This makes them sensitive to underwater noise that can mask echolocation and impair prey detection. Understanding fine-scale temporal patterns of occurrence is critical for management in multi-use coastal environments. This study establishes harbor porpoise acoustic activity in the Piscataqua River estuary, characterized by strong tidal currents and intensive maritime activity. Harbor porpoises produce stereotyped narrowband high-frequency echolocation clicks almost continuously while foraging. Using SoundTrap 600 HF hydrophones with onboard click detectors, we recorded underwater sounds at three Piscataqua River estuary sites since September 2025. Click detections are validated using clustering to distinguish porpoise clicks from other high-frequency sounds. Baseline temporal acoustic data will help inform behavior-relevant management strategies to minimize conflicts between porpoise and human activities.

Impacts of Warming Waters on Phytoplankton Respiration

Format: Poster

Authors: Lydia M. Pinard (Bigelow Laboratory for Ocean Sciences, East Boothbay, Maine 04544)
Elizabeth Harvey (The University of New Hampshire, Durham, New Hampshire 03824)
Joseph Salisbury (The University of New Hampshire, Durham, New Hampshire 03824)
Kai Ziervogel (The University of New Hampshire, Durham, New Hampshire 03824)

Presenter: Lydia M. Pinard (Bigelow Laboratory for Ocean Sciences)

Abstract: Phytoplankton play a crucial role in biogeochemical cycles and account for 34% of pelagic respiration. Quantifying respiration helps determine carbon budgets and predict biogeochemical responses to climate change. The Gulf of Maine (GoM) is warming rapidly, and studying it may assist in modeling future global changes. Field experiments to establish baseline respiration rates took place in 2022 in the GoM and on the Scotian Shelf. Lab experiments were conducted with C. tenuissimus and E. huxleyi cultured at various temperatures to estimate net community respiration (NCR) under different climate scenarios. NCR in the surface and subsurface waters were mainly driven by cells in the size fraction > 0.8 µm, and showed a positive correlation with chlorophyll a. No significant difference was found between temperature treatments for volumetric or cell-specific respiration rates for C. tenuissimus. E. huxleyi exhibited significantly higher volumetric and cell-specific cellular respiration rates under the warmest treatment. Based on our research, C. tenuissimus and E. huxleyi in surface and subsurface waters will experience elevated respiration rates if current warming conditions continue.

Gulf of Maine Energyscape: Reconstructing Zooplankton Energy Available to Higher Trophic Levels for the Period 1961–2024

Format: Presentation

Authors: Jérôme Pinti (Gulf of Maine Research Institute, Portland, ME USA), Pierre Hélaouët (Marine Biological Association, Plymouth, UK)

Presenter: Jérôme Pinti (Gulf of Maine Research Institute)

Abstract: Zooplankton are the energetic link between primary production and the fish, seabirds, and whales of the Gulf of Maine, yet current monitoring usually tracks abundance or biomass. These metrics, while valuable in their own right, do not consider the wide diversity of zooplankton and therefore do not capture the energy available to predators. Here, we present an energyscape index that estimates energy available to higher trophic levels. This index relies on taxon-level abundance data, obtained with Continuous Plankton Recorder (the longest-running marine ecological survey in the world) from 1961 to 2024, combined with per-individual energy content and corrected for the CPR's catchability biases. Energy per sample followed a clear seasonal cycle: lowest from December to March and peaking in late spring and summer. Available energy was markedly higher in the 1990s than other decades, consistent with known zooplankton change, and preliminary spatial patterns suggest higher energy nearshore. This index offers a new lens on prey availability and its long-term variability, with applications for fisheries and ecosystem management in a rapidly warming Gulf of Maine.

Kelp Forests of Cashes Ledge: A “Bright Spot” in the Gulf of Maine

Format: Presentation

Authors: Douglas B. Rasher, Ph.D. (Bigelow Laboratory for Ocean Sciences), Robert W. Lamb, Ph.D. (University of Florida, Gainesville, FL 32611); Jon D. Witman, Ph.D. (Brown University, Providence, RI 02912)

Presenter: Douglas B. Rasher, Ph.D. (Bigelow Laboratory for Ocean Sciences)

Abstract: Identifying “bright spots” has become a central focus in ocean ecology, both to improve the science of resilience and to inform ecosystem management and restoration. Yet, despite the importance of cold-water kelp forests, few studies have identified resilience among these globally imperiled habitats. Here, we address this knowledge gap by revealing a kelp forest “bright spot” in the Gulf of Maine, a region now defined by climate change. Using a unique long-term dataset, we show that an offshore underwater mountain (Cashes Ledge) has harbored high-biomass kelp forests throughout the past decade despite ocean warming, marine heatwaves (MHWs), and the rise of invasive “turf” algae known to inhibit kelp. We also show that fish biomass at Cashes Ledge has remained remarkably high throughout recent warming, and consistently included Atlantic cod. Such patterns contrast sharply with coastal reefs under the same thermal regime; they experienced widespread collapse in response to recent MHWs and have long been devoid of large predatory fish. Our study thus sets the stage for new research into drivers of resilience at Cashes – and resultant findings that may enhance reef recovery elsewhere.

