Peconic Estuary Shoreline Summit





protecting 11:00-11:05	S AND RESTORING LONG ISLAND'S PECONIC BAYS				
11:05-11:30	Setting the Scene				
11:30-12:30	Multi-jurisdictional Panel				
12:30-1:30	Lunch				
1:30-2:00	Lessons Learned from Delaware				
2:00-2:30	Viability of Shoreline Adaptatic in the Peconics				
2:30-2:45	Break				
2:45-3:30	0 Shoreline Management Model				
3:30-3:45	30-3:45 PEP Datasets Lightning Talks				
3:45-3:55	Moving Forward & Closing Remarks				

rant

NEW YORK



PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Welcome

Joyce Novak PhD, Peconic Estuary Partnership

Living with Water

Peconic National Estuary Program: Recognized by Congress as an Estuary of National Significance in 1993



Authorized under section 320 of the Clean Water Act

- <u>Comprehensive Conservation</u>
 <u>Management Plan (CCMP)</u>
- Habitat Restoration Plan
 - Water Quality Monitoring Strategy
- Non-Regulatory
- Non-Enforcement
- Not an advocacy organization
- Science based decision making we work to get things done on the ground!



Peconic Est



PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Setting the Scene

Kathleen Fallon PhD, NY Sea Grant

Summit Participation!

Thank you for coming!

• Network with your fellow participants



- We will be discussing and exploring complicated topics
- Meeting index cards
 - This is an interactive meeting
 - We Need Your Input
 - Jot down all thoughts, comments, questions, concerns, feelings, reflections
 - Place your index cards in the boxes before you leave





Living with Water

- The 6 towns of the Peconic Estuary are surrounded by water
 - Peconic Bay, Long Island Sound, and the Atlantic Ocean
- Communities are vulnerable, at risk, and dealing with challenges







Coastal Processes in the Peconics

Flooding

• Tidal, surge, sea level rise

Erosion

• Transport, storms, structures

These natural processes shape shorelines







Coastal Processes in the Peconics

Flooding

Occurs when low-lying land is submerged by water

Causes

- Tidal: during spring-tides (higher than normal) usually twice a month
- Storm Surge: an abnormal rise in water levels pushed by strong winds
- Sea level rise: chronic flooding during normal high tides







Coastal Processes in the Peconics





Erosion

The removal of sediment by the physical forces of waves, tides, wind, etc.

Causes

- Sediment transport: the natural response to physical forces
- Storm events: larger waves can reach further inland removing more sediment
- Structures: can alter natural processes



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Climate Change in the Peconics

- Shorelines have been changing since the formation of LI (21,000 years ago)
- Our changing climate is exacerbating these issues
 - Increased sea levels
 - Increased frequency and intensity of storms
 - \circ More flooding and erosion

Creating more shoreline challenges

	Region	Long Island					
	Descriptor	Low	Low- medium	Medium	High- medium	High	Very High
Time Interval	2030s	7	8	10	12	14	NA
	2050s	13	15	18	21	25	NA
	2080s	23	26	32	<mark>4</mark> 1	48	83
	2100	27	32	39	54	69	114
	2150	42	50	63	94	185	NA

Inches of rise relative to 1995-2014 baseline





Dealing with Change

Traditional method of stabilizing the shore

- Utilized hard methods
 - Bulkheads, rock revetments, sea walls, etc.
- Protect infrastructure
 - Buildings, roads, home, and property
- Resulted in significant amount of shoreline hardened

Shift to preserving and restoring natural shorelines







Methods of Shoreline Adaptation



Resilience

The ability of a system to withstand shocks and stresses while still maintaining its essential functions

Adaptation

Utilizing measures to minimize risks from erosion and flooding while increasing resilience to storms and sea level rise





Shoreline Adaptation Methods



Restoration

- Removal of hardened structures
- Marsh and dune grass plantings
- Dune restoration
- Tidal marsh restoration
- Oyster reef or shellfish bed restoration

