Atlantic Estuarine Research Society

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AERS

October 11 - 13, 2018

Stockton University
Galloway, NJ

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Welcome to the AERS Fall 2018 Meeting

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Venue Information

Stockton University

Galloway, New Jersey

Stockton University's Galloway, N.J. campus in the Pinelands National Reserve is reminiscent of one of America's beautiful national parks. Our campus is within easy driving distance of major metropolitan areas including New York City, Philadelphia, Baltimore and Washington, D.C. A new residential campus in Atlantic City will open in 2018.

Stockton Seaview Hotel

Comfortably secluded on 670 wooded acres along scenic Reed's Bay in Galloway, NJ, yet only minutes away from all the Atlantic City action, Stockton Seaview Hotel and Golf club offers 296 guest rooms and 16 suites, all generously equipped with luxurious bedding and superior amenities. Each room features wireless high-speed Internet, 37" flat-screen TV, and complimentary Lavazza coffee, but they also come standard with a healthy dose of historical charm, not to mention ample views of the manicured grounds or the Atlantic City skyline. The guest rooms and suites at Stockton Seaview have accommodated heads of state, professional golfers and movie stars, but this tradition of excellence is warmly extended to all guests.

Location: 101 Vera King Farris Dr, Galloway NJ 08205

Oyster Creek Inn

Join us at the remote resturant and bar with diverse seafood dishes and sweeping views of the marshes for our welcoming social on Thursday. We will begin out AERS meeting catching up while taking in the local views.

Location: 41 Oyster Creek Rd, Leeds Point, NJ 08220

Schedule at a Glance

Thursday October 11th

3:00 - 6:00 pm Board Meeting- Campus Center Meeting Room 2

6:00 - 10:00 pm Social at Oyster Creek Inn (appetizers and cash bar)

Friday October 12th

8:00- 9:00 am Registration and Breakfast-Stockton Event Room A

9:00 Welcome - Stockton Theater

- 9:15 - Keynote Speaker - Susan Allen
- 10:00 - 10:30 Contributed Talks

10:45 Break - Stockton Event Room A

- 11:00 Contributed Talk
- 11:15 - 11:30 Ignite Talks
- 11:30 Contributed Talks

12:00 Lunch - Stockton Event Room A

- 1:15 Contributed Talks
- 2:00 Keynote Speaker - Naz Onel

2:45 Break - Stockton Event Room A

- 3:00 Contributed Talks
- 4:00 -5:00 Students: Mixer/CV Workshop- Stockton Event Room A
- 4:00 -5:00 Non-Students: Walk or Short Movies - Stockton Theater

5:00 Business meeting

6:00 Poster Session - Stockton Event Room A (Cash Bar)

7:30 Banquet at SeaView Resort (Cash Bar)

Saturday October 13th

8:00- 9:00 am Registration and Breakfast-Stockton Event Room A

9:00 Welcome - Stockton Board of Trustees Room

9:15 Keynote Speaker - Skylar Bayer

10:00 Contributed Talks

10:30 - Break

10:45 Contributed Talks

11:45 Student awards

12:15 Closing remarks

1:00 - 3:00 pm Field Trips

Stockton Marine Field Station

Field Trips

Tour of Stockton Marine Field Station and R/V Petrel

Time: Saturday November 13th, 1 - 3 PM

Meeting Place: 30 Wilson Ave, Port Republic NJ 08241

Following the closing of the meeting Saturday and lunch on your own, attendees are invited to join us at Stockton's Marine Field Station from 1-3pm for a tour of our facilities and our newest research vessel, the R/V Petrel (distance 8 miles, instructions available at registration).

The eight-acre SMFS site provides diverse laboratory space as well as dockage for the research vessel fleet. Access to the southern Barnegat Bay waters, Great Bay and Atlantic City back bays as well as the Mullica, Bass and Wading rivers is easily conducted leaving directly from our waterfront facility on the Nacote Creek. The 36' x 14' R/V Petrel was built to meet Stockton's expanding needs in the coastal sciences, including offshore bottom mapping, ROV video observations, increased oceanography fieldwork and scientific diving. The Petrel provides a much larger platform for both teaching and research and is used extensively throughout the courses in river, bay and ocean environments.

ADD-ON Forsythe National Refuge

Time: Saturday, November 13th, 1:00 OR 2:30pm

Meeting Place: Stockton Marine Field Station

For those interested in exploring Edwin B. Forsythe National Refuge via Wildlife Drive, you will have an opportunity to sign up for times departing from the Stockton Marine Field Station (1pm, 2:30pm). Spaces in the shuttle from the field station are on a first-come, first-serve basis and will be available at registration. The Edwin B. Forsythe National Wildlife Refuge protects more than 47,000 acres of southern New Jersey coastal habitats which is actively managed for migratory birds. The refuge's location in one of the Atlantic Flyway's most active flight paths makes it an important link in seasonal bird migration. Its value for the protection of water birds and their habitat continues to increase as people develop the New Jersey shore for our own use. The most popular place to view wildlife on the refuge is the Wildlife Drive. This 8-mile, one-way, unpaved road leads you through wetlands and woodlands. Look for spectacular concentrations of migratory water birds in spring and fall, as they stop and linger in refuge habitats managed to meet their needs. Two observation towers and the accessible Experimental Pool Overlook are equipped with spotting scopes.

Detailed Schedule of Events

Thursday October 11th

3:00 - 5:00	Board Meeting
6:00 - 10:00	Social at Oyster Creek Inn

Friday October 12th

8:00 - 9:00	Registration and Breakfast - Stockton Event Room A
9:00	Welcome - Stockton Theater
9:15	Keynote Speaker: Susan Allen Social Media Strategies for Science Communicators
10:00	Effects of Predation and Substrate Choice on Ribbed Mussel Recruitment for Living Shoreline Sarah Bouboulis
10:15	New Jersey's Coastal Estuaries Inventory: Connecting Stakeholders, Data, and Managers for Fisheries Mark Sullivan
10:30	Assessing regional marsh resilience through the Chesapeake Bay Sentinel Site Cooperative Taryn Sudol
10:45	Break - Stockton Event Room A
11:00	
11:15	Ignite Talks
	Combining snapshot sampling, time series data, and a reduced complexity model to understand the Mullica River-Great Bay Estuary Stephanie Peart

Blue Crab (Callinectes sapidus) Population Dynamics Across the Salinity Gradient in Blackbird Creek, Delaware
Gulnihal Ozbay

Evaluating horseshoe crab identification, migration, and habitat interaction using non-invasive methods - side scan sonar
Steve Nagiewicz

11:30 Predicting within marsh transgression from elevation and accretion measurements
Linda Blum

11:45 Patterns of stability and change in New Jersey's unditched Atlantic coast salt marsh
Joseph Smith

12:00 Lunch - Stockton Event Room A

1:15 Mapping the future; using sonar-derived bottom classification and spatfall monitoring as tools to direct investments in the Mullica River-Great Bay oyster fishery
Stee Evert

1:30 Using Remote Sensing Technology in documenting and evaluating environmental conditions of Revolutionary War Shipwrecks underwater in the Mullica River
Shannon Chiarel

1:45 Monitoring Change in submerged Aquatic Vegetation using SONAR Mapping in Low-salinity Estuaries in North Carolina
Jon Sherman

2:00 Keynote Speaker: Naz Onel
Goal Framing in Cosumer Energy Use: Towards Ecologcially Responsible Consumption

2:45 Break - Stockton Event Room A

3:00 Where, when and why do downstream processes matter?
Robert R. Christian

3:15 An In-depth Analysis of Differences in Tides, Pressure, and Current Velocities in the Little Egg Inlet Before and After Dredging
Mark Pfander

3:30 Population Ecology of Blue Crabs within the Maryland Coastal Bays
Nilanjana Das

4:00 Students: Mixer and CV work- Stockton Event Room A

4:00 Take a walk around Lake Fred or stay and join us for a compliation of short films

5:00 Business Meeting

6:00	Poster Session (Cash Bar Available)
7:30	Banquet Seaview Hotel (Cash Bar Available)

Saturday October 13th

8:00 - 9:00	Registration and Breakfast - Stockton Event Room A
9:00	Welcome and Announcments - Stockton Board of Trustees Room
9:15	Keynote Speaker: Sklyar Bayer Monologues and Dialogues: Communicating with your personal voice
10:00	Key strategies for maintaining excellent communication through the design and implementation of restoration and monitoring Erin Reilly
10:15	Community Volunteers do field and lab work to learn about stream water quality in Lancaster County, PA. Julie Ambler
10:30	Break - Stockton Event Room A
10:45	Cascading Effects of Shrimp Trawling: Increased Benthic Biomass and Increase in Net Primary Joe Luczkovich
11:00	Student Awards
11:30	Closing Remarks
11:45	Adjourn
1:00 - 3:00	Field Trip Stockton Marine Field Station Tour with add-on exploration of Forsythe National Refuge fromthe Marine Station

Posters

(Alphabetical by presenter, *Presenting Author)

Habitat enhancement for finfish and crustaceans in an oyster restoration reef in Barnegat Bay, NJ
Bauer,Madeline*,Robert Cacace, Christine Thompson

Early life history dynamics of oyster and scallop populations in a connected system in Southern NJ
Blanchet,Alexandra*,Robert Cacace,Christine Thompson

