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# 2018

DELAWARE  
**WETLANDS**  
CONFERENCE



*Painting the picture around  
wetlands in the Mid-Atlantic.*



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**WILMINGTON, DELAWARE**  
**JANUARY 31 & FEBRUARY 1, 2018**

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## Conference Committee

### Wetland Monitoring & Assessment Program

Brittany Haywood

Alison Rogerson

Kenny Smith

Mark Biddle

Erin Dorset

### Delaware National Estuarine Research Reserve—Coastal Training Program

Kelly Valencik

## Name Tag Decoder\*

	Sponsor		Presenter
	Volunteer		Professional
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*\*Please wear your name tag at all times, and return them at the end of your stay.*

## Share Your Experience!

#DEWetlandsConference

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## Welcome

Welcome to the 8<sup>th</sup> Delaware Wetlands Conference hosted by the Delaware Department of Natural Resources and Environmental Control (DNREC). The audience around you comes from many states, many sectors, and many professions. But everyone here has something that ties them together: wetlands. Whether you are avoiding them or restoring them, monitoring them or creating them, studying what they hold or tracking what they create, we all have wetlands in common. And for good reason: they make up a quarter of Delaware's land area, they dominate the Delaware Bay and Atlantic coast in New Jersey, and are the support systems for the tributaries to the Chesapeake Bay. In a time when the focus nationally is on other things we here in the Mid-Atlantic are still working together to not only live with wetlands but make them better. Perhaps a little slower, maybe a little more frugally but we're here because, despite the distractions, our region continues to move forward with wetland science, conservation, education and management.

The event ahead of you is packed with opportunities to keep you busy and engaged. We had such a good time in 2016 that we didn't change much. We found more room to stretch into which is good because we've grown! Over the course of the conference you will have 62 presentations in 3 concurrent sessions, 31 posters and 26 exhibits to choose from and enjoy. When your brain needs a break you can shop for art, check the notice board, stick a question on the Q&A board, or lounge in the lobby. This event would not be possible without our generous sponsors, volunteers, presenters and our audience so we thank you. We hope you enjoy the conference as much as we have enjoyed bringing it to you.

Enjoy the Conference!

*Wetland Monitoring & Assessment Program &  
Delaware National Estuarine Research Reserve*

## About the Cover Art Contest Winner—Teri Edgeworth



### *Connecting What You See And I Sea*

Teri Edgeworth is a Seascapes and Bay Scene artist who works mainly in acrylics on deep edge canvas, with each piece continuing around the sides eliminating framing. She grew up hiking through creeks and rivers in Pennsylvania, and is a self taught artist. Purchasing a home in Maryland, and having shown in Delmarva for the past ten years, her goal is to invite viewers into her vision, and to make them feel as though they are right there hearing the marsh water lapping, watching beautiful sunsets, or relaxing to the surf sounds. The word "connecting" is a common thread in her show titles. It reminds people who come from any coastal town to enjoy vacations with their families and friends, and to do our part to ensure the wetlands, beaches and bays stay pristine for our future generations of both humans and wildlife.

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## Our History

The Delaware Wetlands Conference began in 2001 as a small one-day gathering in Cape Henlopen State Park in Lewes as an avenue to help the State of Delaware share and learn more about the challenges that wetlands face. Throughout the years, we have adapted to the needs of our audiences: the conference has changed names, changed venues, increased to two days, almost quadrupled in attendance, gone from 21 to 62 presentations, and taken on more subject matter from across the Mid-Atlantic region. This was all done to help practitioners, scientists, educators, and regulators better protect and conserve the wetlands we work in and live around.

Our goal is to provide a venue at an affordable price where the latest happenings in wetland science, policy, and education can be shared amongst peers and students to increase our understanding of the natural environment around us. This conference has been shaped by your input over the past 17 years, and is the reason we continue to do what we do. So please remember to fill out our survey online and thanks for growing with us over the years!



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# What Awaits You..

## New This Year

### Just Stick It—Q&A

Look for questions written for you to ponder on large sticky notes in Governors' Hall. Have an answer to one, simply reply back with a smaller sticky note all your own. Questions and answers will be made available online after the event.

### Flash Talks

Enjoy quick five minute presentations that introduce you to various topics in Planning & Conservation, Outreach, and Plants & Wildlife. Want to find out more about a person's project? Connect with them at one of our networking opportunities!

### Notice Board

Have a job notice or announcement you would like to share with conference attendees? Post it to the notice board located in the Lobby.

### Shop with Artist Teri Edgeworth

As the winner of the Delaware Wetlands Conference Art Contest, Teri will have a booth set up in Governors' Hall. Browse her selection of coastal artwork, and you may find something nice to take home to the family!

## Getting Down to Business...

### Session Timing

Each regular presentation will be 15 minutes. The audience will have an additional 5 minutes to ask questions followed by a 5 minute lapse. Please feel free to move between sessions during this time.

Flash Talks are 5 minutes long and back-to-back. Flash talk questions will be taken at the end of the time block.

### Connect to the Wi-Fi

ChaseCenter Wi-Fi is free and available for you to connect to.



### Student Poster Competition

For the 2018 conference we decided to turn up the heat and create a little healthy competition for students in the poster session. Posters participating in the competition are marked with a star. See the registration desk if you are interested in judging.

### Networking Opportunities

#### Lounge in the Lobby

Need a place for an impromptu meeting? Check out the comfy chairs in the Lobby or recharge your personal electronic devices with our complimentary recharge station.

#### Lunch & Poster Sessions

Each day time has been set aside for you to enjoy your lunch in the Riverfront Ballroom, and network. The exhibit hall and posters will be staffed following lunch in Governors' Hall. This is also where an afternoon treat will be available.



#### Eat, Drink & Connect

Join us for **Happy Hour on the second floor of Iron Hill Brewery from 4:00 –7:00 PM on Wednesday**. Enjoy a great atmosphere, complimentary light hors d'oeuvres and a cash bar while catching up with old and new friends alike.

Iron Hill Brewery is a 4 minute walk north of the Chase Center on the Riverfront. This networking event is sponsored by Century Engineering.

### Professional Credits

Professional credits are available for attending this conference. American Planning Association AICP—12 hours of certification maintenance credits. Certified Floodplain Managers—7.5 continuing education credits. For more information please contact Kelly Valencik at 302-739-6377 or [Kelly.Valencik@state.de.us](mailto:Kelly.Valencik@state.de.us).

### We Need Your Help!

*At the end of your stay with us, please fill out the online survey located at this web address: [de.gov/wetlandsconferencesurvey](http://de.gov/wetlandsconferencesurvey). Your input is vital in determining future efforts for this conference.*

# Thank You to Our 2018 Sponsors!

## Champion (\$2500)



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# 2018 Schedule—Day 1—Wednesday, January 31