Erosion Control Methods and Structures

- Natural materials
- Sand placement
- Shell bags
- Breakwaters
- Rock or rip-rap revetments
- Bulkhead construction





Nature-based Features





- Features that mimic natural systems and processes
- Designed to provide specific services
 - \circ Prevent erosion
 - $\circ \quad \text{Reduce flood risk} \\$
 - Increase habitat
 - Improve water quality
- Typically incorporate or promote growth of living materials
- Limit disturbance to existing habitat

*New York State Definition





Advancing Shoreline Adaptation in the Peconics

While interest in shoreline adaptation exists, implementation is low

- NBF are innovative to NY but not in other locations
 - Some states have been utilizing living shorelines for decades

PEP and NYSG set out to understand Why?

- Identified challenges:
 - Lack of property owners awareness about NBF as an option
 - Lack of existing data showing success
 - Complex regulatory structure
 - Complicated permitting process





Lack of Information Challenges

Lack of awareness about NBF as an option

- NBF are innovative in NYS
- Lack of available educational materials
- Hard structures appear to be more protective
- Stick to traditional methods

NBF do not fit in current regulations

Lack of existing data

- Leads to hesitation to implement
- Improper siting resulting in failure
- General mistrust in NBF







Process-based Challenges

Complex regulatory structure

- Federal, state, and local codes and laws dictate shoreline adaptation
 - Rivers and Harbors Act
 - Clean Water Act
 - Coastal Zone Management Act
 - Tidal Wetlands Act
 - Coastal Erosion Hazards Area
 - And others....



Multi-jurisdictional nature of obtaining a shoreline permit in the Peconic Estuary





Process-based Challenges

Overlapping jurisdictions

- Federal and state
 - Navigable waters
 - Wetlands
 - Bay bottoms
 - Water quality
- Local
 - Town
 - Trustees



<u>Town</u>	Shoreline Jurisdiction			
Southold	Trustee rule (except LWRP review & structure permits)			
Southold Trustees	100 ft inland from wetlands			
Riverhead	300 ft from tidal wetlands, 150 ft from freshwater			
Brookhaven	150 ft landward of wetland boundary			
Southampton	200 ft landward of wetland boundary			
Southampton Trustees	Additional governance			
East Hampton	150 ft from tidal wetlands			
East Hampton Trustees	Own certain bottom lands			
Shelter Island	MHW to 75 ft, separate code for 75-100 ft			



Process-based Challenges



Complicated permitting process

- NYS Joint Application
 - Federal Permits: USACE (+ others)
 - State Permits: DEC, DOS, OGS
- Local Permits
 - o Town
 - Trustees



Unclear submission process

- Although joint, applicant is still responsible for sending to all agencies
- Order varies





In Summary...

Shoreline adaptation is complicated!

• Challenges are not solely from lack of knowledge

- Complexity creates challenges
 - Shoreline response
 - Regulatory interactions
 - Complicated permitting





Peconic Estuary Shoreline Adaptation Initiative

PEP and NYSG recognize this complication

- Working to address the challenges
- Creating a regional framework for long-term, nature-based solutions
- Bringing together regulators, municipalities, and practitioners to identify shared challenges and advance improvements
- Facilitating workshop = Information

*Currently, not covering infrastructure projects such as pools, sheds, docks, or homes on waterfront parcels, which are regulated separately under building codes and zoning laws. CEHA, beach nourishment and dredge projects are also outside the scope of work at this time.











Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Multi-jurisdictional Panel

Bob Deluca, Group for the East End James Duryea, Town of Southampton Trustees Office Cassie Bauer, NYS DEC Alexa Fourier, NYS DEC Mark Terry, Town of Southold Jennifer Street, NYS DOS

Brian Frank, Town of East Hampton





Bob Deluca, Group for the East End

"Preserving and restoring natural shorelines is often cited as the most effective long-term strategy for coastal resilience—yet it's also one of the most challenging to sustain, especially after major storms. From your perspective in the nonprofit and land protection space, how can we ensure that the protection of natural shorelines remains a top priority in both policy and public understanding?"