Flexing our freshwater wussels in the Delaware Estuary: Advances in Restoration
Cheng, Kurt*, Danielle Kreeger, Lance Buttler, Roger Thomas, Rachel Mair, Angela Padeletti

A comparison of phytoplankton and water quality in two estuaries in neighboring watershedes of Mon mouth County
Conlon,Erin*,Sydney Lucas, Sklar Post, Katelyn Saldutti, Jason E Adolf

Shit Eating Green Life
Courtney,Sophia*,

Elucidating pathways of nitrogen delivery to low relief streams of Virginia's Eastern Shore
Cronin,Emma*,Janet Herman, Aaron Mills,

Spatial Characterization of Subtidal Flow in Little Egg Inlet
Ertle,Nicole*, Anna Pfeiffer-Herbert

Water quality assessment of Delaware Inland Bays for proposed shellfish aquaculture sites
Mohana Gadde*, Detbra Rosales, Joseph Pitula, Scott Borsum, Melanie Fuoco, Amanda Abbott, Lathadevi K. Chintapenta, Gulnihal Ozbay

Obligate v. Opportunist: The Ecology of the Hard Clam Pathogen, Quahog Parasite Unknown (QPX)
Geraci-Yee,Sabrina*, Jacie L Collier,Bassem Allam

Abundance and diversity of nekton and invertebrate species on a restored oyster reef
Giraldo,Christian*,Allison M Fitzgerald

What Portion of Macrobenthic Invertebrates On An Oyster Reef Feed on Oysters?
Gonzalez,Laura*,Allison M Fitzgerald

Can Side-Scan Sonar be used to Survey Submerged Aquatic Vegetation (SAV)?
Gwynn,Noah*, Joseph J. Luczkovich, Jon Sherman

Top Three Strategies for Excellent Communication for Coastal Wetland Restoration Project Design and Monitoring
Haaf,LeeAnn*, Erin Reilly

Using Wetland Assessment Data to Generate User Friendly Wetland Health Report Cards
Haywood,Brittany*, Erin Doreset, Alison Rogerson, Kenny Smith

Carbon Balance of seagrass and its effect on ecosystem health
Heit,Evan*,Jessica Jarvis

Crassostrea virginica DNA Sequencing and Preliminary Analysis
Luke,Tara*, Natalie Warner, Adjoa Cofie, Josue Mass

Length and Abundance Changes of Representative Juvenile Fishes in Relation to Increasing Temperatures in the Mullica River-Great Bay Estuary, NJ
McGuckin,Emily*,Anna Pfeiffer-Herbert

Comparing the phytoplankton ecology of New Jersey estuaries through flow cytometry
Post,Skyler*,Dr. Jackie L. Collier,Dr. Bassem Allam

Does the diversity and abundance of plankton change with salinity gradients in the Hackensack River?
Ramirez,Margaret*,Allison M. Fitzgerald

Storm effects on SSC and water level in 4 East Coast USA estuaries
Repoli,Donna*,Allison Fitzgerald

Nutrient bioassay experiments in Deal Lake find nitrogen limiting to harmful algal bloom growth in summer season
Saldutti,Katelyn*,Erin Conlon, Sydney Lucas, Skye Post, Jason E. Adolf

Old things under water and how to fix them
Swain,Jaymes*,Kirk Raper,Camila Ibarra,Andrew Gray,Elizabeth Burke Watson

RNA-Seq-Based Transcriptome Analysis to Study Differentially Expressed Salt Tolerant Genes in Spartina alterniflora and Phragmites australis
Josephine A Veerla, Lathadevi K. Chintapenta, Mollee Dworkin, Venkateswara Sripathi, Venu Kalavacharla, Gulnihal Ozbay

Using Net Ecosystem Exchange to Determine the Suitability of Dredge Sediments for Rebuilding Drowned Coastal Wetlands
Wilburn,Brittany*,Kurt Raper, Camila Ibarra, Andrew Gray, Elizbaeth Burke Watson

Keynote Speakers

(In order of speaking)

Susan Allen

Saturday 9:15am

Susan Allen is a two-time graduate of Stockton University in Mathematics and Instructional Technology, and works in the University Relations and Marketing Office doing photography, writing and social media. She has also taught Visual Design and Communications as an adjunct instructor.

In the summer of 2015, she was selected by NASA as one of 40 social media professionals to cover the live RS-25 rocket engine test at the Stennis Space Center in Mississippi to help share a piece of NASA's journey to Mars with the Stockton community.

As a nature photographer, her camera often leads her to wildlife refuges and national parks, and to volunteer projects to survey fish in the Grand Canyon with USGS and Arizona Game and Fish, to rescue migrating amphibians during road crossings, to tag horseshoe crabs during spawning season, and to band shorebirds that migrate long distances. What she enjoys most about nature photography is sharing images that reveal unique and often unnoticed scenes from the natural world and communicating science. Instagram account: @soozi3q www.instagram.com/soozi3q

Title: Social Media Strategies for Science Communicators

Abstract: You've heard it before - but what's the danger in not using social media, particularly Instagram and Twitter, to highlight your research? When you don't create your own frame for your research, the media and general public are forced to create their own frame, oftentimes to the detriment of the very research you are trying to promote and raise awareness on. Susan Allen, part of Stockton's University Relations and Marketing team, will explore the most effective options scientists have to showcase their expertise to the media and public. She'll share how you can utilize the Instagram story to share behind-the-scenes moments of your field work, how to build a network of fellow science communicators and media, how to engage your audience, and how to present your science as a story that non-scientists can connect with.

Dr. Naz Onel

Friday 2pm

Dr. Naz Onel is an Assistant Professor of Business Studies at Stockton University. Her principal areas of research are consumer pro-environmental behavior, sustainability marketing, green branding, sustainable business strategies, the impact of consumption behavior on environmental well-being, goal-framing in sustainable consumption, and social cause marketing. Dr. Onel's research studies aim to engage with the environment in its broadest sense, considering the interconnection of ecological, economic, and social elements with an interdisciplinary emphasis. She is passionate about bringing solutions to tackle pressing environmental and social problems around consumption. Dr. Onel is actively engaged in international sustainability initiatives and has made presentations as a keynote speaker and invited guest speaker, attended sessions as a panel discussant, and served as a proceedings editor, track chair, roundtable facilitator, as well as an editorial board member. She has also presented and published manuscripts in the proceedings of various international conferences, such as American Marketing Association, Academy of Marketing Science, Transformative Consumer Research within the Association for Consumer Research, World Association for Sustainable Development, Society for Marketing Advances, Building Bridges in a Complex World, and Marketing Management Association. Dr. Onel published in a number of leading refereed journals and books.

Title: Goal Framing in Consumer Energy Use: Towards Ecologically Responsible Consumption

Abstract: Our use of energy in the twenty–first century must be sustainable. One of the most environmentally detrimental effects of consumer behavior is identified to take place at the usage stage of the consumption process, which causes a tremendous increase in a person's ecological footprint. Eliminating harmful emissions and, consequently, reducing ecological footprint of consumers could be possible by understanding the usage stage of the consumption process. This study examines consumer energy use decision-making by adopting the framework of the Goal Framing Theory (GFT). The purpose of this study is to analyze the factors that predict different types of ecologically significant energy consumption behaviors of consumers by examining a variety of motives. The results of the study indicates that GFT is an important framework in explaining ecologically responsible energy consumption behavior of consumers. The findings have important implications for environmental marketers, managers, and practitioners.

Dr. Skylar Bayer

Saturdy 9:15am

Skylar Bayer received her B.Sc. in Marine Biology at Brown University (2008), her M.Sc. in Biological Oceanography from the MIT-WHOI Joint Program (2011) and her Ph.D. in Marine Biology from the School of Marine Sciences at the University of Maine. Her research focuses on reproduction and population dynamics of marine invertebrates. She is a producer for The Story Collider, and spent several years running her own radio show and podcast, the Strictlyfishwrap Science Radio Hour. She has appeared on Maine Public Broadcasting Network's Maine Calling, The Colbert Report, and on stage at the 2016 TEDxPiscataquaRiver show. This year she is in Washington, D.C. as a Sea Grant Knauss Marine Policy Fellow to learn how national policy decisions affect our oceans and coastlines.

Title: Monologues and Dialogues: Communicating with your personal voice

Abstract: Communicating through a personal narrative can be a very effective and power tool in convincing an audience of ones values and beliefs. In science, this style of communication can be extraordinarily useful for sharing important scientific ideas and demonstrating that scientists are people who often share values with their audiences. In a recent study, when students listened to recorded podcasts of scientists' stories, they were more likely to be interested in science and found scientists relatable. This humanization of scientists has been incredibly important to building trusting, long-term relationships with stakeholders, politicians and other members of the public. In this talk, I will explore the different ways that personal narrative, particularly in the audio realm, can be impactful to audiences and helpful to scientists. I will also delve into how listening and improvisational skills are often key to creating bridges of communication with any audience. Finally, we will practice a few improvisational skills to aid in developing more effective dialogues about science.

Poster and Presentation Abstracts

(Alphabetical by presenter)

Community Volunteers do field and lab work to learn about stream water quality in Lancaster County, PA.