8:15	Registration & Refreshments - <b>Lobby</b>		
9:15	Opening Remarks & Welcome - DNREC Secretary Shawn Garvin- <b>Riverfront Ballroom</b>		
9:30	Dr. Lenore Tedesco, The Wetlands Institute - <b>Riverfront Ballroom</b>		
<b>Room:</b>	<b>Dravo Auditorium</b>	<b>Christina Ballroom</b>	<b>Pusey &amp; Jones Room</b>
<b>Title:</b>	<b>Climate Change</b>	<b>Freshwater Restoration</b>	<b>Mapping &amp; Modeling</b>
<b>Moderator:</b>	<b><i>Kelly Valencik</i></b>	<b><i>Marcia Fox</i></b>	<b><i>Kimberly Cole</i></b>
10:20	Determination of Future Sea-Level Rise Planning Scenarios for Delaware <i>John Callahan, University of Delaware</i>	Wetland Mitigation on Coastal Plain Sands in Sussex County, Delaware <i>Christie Bonniwell, DelDOT</i>	Development of a Living Shoreline Feasibility Model <i>Joshua Moody, Partnership for the Delaware Estuary</i>
10:45	What Can I Say?: Effective Climate Change Communication <i>Caren Fitzgerald, DNREC</i>	Sand Seepage Wetland Restoration at Lizard Hill, MD <i>Roman Jesein, Maryland Coastal Bays Program</i>	Fine-Scale Mapping of Coastal Plant Communities in the Northeastern USA <i>Greg Shriver, University of Delaware</i>
11:10	A Suitability Analysis for Tidal Marsh Migration in Delaware <i>Amanda Santoni, U.S. EPA (This work is not a product of the United States Government or the U.S. EPA. The author is not doing this work in any gov't capacity...)</i>	Marshyhope Tax Ditch Floodplain Restoration <i>Melissa Hubert, DNREC</i>	An Improved Digital Elevation Model for St. Jones & Blackbird Creek Reserves <i>Naomi Bates, University of Delaware</i>
11:35	Bringing Blue Carbon into the Classroom <i>Patricia Harcourt, UMCES</i>	Restoration of Old Wilmington Marsh, 25 Years Later <i>Robert Meadows, DNREC</i>	Measurements of Soil Hydraulic Properties and Hurricane Sandy Storm Surge Attenuation <i>Dot Lundberg, University of Maryland</i>
12:00	Lunch & Networking - <b>Riverfront Ballroom</b>		
12:45	Poster Viewing, Networking & Dessert - <b>Governors' Hall</b>		
<b>Title:</b>	<b>NJ Beneficial Use</b>	<b>Monitoring &amp; Assessment</b>	<b>Planning &amp; Conservation</b>
<b>Moderator:</b>	<b><i>Alison Rogerson</i></b>	<b><i>Andrew Howard</i></b>	<b><i>Maggie Pletta</i></b>
1:30	Lessons Learned: Beneficial Use of Dredged Material to Enhance Salt Marsh Pilot Projects <i>Patty Doerr, The Nature Conservancy</i>	Implementing the PA DEP Rapid Assessment Protocols <i>Carolyn Steinberg, AECOM</i>	DelDOT: Changes to Standard Practices at Bridges & Culverts <i>Carol, Sullivan, DelDOT</i>
1:55	Adaptive Monitoring & Management: Beneficial Use of Dredged Material to Enhance Salt Marsh Pilot Projects <i>Jaclyn Woollard, NJDEP</i>	The National Wetland Condition Assessment: Overview and Applications for Wetland Management <i>Gregg Serenbetz, U.S. EPA</i>	Prince George's County Living Shoreline Site Assessment GIS Tool <i>Anthony Dowell, AECOM</i>
2:20	Early Ecosystem Responses: Beneficial Use of Dredged Material to Enhance Salt Marsh Pilot Projects <i>Metthea Yepsen, NJDEP</i>	Soil Nutrients and Wetland Disturbance <i>Ann Rossi, U.S. EPA</i>	An Innovative Tool for Integrated Watershed Management: Delaware's Watershed Resource Registry <i>Ralph Spagnolo, U.S. EPA</i>
2:45	Break & Refreshments - <b>Governors' Hall</b>		
3:00	Monitoring Water Chemistry at a Dredge Material Beneficial Reuse Site, Avalon NJ <i>Lenore Tedesco, The Wetlands Institute</i>	Ebb & Flow: Monitoring Marsh Hydrology Along the St. Jones River <i>Drexel Siok, DNREC</i>	USCG Sector Delaware Bay Response to Rail Risks Planning Project <i>Eric Nielsen &amp; Terry Plank, USCG</i>
3:25	Avian Use of a Salt Marsh Island Following a Pilot Dredged Material Project <i>Allison Anholt, The Wetlands Institute</i>	Assessing Blue Carbon Stocks Across Salinity Gradients in Delaware <i>Kari St.Laurent, DNREC</i>	5 Minute Flash Talks <i>See to the right</i>
4:00	<b>Eat, Drink &amp; Connect at the Iron Hill Brewery: 4:00 - 7:00PM ~ Sponsored by Century Engineering</b>		

# Day 1— Flash Talks: Pusey & Jones Room

Planning & Conservation	
PM- 5 Minute Flash Talks	
3:25	DeDOT SR-1 Wetland Mitigation- A Review of Natural Regeneration 10 Years Post Construction <i>Eleanor Wilson &amp; Carissa Reh, Century Engineering Inc.</i>
3:30	Delaware Coastal Inundation Mapping <i>Naomi Bates, University of Delaware</i>
3:35	Top Coastal Flooding Events in Delaware <i>John Callahan, University of Delaware</i>
3:40	The Present Value of the Future Cost of Dredging <i>Sandra Burton, Linne Industries, LLC</i>



**AERS at 70:  
Bridging Past to  
Future**

**Celebrate our 70<sup>th</sup> anniversary**  
April 5-7, 2018 in Rehoboth Beach, DE

Reception at Dogfish Restaurant  
Conference at Atlantic Sands Hotel

The Atlantic Estuarine Research Society (AERS) is the oldest professional organization dedicated to estuarine and coastal science. AERS brings together students, scientists, managers, and educators to discuss estuarine and coastal environmental issues and policies.  
<https://aers.wildapricot.org/Next-Meeting>




**2018  
Workshop Series**

**Intro to Living Shorelines**

- MARCH 7 & 8 - LEWES
- A brief overview of site evaluation, design, permitting, monitoring & more

**Site Evaluation**

- MAY
- Featuring a field tour of site examples

more training information available online

Alison Rogerson  
302-739-9939  
Alison.Rogerson@state.de.us

<https://www.delawarelivingshorelines.org/trainings-workshops/>

## Invited Speaker Biographies



### Dr. Lenore Tedesco, The Wetlands Institute

Dr. Lenore Tedesco is the Executive Director of The Wetlands Institute in Stone Harbor NJ. The Wetlands Institute was founded in 1969 and has a mission to preserve, protect and steward wetlands and coastal ecosystems through programs in research, conservation and education. Lenore's research interests are in wetland restoration, the stability of coastal wetlands in relation to sea level rise, and water resources research. She has a PhD in Marine Geology and Geophysics from the University of Miami. Prior to joining The Wetlands Institute, she was a professor of Earth Sciences at IUPUI for more than 20 years.



### DNREC Secretary Shawn Garvin

Shawn M. Garvin joined Governor John Carney's cabinet in March 2017 as Secretary of the Department of Natural Resources and Environmental Control, leading the agency tasked with protecting and managing Delaware's natural resources, protecting public

health, providing outdoor recreational opportunities and educating Delawareans about the environment. Secretary Garvin's career in intergovernmental affairs spans more than 25 years at the federal, state, and local levels. In November 2009, he was appointed by President Barack Obama to serve as Administrator of Region 3 for the U.S. EPA, overseeing the agency's work in the Mid-Atlantic.



### Delaware Governor John Carney

Governor John Carney has been working for the Delaware people for more than 30 years. From 2011 to 2017, John served as Delaware's lone member of the U.S. House of Representatives. Prior to his time in

Congress, John served two terms as Delaware's Lieutenant Governor. Between 2001 and 2009, John developed the Lt. Governor's Challenge to encourage Delawareans to live active, healthier lifestyles. Under then-Governor Tom Carper, John served as Delaware's Secretary of Finance and Deputy Chief of Staff. Before that, he was Deputy Chief Administrative Officer for New Castle County, and on the staff of then-Senator Joe Biden.