Evolving Ocean Conditions in the Gulf of Maine During the Holocene: New Insights from Marine Microfossils

Format: Presentation

Authors: Ria Raval (University of Maine, Orono, ME), Katherine Allen (University of Maine, Orono, ME), Brenda Hall (University of Maine, Orono, ME), Aaron Putnam (University of Maine, Orono, ME), Alicia Cruz-Uribe (University of Maine, Orono, ME), Bonnie Newsom (University of Maine, Orono, ME), Madelyn Woods (University of Maine, Orono, ME)

Presenter: Ria Raval (University of Maine)

Abstract: The Gulf of Maine (GOM) is an important, climate-sensitive region with a dynamic past due to its link to Northwest Atlantic circulation and the influences of deglaciation (Herlinger et al., 2026). However, changes in seawater conditions during the Holocene epoch (11.6 thousand years ago, or “ka”, to present) in the GOM are enigmatic, as few paleoceanographic records exist from the region. Global Holocene records also remain puzzling, showing cooling despite rising greenhouse gases (Liu et al., 2014). This conflict highlights a need for more high-resolution temperature reconstructions and assessments of their biases (Bova et al., 2020). In this study we reconstruct Holocene sea-surface temperatures (SSTs) by analyzing the magnesium to calcium ratios (Mg/Ca) of planktic foraminiferal calcite, which increase with ocean temperature (von Langen et al., 2005), using laser ablation mass spectrometry. Mg/Ca measurements are then translated to temperatures using a calibration equation. Our preliminary results reconstruct a ∼12 ka GOM SST record showing an early warming followed by a middle-late Holocene cooling and include temperature distributions that will be used to assess seasonal bias.

A Multi-Decadal Increase in Jellyfish in the Gulf of Maine

Format: Poster

Authors: Nicholas R. Record (Bigelow Laboratory for Ocean Sciences). Benjamin Tupper (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME), Omi Johnson (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME), Laura Ganley (New England Aquarium, Boston, MA), Reyn Yoshioka (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME)

Presenter: Nicholas R. Record (Bigelow Laboratory for Ocean Sciences)

Abstract: The Jelly Ocean Hypothesis is the debated proposition that gelatinous zooplankton populations are increasing worldwide as a result of changing ocean conditions. We examined evidence for this hypothesis in the Gulf of Maine across multiple datasets. The Northeast Fishery Science Center's EcoMon survey showed statistically significant increases in salps, siphonophores, and scyphozoans in late summer and early autumn across its 50 year duration. The collaborative Maine-New Hampshire Inshore Trawl Survey showed potential increases in common scyphozoan species, like lion's mane jellyfish and moon jellyfish, as well as ctenophores. A community science program showed episodic changes in jellyfish size. Species distribution models indicated that the strongest covariates associating with the changing occurrences of gelatinous taxa were surface temperature, bottom temperature, and oxygen, depending on taxonomic group. These results provide one line of evidence in favor of a long-term rise in gelatinous species. The roughly synchronized increases in these widely diverse taxa suggest that changes in environmental or ecological conditions could favor a gelatinous body plan generally.

Striped Bass Foraging Ecology and Implications for Ecosystem-Based Fisheries Management in Maine

Format: Lightning talk

Authors: Abrielle E. Remick (University of Maine, ME, USA), Matthew Cieri (Maine Department of Marine Resources, ME, USA), Walter J. Golet (University of Maine, ME, USA), Michelle D. Staudinger (University of Maine, ME, USA).

Presenter: Abrielle Remick (University of Maine)

Abstract: Understanding regional food web dynamics is critical for ecosystem-based management. Striped bass are historically abundant predators that migrate seasonally into the Gulf of Maine to feed, yet their diet in northern habitats remains poorly documented. Striped bass consume several commercially valuable species in Maine, including lobster, Atlantic herring, mackerel, and menhaden, highlighting the need for region-specific diet information. Using a cooperative research approach with Maine's recreational fishing community, we conducted the first comprehensive assessment of striped bass feeding patterns in Maine. Anglers, tackle shops, and charter operators enabled collection of striped bass samples (n = 462) during 2025–2026 through donated filleted racks and non-lethal sampling aboard charter boats. We assess spatial and temporal variation in diet, predator-prey body size relationships, and the energy content of nearshore forage fish to illustrate prey–predator energetic pathways. These findings directly inform ongoing assessments of striped bass and their prey while demonstrating how cooperative research can address critical data gaps and support ecosystem-based management.