Ambler, Julie[1], Matt Kofrothm[2]
1. Millersville University, 2. Lancaster County Conservation District

The Susquehanna River provides 50% of the freshwater and significant nitrogen, phosphate and sediment loads to the Chesapeake Bay. These loads, mostly from runoff, have reduced water quality in the Bay as seen by low summer concentrations of dissolved oxygen. Since the 1980s, the Chesapeake Bay Program, land owners and volunteers have worked to reduce pollutant loads by planting trees in riparian areas and many other Best Management Practices (BMPs). Citizens in Lancaster County (Water Quality Volunteer Corps) have monitored water quality by making monthly stream measurements and collecting water for chemical lab tests such as nitrogen and phosphate. Seasonal and inter-annual trends due to droughts and hurricanes are readily seen from this stream data. Stream macroinvertebrates are collected twice a year to calculate a modified diversity index which gives a rating for water quality. From both chemical and biological data, water quality differences between forested agricultural and suburban watersheds are seen. Volunteers gain a better understanding of water quality and can relate results to their local streams. The next challenge is to integrate field, lab, volunteer data trends, with continuous data logging results from state agencies to present a complete picture of stream water quality to the public.

Oral

Habitat enhancement for finfish and crustaceans in an oyster restoration reef in Barnegat Bay, NJ

Bauer, Madeline, Robert CacacemChristine Thompson
Stockton University

Assessing habitat value for finfish and crustaceans is critical when monitoring oyster reef health and quality. We aimed to assess the impact of an oyster restoration reef in Barnegat Bay, NJ on habitat for motile organisms by recording their abundance and diversity using unbaited fish traps and substrate baskets containing oyster shell. Substrate baskets were deployed for one month in summer of 2018 in groups of three over three oyster cohorts allowing us to compare the impact of differing shell type and oyster age on habitat enhancement for resident fish and invertebrates, as well as the impact of the reef habitat versus a control area with no vertical relief. Unbaited mesh fish traps were deployed for 48 hours in August 2018 to determine if there was a significant difference in abundance, richness, and relative percentages of resident versus transient species between the reef areas and a control. This study will examine whether the reef shows evidence of enhancement of mobile species, demonstrating the reef's importance in the ecology of Barnegat Bay.

Undergraduate Student; Poster

Early life history dynamics of oyster and scallop populations in a connected system in Southern NJ

Blanchet, Alexandra, Sadie GramugliamChristine Thompson
Stockton University

The eastern oyster, Crassostrea virginica, and the bay scallop, Argopecten irradians, are two ecologically and economically important species of shellfish within NJ. Due to population declines of both species associated with habitat loss, it is important to understand their population dynamics by observing spat settlement and larval concentrations. The Mullica River is one of the few areas with natural populations of the eastern oyster and the nearby Little Egg Harbor contains sparse populations of scallops. Stockton University has been monitoring oyster spat settlement in the Mullica River every two weeks in summers since 2012. In 2017, plankton samples were collected from four Mullica River sites every two weeks to look for oyster larvae. During the summer of 2018, scallop spat bags were deployed in hypothesized habitat areas in Little Egg Harbor. We quantified oyster and scallop abundance from plankton samples and compared to settlement patterns around spat monitoring sites. Bivalve larvae from the samples were processed using an automated imaging microscope under polarized light, and oyster and scallop identifications were made using shell birefringence patterns. Connections between larval supply and spat settlement of both species will help provide information for restoration and management of these important subpopulations.

Undergraduate Studentl; Poster

Predicting within marsh transgression from elevation and accretion measurements.

Blum, Linda[1], Robert R Christian[2], Mark M Brinson[3]
1. University of Virginia 2. East Carolina University 3. Deceased

Salt-marsh community structure and ecosystem functioning depend on elevation relative to sea level. Triplicate surface elevation tables and marker layers were installed in a Virginia salt-marsh in three plant communities differing in elevation (1.10, 1.07, and 1.02 m MSL); i.e., high, mid, and low, respectively. Elevation change and accretion were measured either bi-annually or annually from 1997 to 2017. We asked if rates of elevation change, accretion, and subsidence differed spatially and temporally. No differences were detected in the 1997-2017 accretion and subsidence rates among zones. Temporal differences in rates of change were evident, but the environmental drivers of those differences are not clear. Spatial differences in elevation were evident: increase was fastest in the low, intermediate in the mid, and slowest in the high zones (4.9, 4.2, 3.3 mm yr-1, respectively). In low- and mid-zones, elevation changes were equivalent to long-term, local sea-level rise. As a consequence of these rate differences, the mid-marsh elevation currently exceeds that of the high-marsh; low-marsh elevations are predicted to do so in coming decades. Thus, the high marsh should become more isolated from tidal inundation, and rates of elevation change are projected to decrease leading to increased ponding of water.

Oral

Effects of Predation and Substrate Choice on Ribbed Mussel Recruitment for Living Shoreline Applications

Bouboulis, Sarah, Joshua Moody, Danielle Kreeger
Partnership for the Delaware Estuary

Ribbed mussels are one of the functional dominant species in eastern United States salt marshes, providing many ecosystem services such as stabilizing substrates and enhancing vegetative growth. The Delaware Estuary continues to lose coastal wetlands, resulting in reduced ribbed mussel populations along the shoreline. There is growing interest in living shorelines to protect and restore coastal marshes, and since 2008, the Partnership for the Delaware Estuary has implemented and sustained 14 active treatments. Ribbed mussel recruitment into these projects has been variable across space and time. The goal of this study was to test whether mussel recruitment in living shorelines can be enhanced by substrate choice and/or predator exclusion. Two multi-factor experiments were conducted in triplicate at two locations in two representative rivers of the Delaware Bay, NJ. The first experiment evaluated the effects of predation at three positions relative to the vegetated marsh edge. The second experiment assessed interactive effects between predatory exclusion and various substrates including: oyster shell; oyster castles; Spartina alterniflora plugs; and coir fiber. Recruitment of ribbed mussels was significantly lower along surfaces exposed to predation than along surfaces where predation was inhibited, independent of position. Additionally, materials that did not provide interstitial recruitment space had significantly higher recruitment rates when predation was inhibited, whereas materials with interstitial space saw no difference in recruitment rates across predation levels. These results indicate that material selection and predator exclusion can affect ribbed mussel colonization in living shoreline projects

Poster

Flexing our Freshwater Mussels in the Delaware Estuary: Advances in Restoration

Cheng, Kurt[1] Danielle Kreeger[1], Lance Butler[2], Roger Thomas[3], Rachel Mair[4], Angela Padeletti[1]

1 Partnership for the Delaware Estuary 2 Philadelphia Water Department 3 Academy of Natural Sciences of Drexel University 4 Harrison Lake National Fish Hatchery

Freshwater mussels are increasingly recognized both locally and nationally for their importance as natural heritage as well as ecosystem engineers. Efforts to conserve and restore declining mussel populations will be strengthened with hatchery propagation. To provide the capacity to restore declining mussel populations, academic and governmental researchers have dramatically improved methods for propagating mussels. In 2017, scientists from the Harrison Lake National Fish Hatchery (HLNFH) provided their expertise and propagated the alewife floater, Utterbackiana implicata, for Partnership for the Delaware Estuary for research in Pennsylvania and Delaware. Observed mussel growth was greater than 40 mm per year in the best ponds. In June 2018, scientists built upon research at HLNFH to form the Aquatic Research and Restoration Center in Philadelphia. The focus of this collaborative arrangement is the propagation of native mussel species to support restoration goals focused on ecosystem services including water quality enhancement. Early results from propagation trials included the production of transformed juveniles from five native mussel species: alewife floater, yellow lampmussel (Lampsilis cariosa), eastern pondmussel (Ligumia nasuta), tidewater mucket (Leptodea ochracea), and eastern elliptio (Elliptio complanata). Scientists have identified key limiting factors to address for future mussel propagation and rearing.

Poster

Using Remote Sensing Technology in documenting and evaluating environmental conditions of Revolutionary War Shipwrecks underwater in the Mullica River.

Chiarel, Shannon [1], Stephen D. Nagiewicz[2], Jaymes Swain[2],Jason Sass[2],Elizabeth Klein[2]
1. Monmouth University, 2.Stockton University

The Battle of Chestnut Neck fought on October 6th, 1778, between British Naval forces and local patriots/privateers near what is now the town of Port Republic on the Mullica River. The area has been designated by the State of New Jersey as a Historic District. During that battle, ten ships captured by privateers were burned and sunk by British Marines. This project is student-centered field work and part of the MARS 3360 Underwater Archaeology course which is teaching students how to use and provide analysis of collected sonar data. Stockton University vessels equipped with side scan and multibeam sonar equipment are used to map the three known shipwrecks in the Mullica River documenting their location, orientation and environmental condition. Turbid water, river currents and tides are contributing to the physical deterioration of these historic shipwrecks with the eventual loss of maritime history. Working with New Jersey State Historic Preservation Office, the State Museum and local Historical Societies, Stockton will provide sonar images, maps using sonar mosaics and area bathymetry and conservation of artifacts of a historic nature to evaluate future considerations to protect the marsh locations of these historic shipwreck sites.

Masters Student; Oral

Where, when and why do downstream processes matter?