# 2018 Schedule—Day 2—Thursday, February 1

8:15	Registration & Refreshments - <b>Lobby</b>		
9:15	Opening Remarks & Welcome—DNREC Secretary Shawn Garvin - <b>Riverfront Ballroom</b>		
	Delaware Governor John Carney - <b>Riverfront Ballroom</b>		
<b>Room:</b>	<b>Dravo Auditorium</b>	<b>Christina Ballroom</b>	<b>Pusey &amp; Jones Room</b>
<b>Title:</b>	<b>Pocomoke River Restoration</b>	<b>Saltwater Restoration</b>	<b>Outreach Initiatives</b>
<b>Moderator:</b>	<b>Kari St.Laurent</b>	<b>Tyler Monteith</b>	<b>Erin Dorset</b>
10:20	Freeing a Trapped River: History & Overview of Restoration <i>Erin McLaughlin, MDNR &amp; Amy Jacobs, The Nature Conservancy</i>	Flow Hydrodynamics in an Erosive Salt Marsh Environment: Bombay Hook National Wildlife Refuge <i>Mithun Deb, University of Delaware</i>	Understanding Delawarean's Perceptions of Wetlands <i>Alison Rogerson, DNREC</i>
10:45	Water Quality Targeting Model & Outreach Efforts <i>Mike Dryden, The Nature Conservancy</i>	Tidal Marsh Restoration at Milford Neck Conservation Area <i>Jessica Hammond, The Nature Conservancy</i>	Clean Water: Delaware's Clear Choice <i>Laura Miller, Delaware Nature Society</i>
11:10	Mechanics of Channelization & Floodplain Reconnection <i>Steve Strano, USDA NRCS</i>	Adaptive Management on Ecosystem Restoration Projects: Where Project Success is Truly Attained... <i>Bartholomew Wilson, USFWS</i>	Changes to the Inland Bays Oyster Gardening Program <i>Bob Collins, Center for Inland Bays</i>
11:35	Design Process for the Floodplain Reconnection Projects & Lessons Learned <i>Brian Jennings, USFWS &amp; Amy Jacobs, The Nature Conservancy</i>	Restoration and Enhancement of Coastal Wetlands - New Jersey Bay Improvement <i>Travis Merritts, Anchor QEA</i>	5 Minute Flash Talks <i>See to the right</i>
12:00	Lunch & Networking - <b>Riverfront Ballroom</b>		
12:45	Poster Viewing, Networking & Dessert - <b>Governors' Hall</b>		
<b>Title:</b>	<b>Coastal Preparedness</b>	<b>Monitoring &amp; Assessment</b>	<b>Plants &amp; Wildlife</b>
<b>Moderator:</b>	<b>Kenny Smith</b>	<b>Lori Brown</b>	<b>Mark Biddle</b>
1:30	Gray & Green Adaptation Strategies: Drivers for Sustainable Coastal Development <i>Fernando Pasquel, Arcadis</i>	Creating a Unified Mid-Atlantic Rapid Condition Assessment Protocol for Wetlands <i>Robert Brooks, Riparia at PSU</i>	Dendroecologically Understanding <i>Chamaecyparis thoides</i> Resiliency to Salinity Intrusion <i>Olivia Gullede, Wesley College</i>
1:55	Integrating Community Natural Resource Values to Resiliency Planning <i>Kelly Valencik, DNREC</i>	Linkages Between Hydrology, Biology, and Geochemistry in at Tidal Wetland <i>Julia Guimond, University of Delaware</i>	Introducing: Field Guide to Grasses of the Mid-Atlantic <i>Sarah Chamberlain, Penn State University</i>
2:20	Coastal Resilience, Is Your Infrastructure at Risk? <i>Douglas Janiec, Sovereign Consulting Inc.</i>	Long Term Salt Marsh Monitoring in the Inland Bays <i>Andrew McGowan, Delaware Center for the Inland Bays</i>	Mid-Atlantic Tidal Rapid Assessment Updates, Including Developing a Tidal Fresh Protocol <i>Erin Dorset, DNREC</i>
2:45	Break & Refreshments - <b>Governors' Hall</b>		
3:00	Assessing Tidal Marsh Resilience to Sea-Level Rise at Broad Geographic Scales with Multi-Metric Indices <i>Scott Lerberg, CBNERR of VA</i>	Coastal Wetland Intensive Monitoring: Reflecting on Long Term Efforts Along the Christina River & Canary Creek, Delaware <i>LeeAnn Haaf, Partnership for the Delaware Estuary</i>	Chesapeake Bay Nutria Eradication Project <i>Margaret Pepper, USDA</i>
3:25	Beneficial Use of Dredged Material to Increase Resilience of a Salt Marsh on Pepper Creek, Delaware <i>Kenny Smith, DNREC</i>	Establishing a Microplastic Detection Methodology for the State of Delaware <i>Nicole Rodi, DNREC</i>	5 Minute Flash Talks <i>See to the right</i>

# Day 2— Flash Talks: Pusey & Jones Room

Outreach Initiatives	
AM—5 Minute Flash Talks	
11:35	Advocacy & Education Adventures in our Single-Use Plastic Culture <i>Dee Durham, DE Plastic Pollution Action Coalition</i>
11:40	Wetland Workers At-Risk to Climate Change <i>Kerri Yandrich, DNREC</i>
11:45	Introducing the Delaware Wetland Plant Guide <i>Brittany Haywood, DNREC</i>
11:50	Creating Workforce Ready Students that Develop Transferable, Interactive Software Designed <i>Maggie Pletta, DNREC</i>

Plants & Wildlife	
PM—5 Minute Flash Talks	
3:25	Marsh Habitat Influence on Blue Crab, <i>Callinectes sapidus</i> , Feeding <i>Lauren Jescovitch, Delaware State University</i>
3:30	<i>Galerucella</i> spp. Beetles as Biological Control for Purple Loosestrife ( <i>Lythrum salicaria</i> ): A Delaware Case Study <i>Kathryn Bartling, AECOM</i>

## Abstracts

### Climate Change: Day 1, AM—Dravo Auditorium

*Moderated by: Kelly Valencik*

As Coastal Training Program Coordinator at the Delaware National Estuarine Research Reserve, Mrs. Valencik provides technical assistance and skill-building opportunities to those responsible for making decisions about Delaware coastal resources. An environment and policy enthusiast, she holds an M.A. in Urban Affairs and Public Policy from the University of Delaware.

#### Determination of Future Sea-Level Rise Planning Scenarios for Delaware

*John Callahan, Delaware Geological Survey, University of Delaware*

Globally, sea-level rise (SLR) is primarily due to melting glaciers and thermal expansion, however, regional processes cause the rate of SLR in Delaware to be about twice the global average. With its low, flat topography and significant amount of natural resources and development along the coast, Delaware is extremely vulnerable to the potential impacts of SLR. This presentation will summarize the findings of the Delaware SLR Technical Committee regarding updated SLR planning scenarios.

#### What Can I Say? : Effective Climate Change Communication

*Caren Fitzgerald, DNREC Division of Energy & Climate*

Talking to people about climate change is really difficult, and everyone has different ideas about how it should be done. This talk presents a synthesis of best practices for communicating effectively with the public about climate change, with the ultimate goal of inspiring positive behavior change. We'll start with common challenges and look at tangible, practical strategies for navigating this complex and, frankly, scary topic. Strategies span verbal, print, and digital communication forms, diverse audiences, and Delaware-specific challenges.

#### A Suitability Analysis for Tidal Marsh Migration in Delaware

*Amanda Santoni, U.S. EPA (This work is not a product of the United States Government or the U.S. EPA. The author is not doing this work in any governmental capacity. The views expressed are their own and do not necessarily represent those of the United States or U.S. EPA.) and Dr. Kari St.Laurent, DNREC, Delaware National Estuarine Research Reserve*

This study includes a suitability analysis on land in Delaware that may have the potential for future tidal marsh migration. The model was based primarily on the main characteristics of a wetland, including hydric soils, hydrology, and hydrophytic plants. The results under a scenario of 4ft of sea level rise indicate that the majority of highly suitable lands are privately owned. This analysis serves as an important screening tool to inform state land management.

#### Bringing Blue Carbon into the Classroom

*Patricia Harcourt, UMCES - MADE CLEAR Maryland Delaware Climate Change Education Assessment and Research*

Carbon sequestration in coastal wetlands can help address climate change. I will share a curriculum on Blue Carbon designed for middle school and high school, and discuss practical ways for teachers to include these topics in the curriculum. I will also describe coastal wetland stewardship ideas for students, to guide the study and protection of these essential systems.

## Freshwater Restoration

### Day 1, AM—Christina Ballroom

#### **Moderated by: Marcia Fox**

*Marcia Fox is a native to Delaware and has worked with the state for 15 years. She manages DNREC's Nonpoint Source Program where she administers the Clean Water Act, Section 319 grant for the state; the Delaware Conservation Reserve Enhancement Program, and Chesapeake Bay Implementation Program.*

### Wetland Mitigation on Coastal Plain Sands in Sussex County, Delaware

**Christie Bonniwell**, Delaware Department of Transportation

The sands of the Atlantic Coastal Plain allow for the establishment of low nutrient, groundwater wetlands that strongly favor regional floristics. The soil needs to be sand (psamment), not a loam. Nutrients, fertilizer or outside topsoil are not introduced. Hydrological sources are restricted to the rise in the groundwater. After 18-years, the 100-acre Eskridge wetland mitigation site now supports a diverse species assemblage including a number of uncommon and rare species.

### Sand Seepage Wetland Restoration at Lizard Hill, MD

**Roman Jesien**, Katherine Phillips and Amanda Poskaitis, Maryland Coastal Bays Program

The Lizard Hill Wetland Project is a 20-acre wetland restoration effort near Bishopville, Worcester County, MD. Throughout the monitoring (2011 – 2016) period water quality was monitored at two sampling stations as a stream flowed through the site. Physical measurements such as temperature and dissolved oxygen generally increased from the upstream to the downstream station. Nutrients exhibited wide fluctuations but nitrate and phosphorus (total and dissolved) concentrations consistently decreased from the upstream to the downstream station during summer.

### Marshyhope Tax Ditch Floodplain Restoration

**Melissa Hubert**, DNREC Drainage Program, Amy Jacobs, The Nature Conservancy, NRCS, USFWS and DNREC

Reconnecting floodplains along channelized streams is an effective restoration technique that enhances habitat and improves water quality. Partners are embarking on a project along the Marshyhope Tax Ditch that was channelized in the 1960's. We will construct breaches along the existing berm to increase the frequency the Marshyhope flows into adjacent floodplains. The project will enhance existing floodplain forests while allowing for routine tax ditch maintenance and will be a model for other tax ditches.

### Restoration of Old Wilmington Marsh, 25 Years Later

**Robert Meadows**, DNREC, Division of Fish & Wildlife

Restoration of Old Wilmington Marsh began over 25 years ago, being inspired by former Governor Peterson's "Vision for the River" (1992) document that envisioned a revitalizing Christina Riverfront in Wilmington and creation of an Urban Wildlife Refuge. Planning began in 1994 with restoration starting in 1997, with the final phase being scheduled for completion in the winter of 2018. Walking and kayak trials are also planned to provide public access.