James Duryea, Town of Southampton Trustees Office

"In your experience, why is institutional knowledge around shoreline management and permitting so often at risk, and how does your role help support knowledge sharing—both in terms of regulatory process continuity and the technical expertise needed for effective shoreline decisions?"

Cassie Bauer, NYS DEC

"Given the dynamic nature of coastal systems and the increasing number of shoreline projects across Long Island, adaptive management and regional learning are essential to improving outcomes over time.

How is the Division of Marine Resources supporting the collection and use of project data to inform future shoreline management and restoration efforts?"

Alexa Fourier, NYSDEC DMR

"There's growing interest in how regulatory agencies can help incentivize more resilient shoreline solutions. For NYSDEC, how is the more recent Tidal Wetlands Law shaping your approach to permitting, especially in terms of reinforcing the use of nature-based or living shoreline strategies over traditional hardened structures?"

Mark Terry, Town of Southold Planning

"We've seen that contractor experience and understanding of local regulations can make or break shoreline project success. How can local licensing programs or certification requirements improve the quality of shoreline projects and reduce permitting violations?"

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Jennifer Street, NY Dept. of State, Coast Zone Management

What is the role of coastal consistency review in the permitting process? How does New York DOS coordinates with agencies like DEC and the Army Corps during project reviews? How does LWRP* support resilience funding, but more importantly, how does the LWRP provide local governments with additional regulatory authority to back up their legislation?

*Local Waterfront Revitalization Program

Jennifer Street, NY Dept. of State, Coast Zone Management



Brian Frank, Town of East Hampton

" All of the representatives on this panel are highlighting the different perspectives that come together for coastal planning.

There are many entities involved in the shoreline permitting process—including federal and state agencies, local government staff, elected and appointed board members, and trustees. This must make coordination and communication both extremely complex but also essential. Can you speak to your experience navigating this process, and what you see as the key benefits of improved interagency cooperation?"

Overall (if time allows)

"Despite strong regulations, enforcement challenges persist. What steps are being taken—or could be taken—to ensure shoreline projects comply with permit conditions, especially in the face of limited capacity and low violation penalties?"

Thank you Panelists!

As we move into Lunch,

- Use this time to network with fellow participants
- Jot down notes, feedback, questions, reflections on your index cards
- Browse the materials in the room
- Visit our posters







Peconic Estuary Shoreline Summit



Lunch

12:30-1:30 Lunch Lessons Learned from 1:30-2:00 Delaware Viability of Shoreline 2:00-2:30 Adaptation in the Peconics Break 2:30-2:45 Shoreline Management 2:45-3:30 Model PEP Datasets Lightning Talks 3:30-3:45 Moving Forward 3:45-3:55 **Closing Remarks** 3:55-4:00



PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Lessons Learned from Delaware

Olivia Allread, DNREC

Natural Accretion: Building a Living Shorelines Committee in Delaware



Olivia Outreach and Education Allread Subcommittee Chair

DNREC's Wetland Monitoring and Assessment Program


Who We Are

13 years ago...



Utilize our Partners

DNREC Partnership for the Delaware Estuary

About 10 members to start! DELAWARE LIVING SHORELINES COMMITTEE

Multiple states 40 members Meet 2 times a year Wide range of expertise

DELSC is a work group dedicated to facilitating the understanding, peer review and implementation of living shoreline tactics within the state of Delaware.

How Did We Get This Far? Our First Two Years



3 Demonstration Sites – 2013 to 2015



Here We Are in 2025

Voluntary group

- Initiatives into grants/funding
- Private practitioners = less constraints

Implementation and Management:

Create and update framework or documents as needed to aide in the monitoring of living shorelines and provide input to projects.