Impacts of Intracellular Nitrate Cycling on Measurements of Denitrification in Damariscotta River and Gulf of Maine Sediments

Format: Poster

Authors: Jeremy Rich (University of Maine), Caitlin Haley (University of Maine), Sean O'Neill (University of Maine), Chris Algar (Dalhousie University), and Anne Giblin (Marine Biological Laboratory)

Presenter: Jeremy Rich (University of Maine)

Abstract: The inventory of biologically available nitrogen (N) in coastal ecosystems is influenced by microbial transformations of nitrate in marine sediments. New data indicate that nitrate stored inside microbial eukaryotic cells, known as intracellular nitrate (ICNO3), accounts for a major pool of nitrate in marine sediments. We conducted 4 day laboratory incubations of sediment cores with added 15N-nitrate to the overlying seawater to allow 15N-nitrate to be taken up into the ICNO3 sediment pool. We used two methods to measure denitrification, one that does not rely 15N-nitrate (N2/Ar technique), and another that relies on 15N-nitrate distribution in sediments (Isotope Pairing Technique, IPT). If sufficient 15N-nitrate is taken up into the ICNO3 pool and denitrified during incubations, we would expect increasing 15N enrichment of N2 gas measured in IPT compared to N2/Ar in our experiments. We will present IPT and N2/Ar data from two sites that we measured this past spring, a shallow site (17 m) in the Damariscotta River and a nearby deep site (100 m) in the Gulf of Maine.

Interannual Variation in Larval Lobster (*Homarus americanus*) Phenology and Environmental Drivers in the Gulf of Maine

Format: Poster

Authors: Heather Glon (Maine Department of Marine Resources, Augusta, ME 04330, USA), Amalia Harrington (University of Maine, School of Marine Sciences, Orono, ME 04469, USA), Greg Gerbi (University of Maine, School of Marine Sciences, Darling Marine Center, Walpole, ME 04573, USA), Chloe Root (University of Maine), and Michelle Staudinger (University of Maine, School of Marine Sciences, Darling Marine Center, Walpole, ME 04573, USA)

Presenter: Chloe Root (University of Maine)

Abstract: The reproductive cycle and early life stages of the American lobster (Homarus americanus) are seasonally regulated processes strongly influenced by temperature. Long-term monitoring in the southern Gulf of Maine has shown that warmer spring bottom water temperatures are associated with earlier larval hatching, suggesting that climate-driven shifts in phenology may affect recruitment patterns and the effectiveness of monitoring programs. Since 2018, the Maine Department of Marine Resources Larval Lobster Survey has monitored four fixed stations near Boothbay Harbor, generating an eight-year time series of larval abundance and environmental conditions. This study characterizes seasonal larval phenology by quantifying annual timing of first appearance, peak abundance, season end, and season duration across larval stages I and IV. It also evaluates how environmental and ecological variables influence larval density and phenological timing. The study aims to identify ecological indicators that predict early, average, or late larval seasons, which could improve survey timing and optimize personnel and financial resources for long-term monitoring.

Identifying the Gaps in Our Ocean Observations

Format: Poster

Authors: Jackie Motyka (NERACOOS), Katy Bland (NERACOOS), Tom Shyka (NERACOOS), Caitlin Shanahan (NERACOOS), Austin Pugh (NERACOOS), Anna Simpson (NERACOOS), Cameron Thompson (NERACOOS), Brenda Darroch (NERACOOS), Sami McCorkle (NERACOOS), Emily Silva (NERACOOS)

Presenter: Anna Simpson (NERACOOS)

Abstract: Ocean data is critical for understanding oceanographic and biological trends, informing maritime safety, and supporting coastal preparedness. The Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS) coordinates an ocean observing system throughout the Gulf of Maine and Long Island Sound that provides ocean data for decision-making. As part of this system, NERACOOS operates a regional network of buoys, sensors, and models that provide information and data products to meet the needs of the northeast region. We solicit input to identify gaps in current observing coverage and prioritize where additional monitoring systems would provide the greatest value. We will display a map of existing observing assets and provide an opportunity for participants to provide input on where additional monitoring should be prioritized. Through this collaborative, stakeholder-driven approach, we aim to grow a more comprehensive, responsive coastal ocean observing network for New England and the broader Gulf of Maine region.