## Mapping & Modeling

### Day 1, AM—Pusey & Jones Room

#### **Moderated by: Kimberly Cole**

*Kimberly Cole is an Environmental Program Administrator for the Coastal Programs Section in the Delaware Department of Natural Resources and Environmental Control which focuses on the preservation, development and use of coastal, estuarine and ocean resources.*

### Development of a Living Shoreline Feasibility Model

**Joshua Moody**, Sara Bouboulis and Danielle Kreeger, Partnership for the Delaware Estuary

Living shorelines describes a suite of tactics developed to address coastal erosion while providing ecological uplift. As many of our coastal areas are experiencing erosion, it can be difficult to choose between locations for project implementation. To inform practitioners and project managers, a living shoreline feasibility model was constructed. This additive model provides information regarding ease of project implementation and persistence through the integration of quantitative and qualitative data across eleven metrics and five categories.

### Fine-scale Mapping of Coastal Plant Communities in the Northeastern USA

**Greg Shriver**, University of Delaware, Wouter Hantson, Brian J. Olsen, Thomas P. Hodgman, Brittany B. Cline, Chris S. Elphick, Elizabeth L. Tymkiw and Maureen D. Correll

We compared remote sensing techniques to develop a tool that accurately maps high- and low- tidal marsh zonation in the northeast USA. Random forests outperformed other classifier tools when applied to National Agricultural Imagery Program (NAIP) imagery, NAIP derivatives, and elevation. Mean classification accuracies of 94% for high marsh, 76% for low marsh zones, and 90% overall map accuracy. The detailed output is a 3-m resolution continuous map of tidal marsh vegetation communities.



## **Monitoring Water Chemistry at a Dredge Material Beneficial Reuse Site, Avalon NJ**

*Lenore P. Tedesco and Brian Williamson, The Wetlands Institute*

The Avalon demonstration project was designed to evaluate the potential to beneficially use dredge material for marsh restoration. Between 2014 and 2016, approximately 50 acres of pools and marsh platform near Avalon, NJ were treated with 55,000 cubic yards of dredge material to enhance marsh elevation. This presentation will discuss surface and groundwater chemistry following emplacement of dredge material and compare conditions to controls and reference conditions.

## **Avian Use of a Salt Marsh Island Following a Pilot Dredged Material Project**

*Allison Anholt, The Wetlands Institute*

Avian use of a salt marsh island in New Jersey was monitored after dredged material was experimentally placed to create habitats with enhanced elevations. Material placement was intended to benefit coastally dependent nesting and migratory avian and other wildlife species. Point counts and breeding productivity surveys were conducted from 2015-2017 to assess the impacts to avian and other wildlife species. A summary of three years of results of both survey types will be presented.

## **Monitoring & Assessment**

### **Day 1, PM—Christina Ballroom**

*Moderated by: Andrew Howard*

*Andy is an environmental scientist within the Watershed Assessment and Management Section of DNREC. Andy primarily focuses on improving water resources in Kent County and Chesapeake Bay related grants.*

### **Implementing the PA DEP Rapid Assessment Protocols (RAPs)**

*Carolyn Steinberg and Sarah Binckley, AECOM*

AECOM has developed an ArcGIS based process to streamline the implementation of PADEP's Rapid Assessment Protocols. The process has been informally presented to PADEP, and the methods used were verified as being sufficient to meet the intent of the protocols. The presentation will give an overview of the GIS process developed, as well as the implementation of the RAPs in the field, using the results of the GIS analysis, and lessons learned during the process.

### **Notes:**

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## **The National Wetland Condition Assessment: Overview and Applications for Wetland Management and Protection**

*Gregg Serenbetz, Ann Rossi and Kendall Harris, U.S. Environmental Protection Agency*

The National Wetland Condition Assessment (NWCA) is an effort by U.S. Environmental Protection Agency and state, tribal, and federal partners to collect biological, physical, and chemical data to understand and describe wetland condition at national and regional scales. This talk will provide an overview of NWCA and potential applications of NWCA methods, data, and findings for wetland management and protection efforts.

## **Soil Nutrients and Wetland Disturbance**

*Ann Rossi and Gregg Serenbetz, U.S. Environmental Protection Agency*

This presentation will look at efforts to develop wetland disturbance indicators based on soil nutrient ratios (C:N:P) and measures of phosphorus availability. Data from the National Wetland Condition Assessment (NWCA) 2011 was used to explore soil nutrients and how they vary at national and regional scales and with soil and wetland type. In addition to NWCA, these indicators may have use in state and regional wetland monitoring and assessment efforts.

## **Ebb & Flow: Monitoring Marsh Hydrology Along the St. Jones River**

*Drexel Siok and Kari St.Laurent, Ph.D, DNREC - Delaware Coastal Program*

Delaware's Department of Natural Resources and Environmental Control's Delaware Coastal Programs has established several long-term tidal wetland monitoring programs, including Surface Elevation Tables (SETs) and water quality sondes. Additional research and monitoring of hydrological patterns are needed in order to better understand and predict wetland habitat changes, sediment accretion rates, and coastal property vulnerability in Delaware's tidal wetlands. This on-going monitoring project will capture marsh water level and flooding dynamics.

## **Assessing Blue Carbon Stocks Across Salinity Gradients in Delaware**

*Kari St.Laurent, DNREC-Delaware Coastal Programs, Daniel Hribar and Ariana Sutton-Grier*

Coastal wetlands offer a suite of ecosystem services, including the ability to store carbon known as "blue carbon". This study collected tidal wetland sediment samples over different salinities at the Delaware National Estuarine Research Reserve. Bulk carbon stock was measured and investigated for correlations with sediment bulk density, vegetation type, and pore water salinity. This work will improve knowledge of Delaware-specific carbon stocks and identify if environmental factors can help broadly predict carbon stocks.

## Planning & Conservation

### Day 1, PM—Pusey & Jones Room

#### **Moderated by: Maggie Pletta**

*Maggie Pletta holds a B.S. in Environmental Restoration and Management, with a focus on wetland habitats from the University of Maryland College Park. She is the current Education Coordinator at the Delaware National Estuarine Research Reserve (DNERR) where she is tasked with managing and leading K-12 fieldtrips and outreach, public programs, family events, and teacher professional development workshops.*

#### **DeDOT: Changes to Standard Practices at Bridges & Culverts**

*Carol Sullivan, Delaware Department of Transportation*

In an effort to accommodate environmental concerns while remaining cognizant of design limitations, over the years, DeDOT has made several changes to their bridge and culvert protocols. These (now standards) include: recessing structures; placing in-stream channel bed fill; constructing low-flow channels; topsoiling/seedling/mulching streambank slopes; using sandbag silt fence to protect trees and reduce the spread of invasives; and routinely planting native trees and shrubs as site conditions allow.

#### **Prince George's County Living Shoreline Site Assessment GIS Tool**

*Anthony Dowell and Jennifer Slacum, AECOM and Michael Snyder, Prince George's County Department of the Environment*

Working for the Prince George's County Department of the Environment, AECOM led an effort to identify viable living shoreline sites throughout the County. To help identify potential living shoreline project sites across the County's 80 miles of tidal shoreline, AECOM developed a custom methodology and GIS-based tool to score, rank and map sites based on a number of criteria, including land ownership, erosion trends, bank height, vegetation, and SAV presence, among others.

#### **An Innovative Tool for Integrated Watershed Management: Delaware's Watershed Resources Registry**

*Ralph Spagnolo, Ellen Bryson and Rebecca Cope, EPA Region 3, LaTonya Gilliam, DeDOT and Mark Biddle, DNREC*

The WRR is a GIS tool created through a collaborative partnership between EPA and other agencies which integrates programmatic decision-making. Initiated as a pilot in Maryland, the WRR has been expanded throughout EPA Region 3, creating tools tailored to each state's unique resources. Partners worked together to produce GIS analyses that identify and rank restoration and preservation sites. Exciting new features - including a field application for phones and tablets - are on their way.

## USCG Sector Delaware Bay Response to Rail Risks Planning Project Pilot Projects

*Eric Nielsen, U.S. Coast Guard*

Increase oil transport by rail impacts how the Coast Guard responds to rail incidents. Historically, one Million Barrels Per Day (BPD) has been transported within Delaware Bay; 588,000 BPD Bakken and 103,000 BPD Bitumen/Dilbit is refined daily at five refineries which is received via three different rail companies. To address this risk, a Comprehensive Ecological Risk Assessment (CERA) was completed, rail/water nexus areas were identified, and response strategies were incorporated into the Area Contingency Plan.