Specialized subcommittees

 Coordinate collaboration and be open to feedback

Outreach and Education:

Promotes the understanding of LS through trainings and the development of outreach materials, as well as attends events and visits communities when needed. Regulatory, Policy and Programmatic Development: Provide guidance on navigating the regulatory process, facilitate updates to permits, and work towards developing projects.

What We Make Happen

Website since 2018

- Primary interface
- LOTS of resources, updates from committee, webinars, and events
- Funded by partner and we maintain in-house

delawarelivingshorelines.org



Living shorelines are the natural and effective way to protect Delaware's shorelines.



A living shoreline project during installation. This project was done to protect the edge of the marsh from washing away. If you own waterfront property in Delaware, whether it be saltwater or freshwater, and are concerned about erosion or just want to beautify your land, a living shoreline may be for you.

Traditional methods of shoreline protection, such as bulkheads and riprap, can actually make erosion problems worse by redirecting wave energy. In addition, they disconnect the land from the water which prevents wildlife, such as turtles and ducks, from accessing the habitats they need to survive.

Living shorelines use common natural materials, and can be designed not only to meet your shoreline protection needs, but also your personal interests whether you like sitting from the comfort of your own home bird watching, or taking your kayak out for a paddle.







Flowchart

 Information hub = easy access, details on webpage for each step

What We Make Happen

Story Map of Living Shorelines in Delaware and our Case Studies

Good way to see SOME of our projects without getting TOO technical



Designed to Fit Site Conditions:

Atlantic

This area was experiencing erosion of a small strip of marsh that blocks saltwater from entering a managed freshwater impoundment.

In an attempt to stabilize the area and regain ground in the face of moderate to high wave energy, a hybrid living shoreline design approach was used that combined natural materials, rocks, and sand:

 Rock sill: reduce wave energy by intercepting incoming waves, and keep or trap new sediment behind it to build marsh elevation, while having gaps to allow wildlife connection to land Clean sand: raise the height of the land to the



Mispillion Living Shor	Celine Milford, Delaware							
Partnership for the Delaware Estuary								
Project Details	Baseline Conditions							
Goals: • Erosion control • Water quality enhancement via increases in shellfish populations	The existing salt marsh was experiencing excessive erosion, moving towards the upland fringe June 2014 March 2014 Extensive intertidal Salt marsh erosion ovster reef condition							
Energy Environment: • Moderate The primary source of energy is the ebb and fold tides; secondary energetic source is direct wave inundation when server matter levels surpass the height of the seawall between the river and the Delaware Bay								
Construction Dates: • June 2014: three initial coir cusps and breakwaters • June 2016: eroded coir replaced with shell bags • March 2019: shell bag cusps in former control areas	Baseline Conditions Issues: • Excessive salt marsh erosion • Standing water in some areas of the high marsh							
Partners: • DNREC Division of Fish and Wildlife, DuPont Nature Center	Site Characteristics/Important Features to Consider: Existence of the DuPont Nature Center at site Presence of an extensive intertidal syster reef Medicate access due to the section							
See the Site Before and After Initial Installation June 2014 (a) – June 2018 (b)	 involve ace energy use to the position of the size along a benefit in the river, and the large fetch beyond periodically overtopped seawall across the river from the site Substrate variability across the site from soft near the nature center to firm and rocky along their wiver portion of the site from soft South we break just landward of the oyster coefficient wave break just landward of the oyster 							

Breakwaters: June 2014 (a) - September 2019 (b)

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What We Make Happen – Heavy Hitters

Training Workshops

• An opportunity to showcase, exchange, teach!

In-depth training for those interested in understanding the process and components for living shorelines

Open to scientists, engineers, landscape professionals, government entities, marine contractors and students Instructors from USACOE, USFWS, Delaware DNREC, private consulting firms, and non-profit organizations In-person training with classroom and field components, plus lunch and networking time

• Introduction to Living Shorelines Training

- 2-day workshop that happens every spring
- Registration and promotion is done in-house
- Training is typically full, with a waitlist need is there!