Christian, Robert R., Dorothea V. Ames, Stanley R. Riggs
East Carolina University & NC Land of Water

Water flow and level dynamics of lower coastal plain rivers are not as easily characterized as systems more inland or seaward. Inland, upstream water levels closely associate with precipitation, land use and discharge. The influence of wind and astronomical tides dominate level downstream and seaward. The Cashie River in North Carolina may provide a useful case study of how these factors interplay to determine water level within lower coastal plains. The Cashie R. opens into the western end of Albemarle Sound near the confluence of two large rivers: Chowan and Roanoke. Gage stations are maintained by agencies on the upper Cashie and along the Roanoke Rivers. We supplement data from these stations with water level recorders in the lower Cashie and nearby Chowan. Here we present initial information from recorders and of local weather to partition processes affecting water levels. Water-level patterns in the lower Cashie are similar to those of the larger rivers. This similarity decreases upstream. Windsor, a town on the Cashie, which has been subject to frequent flooding, sits at the transition from the tidal to non-tidal regions. Initial results suggest that downstream processes may impact the extent of flooding of the town.

Oral

A comparison of phytoplankton and water quality in two estuaries in neighboring watersehds of Monmouth County

Conlon, Erin, Sydney Lucas, Skyler Post,Katelyn Saldutti,Jason E. Adolf
Monmouth Universit

The Navesink and Shrewsbury estuaries offer an ideal system for comparative studies due to their similar geomorphology, yet different watershed characteristics. Over the course of twelve weeks, five boat trips were taken to obtain water samples at twenty-one designated stations, each 1.6 kilometers apart, reaching from the tips of the rivers all the way to the outer edge of Sandy Hook Bay. These locations were tested for different parameters, including salinity, temperature, dissolved oxygen, and Secchi depth. Each sample was also processed at the lab for chlorophyll a, turbidity, in vivo fluorescence, flow cytometry, and preserved using Lugol's. The results of each parameter were graphed on scatterplots to observe possible correlations. Overall, there was no significant difference between systems in chlorophyll a biomass and no significant correlation between chlorophyll a and salinity, however a correlation between temperature and chlorophyll a was found (r2 = 0.10, p = 0.002). The sites found to have extremely high chlorophyll levels were investigated further using the Lugol's samples to determine the taxonomy of the organisms responsible. These data give an idea of how each parameter affects the types of phytoplankton that culminates in the different systems. Comparing these two estuaries has shown similar averages of salinity, chlorophyll a turbidity, and temperature. Further research is needed to accurately track the growth of chlorophyll within the neighboring estuaries of the Navesink and Shrewsbury, for instance, how chlorophyll a is spatially distributed within each system.

Undergraduate Student; Poster

Shit Eating Green Life

Courtney, Sophia, Syndney Lucas[2], Skye Post[2], Jason E Adolf[2]
1. Acaedmy of Natural Sciences of Drexel University 2. Monmouth University

Wet lands are important to keep humans safe from strong wind and rain. They are also important for land and water animals. As the world gets warmer, the world's water gets higher and wet lands have to move into the dry land to live. Many wet lands can not move into the land because of houses and roads, and they die. There are other reasons why wet lands die. Humans put shit in the water, and it ends up in wet lands. The shit is food for green life in the wet lands. If the shit helps the green life grow, the wet lands can get taller and move into the land. However, the shit may be more food than the green life is used to, and so it may cause problems in the green living things bodies. Wet lands are under water two times in a day. When this happens, the bottoms of green living things that live in wet lands are also under water. So green living things use little spaces inside of their bodies to pull air from above the water. Some types of green life do not make these spaces of they have too much food. If they do not make these spaces they can not get enough air and can get sick. Sick green life does not help wet lands move into the land as the world's water gets higher.

Undergraduate Student; Poster

Elucidating pathways of nitrogen delivery to low relief streams of Virginia's Eastern Shore

Cronin, Emma, Janet Herman, Aaron Mills
University of Virginia

Vertical profiles of NO3- concentration in the groundwater discharging to low-relief seaside coastal streams on Virginia's Eastern Shore vary substantially among streams. Hydraulic gradients between the sediment and the stream indicate generally upward flow of groundwater. Interval measurements of NO3- concentration made at 100, 70, 30, and 0 (i.e., stream water) cm below the bed surface (BBS), revealed profiles that, in some cases, decreased upward toward the sediment surface, while others actually increased toward the surface with the highest concentration of NO3- in the stream water. Still other streams had peaks in NO3- at intermediate depths below the surface, and the location of those peaks varied over several sampling dates. The range of NO3- concentrations measured overall ranged from 0.22 to 48.03 mg NO3- L-1 with the highest concentrations recovered from 100 cm BBS in Tommy's Ditch. The amount of organic matter in the top layers of the stream sediment combined with variable dissolved O2 levels suggests that the variability of NO3- is controlled by relative rates of ammonification, nitrification, and denitrification. Current work seeks to establish the relative abundance of organic matter, nitrifying bacteria, denitrifying bacteria, and their respective activities along hydrological flow paths in these streambeds.

PhD Student; Poster

Population Ecology of Blue Crabs within the Maryland Coastal Bays

Das, Nilanjana[1], Ejiroghene Mayor[2],Paulinus Chigbu[2]
1. Stockton University 2.University of Maryland Eastern Shore

Blue crabs (Callinectes sapidus) are abundant in the mid-Atlantic waters of the Chesapeake and Coastal bays and is the largest fishery in the State of Maryland. However, little information exists on the population dynamics of C. sapidus in the Maryland Coastal Bays (MCBs). This study was conducted using annual trawl survey data provided by the Maryland Department of Natural Resources (MD DNR) from 1990-2016 to describe C. sapidus distribution and recruitment in the MCBs. In addition, the influence of environmental factors (temperature, salinity, wind speed, El Nino Southern Oscillation (ENSO), and North Atlantic Oscillation (NAO) indices) on the recruitment of juvenile (<60 mm carapace width) blue crabs was assessed. Juvenile C. sapidus were most abundant in June ($P<0.0001$) in contrast to adult crabs (> 60 mm carapace width), which were most abundant from June to August ($P=0.0001$). Spatially, juvenile crabs were most abundant ($P<0.0001$) in site 5, in the St. Martin's River (SMR), similar to adult crabs that occurred abundantly in sites 5 and 12, corresponding to the low salinity areas of the SMR and Newport Bay ($P=0.0002$). Generalized Linear Model (GLM) results indicated adult female C. sapidus abundance, winter ENSO indices, and average summer temperature to be the most important factors affecting recruitment of juvenile blue crabs in the MCBs. Results of this research will aid with the management of the species in the MCBs.

Undergraduate Student; Oral

Spatial Characterization of Subtidal Flow in Little Egg Inlet

Ertle, Nicole, Anna Pfeiffer-Herbertm
Stockton UniversitY

Net flow of water through inlets affects larval dispersal, water quality and supports migration of bar-built barrier islands through sediment transport. Little Egg Inlet is one of multiple inlets to New Jersey's coastal bays and is part of the Great Bay-Little Egg Harbor ecosystem, a shallow bar-built estuary located within the Jacques Cousteau National Estuarine Research Reserve. The purpose of this study is to determine the net volume of water exchange between the ocean and the branches of the inlet and to compare lateral variability of velocity across inlet channels. Two 14-hour surveys were conducted with a boat-board Acoustic Doppler Current Profiler in August 2018 to collect velocity data along set transects. Transects were chosen perpendicular to current flow and located in each branch of the inlet. This survey design allows for removal of the tidal component and calculation of a subtidal volume budget. We will present preliminary results on net volume exchange and lateral flow patterns over a tide cycle. The results will establish a baseline of water flow in an inlet experiencing rapid shoreline change.

Undergraduate Student; Poster

Flexing our Freshwater Mussels in the Delaware Estuary: Advances in Restoration

Cheng, Kurt [1] Danielle Kreeger[1], Lance Butler [2], Roger Thomas [3], Rachel Mair [4], and Angela Padeletti [1]
1. Partnership for the Delaware Estuary 2. Philadelphia Water Department 3. Academy of Natural Sciences of Drexel University 4. Harrison Lake National Fish Hatchery

Freshwater mussels are increasingly recognized both locally and nationally for their importance as natural heritage as well as ecosystem engineers. Efforts to conserve and restore declining mussel populations will be strengthened with hatchery propagation. To provide the capacity to restore declining mussel populations, academic and governmental researchers have dramatically improved methods for propagating mussels. In 2017, scientists from the Harrison Lake National Fish Hatchery (HLNFH) provided their expertise and propagated the alewife floater, Utterbackiana implicata, for Partnership for the Delaware Estuary for research in Pennsylvania and Delaware. Observed mussel growth was greater than 40 mm per year in the best ponds. In June 2018, scientists built upon research at HLNFH to form the Aquatic Research and Restoration Center in Philadelphia. The focus of this collaborative arrangement is the propagation of native mussel species to support restoration goals focused on ecosystem services including water quality enhancement. Early results from propagation trials included the production of transformed juveniles from five native mussel species: alewife floater, yellow lampmussel (Lampsilis cariosa), eastern pondmussel (Ligumia nasuta), tidewater mucket (Leptodea ochracea), and eastern elliptio (Elliptio complanata). Scientists have identified key limiting factors to address for future mussel propagation and rearing.