Linking the Diet of Key Copepods in the Gulf of Maine to Interannual Phytoplankton Taxonomic Variability

Format: Poster

Authors: Karen Stamieszkin (Bigelow Laboratory of Ocean Sciences), Catherine Nowakowski (Smithsonian Environmental Research Center, The Nature Conservancy), Kelton W. McMahon (University of Rhode Island), Catherine Mitchell (Bigelow Laboratory for Ocean Sciences), Nick R. Record (Bigelow Laboratory for Ocean Sciences)Catherine Nowakowski (Smithsonian Environmental Research Center, The Nature Conservancy), Kelton W. McMahon (University of Rhode Island), Catherine Mitchell (Bigelow Laboratory for Ocean Sciences), Nick R. Record (Bigelow Laboratory for Ocean Sciences)

Presenter: Karen Stamieszkin (Bigelow Laboratory of Ocean Sciences)

Abstract: The trophic linkage between phytoplankton and zooplankton is a critical step in the transfer of energy and nutrients from primary producers to upper trophic levels. While it is known that mesozooplankton prey on primary producers, the impact of their changing productivity, composition, and phenology on mesozooplankton populations remains elusive. The Gulf of Maine's (GoM's) hydrography and phenology are shaped by shifting source waters and a recent (approximately two-decade) warming trend. Historical oceanographic time series have documented decadal shifts in the zooplankton community, and potential declining primary productivity. However, the link between phytoplankton production and composition, and zooplankton variability, remains elusive. We analyzed two GoM phytoplankton time series – the Continuous Plankton Recorder (CPR, 1961-2023) and the GoM North Atlantic Time Series (GNATS, 1998-2020) – which offer multi-decade taxonomic and abundance information on complementary size fractions of the phytoplankton community. By examining these two times series side-by-side, we gained a more complete picture of seasonal and interannual variability in GoM phytoplankton over 22 years of overlap. Next, we analyzed compound-specific stable isotopes of carbon in amino acids (C CSIA-AA) from two copepod species – Calanus finmarchicus and Centropages typicus – over ~2 decades. We used a taxonomic "fingerprinting" technique to determine which primary producer taxa the copepods fed upon. Finally, we compared the interannual patterns of diet in the copepods to those in phytoplankton taxa from GNATS and CPR, to determine whether there was a link between these copepod populations and their prey at annual-to-decadal timescales.

What's for dinner? A Comparison of Gulf of Maine Forage Fish Energy Densities

Format: Poster

Authors: Esher Swanson (Department of Biological Sciences, University of New Hampshire), Kimberly A. Lato (Department of Biological Sciences, University of New Hampshire), Nathan B. Furey (Department of Biological Sciences, University of New Hampshire)

Presenter: Esher Swanson (Department of Biological Sciences, University of New Hampshire)

Abstract: Forage fish, small-bodied, pelagic marine organisms that are important prey for marine predators, connect and disperse energy across food webs. Thus, climate-mediated changes in forage fish availability and energy content could have far-reaching effects. Recent warming in the Gulf of Maine necessitates the study of forage fish populations to identify potential shifts in energy flows, which may have implications for ecosystem resilience and predator population persistence. To address this need, we studied the energy densities of forage fish species observed in various predator (Atlantic cod (Gadus morhua), striped bass (Morone saxatilis), and common tern (Sterna hirundo)) diets using bomb calorimetry. Mean energy density of Atlantic moonfish (Selene setapinnis) was lowest across all species studied. In contrast, the mean energy densities of Atlantic butterfish (Peprilus triacanthus) and sand lance (Ammodytes spp.) were highest, suggesting that they provide higher energetic value to marine predators. Our results provide important context for understanding how changing prey fields may impact predator energetics with continued ocean warming.

Evaluation of Spatially-Explicit Water Mass Characterizations in the Gulf of Maine

Format: Lightning talk

Authors: Haley Synan (National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, and University of Rhode Island, Graduate School of Oceanography), Kimberly Hyde (National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Narragansett RI), Colleen Mouw (University of Rhode Island, Graduate School of Oceanography), Adrienne Silver (Atmospheric and Environmental Research, Inc), Glen Gawarkiewicz (Woods Hole Oceanographic Institution)

Presenter: Haley Synan* (National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, and University of Rhode Island, Graduate School of Oceanography)

Abstract: The dynamic productive waters of the Gulf of Maine (GOM) are highly variable through space and time. Large scale circulation changes and rapid warming have altered the prevalence and location of spatially-explicit water masses in the GOM. Variations in water masses can impact plankton community composition, affect primary productivity, and shift essential fish habitat. Accurate characterization and classification of regional water masses is necessary to quantify spatiotemporal water mass variability and develop fisheries relevant operational products. We developed a satellite-based surface water mass classification model using unsupervised clustering methods to identify dominant water masses in the Northwest Atlantic. Time-series analysis of monthly water mass characterizations in the GOM reveal dynamic water mass boundaries and several anomalous events, including evidence of the Tripos bloom in 2023 and several Scotian Shelf Crossover events. This new operational product will be incorporated into new and existing modeling efforts aimed at understanding the oceanographic drivers of lower trophic levels, commercial fisheries, and protected species.