• Topics Covered

- Types of living shorelines
- Site evaluation
- Design and goals
- Permitting/restrictions

- o Plants
- Habitat creation
- Example projects
- \circ Site visits



GROUP

EFFORT!

What We Make Happen – Heavy Hitters

3 Guidance Documents

- Provide a baseline for professionals
- A slow, thought-out process
 - Each took about 1 ½ year to develop
 - o 2018, 2020, and 2023
 - Different subcommittees took the lead;
 committee at-large provided feedback
- Benefits of having them? Too many to list!



Developing Monitoring Plans for Living Shoreline Projects in Delaware: A Goal-Based Framework



Procedure for the selection of relevant metrics and appropriate methods to assess performance and adaptive management needs of tidal shoreline restoration projects. Site Evaluation for Living Shoreline Projects in Delaware



Intended for use by living shoreline *practitioners and interested landowners* considering the **suitability of a site** for a living shoreline project. Techniques and Application of Living Shorelines in Delaware



Guidance on how to visualize and design living shorelines using selected elements and materials to meet site-specific goals.

Challenges – It's Not Always Smooth Sailing!

- People get too busy and staff changes
- Costs of materials, funding, and habitat changes
- Adapting to how to communicate information
 Social media and the internet
 - Explain to the public
- Green VS. Gray...Engineers VS. Environmentalists
- Meetings with awkward silence? Yes. Rushing to make meeting agendas? Yes.

Committees change shape over time!

We had 5 subcommittees but now have 3!

Successes – Importance and Impact

Network, share, and build ideas ٠ (priceless feedback!)

Don't Chuck Your Shucks

projects such as Living Shorelines and Oyster Gardening.

PI ANNING

Status

Meet and learn from experts in the field

IN PROGRESS

50%

Since 2014, the "Don't Chuck Your Shucks" shells recycling program has collected

shell from local restaurants for use in projects that directly benefit our Inland Bays.

Promote individual programs and happenings **DELSC** recommended providers Ο

COMPLETE

December 2024

Provider	Address	Living Shoreline Type	Installing Living Shorelines: Provider Services			Completed DE		
			Site Assessment & Design	Permitting	Construction	Maintenance	Living Shorelines Training	Project Examples
Advanced Ecology, LLC	107 Mary Ann Ct. Newark DE 19711 P. (302) 230-1265	Traditional	x		x	x		
Bella Terra Landscapes	1348 Spicer Rd. Ellendale, DE 19941 P. (302) 422-9000	Hybrid and Traditional	x	x	x	x	x	
Biohabitats	13482 Spicer Rd. Baltimore, MD 21211 P. (410) 554-0156	Hybrid and Traditional	x	x	x	x	x	link to example
Cardno	121 Continental Drive Suite 308 Newark, DE 19711 P. (302) 395-1919	Information not provided	x	x				
Ches Shores Marine	103 Stone Point Dr. Unit 173 Annapolis, MD 21401 P. (410) 703-7211	Information not provided	x		x	x	x	
Coastal & Estuarine Research, Inc.	P.O. Box 674 Lewes, DE 19958 P. (302) 645-9610	Information not provided	x	x				
EA Engineering, Science and Technology, Inc. PBC	225 Schilling Circle Suite 400 Hunt Valley, MD 21031 P. (410) 584-7000	Hybrid and Traditional	×	x			x	
Ecological Restoration & Management,	10600 York Rd. Suite 203 Cockeysville, MD 21030 P (302) 422-9000	Hybrid and Traditional			x	x		

Living Shoreline Cost Share Program

E di Listen



Living shorelines can protect and enhance the beauty of shoreline properties. The DNREC Division of Watershed Stewardship provides cost share assistance for installing living shorelines and stabilization projects.