### Flash Talks

#### **DeDOT SR-1 Wetland Mitigation - A Review of Natural Regeneration 10 years Post Construction**

*Eleanor Wilson and Carissa Reh, Century Engineering Inc.*

A case study of the six (6) DeDOT SR-1 nontidal forested wetland mitigation sites. A comparison 10 years post construction of tree coverage, species diversity, and health for sites that were planted versus sites that were natural regeneration. A review of success, failures, and lessons learned.

#### **Delaware Coastal Inundation Mapping**

*Naomi Bates and John Callahan, Delaware Geological Survey, University of Delaware*

The statewide 1-m topographic digital elevation model (DEM) from the 2014 LiDAR data collection was used to develop new bathtub-model coastal inundation maps for the state of Delaware. Inundation maps include surfaces from Mean Higher-High Water (MHHW) to 7 feet above MHHW, in 1-foot increments. These maps will help assess the potential impacts of sea-level rise and storm surges and advise long-range planning of infrastructure, facilities, land management, land use, and capital spending.

#### **Top Coastal Flooding Events in Delaware**

*John Callahan, Delaware Geological Survey, University of Delaware*

Coastal storms bring a broad range of natural hazards to the Delaware coastline (beach erosion, high winds, waves, precipitation), however, surge is often the greatest threat to life and property. Historic water level data for regional tide gages will be gathered and top flood events will be identified and ranked for each gage. Similarities and differences in storm characteristics affecting water levels throughout the gage network will be summarized and presented.



## Saltwater Restoration

### Day 2, AM—Dravo Auditorium

#### **Moderated by: Tyler Monteith**

*Tyler Monteith has been an Environmental Scientist with the Watershed Assessment and Management Section of DNREC since 2013. He currently represents the Department as the Sussex County Watershed Coordinator.*

### **Flow Hydrodynamics in an Erosive Salt Marsh Environment: Bombay Hook National Wildlife Refuge, DE**

*Mithun Deb, James T. Kirby and Fengyan Shi, Center for Applied Coastal Research, University of Delaware and Ali Abdolali, National Oceanic and Atmospheric Administration*

We provide an overview of ongoing field and modeling efforts in 13,000 acres of salt marshes within the Bombay Hook National Wildlife Refuge, located along the western shore of Delaware Bay. The impact of historical modifications to the marsh and a range of possible remedial steps to restore a healthier marsh environment are being investigated. This study is aimed at helping the local community and stakeholders to take necessary remedial steps for marsh stability and develop potential restoration strategies.

### **Tidal Marsh Restoration at Milford Neck Conservation Area**

*Jessica Hammond, The Nature Conservancy, Bob Hamilton and Mara Orescanin, Woods Hole Group, Inc.*

Healthy tidal marsh ecosystems provide numerous benefits to both people and the environment, including protection from storm surge, which will be increasingly important in future climate conditions. The tidal marsh system at Milford Neck has been degraded and altered hydrologically, resulting in hundreds of acres of *Spartina* to convert to open water. Engineers at Woods Hole Group are near completion on restoration designs with the goal to restore this marsh complex.

### **Adaptive Management on Ecosystem Restoration Projects: Where Project Success is Truly Attained...**

*Bartholomew Wilson and Al Rizzo, USFWS*

Ecosystem restoration projects are planned and designed in accordance to restoration goals and objectives. Commonly the final as-built project does not completely match the intended design and a common issue then ensues as teams then try to force a project toward that vision. Adaptive management should be used to optimize the project results to match the evolving conditions of the site. Several current ongoing projects will be used to discuss the role of adaptive management.

## Restoration and Enhancement of Coastal Wetlands - New Jersey Bay Improvement

*Travis Merritts, Anchor QEA, PE, R.K. Mohan, PE, M. Henderson, PE, E. Rosina, and J. Mallon*

The City of Ocean City, New Jersey is undertaking an ambitious planning and management program of their back bay system which includes wetland enhancement projects as part of the overall bay improvement program. Wetland enhancement of an approximately 150-acre island in the back bay is currently targeted to protect the island from further erosion, improve the ecologic health of the wetlands, achieve targeted elevations for wetlands to promote vegetative growth, and provide increased protection from storm surge to the bay community.

## Outreach Initiatives

### Day 2, AM—Pusey & Jones Room

#### **Moderated by: Erin Dorset**

*Erin Dorset is an environmental scientist for the Delaware Department of Natural Resources and Environmental Control (DNREC). She is part of DNREC's Wetland Monitoring and Assessment Program (WMAP).*

### **Understanding Delawarean's Perceptions of Wetlands**

*Alison Rogerson, DNREC—Wetland Monitoring & Assessment Program*

In September 2017 DNREC surveyed 600 Delaware residents to determine their understanding of and appreciation for wetlands and wetland ecology. We asked 30 questions related to their perceptions of the environment, what they know about wetlands in Delaware, whether or not they like wetlands and why, if they use wetlands, their familiarity with DNREC's wetland outreach efforts, and how and where they get their information about wetlands and the environment.

### **Clean Water: Delaware's Clear Choice**

*Laura Miller, Delaware Nature Society*

In Delaware, 90% of our waterways are polluted due to excess nutrients and legacy toxics. \$100 million annually is the current shortage faced by Delaware to address water quality programs. Clean water is vital to our health, the health of future generations, and is an integral part of Delaware's economy. The Clean Water: Delaware's Clear Choice campaign is a statewide education and outreach effort focused on securing additional funding for clean water.

*Notes:*

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## Changes to the Inland Bays Oyster Gardening Program

**Bob Collins**, *Center for the Inland Bays*

The Center for the Inland Bays has operated the Oyster Gardening Program since 2003. The program enlists homeowners to provide husbandry to grow small amounts of oysters. The presentation will provide a brief overview of the program's past, insight into the future of the program, and discussion of the program process from larvae to use in enhancement projects. The presenter will collaborate with DNREC Shellfish Program to present the most up-to-date information on the program.

### Flash Talks

#### Advocacy & Education Adventures in our Single-use Plastic Culture

**Dee Durham**, *Delaware Plastic Pollution Action Coalition*

An overview of recent and current educational and policy/advocacy efforts to reduce plastic pollution across Delaware and in our marine environments, including recent legislation and outreach initiatives on single-use plastic.

#### Wetland Workers At-Risk to Climate Change

**Kerri Yandrich**, *DNREC Division of Energy and Climate*

As a result of climate change we will continue to experience more frequent and hotter days, longer heat waves, more vectors such as ticks and mosquitoes, and warmer waters. These climate change risks are a particular concern for those who work in wetlands. These workers are directly exposed to these climate change effects making them more vulnerable to various health impacts including heat-related illness, vector-borne illness and water-borne illness.

#### Introducing the Delaware Wetland Plant Guide

**Brittany Haywood**, *DNREC Wetland Monitoring and Assessment Program*

Learn about the most common plants found in Delaware's tidal and freshwater wetlands with this new plant field guide which features color photos and drawings.

#### Creating Workforce Ready Students that Develop Transferable, Interactive Software Designed to Encourage Free-choice Learning

**Maggie Pletta**, *DNREC, Delaware National Estuarine Research Reserve, Kenneth Rainer, Guana Tolomato Matanzas National Estuarine Research Reserve, Kristin Evans, Mission-Aransas National Estuarine Research Reserve and Dr. Terry Harvey, University of Delaware*

Technology has become an integral part of environmental education, however purchasing or producing technology can be very cost prohibitive. As part of a NERR Science Collaborative Science Transfer grant the Delaware, Guana Tolomato Matanzas, and Mission-Aransas National Estuarine Research Reserves partnered with the University of Delaware Introduction to Software Engineering course. As part of their coursework, students produced gesture controlled, educational computer games that promote interactive, free-choice learning opportunities.

## Coastal Preparedness

### Day 2, PM—Dravo Auditorium

**Moderated by: Kenny Smith**

*Kenny Smith is an environmental scientist for the Delaware Department of Natural Resources and Environmental Control (DNREC). He is part of DNREC's Wetland Monitoring and Assessment Program (WMAP).*

#### Grey and Green Adaptation Strategies - Drivers for Sustainable Coastal Development

**Fernando Pasquel**, *Arcadis National Director for Watershed and Stormwater Management*

Densely populated areas along the US coast are exposed to rising sea levels, requiring governance and coastal managers to develop new strategies to address increasing risk of storm surge and nuisance flooding during intense precipitation. Global best practices in sustainable water management, including the Dutch Building with Nature concept show the socio-economic benefits of combining traditional engineering solutions with more natural green coastal strategies which has a strong potential along Delaware's urban and more remote coastline.