Poster

Mapping the future; using sonar-derived bottom classification and spatfall monitoring as tools to direct investments in the Mullica River-Great Bay oyster fishery

Evert, Steve, Dave Ambrose, Susanne Moskalski,Anna Pfeiffer-Herbert,Christine Thompson
Stockton University

New Jersey's coastline has over 100 miles of small coastal bays that separate the barrier islands from the mainland. Of these many discrete systems only the Mullica River-Great Bay (MRGB) estuary currently has a sustainable oyster fishery. The natural resource of the MRGB system supports multiple commercial shellfishing operations that depend on State-leased areas and active shelling to manage their on-bottom investments. In 2014 the Stockton University Marine Field Station initiated a spatfall monitoring program in this riverine-coastal bay system. Spatfall of the eastern oyster Crassostrea virginica is assessed at 10 sites along the salinity gradient (~10-25 ppt) from the river/bay intersection (Fitney Bit) to an area approximately 10 km upriver (Turtle Creek). Five years of data from the spatfall study is being collectively viewed with multibeam sonar bottom mapping to assess the extent of recruitment potential to the seeds beds of the Mullica River. Data suggests that recruitment potential and suitable bottom type extend well upriver of the current regulatory line for permitted harvest. Although State-owned and leased beds within the traditional river areas are well managed and assessed annually, prior to these studies little to no formal data has been collected in these upriver areas.

Oral

Monitoring the invertebrate diversity of a restored oyster reef in the Bronx River,NYC

Fitzgerald, Allison[1], Meredith Comim[2]
1. New Jersey City University 2. NY/NJ Baykeeper

Oyster reefs were once plentiful in NYC, surrounding Manhattan and up through to the Bronx River. Today, only small pockets of wild oysters are remaining due to overharvesting and pollution pressures. Many efforts to restore this ecologically relevant species to the Bronx River (and greater NYC) have occurred over the past decade, incorporating various restoration techniques and involving many citizen science groups. Monitoring of the "community reef" at Soundview Park (at the confluence of the Bronx River and East River) has allowed for the incorporation of biodiversity studies to the oyster restoration techniques. The use of submerged baskets with living oysters revealed several key invertebrate species, including mud crabs (Panopeus), shore shrimp (Paleomontes), slipper snails (Crepidula fornicata and C. plana), and small Gammaridae amphipods. These invertebrates, along with several fish species, are a vital source of diversity on the oyster reef and contribute to a thriving community. As oyster restoration moves forward, consideration to the infaunal and epifaunal invertebrate communities must be considered.

Oral

Water quality assessment of Delaware Insland Bays for proposed shellfish aqualucture sites

Gadde, Mohana [1,3], Detbra Rosales[2], Joseph Pitula[2], Scott Borsum[3], Melanie Fuoco[3], Amanda Abbott[3], Lathadevi K. Chintapenta[3], Gulnihal Ozbay[3]
1 University of Delaware, 2. University of Maryland Eastern Shore 3.Delaware State University

The shellfish aquaculture industry is a million dollar industry and can bring enormous economic benefits to the state of Delaware and the East Coast of the U.S. In 2012, the Shellfish Aquaculture Tiger Team was appointed to oversee whether Delaware coastal inland bays are ideal environments for establishing aquaculture sites. We focused on Sloan Cove, an inland bay near the proposed aquaculture sites in Rehoboth Bay. It is hypothesized that harmful dinoflagellates will be absent or present in low numbers in the water samples at Sloan Cove when compared to the existing inland bay sites.

Since oysters filter water and give insight about the water quality, we harvested 10 oysters, extracted DNA from their guts, and screened them for the presence of dinoflagellates. Polymerase Chain Reaction analysis was performed targeting the 18s rRNA (small subunit- SSU) and 28s rRNA (large subunit- LSU), regions to identify all dinoflagellates in the oyster guts. Preliminary PCR results for oyster gut DNA did not confirm the presence of dinoflagellates. However, water samples were also monitored for dinoflagellates using microscopy techniques; we counted 2,080.20 cells/Liter of Karlodinium spp. (a harmful dinoflagellate).

In conclusion, we found far less Karlodinium spp. in the water than the set harmful EPA guidelines of 15,000-20,000 cells/mL and proved that there are low numbers of dinoflagellates. Current studies focus on testing water samples for more physical and chemical parameters along with molecular confirmation of dinoflagellates in oyster gut content to get a more definite picture and compare water quality at Sloan Cove to those of the proposed sites. Long term analysis of this site will provide information with increased confidence for the state of Delaware to build the aquaculture sites.

Student; Poster

Obligate v. Opportunist: The Ecology of the Hard Clam Pathogen, Quahog Parasite Unknown (QPX)

Geraci-Yee, Sabrina, Dr. Jackie L. Collier, Dr. Bassem Allam
Stony Brook University

A critical question in the management of QPX disease is whether QPX is an obligate or opportunistic pathogen. Although most evidence suggests that QPX is an opportunist, it is managed based on the assumption that it is an obligate pathogen, resulting in significant economic losses. In order to determine whether or not the presence or abundance of QPX equates to disease in hard clams, we performed a two year survey throughout the marine district of New York and quantified QPX abundance in clams and the environment using newly developed quantitative PCR (qPCR) and nested qPCR assays. QPX was prevalent in clam tissue and pallial fluid; in individual clam samples, when QPX was abundant in the pallial fluid it was absent or low in the tissue, and vice versa. QPX was also regularly detected in sediment and seawater samples, but its distribution was not strongly related to the prevalence or intensity of QPX in hard clams. Although QPX is widely distributed in the marine environment, it may have a unique relationship with the hard clam and be a common component of the clam microbiota. This study supports that QPX is an opportunistic pathogen, highlighting the need for improving current management approaches.

PhD Student; Poster

Abundance and diversity of nekton and invertebrate species on a restored oyster reef

Giraldo, Christian, Allison M. Fitzgerald
New Jersey City University

Oyster reefs provide an ideal environment for many aquatic species to feed, develop and reproduce. For many years the oyster reef at Soundview Park has been under restoration by various organizations. This study focuses on abundance of invertebrate and fish species commonly found on oyster reefs as well as transient fish species, and whether the presence of oysters have influenced species habitat preference. Monthly, a total of twelve fish traps were deployed for 48 hours, six containing oyster and six empty. Three with and without oysters were set out on the reef and the other six were set off the reef. The results show that a greater diversity of organisms was found in areas and traps that contained oysters. Sorenson's Coefficient was calculated to acquire community similarity and this supported the idea that organisms were actively searching out habitats with oyster shells. Though not many transient organisms were found, they are present in the surrounding area. An oyster condition index was also taken over a 3-month period. This showed that the oysters were healthy and reproducing. Despite low catch numbers, probably attributed to trap size, the results of this research show that oysters do influence species habitat preference.

Undergraduate Student; Poster

What Portion of Macrobenthic Invertebrates On An Oyster Reef Feed on Oysters?

Gonzalez, Laura, Alison Fitzgerald
New Jersey City University

Our goal for this project was to attempt to map out the species of macrobenthic invertebrates that reside in the Soundview Park Oyster Reef Estuary, and identify their predation habits upon oysters. This was to understand the diets of these creatures, and ultimately understand the population risk of the oysters in the reef. We approached this research with the hypothesis that the most common type of invertebrate we would find would be the type that consumed oysters, leading to a threat to the reef's oyster population outside of common human intervention issues. We collected samples from randomly placed baskets on the reef, taking them back to the lab to identify them using morphological structures. We then used literature to confirm whether or not they predated on oysters. Our results showed no significant difference between the abundance of consumers and non-consumers of oysters, leading to the conclusion that the oyster population is currently in balance. The largest taxons identified on the reef were polychaetes and amphipods, which are detritivores and scavengers. Their presence, particularly of the scale worms and amphipods, assist with reef construction to compensate for the consumption of oysters by the crabs and clam worms present on the reef.",

Undergraduate Student; Poster

Can Side-Scan Sonar be used to Survey Submerged Aquatic Vegetation (SAV)?

Gwynn, Noah, Joseph J. Luczkovich, Jon Sherman
East Carolina University

The purpose of this study was to see if side-scan sonar can be used to survey low-salinity submerged aquatic vegetation (SAV) in the Neuse River and Albemarle Sound. SAV is an important fish habitat that we have been monitoring for areal coverage in North Carolina estuaries. We have been using single-beam sonar (Lowrance Elite 9Ti echosounder) taken along shore-perpendicular transects spaced 25 m apart at sentinel sites (40 transects/site) to survey SAV. This single-beam sonar used a transducer with a narrow swath width (~10-20 cm) along each transect, and kriging was used to interpolate the SAV abundance across all transects to make an SAV map. In order to collect sonar data between transects we used the same echosounder with an integrated side-scan (Lowrance Total Scan) transducer. This transducer scans the entire area between transects simultaneously with the single-beam down scan. Each transects' side-scan sonar track was then assembled into a mosaic and classified into SAV polygons and other bottom habitats by an analyst. The comparison suggested a similar SAV areal measurement can be obtained from the side-scan data and single-beam sonar maps. Side-scan sonar provided additional confidence for the SAV areal estimates, while adding the ability to visualize woody debris.