Living shorelines use natural materials like native plants, oyster shells and biodegradable coconut-fiber logs as a barrier to defend against shoreline erosion and flood impacts

The Living Shoreline Cost Share Program (LSCSP) is available to landowners, homeowners' associations (HOAs) or community boards in many watersheds in Delaware.

Program Offerings



- Resources for all!
 - HOAs and landowners
 - Local/municipal
 - o **K-12**
- Subcommittees are key
 Delegating tasks
 Fleshing out items
- Help shape information for the public
 - Increased our E & O
 - Get to know coastal communities



Where We're Headed





Expand and Share

- Bring back our Site Evaluation Training
- Create a living shoreline/tidal planting guide

More Public Events

- Fall 2025 tour for landowners
- Attend community events/outreach in localized areas



Get People On Board

- Spread the word and get 'em installed!
- If folks aren't ready to install, give them other options



Olivia Allread Olivia.Allread@delaware.gov





PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Viability of Shoreline Adaptation in the Peconics

Jade Blennau, PEP

Thank you

Despite capacity limitations, development pressure, evolving priorities...

Stakeholders across the estuary have come together to identify shared challenges **Shaped these collaborative recommendations**







Thank you

Despite capacity limitations, development pressure, evolving priorities...

Stakeholders across the estuary have come together to identify shared challenges **Shaped these collaborative recommendations**

Document - Connect - Draft

Facilitating conversations...

- Fostered region-wide conversation and collaboratior across federal, state, and local levels
- Supported internal agency change
- Advanced discussions and fostered update of municipal wetland code updates
- Strengthened understanding of permitting pathways challenges, and opportunities









FINDINGS- Three Key Recommendation Focus Areas

1. Internal Agency Procedures

2. Interagency Coordination

3. Estuary-wide Priorities



Photo Credit: US EPA







Early Engagement in Permitting

- Make **pre-application meetings** and site visits standard practice
- Incentivize early coordination in fee structure

Goal: Improve project implementation and success and reduce permitting delays by fostering early communication and collaboration.



Pre-application meeting fees to be applied as credit toward final permit fees





Communication & Coordination

- Align roles of advisory boards (e.g., enviro, conservation, LWRP advisory committees), permitting authorities, planning teams at the town level
- Use & align state programs like LWRP & CSC to build capacity

Goal: Improve community resilience through coordination and participation in state programs.









Early Engagement in Permitting

Communication & Coordination

Regulatory Knowledge Transfer



Regulatory Knowledge Transfer

- Develop **orientation/training** for local decision-makers
- Promote *permanent* shoreline staff roles and knowledge-sharing systems
- Offer structured learning opportunities
- Encourage the **rotation and staggering** of board memberships to promote knowledge-sharing.

Goal: Build and retain permitting expertise across regulating entities.





Early Engagement in Permitting

Communication & Coordination

Regulatory Knowledge Transfer

Code and Policy Updates



Code and Policy Updates

- Update municipal shoreline codes to promote appropriate NBF
- Use model laws and pilot projects to **inform new standards**
- Incorporate NBF into LWRP planning for state alignment
- Update LWRP to clearly identify specific protections for specific areas in order to best reflect shoreline priorities

Goal: Remove barriers to NBF and improve local adaptive capacity through up-to-date codes.





Early Engagement in Permitting

Communication & Coordination

Regulatory Knowledge Transfer

Code and Policy Updates



Code and Policy Updates

- Update municipal shoreline codes to promote appropriate NBF
- Use model laws and pilot projects to **inform new standards**
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Goal: Remove barriers to NBF and improve local adaptive capacity through up-to-date codes.





Ex. Codify that applications to provide viable alternative to hardened structures.



NYSG Law and Policy Fellowship

Access to law school students (Pace)



• 2024 Fellow

- Assessed local town codes for strengths and opportunities
- Suggested amendments based on NYS Model Local Laws
- Focused on one town and compared to the others for suggestions
- Draft guidance on how to amend a town code

To be continued...