#### Integrating Community Natural Resource Values to Resiliency Planning

**Kelly Valencik**, *DNREC Delaware National Estuarine Research Reserve*

The Delaware Coastal Programs office awarded Resilient Community Partnership grants to the municipalities of Slaughter Beach and New Castle for assessment of their vulnerabilities to coastal hazards and climate change, and the development of adaptations options. To increase community buy-in and capacity for implementing adaptation recommendations, the Delaware CTP led public engagement efforts including community surveys, workshops, focus groups, and a task force that leveraged residents' perceptions of their community's natural resource assets for decision-making.

#### Coastal Resilience, Is Your Infrastructure at Risk?

**Douglas Janiec**, *Sovereign Consulting Inc., Larry Trout, RK&K, LaTonya Gilliam and Erika S. Furlong, DelDOT*

A team of engineers and scientists utilized existing data, modeling tools and information to analyze the vulnerability and resilience of the Coastal Highway (SR 1) Corridor between the Town of Dewey and the State line. This presentation will discuss the portion of the effort involving the development and use of a vulnerability screening tool, which enables a rapid assessment of vulnerability (or resilience) to flooding, exposure to wave energy, and marsh buffer function and health.

## Assessing Tidal Marsh Resilience to Sea-Level Rise at Broad Geographic Scales with Multi-Metric Indices

**Scott Lerberg**, *Chesapeake Bay National Estuarine Research Reserve of Virginia, Kenneth B. Raposa, Kerstin Wasson and Erik Smith*

Tidal marsh resilience to sea level rise (SLR) can vary due to differences in local rates of SLR, geomorphology, sediment availability and other factors. Understanding differences in resilience is critical to inform coastal management, but comparing resilience across marshes is hindered by a lack of analysis tools. In this project, a team of reserves developed and applied indices of tidal marsh resilience to sea-level rise that provide a new approach to inform adaptation strategies.

## Beneficial Use of Dredged Material to Increase Resilience of a Salt Marsh on Pepper Creek, Delaware

**Kenny Smith**, *DNREC Wetland Monitoring and Assessment Program*

In the winter of 2013 the Wetland Monitoring and Assessment Program undertook a pilot project in the Inland Bays to test the efficacy of treating tidal wetlands with dredged materials using a thin layer application process. This project included two application periods and multiple plantings. We now have multiple years of monitoring data on the application and plantings, as well as many lessons learned for implementation in any future projects.

## Monitoring & Assessment

### Day 2, PM—Christina Ballroom

**Moderated by: Lori Brown**

*Lori Brown is an Environmental Planner III in the Nonpoint Program in DNREC's Division Watershed Stewardship. She is a GIS specialist and her primary focus is on the Chesapeake Bay Program. Since she started in this position, she has been actively involved in projects throughout the Division.*

## Creating a Unified Mid-Atlantic Rapid Condition Assessment Protocol for Wetlands

**Robert P. Brooks**, *Riparia at Pennsylvania State University, Kirk Havens, Hannah Ingram, Kory Angstadt, David Stanhope, Amy Jacobs, Michael Nassry and Denice Wardrop*

A RAP was synthesized from three existing state protocols (DE, PA, VA) and applied to a spatially-balanced sample of wetlands in the Mid-Atlantic. Two field teams sampled 400 wetland sites across five ecoregions and four states. Data on wetland type, vegetation structure, invasive species, and stressors were collected. Most wetland scored between high and moderate ecological condition, representative of the regional population of non-tidal, freshwater wetlands. Dominant stressors were hydrologic modification, sedimentation, and vegetation alternation.

## Linkages Between Hydrology, Biology, and Geochemistry in a Tidal Wetland

**Julia Guimond** and *Holly Michael, University of Delaware*

This project looks at the hydrologic influences on subsurface redox zonation and biogeochemistry in the St. Jones NERR tidal wetland. Results show that burrows temporarily increase hydraulic conductivity and the depth and magnitude of hydrologically induced redox oscillations, especially near tidal creeks where burrows are most prevalent. This biologically-induced spatial and temporal variability in hydrologic parameters has the potential to alter the quantity and composition of the water exchanged between the marsh and tidal channel.

## Long Term Salt Marsh Monitoring in the Inland Bays

**Andrew McGowan**, *Delaware Center for the Inland Bays*

Sea level rise in coastal Delaware is expected to seriously impact natural habitats, particularly wetlands, which are already in close proximity to water. To assess the impacts that sea level rise will have on marshes in the Inland Bays, three marshes were outfitted with Sediment Elevation Tables, and monitored for elevation changes over time. Results from almost 10 years of monitoring will be presented.

## Coastal Wetland Intensive Monitoring: Reflecting on Long Term Efforts along the Christina River and Canary Creek, Delaware

**LeeAnn Haaf**, *Partnership for the Delaware Estuary, Angela Padeletti, Kenneth Smith, Andrew Howard, Alison Rogerson, Kirk Raper, Tracy Quirk, Elizabeth Watson, David Velinsky and Danielle Kreeger*

Coastal wetlands are a hallmark feature of Delaware's Bayshore. They provide a variety of services to coastal communities. To address a regional need, an intensive long term coastal wetland monitoring program was established. This study reviews two monitoring stations in Delaware: one along the Christina River and one along Canary Creek. Information analyzed included data derived from surface elevation tables, marker horizons, water quality sampling, plant biomass, vegetation structure, and RTK GPS elevation surveys.

## Establishing a Microplastic Detection Methodology for the State of Delaware

**Nicole Rodi** and *Kari St.Laurent, DNREC Delaware Coastal Programs*

Microplastics have become an emerging issue in water quality and estuarine environments around the world. NOAA has developed a guide to microplastic identification; using this guide as a framework in addition to literature review and collaboration with University of Delaware, DCP has adapted these methods to develop a more effective methodology specific to various estuarine ecosystems in Delaware.

## Plants & Wildlife

### Day 2, PM—Pusey & Jones Room

#### **Moderated by: Mark Biddle**

Mark Biddle, PWS, is a senior wetland scientist with over 25 years at DNREC. Mark works to enhance and protect the quality and quantity of Delaware's waters and wetlands, promotes the importance watershed-based resource management, and coordinates collaboration of wetlands work in Delaware with efforts regionally and nationally.

#### **Dendroecologically Understanding *Chamaecyparis thyoides* Resiliency to Salinity Intrusion**

**Olivia Gulledge and Dr. Stephanie Stotts, Wesley College**

A major straightening and dredging project ending in the 1930s caused the salt line to shift upstream within the St. Jones River, leading to a die-off of many freshwater-obligates. This study examines Atlantic white cedar response to this event by measuring, detrending, and analyzing tree rings in order to shed light on future, coastal forest responses to sea level rise. Results show a significant decrease in ring width and subsequent death associated with increased salinity.

#### **Introducing: Field Guide to Grasses of the Mid-Atlantic**

**Sarah Chamberlain, Penn State University**

Although most people are familiar with cultivated grasses, they are usually less knowledgeable of wetland grasses and are often discouraged by the minute parts of the grass flower and specialized terminology. My Field Guide to Grasses of the Mid-Atlantic streamlines grass identification by simplifying technical terms and providing a key that is both straightforward and fun to use. This presentation will provide an introduction to my book that will be published in early 2018.

#### **Assessing Nekton Biodiversity at the Delaware National Estuarine Research Reserve**

**Michael G. Mensinger, Drew Faulhaber and Kari St. Laurent, Ph.D., DNREC: Delaware National Estuarine Research Reserve**

Estuaries are susceptible to climate change pressures that may impact nekton community assemblages. The Delaware NERR implemented a Blackbird Creek nekton monitoring program to better understand short- and long-term biological responses to climate change. Monthly trawls were conducted to assess nekton spatiotemporal biodiversity trends and identify the appearance or disappearance of species long-term. Preliminary data suggests blue crab, white perch, and American eel are among the most common species and non-native oriental shrimp utilize Blackbird Creek.

#### **Notes:**

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## Chesapeake Bay Nutria Eradication Project

**Margaret (Marnie) Pepper, USDA - Wildlife Services**

Nutria (*Myocaster coypus*), semi-aquatic, South American rodents, were introduced to Maryland's eastern shore in the early 1940s. Nutria thrived and destroyed the coastal wetlands resulting in negative environmental and economic impacts. Since its inception in 2002, The Chesapeake Bay Nutria Eradication Project (CBNEP), has reduced nutria populations to near zero across the Delmarva Peninsula. The CBNEP focuses today on ensuring the landscape is free of nutria through a systematic monitoring plan.