Undergraduate Student; Poster

Top Three Strategies for Excellent Communication for Coastal Wetland Restoration Project Design and Monitoring

Haaf, LeeAnn[1], Erin Reilly[2]
1. Partnership for the Delaware Estuary 2.University of Maryland Center for Environmental Science Chesapeake Biological Laboratory

Effective communication among scientists, engineers, planners, stakeholders, and community members is essential to successful restoration project monitoring and implementation. Interest in coastal wetland restoration and nature based resiliency projects surged after Hurricane Sandy, which led to the rapid coordination of numerous projects throughout New Jersey. The expediency frequently generated a wake of confusion among those involved, as multiple expertises converged and new theories about design were incorporated. Many projects were all together pioneering. As coastal scientists and ecologists, our involvement in various design and monitoring projects had two main common objectives: 1) help craft goals that were resilience-based and ecological and 2) help design monitoring plans that would help track performance and identify problems quickly. Amid numerous befuddling exchanges, we were able to learn how to navigate new and challenging communication scenarios, both professionally and scientifically. We have ultimately found that the best cure for miscommunication was good communication. In order to assist those just starting the process, in this poster we summarize some of top 3 key strategies to avoid time engulfing missteps.

PhD Student; Poster

Using Wetland Assessment Data to Generate User Friendly Wetland Health Report Cards

Haywood, Brittany, Erin Dorset, Alison Rogerson,Kenny Smith
Delaware Department of Natural Resources & Environmental Control

The Delaware Department of Natural Resources' (DNREC) Wetland Monitoring and Assessment Program assesses tidal and non-tidal wetlands by watershed and uses this data to generate scientific reports and report cards. This data is used to inform scientists, decision makers, and the general public about the health of the wetlands in their area and highlight actions they can take to help improve these habitats. The report cards are used as the primary way to reach the public, and were streamlined and updated in 2016 with science communication principles in mind to have a larger impact with the target audience.

Poster

Carbon Balance of seagrass and its effect on ecosystem health

Heit, Evan, Jessie C. Jarvis
UNCW

The overall objective of this study is to identify why some seagrass meadows are more resilient to stress and disturbance than others, by quantifying the response of physiological processes that affect positive carbon storage in Zostera marina to stressful environmental conditions. Specifically, we quantified differences non-structural carbohydrate reserves (NSC) between individuals collected from stable (North Carolina) and declining (Virginia) seagrass meadows in response to temperature and light stress under controlled experimental conditions. These populations are of particular interest as they are both located near the southern limit of Z. marina's geographical distribution along the Western Atlantic Ocean where impacts of climate change, including warmer temperatures and low light conditions, are expected to occur first. We found greater carbohydrate reserves under stressful conditions for NC populations, indicating a localized resilience to temperature and light stress. These results provide a better understanding of the physiological mechanisms underlying the response of seagrass meadows to anthropogenic stressors.

Undergraduate Student; Poster

Cascading Effects of Shrimp Trawling: Increased Benthic Biomass and Increase in Net Primary Production

Luczkovich, Joseph[1], Rebecca A. Deehr[2], Kevin J. Hart[3],Lisa A. Clough[4],Jeffrey C. Johnson[5]
1. East Carolina University 2.Hutchison School, Science, Middle School Memphis, Tennessee 3.NC Department of Environmental Quality, 4.National Science Foundation 5. University of Florida

Trawling has been shown to cause high mortality of discarded species (bycatch) and short-term ecological disturbance to bottom communities in coastal systems, resulting in lowered benthic biomass. Here we report evidence of a trawling-induced trophic cascade resulting in an increase in biomass of benthic polychaetes after the end of the shrimp trawling season in areas open to trawling in North Carolina (USA). Using comparative measurements of the abundance of bycatch species and benthos in open and closed trawling management areas and Ecopath network modeling, we show that trawling in the open area has led to increases in deposit-feeding polychaetes and decreases in bycatch species (fish and crabs) that are benthic predators on the polychaetes. We conclude that proposed management actions to reduce the shrimp trawl fishery effort will influence other net and trap fisheries for southern flounder and blue crabs indirectly, as revealed by our network models, and the proposed trawling ban may lead to improvements in other valuable fisheries.

Oral

Crassostrea virginica DNA Sequencing and Preliminary Analysis

Luke, Tara, Natalie Warner, Adjoa Cofie,Josue Mass
Stockton University

Crassostrea virginica DNA Sequencing and Preliminary Crassostrea virginica, the Eastern Oyster is both an economically and ecologically significant inhabitant of our local coastal ecosystem. Once widespread, this species has declined over the years, and local oyster fisheries restoration projects are currently underway in this region. Using genetic material collected from oysters of the Mullica River Great Bay Estuary in New Jersey, the research experiment aimed to characterize genetic variability among various oyster populations. DNA was isolated from oyster samples, amplified via polymerase chain reaction (PCR) and sequenced. The DNA sequences collected from samples were compared to known sequence via BLAST, DNA sequence alignments were constructed, and a phylogenetic tree was inferred. This confirmed the identity of the DNA matched known Crassostrea virginica sequences. The experiment provides preliminary DNA sequencing data that will allow this project to expand in the future to include genetically identifying subpopulations of oysters by looking at more specific variable regions of DNA.Analysis

Poster

Length and Abundance Changes of Representative Juvenile Fishes in Relation to Increasing Temperatures in the Mullica River – Great Bay Estuary, NJ

McGuckin, Emily[1], Anna Pfeiffer-Herbert[1], Roland Hagan[2],Kenneth W. Able[2]
1. Stockton University 2.Rutgers University Marine Field Station

With increasing ocean temperature, latitudinal shifts in species distributions are expected to alter the relative abundance, phenology and size distributions of fishes recruiting to estuaries of the mid-Atlantic coast such as the Mullica River – Great Bay (MRGB) Estuary. To test this possible response, we examined the patterns for American silver perch (Baidiella chrysoura), a southern Atlantic, migratory fish and Cunner (Tautogolabrus adspersus), a resident, northern Atlantic fish. B. chrysoura and T. adspersus abundance and length data were obtained from wire mesh sample collection at the Rutgers University Marine Field Station (RUMFS). Temperature data collected by the RUMFS and Jacques Cousteau National Estuarine Research Reserve monitoring program (1990 – 2016) were also analyzed for long-term annual trends. Yearly and seasonally average water temperatures in MRGB significantly increased over the past few decades. Analysis of the long time series (1990 – 2017) investigated patterns of abundance and size of young-of-the-year fishes. The northern, resident species, T. adspersus decreased in abundance over time and increased in average length. The southern, migratory species, B. chrysoura, had high interannual variability in appearance at the sampling site. Both patterns are in keeping with a climate related change for these two representative estuarine fishes.

Undergraduate Student; Poster

Evaluating horseshoe crab identification, migration, and habitat interaction using non-invasive methods - side scan sonar.

Nagiewicz, Steve, Peter Straub, Stee Evert, Nate Robinson, Travis Nagiewicz
Stockton University

Stockton University conducted a late spring 2018 side scan sonar survey of a proposed oyster and horseshoe crab nesting area between Highs Beach and Green Creek in Cape May, New Jersey. The Stockton University Marine Field Station proposes to provide a non-invasive method of acoustic sampling approaches to assess the utility of side scan sonar for detecting and quantifying the movement of Horseshoe Crabs (Limulus polyphemus), within the described survey area. Instrumentation for the survey included scientific-grade Klein 3900 side scan sonar and Humminbird MEGA 12 SI GN2 side scan sonar unit aboard a highly maneuverable shallow draft research vessel with survey grade global positioning equipment and trawl capabilities. Survey design required detection limits of each instrument to clearly observe and geo-reference potential acoustic targets of horseshoe crabs (Limulus polyphemus) moving along the Bayshore from deeper water to beaches during periods leading up to high tide. SAR HAWK post-processing sonar software was used to provide data interpretation, target geo-referencing, and area sonar mosaics.

Ignite Talk

Stable isotope analysis to understand feeding habitats of blue crabs Callinectes sapidus in Delaware Blackbird Creek

Gulnihal Ozbay, Lauren Jescovitch and Matthew Stone
Delaware State University

Stable isotope analysis and elemental profiling have been a new trend in fisheries to discover not only what the organism eats, but also where it was produced and the effects of land-use on the organism and analyze nutrient cycling which can measure traceability in fisheries. Stable isotopes in blue crabs (Callinectes sapidus) at areas with various land cover were analyzed and were compared with surface water quality chemistry in the semi-pristine tidal creek – Blackbird Creek – connected to the Delaware Bay to determine blue crab fisheries sustainability. A total of 30 blue crab samples were collected in various Delaware Bay sites in 2014. Water samples were monitored for temperature, dissolved oxygen, pH, salinity, conductivity and turbidity within different marsh habitat (Spartina dominant, Phragmites dominant, mixed, agricultural, non-agricultural). Water samples were further analyzed in the laboratory for ammonia, nitrite+nitrate, total nitrogen, orthophosphate and total phosphorus. Blue crabs were analyzed for δ15N and δ13C isotopic composition using tissues from the legs and gut. Preliminary data that was assessed in 2014 resulted that water quality had no influence on isotopic signature between the study sites; however, the shoreline habitat influenced the δ13C isotope. Preliminary data also discovered that The δ15N values were very high compared to previous studies, the blue crabs were feeding higher in the food chain or adapted to utilize what is available to them –fish and/or detritus, thus changing the fisheries dynamics in this region. A typical value for blue crabs is between 4 and 9 ‰, suggestive of a diet of small marine crustaceans, mollusks, clams, and other blue crabs. Further water and crab samples were taken once every month from July through October 2017 along seven salinity gradient (from 7.5 psu to 5 psu) in the Blackbird Creek and crab samples are currently being analyzed. Partial analysis displayed similar pattern across the study sites and similarly higher δ15N values in the crab leg tissue. Further isotope analysis is being done to confirm our findings in 2014 and 2017 regarding blue crabs feeding at higher in the food chain.