The New England Ocean Atlas: Story-Driven Science Translation for the Gulf of Maine

Format: Lightning talk

Authors: Peter H. Taylor (Waterview Consulting, Harpswell, ME 04079 USA)

Presenter: Peter H. Taylor (Waterview Consulting)

Abstract: The Gulf of Maine is altering rapidly due to climate change, shifting species ranges, and expanding human uses. Public interest in ocean and coastal issues has never been higher, and science-based decision-making has never been more urgent. While online portals successfully provide scientists and technical specialists with centralized access to comprehensive data, stakeholders, decision-makers, and the interested public have few reliable, user-friendly resources for the contextual, science-based information they need on timely issues. To bridge this gap, we are developing a new platform called the New England Ocean Atlas, which approaches marine and coastal science from the perspective of these audiences. Curated by expert science communicators, the Atlas translates complex data into engaging, relevant information through customized mapping, narrative storytelling, and clear visualizations. The Atlas will expand over time with centralized information on high-impact topics. We invite partnerships with NGOs, government agencies, academic researchers, and others interested in communicating science-based information to communities around the Gulf of Maine.

Marine Biodiversity Observation Network (MBON): Integrative Approaches to Sustained Ecosystem Monitoring in the Western Gulf of Maine

Format: Lightning talk

Authors: Cameron Thompson (NERACOOS); Erin Grey (UMaine); Elizabeth Harvey (UNH); Lee Karp-Boss (UMaine); Laura Lubelczyk (Bigelow); Maura Niemisto (Bigelow); Nicole Poulton (Bigelow); Dylan Pugh (GMRI); Shawn Shellito (UNH); Sara Smith (UNH); Michelle Staudinger (UMaine); Ian Thompson (UMaine); Sean O'Neill (UMaine); Angelique Wooldridge (UMaine); Greg Teegarden (St. Joseph's College Maine); Jeffrey Runge (UMaine)

Presenter: Cameron Thompson (NERACOOS)

Abstract: NERACOOS maintains two time series stations with over two decades of observations. They serve as sentinels of ecosystem change, tracking the population of the lipid-rich copepod Calanus finmarchicus in the western GoM. The time series documented a decline in Calanus following changing oceanographic conditions around 2010, coinciding with a decline in Calanus in the eastern GoM and changing foraging habitat for the North Atlantic right whale. Resolving the drivers of Calanus variability demands integrative approaches. To that end, we expanded lower trophic sampling and are incorporating novel methods including eDNA, lipid analysis, and in situ imaging to increase taxonomic resolution and functional characterization. Central to any monitoring effort is making data accessible and building partnerships that put it to use. Sustained sampling cruises and derived data products provide opportunities for outreach and engagement, while open access through ERDDAP ensures data are discoverable by the wider community. Altogether, these well-characterized stations help foster a broader community of practice in the region and serve as a testbed for discovery by multiple users and programs.

Changes in Gulf of Maine Ichthyoplankton Community Composition and Abundance

Format: Poster

Authors: Ian Thompson (University of Maine), Cameron Thompson (NERACOOS), Jeffery Runge (University of Maine), Michelle Staudinger (University of Maine)

Presenter: Ian Thompson (University of Maine)

Abstract: Ichthyoplankton represent the larval forms of fish species present in an ecosystem. Despite their importance as population indicators of spawning productivity and recruitment, ichthyoplankton have been poorly monitored in the Gulf of Maine (GOM), limiting understanding of system changes such as development schedules and abundance. This study analyzed a long-term ichthyoplankton dataset collected using bongo nets at the Coastal Maine Time Series (CMTS) station located ~8 km off mid-coast Maine, and aimed to quantify trends in community composition and structure between 2009-2014 and 2019-2022. These two time periods represent distinct thermal regimes in the GOM. Over the time series, decreased abundance was observed in species such as Acadian Redfish (Sebastes fasciatus), Atlantic Herring (Clupea harengus), and Sandlance (Ammodytes sp.), while benthic generalists including Cunner (Tautogolabrus adspersus) and Silver Hake (Merluccius bilinearis) underwent large increases. As an example, Silver Hake experienced a 2,614% increase in population abundance. Continued monitoring is needed to characterize ongoing population changes as the ecosystem continues to experience rapid change.