### Flash Talks

#### **Marsh Habitat Influence on Blue Crab (*Callinectes sapidus*) Feeding**

**Lauren Jescovitch, Matthew Stone and Gulnihal Ozbay, Delaware State University**

A large, tidal creek – Blackbird Creek – connects to the Delaware Bay and was used to study blue crabs (*Callinectes sapidus*) and water quality for ecological influences and blue crab fisheries sustainability. Water samples were monitored at sites within different marsh habitats (*Spartina* dominant, *Phragmites* dominant, mixed, agricultural, non-agricultural). Blue crabs were analyzed for  $\delta^{15}\text{N}$  and  $\delta^{13}\text{C}$  isotopic composition using tissues from the legs and gut. Data will be presented and discussed.

#### ***Galerucella* spp. Beetles as Biological Control for Purple Loosestrife (*Lythrum salicaria*): A Delaware Case Study**

**Kathryn Bartling, AECOM**

Purple loosestrife (*Lythrum salicaria*) is a perennial wetland plant that can grow up to 9 feet tall. It was introduced into the United States (U.S.) in the 1800s from Europe and has now become a designated invasive species. Included here is a case study for the utilization of the *Galerucella* spp. beetle as biological control for purple loosestrife within an 11-acre wetland restoration site in Delaware.

#### **Mid-Atlantic Tidal Rapid Assessment Updates, Including Developing a Tidal Freshwater Protocol**

**Erin Dorset, DNREC, Wetland Monitoring and Assessment Program**

Delaware's Wetland Monitoring and Assessment Program updated the Mid-Atlantic Tidal Rapid Assessment Method (MidTRAM) in 2017 to reduce user subjectivity and reflect the range of conditions found in watersheds to date. The protocol now allows for accurate assessment of tidal freshwater wetlands. Additionally, measurements of ditches and fill piles are now taken in the field for more accurate hydrology scoring. Duck blinds and docks were removed from the protocol as a hydrology metric.

# Posters

- 1** **Kathryn Bartling**  
AECOM  
***Galerucella* spp. Beetles as Biological Control for Purple Loosestrife (*Lythrum salicaria*): A Delaware Case Study.** *Kathryn Bartling (AECOM)*
- 2** **Scott Borsum**  
Delaware State University  
**Baseline Monitoring for Population Density and Distribution of the Eastern Oyster, *Crassostrea virginica*, in Delaware Inland Bays.** *Scott Borsum, Lanie Fuoco and Gulnihal Ozbay (Delaware State University)*
- 3** **Jillian Bradley**  
Delaware State University  
**Assessing the Sustainability and Performance of Caged and Tray Aquaculture Gear for the Eastern Oyster (*Crassostrea virginica*).** *Jillian Bradley, Melanie Fuoco, Scott Borsum and Dr. Gulnihal Ozbay (Delaware State University)*
- 4** **Margaret Capooci**  
University of Delaware  
**Effects of a Storm-Surge Related Salinity Decrease on Greenhouse Gas Emissions in Tidal Salt Marsh Mesocosms.** *Margaret Capooci, Josep Barba, Angelia Seyfferth and Rodrigo Vargas (University of Delaware)*
- 5** **Lena Champlin**  
Academy of Natural Sciences of Drexel University  
**A Comparison of Annual and Decadal-Scale Carbon Sequestration Rates in New Jersey, Pennsylvania, and Delaware Tidal Wetlands Using Interpolation Mapping.** *L. Champlin and D.J. Velinsky (Drexel University and the Academy of Natural Sciences), C. Sommerfield (University of Delaware), K. Raper (Drexel University and the Academy of Natural Sciences), L. Haaf (Partnership for the Delaware Estuary), K. St. Laurent (Delaware National Estuarine Research Reserve), T. Quirk (Louisiana State University) and E.B. Watson (Drexel University and the Academy of Natural Sciences)*
- 6** **Sandra Demberger**  
Partnership for the Delaware Estuary  
**Finding Vegetative Metric Correlations to Relate Long Term Reference Stations to Project Specific Sites.** *Sandra Demberger, LeeAnn Haaf, Angela Padeletti and Danielle Kreeger (Partnership for the Delaware Estuary) and Martha Doyle-Maxwell and Jessie Buckner (Barnegat Bay Partnership)*
- 7** **Anthony Dowell**  
AECOM  
**Prince George's County Living Shoreline Site Assessment GIS Tool.** *Anthony Dowell, GISP and Jennifer Slacum, PWS (AECOM) and Michael Snyder (Prince George's County Department of the Environment)*
- 8** **Katelynn Fry**  
Wesley College  
**Discharge Precipitation Relationship for White Clay Creek.** *Katelynn Fry (Wesley College)*
- 9** **Jack Gingrich**  
DNREC, Division of Fish & Wildlife, Mosquito Control Section  
**Search for Zika Virus Vectors among Daytime-Biting Mosquitoes Across Delaware, 2017**  
**Artificial Water Containers.** *Jack Gingrich, Kim Brinson, Rebecca Sabraoui, Troy Salt, Andrew Adami and Zach Vincent*
- 10** **Olivia Gulledge**  
Wesley College  
**Cellularly Understanding *Chamaecypris thyoidea* Resiliency to Salinity Intrusion.** *Olivia Gulledge and Dr. Stephanie Stotts (Wesley College)*
- 11** **Sydney Hall**  
Wesley College  
**Analysis of Water Quality in the St. Jones River.** *Sydney Hall (Wesley College)*
- 12** **Joseph Hee**  
Delaware State University  
**The Effect of Land Use on Atmospheric CO<sup>2</sup>.** *Joseph Hee and Gulnihal Ozbay (Department of Agriculture and Natural Resources, Delaware State University)*
- 13** **Sarah Koser**  
EA Engineering, Science, and Technology, Inc.  
**Incorporating Diatom Collection and Analysis in Combination with Benthic Macroinvertebrates and Fisheries Sampling to Describe a More Holistic Representation of Water Quality Conditions.** *Koser, Sarah T. (EA Engineering, Science, and Technology, Inc., PBC); Brian Cox (Maryland State Highway Administration) Jack Holt, Ph.D. (Susquehanna University) and Matt Harper (Maryland-National Capital Park and Planning Commission)*
- 14** **Johannes Krause**  
Drexel University  
**Are Nutrient Polluted Coastal Wetlands More Vulnerable to Sea Level Rise?** *Johannes Krause, Elisabeth Powell and Elizabeth B. Watson (Drexel University)*
- 15** **Amy Mann**  
Delaware Technical Community College  
**Visualizing Drinking Water Risk.** *Amy Mann (Delaware Technical Community College), Todd Keyser (Delaware Department of Natural Resources and Environmental Control), Ed Hallock and Kevin Cottman (Department of Health Services) and Kym Kelly (DTCC)*