Ignite Talk

Combining snapshot sampling, time series data, and a reduced complexity model to understand the Mullica River-Great Bay Estuary

Peart, Stephanie, Mark Brush, Anna Pfeiffer-Herbert
Virginia Institute of Marine Science

The Mullica River-Great Bay (MRGB) estuary in southern New Jersey remains one of the few relatively pristine estuarine environments along the east coast. This well-oxygenated estuarine system is characterized by minimal anthropogenic impacts due in part to its location within the Pinelands National Reserve and other federal and state protected areas. As such this system has been of interest for long-term monitoring and has served as a baseline system for comparative research. In this study, snapshot data collected by Stockton University (SU) students from a spatially detailed sampling cruise and time series data from the Jacques Cousteau National Estuarine Research Reserve (JCNERR) were used to investigate spatial patterns and seasonal salinity-water quality relationships in the MRGB estuarine system. These data were used to apply a reduced complexity estuarine ecosystem model as part of a larger effort applying this type of model to multiple estuaries. We will present results of our initial model application to the MRGB and compare model outputs to JCNERR and SU data. Once completed, the model will serve as an aid to better understand the MRGB estuarine system, and inform future management decisions pertaining to maintenance of the MRGB system under changes in nutrient loading and climate.

An In-depth Analysis of Differences in Tides, Pressure, and Current Velocities in the Little Egg Inlet Before and After Dredging

Pfander, Mark, Anna Pfeiffer-Herbertm
Stockton University

Inlets are the connection of shallow estuaries to ocean, essential for processes such as water exchange, flushing and sediment transport. Little Egg Inlet in southern New Jersey is experiencing rapid sedimentation, which affects flow through the inlet and likely influences circulation in the shallow bays that the inlet feeds. Because of the sedimentation, the inlet was dredged during the winter of 2018. Our study collected observations of flow through the inlet as a baseline prior to dredging. An Acoustic Doppler Current Profiler was deployed in Little Egg Inlet for two months in the summer of 2017 and compared with wind from a nearby WeatherFlow station and sea level information from USGS tide gauges. Wind blowing from the southeast has the largest influence on the velocity through the inlet. The lagged correlations indicated an elapsed time from wind forcing to water movement of approximately five hours. The sea surface slope varied between positive and negative gradients. Sea surface slope in the bay appeared to respond strongly to wind, but water velocity was less strongly correlated with sea surface slope. These results will be compared to post-dredging data collected in August-September 2018 to assess effects of the channel deepening on water flow.

Undergraduate Student; Oral

Comparing the phytoplankton ecology of New Jersey coastal estuaries through flow cytometry

Post, Skyler[1], Erin Conlon[1,] Sydney Lucas[1],Katelyn Saldutti[2],Jason E. Adolf[1]
1. Monmouth University 2. Rutgers University

Phytoplankton have a tremendous impact on the ecosystem. They are beneficial in that they are the primary producers of the food web, converting sunlight to 'food energy' and driving ecological productivity. However, they are also responsible for harmful algae blooms, which can result in massive fish kills and a negative impact on the food web. To complement studies of bulk phytoplankton based on measuring Chlorophyll a in the water, the objective of this experiment was to characterize patterns of phytoplankton cell size and cell abundance in relation to salinity and chlorophyll a in Sandy Hook Bay, the Shrewsbury River, and the Navesink River. Flow cytometry was used to measure the fluorescence (color), diameter (size) and count (number) of cells for each sample. Results show that, in areas that have similar total phytoplankton biomass based on Chl a measurement, the composition of the phytoplankton community could be different. Differences between the systems studied included that the abundance of nanoplankton in the Navesink River was higher than in the Shrewbury and Sandy Hook Bay, suggesting a species composition difference between these neighboring estuaries. The results suggest that the phytoplankton composition substantially varies between the Shrewsbury River, Navesink River, and Sandy Hook Bay despite similarities in total phytoplankton biomass. These data can be used to understand the mechanisms causing phytoplankton blooms, and potentially analyze their effect on the ecology of the estuaries.

Undergraduate Student; Poster

Does the diversity and abundance of plankton change with salinity gradients in the Hackensack River?

Ramirez, Margaret, Allison Fitzgerald, Laura Gonzalez,Jessica Fernandez,Christian Giraldo,Johany Tejada
NJCU

The Hackensack River extends 45 miles from New York to Newark Bay. Its salinity ranges from 0 to 16. Many species from plankton to birds use the river as a habitat. The river's habitat range from freshwater to brackish wetlands. For our survey, we focused on the microscopic plankton throughout different gradients. Three sites were surveyed, and sample was sieved and collected at each site. Species identification was obtained at the lab with a microscope. A diversity and abundance record was created to compare sites. Our results demonstrated that species diversity and abundance did in fact change with the gradient. Species diversity and abundance was higher in lower salinity levels. Nutrients were obtained from each site, and results showed that along with an increase in diversity, there was also a higher level of nutrient count due to CSO runoff.

Undergraduate Student; Poster

Key strategies for maintaining excellent communication through the design and implementation of restoration and monitoring

Reilly, Erin[1], LeeAnn Haaf[2]
1. UMCES Chesapeake Biological Lab 2.Partnership for the Delaware Estuary,,,

Effective communication among scientists, engineers, planners, stakeholders, and community members is essential to successful restoration project monitoring and implementation. Interest in coastal wetland restoration and nature based resiliency projects surged after Hurricane Sandy, which led to the rapid coordination of numerous projects throughout New Jersey. The expediency frequently generated a wake of confusion among those involved, as multiple expertises converged and new theories about design were incorporated. Many projects were all together pioneering. As coastal scientists and ecologists, our involvement in various design and monitoring projects had two main common objectives: 1) help craft goals that were resilience-based and ecological and 2) help design monitoring plans that would help track performance and identify problems quickly. Through many baffling interactions, we were able to learn how to navigate new and challenging communication scenarios, both professionally and scientifically. We have ultimately found that the best cure for miscommunication was good communication. In order to assist those just starting the process, in this presentation we summarize some of our key strategies to avoid time engulfing missteps.

Oral

Storm effects on SSC and water level in 4 East Coast USA estuaries

Repoli, Donna, Dr. Susanne Moskalskim
Stockton University

Estuaries are ecologically-significant communities that are affected by many environmental factors, including coastal storms. Coastal storms have a measured impact on estuarine processes such as water level and turbidity, but there is currently little research on the impact of specific storm types. As a follow-up to previous research, water level and turbidity readings from a ten-year period (2006-2016) were obtained from the National Estuarine Research Reserve (NERR) for four estuaries: Chesapeake Bay, VA; Great Bay-Mullica River, NJ; St. Jones River, DE; and Narragansett Bay, RI. Readings greater than the 95th percentile were compared to weather events recorded in the NCDC Storm Events Database. Chesapeake Bay had the highest amount of weather-related water level events; this number decreased northward. Delaware Bay had the highest amount of turbidity events. Across all four estuaries, water level events were most often influenced by extratropical storms and fronts, but turbidity events were affected by fronts continental storms. In Chesapeake Bay rain storms and thunderstorms proved the greatest influence on weather-related water level events, while nor'easters held this role in the three northernmost estuaries. The effects of storms depend on the location and morphology of the estuary, and the type of storm that occurs.

Undergraduate Student; Poster

Nutrient bioassay experiments in Deal Lake find nitrogen limiting to harmful algal bloom growth in summer season

Saldutti, Katelyn[1], Erin Conlon[2], Sydney Lucas[2],Skye Post[2],Jason E. Adolf[2]
1. Rutgers University 2.Monmouth University

Cyanobacteria are microscopic, photosynthetic, opportunistic organisms that can be problematic to both marine and freshwater habitats. With favorable growth conditions - ample sunlight, warm water, and readily accessible nutrients - cyanobacteria form harmful algal blooms (HABS) that discolor lakes a striking blue-green and negatively affect entire lake ecosystems from the bottom up. Cyanobacteria species Microcystis and Anabaena common to these blooms and identified in this study produce neurotoxins and hepatotoxins linked to very serious human health consequences. Five nutrient bioassay experiments were conducted in this fresh-to-brackish water coastal lake to determine nutrient limitation on algal growth. Anthropogenic nutrient inputs commonly attributed to the over-application of fertilizers and storm water runoff, were simulated by the addition of nitrogen (NO3), ammonia (NH4), and phosphorous (PO4) individually and combined in Redfield ratio requirements (16:1). Triplicate samples of lake water were subjected to 7 nutrient treatments representing single and combination additions of NO3, NH4, and PO4 and incubated over a five-day period. Measurements of phycocyanin (PC) pigment, chlorophyll (Chl), and PC:Chl fluorescence were analyzed for statistical significance ($p < 0.05$) and found nitrogen to be limiting in the summer season with appreciable growth in treatments containing ammonia. Microscopic analysis of preserved samples suggests a succession pattern between Anabaena and Microcystis during a bloom event. Empirical understanding of nutrients supporting growth, water quality monitoring, informed management, and public knowledge is critical to mitigating the effects of cyanobacterial harmful algal blooms.