Baseline Offshore Wind Livelihood Impacts and Needs Exploration (BOWLINE)

Format: Poster

Authors: Kanae Tokunaga (Gulf of Maine Research Institute), Todd Guilfoos (University of Rhode Island), Christine Beitl (University of Maine), Clea Harrelson (University of Maine), Jay Kim (Gulf of Maine Research Institute), Ben Cotton (Gulf of Maine Research Institute), Chas Van Damme (Gulf of Maine Research Institute)

Presenter: Kanae Tokunaga (Gulf of Maine Research Institute)

Abstract: The Northeast US is among the most suitable areas for offshore wind development. Floating offshore wind is a new technology, with only five farms operating globally. This, combined with the region's limited exposure to offshore development, presents novel challenges for estimating fisheries' impacts. This project examines baseline economic and sociocultural impacts of floating offshore wind in the Gulf of Maine on Maine's fishing communities. A scenario-based economic assessment examined impacts on landings through direct exposures and potential spillover impacts on inshore fishing operations. An econometric approach investigated impacts on employment and wages in commercial fishing and shoreside seafood sectors. Ethnographic interviews explored broader community impacts, offering nuanced understanding of how people across sectors perceive offshore wind. We present our findings, discuss data and knowledge gaps, and share lessons learned from our research process—which incorporated industry and community feedback—highlighting priority research areas to improve our capacity to estimate and prepare for potential impacts from floating offshore wind development in the Gulf of Maine.

Mixing It Up: Storm-Induced Alterations to Physical and Biological Water Column Conditions Detected in the Gulf of Maine

Format: Poster

Authors: Paige Tortorice (Stony Brook University, Southampton, NY 11968), Douglas Vandemark (University of New Hampshire, Durham, NH 03824), Joseph D. Warren (Stony Brook University, Southampton, NY 11968)

Presenter: Paige Tortorice (Stony Brook University)

Abstract: Instrumented bottom landers were deployed at five different locations in the Gulf of Maine beginning in 2021 to record bottom hydrography and water column acoustic backscatter. Storms moving through the Gulf of Maine are common and the mix of heavy rain and strong winds can potentially impact even the deepest parts of the Gulf. Ten storms were identified and classified using a modified Dolan and Davis intensity scale. Hydrographic and acoustic backscatter measurements quantified the impact of these storms on the physical and biological conditions in the water column. For most storms, bottom waters became fresher and more oxygenated, while bottom temperature responses were more variable. At most sites (76%) organisms were shifted vertically between 0 and ± 20 m by storms, however the remaining locations had even greater vertical shifts (± 20 - 60 m). The spatial variability observed in storm impacts may reflect differences in local hydrography and circulation, as well as the location of the sensors relative to storm-driven processes. These findings highlight the need for expanded ocean-bottom monitoring to track physical and biological changes in a rapidly evolving Gulf of Maine.

A Tale of Two Kelps: Habitat Models and Drop Camera Observations Suggest Isles of Shoals Kelp Bed Persistence Depends on Depth and Species

Format: Poster

Authors: Constance N. Tyler (Center for Coastal and Ocean Mapping/Joint Hydrographic Center, University of New Hampshire, Durham, NH 03824 USA), Kim Lowell (Center for Coastal and Ocean Mapping/Joint Hydrographic Center, University of New Hampshire, Durham, NH 03824 USA), Christopher E. Parrish (College of Engineering, Oregon State University, Corvallis, OR 97331 USA), Jennifer A. Dijkstra (Center for Coastal and Ocean Mapping/Joint Hydrographic Center, University of New Hampshire, Durham, NH 03824 USA)

Presenter: Constance N. Tyler (Center for Coastal and Ocean Mapping/Joint Hydrographic Center, University of New Hampshire)

Abstract: Kelp bed habitats are being replaced by filamentous red macroalgae in many regions around the world, with a variety of anthropogenic stressors contributing to this turnover. Many of these observations rely on diver surveys performed to limited depths. Kelp habitats are often treated as equivalent between regions, despite differing species composition and variation in functional traits across taxonomic levels. Habitat classification models produced from bathymetry and SST data around the Isles of Shoals indicate that filamentous red macroalgae are much less successful at dominating substrate below 16 meters depth; drop camera habitat observations suggest that this depth falls within the transition zone from shallower Saccharina latissima beds to deeper Agarum clathratum beds. Several biotic and abiotic factors related to depth may contribute to kelp species zonation and the differing ability of these species to persist, including light availability, temperature, and resilience against grazing.

Opportunities for Collaborative Ecosystem-Based Science in the State of the Ecosystem Reports and Ecosystem and Socioeconomic Profiles

Format: Poster

Authors: Abigail Tyrell, Joseph Caracappa, Scot Large, Stephanie Owen (Northeast Fisheries Science Center, Woods Hole, MA 02543)

Presenter: Abigail Tyrell (Northeast Fisheries Science Center)

Abstract: Rapid environmental shifts in the Gulf of Maine and broader Northeast U.S. Shelf necessitate adaptive, holistic management. The Northeast Fisheries Science Center produces annual State of the Ecosystem (SOE) reports and species-specific Ecosystem and Socioeconomic Profiles (ESPs) to provide physical, biological, and human-dimension indicators to fisheries managers. This presentation summarizes the SOE and ESPs, their delivery formats, and associated management on-ramps. We emphasize key research priorities that hold significant interest for the Fisheries Management Councils, yet currently lack capacity from our team; these are ripe for exploration by external partners. Such areas include: fleet- and community-level trends in fishing; biological trends of species not sampled by the NEFSC bottom trawl survey; and linkages between oceanographic events and fisheries outcomes. We invite academic researchers, state managers, and community stakeholders across the Gulf of Maine region to partner in co-developing next-generation indicators. By leveraging regional expertise, we can enhance the usefulness of ecosystem products and build stronger pathways from research to decision-making.