-  **16 Cate Medlock**  
University of Delaware  
**Bias Correction of a LiDAR-derived Digital Elevation Model in Delaware's National Estuarine Research Reserves.** *Cate Medlock, Dr. Naomi Bates, Dr. Thomas McKenna and John Callahan (University of Delaware)*
- 17 Ryan Mello**  
ESRGC  
**Remapping the Critical Area.** *Ryan Mello (ESRGC)*
- 18 Eric Nielsen**  
U.S. Coast Guard  
**USCG Sector Delaware Bay Response to Rail Risks Planning Project.** *Eric Nielsen (U.S. Coast Guard)*
-  **19 Kathryn Norman**  
George Washington University  
**Salinity and Vegetation Community Composition Impacts to Blue Carbon Storage in Mid-Atlantic Tidal Wetlands.** *Kathryn Norman and Dr. Keryn Gedan (Department of Biology, George Washington University)*
- 20 Dr. Gulnihal Ozbay**  
Delaware State University  
**Investigating Saltmarsh Habitat of Delaware Estuarine Research Reserve and Land Use Impacts.** *Gulnihal Ozbay, Matthew Stone, Kris Roeske, Latadevi Karuna Chintapenta and Laurieann Phalen (Delaware State University)*
- 21 Katherine Phillips**  
Maryland Coastal Bays Program  
**Green Bulkheads Increase Biodiversity.** *Katherine Phillips, Brenna Waite, Madison Warfield and Roman Jesien (Maryland Coastal Bays Program)*
-  **22 Maggie Pletta**  
DNREC, Delaware National Estuarine Research Reserve  
**Creating Workforce Ready Students that Develop Transferable, Interactive Software Designed to Encourage Free-choice Learning.** *Maggie Pletta (Delaware National Estuarine Research Reserve), Kenneth Rainer (Guana Tolomato Matanzas National Estuarine Research Reserve), Kristin Evans (Mission-Aransas National Estuarine Research Reserve) and Dr. Terry Harvey (University of Delaware)*
-  **23 Elisabeth Powell**  
Academy of Natural Science of Drexel University  
**The Effect of Open Marsh Water Management Practices on the Carbon Balance of Tidal Marshes in Barnegat Bay, New Jersey.** *Elisabeth Powell and Elizabeth Burke Watson, Ph.D. (Drexel University)*
- 24 Kirk Raper**  
Academy of Natural Sciences of Drexel University  
**The Relative Importance of Elevation Change and Hypsometry as Benchmarks for Coastal Wetland Vulnerability to Sea Level Rise.** *Kirk Raper (Drexel University), LeeAnn Haaf (Partnership for the Delaware Estuary), Martha Maxwell-Doyle (Barnegat Bay Partnership), Elizabeth Burke Watson and David J. Velinsky (Drexel University) and Danielle Kreeger and Angela Padeletti (Partnership for the Delaware Estuary)*
-  **25 Kassandra Rodriguez**  
Wesley College  
**Vegetation Community Response to Large Scale Tidal Marsh Restoration at Prime Hook National Wildlife Refuge.** *Kassandra Rodriguez (Wesley College), Susan Guiteras (USFWS), Liz Tymkiw and Greg Shriver (University of Delaware) and Nathan Bush (USFWS)*
- 26 Dr. Christopher Sommerfield**  
University of Delaware, School of Marine Science and Policy  
**Sediment Transport Processes at the Prime Hook NWR Restoration Site.** *C. Sommerfield and J. Biddle (University of Delaware) and M. Mensinger and B. Scarborough (Delaware Department of Natural Resources and Environmental Control)*
-  **27 Ben Spitz**  
Delaware Technical Community College  
**Visualizing Drinking Water Risk.** *Jermain Robinson, Benjamin Spitz, Julie Petrowsky, Sharon Dutton and Jillian Pyle (Delaware Technical Community College)*
-  **28 Branimir Trifunovic**  
University of Delaware  
**Tidal Influence on Greenhouse Gas Emissions from Water in a Salt Marsh Creek.** *Branimir Trifunovic, Daniel Warner, Angelia Seyfferth and Rodrigo Vargas (University of Delaware)*
-  **29 Alma Vázquez-Lule**  
University of Delaware  
**Carbon Fluxes and Phenology Changes in a Delaware Tidal Salt Marsh.** *Alma Vázquez-Lule, Natalia Kowalska and Rodrigo Vargas (University of Delaware)*
- 30 Elizabeth Watson**  
Academy of Natural Sciences of Drexel University  
**A Comparison of Object and Pixel-based Classification Methods for Detecting Coastal Wetland Habitat Change.** *Elizabeth Watson, Elisabeth Powell, Lin Perez and Scott (Drexel University)*
-  **31 Angelina Watts**  
Delaware State University  
**Effect of Salinity on Eastern Oyster Reproduction (*Crassostrea virginica*).** *Angelina Watts (Delaware State University), Bob Carey (University of Maryland Center for Environmental Science) and Dewayne Fox (Delaware State University)*

 A "P" with a circle around it highlights a presenter who is presenting both a poster and oral presentation

 A star highlights students participating in the new Student Poster Competition. If you would like to be a judge, please see the registration desk.

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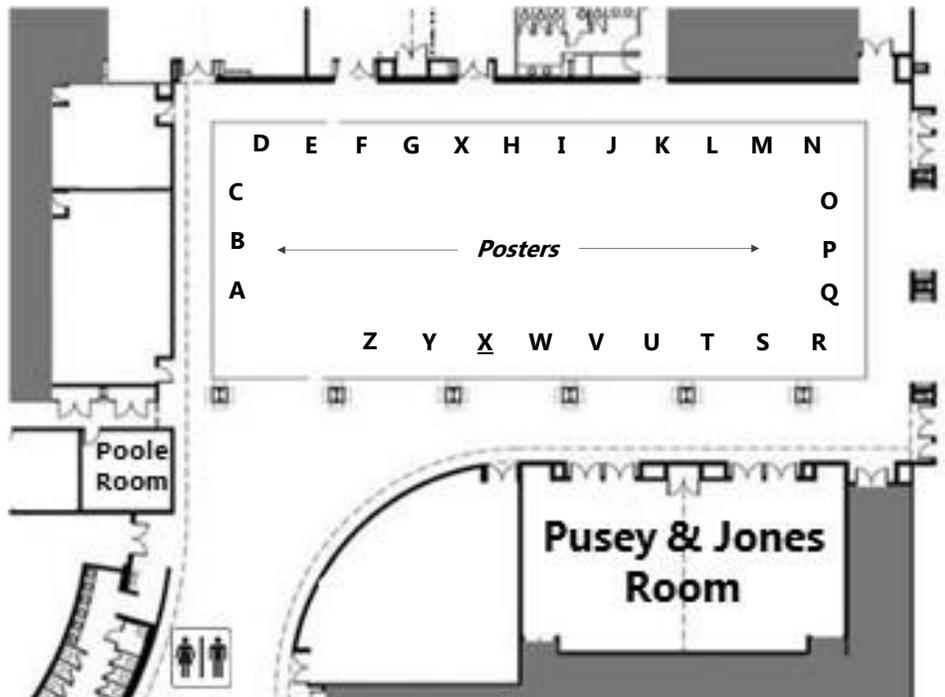
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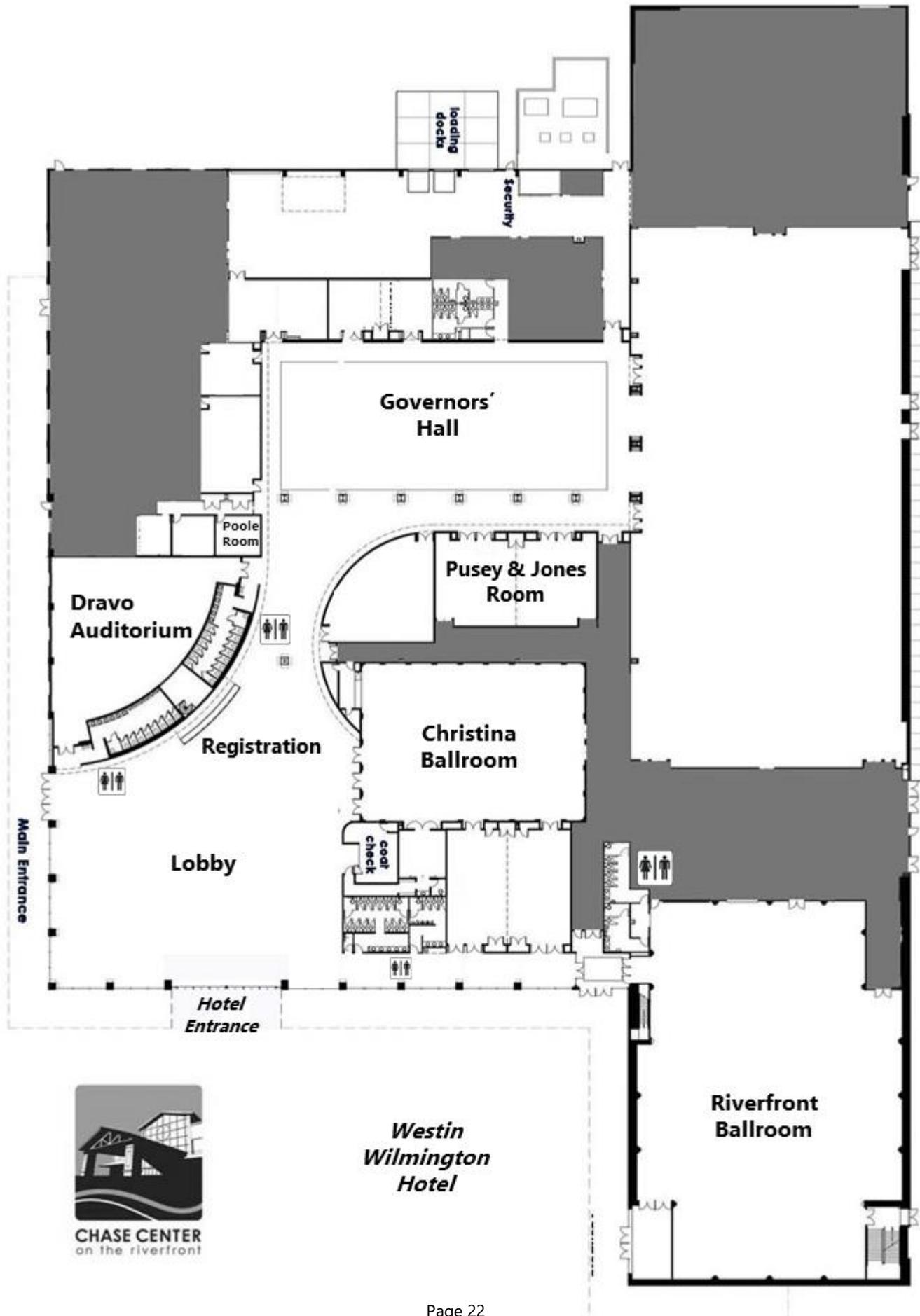
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