Undergraduate Student; Poster

Monitoring Change in submerged Aquatic Vegetation using SONAR Mapping in Low-salinity Estuaries in North Carolina

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This project describes an ongoing monitoring program to examine how submerged aquatic vegetation (SAV) has changed at sentinel sites in the low-salinity regions of the Albemarle and Neuse estuaries over the past few years. We mapped and analyzed SAV using single-beam SONAR (BioSonics DTX and Lowrance Elite 9 Ti). Data were analyzed using SAV detection algorithms then exported to a GIS map. We followed the APNEP SAV SONAR protocol developed for sentinel sites to allow comparison of sites over multiple years. Boat-based data collection of vegetation cover along 40 shore-perpendicular SONAR transects (25 m spacing) produced a geospatial kriged surface of the SAV percent coverage. Ground truthing at random points with an underwater video camera was performed to compute the accuracy of the SONAR maps. Comparisons were made from 2017 to 2018 at 10 sentinel sites in both the Neuse and Albemarle. In the Neuse River there were observed increases in SAV cover at two sites and a decrease in vegetation coverage at another. Cyanobacterial algae blooms in Albemarle Sound in 2018 caused a dramatic decline in SAV at one site. Our findings for SAV areal coverage based on the SONAR data was calculated for each year, showing these changes.

Undergraduate Student; Oral

Patterns of stability and change in New Jersey's unditched Atlantic coast salt marsh.

Smith, Joseph
Niles & Smith Conservation

Pools in tidal marshes are often misinterpreted as a symptom of degradation, yet recent research demonstrates that pools in unditched marshes instead represent a fundamental cyclical geomorphic process of pool formation, expansion, tidal breaching and vegetation recovery. Given the importance of each pool successional stage as wildlife habitat, pool dynamics are a key driver of habitat diversity. Pool dynamics may be altered by accelerated sea level rise, with consequences for both wildlife and marsh resilience. We test the prediction that pools in unditched Atlantic Coast marshes in Southern New Jersey are in dynamic equilibrium by (1) comparing the relative coverage of different pool stages and vegetated marsh types during 1970 and present and (2) by tracking individual pool dynamics across an 86 year time series of aerial imagery to determine whether pool formation, expansion, tidal breaching and revegetation has affected the net change in marsh area over time. Conservation practitioners must incorporate a nuanced understanding of marsh pools when assessing marsh condition and setting restoration priorities.

Oral

Assessing regional marsh resilience through the Chesapeake Bay Sentinel Site Cooperative

Sudol, Taryn
Maryland Sea Grant

The Chesapeake Bay Sentinel Site Cooperative (CBSSC) is a regional collaborative network of scientists, coastal managers, decision makers, and community liaisons that work to assess sea level change impacts. Sentinel sites are distinct locations where researchers collect long-term environmental data and lead intensive studies to detect and understand changes in coastal ecosystems. The CBSSC facilitates the communication of scientific research and monitoring between scientists and resource managers and educates the public on these impacts and adaptation strategies. In 2018, the CBSSC undertook a major revision to its Bay-wide Surface Elevation Table (SET) inventory as the first step to develop a public-facing, interactive map. This map will display over 300 SET locations including the sites' geomorphic characteristics, monitoring regime, and elevation trends, forming the framework for future regional collaborative data analysis and syntheses. In addition, the CBSSC plans to perform a more comprehensive assessment of marsh vulnerability following the Marsh Resilience to Sea-Level Rise (MARS) index (Raposa et al. 2016). This assessment will be presented at a CBSSC-hosted Marsh Resilience Summit in early 2019. The two-day summit will share the latest science on tidal marsh resilience against sea level rise in coastal Virginia and Maryland as a guide for local government, land managers, and academics to integrate ecological processes with societal needs. The outcomes from the Cooperative result from years of building effective collaborations. This presentation will share these latest CBSSC initiatives and our available resources for further estuarine assessments or informed actions.

Oral

New Jersey's Coastal Estuaries Inventory: Connecting Stakeholders, Data, and Managers for Fisheries Success

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1. Stockton University 2. New Jersey Department of Environmental Protection

Estuaries provide more than 30,000 km2 of nursery habitat for over two-thirds of the economically important fish species along the East Coast of the United States. The Mullica River-Great Bay Estuary (MRGB) is one such estuarine system in the Middle Atlantic Bight that provides a wide variety of "Essential Fish Habitat" (EFH) for estuarine-dependent species. One element frequently omitted from traditional estuarine fish surveys in an academic setting is meaningful stakeholder involvement and access to the data by fisheries professionals. This project explicitly engaged Stockton University faculty and staff, undergraduate students, recent graduates, as well as local commercial fishers to collect seasonal seine and fyke net data from 14 locations in the MRGB estuary. Bi-weekly haul seine collections from May–October (once per month from November-April) were conducted along the MRGB salinity gradient. In addition, a local commercial waterman was engaged to collect monthly fyke net data for highly migratory species within the system from November - April. Results from 2+ years of survey work (2016-present) will be discussed.

Oral

Old things under water and how to fix them

Swain, Jaymes, Jason SassmElizabeth Klein,Steve Nagiewicz,Travis Nagiewicz
Stockton University

This project is conserving an artifact from Revolutionary War Battle on the Mullica River for the State of New Jersey Office of Historic Preservation. Stockton University was given permission by the State to preserve an anchor, taken by accident on a trawl from the site of the "Bead wreck", which is on the National Parks Register of Historic Shipwrecks. Its wrought iron construction has degraded over time in the brackish water of the river. Being a ferrous metal, it is extremely susceptible to the chemical process of oxidation. If not treated, it will continue to rust, eventually degrading to a point beyond repair. To stop this oxidation process and thereby preserve this 240-year old historic artifact, MARS 3360 Underwater Archaeology students working with NJ Historic Preservation Office are treating this anchor by immersing it in a chemically-treated solution of water containing sodium carbonate (Na2CO3) and by passing a weak electric current through it. The process is commonly known as electrolysis and is a noninvasive process which will inhibit further corrosion and disintegration of this historic artifact.

Undergraduate Student; Poster

RNA-Seq-Based Transcriptome Analysis to Study Differentially Expressed Salt Tolerant Genes in Spartina alterniflora and Phragmites australis

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1.Wesley College, Dover 2. Delaware State University 3. Alabama A&M University

Marsh grasses are important in regulating and filtering water that passes through the wetlands while reducing soil erosion. They are the primary producers supporting the majority of the biodiversity in these ecosystems. The study site, Blackbird Creek Reserve is located in Townsend, DE, which was once heavily populated by the marsh grass, Spartina alterniflora. Recent reports indicate that this reserve is experiencing reduced abundance of S. alterniflora due to the invasiveness of the common reed, Phragmites australis. Both P. australis and S. alterniflora are salt tolerant marsh grasses which act as ecosystem engineers. This study aims to find if P. australis exhibits similar salt tolerance mechanisms as S. alterniflora. Root and leaf samples were collected from P. australis and S. alterniflora, during August, 2014. The plant tissues were washed, frozen in liquid nitrogen, and then stored at -80°C. RNA was isolated from the leaves and roots and RNA-sequencing was performed. RNA-sequencing data from S. alterniflora and P. australis were mapped to the rice (Oryza sativa v7) reference genome, using CLC Genomics Workbench 8.5. PCR was performed to validate the salinity-responsive gene expressions. Differentially expressed genes between the two plant species include osmotin 334, ATP synthase subunit alpha, salt overlay sensitive interacting protein, ABC-2 type transporter family protein, ATP synthase subunit beta, cation exchanger- and ammonium transporter. Transporter genes were highly expressed in S. alterniflora whereas metal tolerance genes were comparatively highly expressed in P. australis. Future studies will involve green-house experiments with salinity treatments.

Undergraduate; Poster

Using Net Ecosystem Exchange to Determine the Suitability of Dredge Sediments for Rebuilding Drowned Coastal Wetlands

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1. Academy of Natural Sciences of Drexel University 2. Arizona State University 3.University of California, Riverside

Thin layer sediment deposition (TLSD) is being used to extend the lifespan of drowning wetlands, but recent work has highlighted the development of acid sulfate soils in TLSD projects. The purpose of this study was to determine the viability of benthic sediments with three distinct sediment textures in TLSD projects (medium silt, very fine sand, and coarse sand) and to test the ability of soil amendments (biochar, compost) to facilitate plant re-establishment. We grew Salicornia pacifica, Spartina alterniflora, and Spartina patens in a greenhouse under simulated tidal conditions in raw benthic sediments and in one type of quarry fines. Additionally, we tested the effectiveness of soil amendments by growing S. alterniflora in low nutrient coarse sand with and without biochar and compost and by growing S. pacifica in soils prone to develop acid sulfate conditions with and without biochar. Net ecosystem exchange rates suggest that coarse sediment textures promote plant re-establishment for flood intolerant plants (e.g, S. patens and S. pacifica), presumably due to better drainage. Soil additives were not found to enhance growth but were observed to increase rates of respiration through decomposition. These results suggest that coarse sediments without any additives may overall be best for TLSD.

PhD Student; Poster

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