Improving Detection Probability and Spatio-Temporal Inferences by Manipulating Teleost eDNA Fragment Length

Format: Poster

Authors: Kade O. Tyrrell (University of New England,. Biddeford ME 04005), Emily R. Lancaster (Eckerd College, St. Petersburg, FL 33711), Graham Sherwood (Gulf of Maine Research Institute, Portland, ME 04101) Markus Frederich (University of New England, Biddeford ME 04005)

Presenter: Kade Tyrrell* **(**University of New England**)**

Abstract: Environmental DNA (eDNA) is a powerful tool for biomonitoring. However, DNA degradation affects the respective results and is dependent on DNA fragment length. Therefore, understanding how DNA degrades over time and manipulating eDNA fragment length to affect the detection of eDNA will potentially help to improve the interpretation of eDNA results and provide more detailed spatio-temporal information on the targeted species. We combined controlled lab experiments and field sampling in the Gulf of Maine to assess the influence of amplicon length on detection efficiency. Black sea bass and striped bass eDNA decayed in a controlled lab experiment within 24 hours and eDNA detection correlated positively to different amplicon lengths. Ongoing eDNA analysis of sampling in Casco Bay for alewife eDNA and its correlation to CPUE data will field test whether amplicon length-dependent eDNA results can be used to optimize spatio-temporal interpretation of the respective data. Improving the accuracy of eDNA-based biomass estimates can have major implications on fisheries management and inform sampling patterns for future survey studies using eDNA.

A Framework for Climate Adaptation in Marine Resource Monitoring Programs and Application within the Maine Department of Marine Resources

Format: Lightning talk

Authors: Jesica Waller (Maine Department of Marine Resources, West Boothbay Harbor, ME) and Michelle Staudinger (University of Maine, School of Marine Sciences, Darling Marine Center, Walpole, ME, USA)

Presenter: Jesica Waller (Maine Department of Marine Resources)

Abstract: To sustain and adapt long-term monitoring programs to ongoing ecosystem transformation, strategic planning is needed to identify and operationalize actions in support of climate resilience. This study evaluated eight marine resource monitoring programs within the Maine Department of Marine Resources to assess the potential to capture climate-driven responses and proactively identify where climate adaptation actions could be implemented. Survey program leads were asked 28 questions to identify climate and ecosystem-scale data gaps, risks, and opportunities. Questions and results were organized around four themes, and responses were analyzed to produce short (≤ 5 years) and long-term (≥ 5 years) recommendations. A key finding was that strong partnerships and consistent data structures were critical to successful data collection and the ability of the Department to integrate these recommendations into their programs moving forward. The evaluation framework represents one of the first applications at the U.S. state agency scale.

BloomBoard: An Interactive Dashboard for Daily Coastal Chl-a Forecasts in the Gulf of Maine

Format: Lightning talk

Authors: Cameron Webb (Boston University, Boston, MA, 02215 USA), Sasha J. Kramer (Boston University, Boston, MA, 02215 USA), Michael C. Dietze (Boston University, Boston, MA, 02215 USA), Claudia Mazur (Massachusetts Water Resources Authority, Boston, Massachusetts, 02128 USA), Chris Goodwin (Massachusetts Water Resources Authority, Boston, Massachusetts, 02128 USA)

Presenter: Cameron Webb (Boston University)

Abstract: Phytoplankton biomass, the marine food web's base and commonly measured via chlorophyll-a, governs coastal fisheries productivity and marine ecosystem health. However, due to environmental change, phytoplankton blooms once reliable throughout the year are shifting in magnitude and timing. In collaboration with the Massachusetts Water Resources Authority, BloomBoard was created to improve coastal chl-a forecasting and make real-time forecasts accessible for water quality monitoring and response. The dashboard provides daily 7-day chl-a forecasts for two Gulf of Maine buoys using in-situ chl-a and water condition data. Preliminary results show strong forecast skill for background (non-bloom) chlorophyll, explaining 59% of variance at a 3-day lead, as well as for the key components of bloom events as sub-models predicting a bloom's peak magnitude, duration, and decline rate each independently explain 63-71% of variance. Water temperature and conductivity emerged as the leading predictors of both calm-period dynamics and bloom decline which can help improve future forecasts.