Early Engagement in Permitting

Communication & Coordination

Regulatory Knowledge Transfer

Code and Policy Updates

Incentivizing Resilient Shorelines



Incentivizing Resilient Shorelines

- Create fast-track permitting pathways for NBF
- Offer reduced application fees for projects that will provide NBF data
- Designate/codify NBF as preferred alternatives in guidance documents

Goal: Accelerate adoption of NBF by rewarding innovative, resilient project designs.



Southold Fee structure Recommendation



Early Engagement in Permitting

Communication & Coordination

Regulatory Knowledge Transfer

Code and Policy Updates

Incentivizing Resilient Shorelines

Enforcement & Compliance Monitoring

Enforcement & Compliance Monitoring

- Regional enforcement coordination: Task force
- Standardized permit follow-up protocols
- **Tiered & updated violation penalties** and restoration requirements

Goal: Ensure environmental protection and regulatory integrity through consistent enforcement.











Goal: Streamline permitting through improved coordination and **transparent decision-making** across regulatory bodies.







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"We are looking for **shared understanding**, not necessarily consensus, across regulatory agencies"







Communication & Coordination

- Shared **digital tools for tracking, updates,** and interagency **communication**
- Regular interagency meetings/workshops for relationship-building
- Resources and training to support science-based decision-making
- Connect Early: Site Visits & planning

Goal: Streamline permitting through improved coordination and **transparent decision-making** across regulatory bodies.



Interagency general email connection for moving applications for streamlined application coordination





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Permit submission sequence and decision:

Permit submission sequence and decision:

• What is the suggested order for applicants to submit their permits?

Goal: Reduce duplication of effort, **enhance inter-agency natural resource protection** and support through improved coordination, the leveraging of programs, and transparent decision-making across regulatory bodies.





Remember.....

Recommendations connect & build off each other

Ideally local governments have addressed...



Code and Policy Updates Implemented science-based, specific code updates to support NBF and resilience measures, refined their LWRP for specific shoreline protection needs

Permit submission sequence and decision:

Advising permit applicants to get all permits at once, or Joint Permit first? What is the most advantageous pathway to allow towns control of their shorelines? Recommended Permit Submission Sequence to promote government alignment at all levels



Recommended Permit Submission Sequence to promote government alignment at all levels




What is soft denial? Official denial of a permit application with incentive to return with amended application. -Fee structure
-Expedited process upon resubmission









Because of this alignment, illegal structures not only break local law but also break federal law When the coastal consistency review takes place, your objection denial will be honored!

Convey project Local Town/Trustee Town/trustee issue denial to DOS & "soft denial" permit review **Army Corps** LWRP **Review first** Town can deny permit as Soft denial details proposed, but make In the case of a are sent to DOS & recommendations for violation of local law Army Corps with the **O** Z nature based solutions move toward soft permit package. where appropriate denial logged.

Army Corps

If applicants submit permits to all agencies for concurrent review. Towns are potentially protected because the denial is logged.

Codified local law: recognized by DOS

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Army Corps If applicants submit permits to all agencies for concurrent review. Towns are potentially protected because the denial is logged. 79

Codified local law: recognized by DOS

Joint Permit: DOS DOS reviews for Coastal Consistency include LWRP If does not meet the LWRP= DENY coastal consistency review

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Codified local law: recognized by DOS

HAS LWRP

Joint Permit: DOS DOS reviews for Coastal Consistency include LWRP If does not meet the LWRP= DENY coastal consistency review

DOS CCR denial= ARMY CORPS Denial

Denial of CCR leads to Army Corps "Denial without Prejudice"

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Joint Permit: DOS DOS reviews for Coastal Consistency include LWRP If does not meet the LWRP= DENY coastal consistency review