Temporal Dynamics of Planktonic Protist Communities at Two Gulf of Maine MBON Stations

Format: Poster

Authors: Angelique Wooldridge (University of Maine), Dr. Lee Karp-Boss (University of Maine), Dr. Erin Grey (University of Maine), Sean O'Neill (University of Maine), Cameron Thompson (NERACOOS)

Presenter: Angelique Wooldridge (University of Maine)

Abstract: Planktonic protists are ecologically diverse organisms that function as primary producers, grazers, mixotrophs, and parasites. Because many protists respond rapidly to environmental change, shifts in community composition can indicate changing conditions. This study uses 18S rRNA metabarcoding to characterize planktonic protist communities at two Gulf of Maine Marine Biodiversity Observation Network (MBON) stations: WBTS in Wilkinson Basin and CMTS within Maine's Coastal Current. Analyses focus on samples from the deep chlorophyll maximum and examine how community composition changes through time at each station. Preliminary results identify groups of genera with similar temporal trajectories. Ongoing analyses evaluate community diversity and turnover, identify taxa contributing to community shifts, and examine associations between community patterns and environmental conditions. Understanding these communities provides insight into environmental variability and ecological processes that structure plankton diversity in this ecosystem. This research will contribute to MBON efforts to identify biological indicators of ecosystem change and understand Gulf of Maine food web conditions.

Differential Effects of Seasonal Temperatures on Epizootic Shell Disease of American Lobster in Maine from 2003-2025

Format: Poster

Authors: Reyn M. Yoshioka (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME 04544), Melissa M. Rocker (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME 04544), Kathleen M. Reardon (Maine Department of Marine Resources, West Boothbay Harbor, ME 04575), Kirsten E. Johnston (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME 04544), Heather E. Glon (Maine Department of Marine Resources, West Boothbay Harbor, ME 04575), Nicholas R. Record (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME 04544), & Maya L. Groner (Bigelow Laboratory for Ocean Sciences, East Boothbay, ME 04544)

Presenter: Reyn Yoshioka (Bigelow Laboratory for Ocean Sciences)

Abstract: Epizootic shell disease (ESD) of American lobsters (Homarus americanus) is temperature sensitive, raising the question of how rapidly warming marine waters in the Gulf of Maine influence the prevalence of ESD in this iconic fishery. Molting is a critical defense against ESD, but the timing of the molt is shifting and becoming less predictable as temperatures increase. To investigate how these interactions impact ESD, we fit a series of dynamic structural equation models evaluating how ESD prevalence in Maine lobster from 2003-2025 was influenced by hindcasted bottom temperatures. Consistent with past studies, we found that the annual molt is earlier over time and that warmer temperatures in seasons preceding the molt generally hasten its peak. Warmer winter temperatures were most consistently associated with increased ESD prevalence, but other seasonal effects, like summer temperatures, depended on lobster demography. Our results highlight phenological interactions of temperature, molting, and ESD, underscoring that anticipating future ESD will rely on understanding seasonal patterns of changing bottom temperatures.

“It Takes Somebody to Love It”: The Invisible Work of River Herring Stewardship

Format: Presentation

Authors: Anne Zegers (Manomet Conservation Sciences, Brunswick, ME 04011, USA), Caitlin Cleaver (Colby College, Environmental Studies Department, Waterville, ME 04901, USA), Emily Reynolds Farr (Manomet Conservation Sciences, Brunswick, ME 04011, USA), Anne Zegers (Manomet Conservation Sciences, Brunswick, ME 04011, USA), Laurie Louise Baker (Bates College, Mathematics Department, Lewiston, ME 04240, USA), Sophia Amira Chivers (College of the Atlantic, Bar Harbor, ME), Mike Thalhauser (Maine Coast Heritage Trust, Topsham, ME 04086, USA), Alexa Dayton (Maine Center for Coastal Fisheries, Stonington, ME 04681, USA), Bailey Bowden (Alewife Harvesters of Maine (Emeritus); Bagaduce River Steward, Penobscot, ME 04476, USA)

Presenter: Anne Zegers (Manomet Conservation Sciences)

Abstract: Alewives and blueback herring (collectively, river herring) are anadromous fish found along the east coast of North America. River herring historically returned to Maine’s rivers in the tens of millions, acting as keystone species supporting Wabanaki peoples, a substantial commercial fishery, and marine and freshwater ecosystems. Population declines due to industrialization, loss of spawning habitat, and overfishing have led to harvest moratoria throughout most of their range, with Maine being one of the few states with a commercial fishery.

Part of Maine’s success is due to community stewardship. This presentation will describe the role of stewards in long-term care of river herring runs. Through 13 interviews with key informants, 23 semi-structured interviews with Maine stewards, and 16 structured survey responses from a subset of those stewards, we documented the time and effort involved in stewardship and restoration, the role that community members and commercial harvesters play in stewardship, and the tangible outcomes they see. We identify barriers to stewardship, and make recommendations for enhancing future river herring restoration, stewardship and co-management.