DOS CCR denial= ARMY CORPS Denial

Denial of CCR leads to Army Corps "Denial without Prejudice" Applicant Army Corps denial, can recommend contact town Town engage in pre application meeting to suggest the permissible activities on the shoreline introduce nature based solutions or preservation

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DOS CCR denial= ARMY CORPS Denial

Denial of CCR leads to Army Corps "Denial without Prejudice" Applicant Army Corps denial, can recommend contact town Town engage in pre application meeting to suggest the permissible activities on the shoreline introduce nature based solutions or preservation

NO LWRP

LWRP

HAS

Local Town/Trustee permit review

Review first In the <u>case of a</u> <u>violation of local law</u> move toward soft denial

Town/trustee issue "soft denial"

Town can deny permit as proposed, but make recommendations for nature based solutions where appropriate Convey project denial to DOS & Army Corps Soft denial details are sent to DOS & Army Corps with the permit package logged.

Army Corps If applicants submit permits to all agencies for concurrent review. Towns are potentially protected because the denial is logged.

Codified local law: recognized by DOS

Joint Permit: DOS DOS reviews for Coastal Consistency include LWRP If does not meet the LWRP= DENY coastal consistency review

DOS CCR denial= ARMY CORPS Denial

Denial of CCR leads to Army Corps "Denial without Prejudice" Applicant Army Corps denial, can recommend contact town Town engage in pre application meeting to suggest the permissible activities on the shoreline introduce nature based solutions or preservation Resubmission of a permissible project to joint permit If successfully receives army corp permit

NO LWRP

LWRP

HAS

Local Town/Trustee permit review

Review first In the <u>case of a</u> <u>violation of local law</u> move toward soft denial

Town/trustee issue "soft denial"

Town can deny permit as proposed, but make recommendations for nature based solutions where appropriate Convey project denial to DOS & Army Corps Soft denial details are sent to DOS & Army Corps with the permit package logged.

Army Corps If applicants submit permits to all agencies for concurrent review. Towns are potentially protected because the denial is logged.

Codified local law: recognized by DOS

Joint Permit: DOS DOS reviews for Coastal Consistency include LWRP If does not meet the LWRP= DENY coastal consistency review

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Convey project Local Town/Trustee Town/trustee issue denial to DOS & "soft denial" permit review **Army Corps** LWRP **Review first** Town can deny permit as Soft denial details proposed, but make In the case of a are sent to DOS & recommendations for violation of local law Army Corps with the nature based solutions **N** move toward soft permit package. where appropriate denial logged.

Army Corps

If applicants submit permits to all agencies for concurrent review. Towns are potentially protected because the denial is logged.

Codified local law: recognized by DOS

Joint Permit: DOS DOS reviews for Coastal Consistency include LWRP If does not meet the LWRP= DENY coastal consistency review

LWRP

HAS

DOS CCR denial= ARMY CORPS Denial

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Town/trustee permit submitted

Local Town/Trustee permit review

Review first In the <u>case of a</u> <u>violation of local law</u> move toward soft denial

LWRP

N

LWRP

HAS

Town/trustee issue "soft denial"

Town can deny permit a proposed, but make recommendations for nature based solutions where appropriate In absence of a soft denial, LWRP is the mechanism DOS has to understand a town's legal requirements for their shoreline, this guides coastal consistency review to approve/deny.

Codified local law: recognized by DOS

Joint Permit: DOS DOS reviews for Coastal Consistency include LWRP If does not meet the LWRP= DENY coastal consistency review

DOS CCR denial= ARMY CORPS Denial

Denial of CCR leads to Army Corps "Denial without Prejudice" Applicant Army Corps denial, can recommend contact town Town engage in pre application meeting to suggest the permissible activities on the shoreline introduce nature based solutions or preservation Resubmission of a permissible project to Joint permit If successful receives army corp permit

Town/trustee permit submitted



Preservation natural shorelines

- Retain existing natural shoreline
- Utilize buyout programs, conservation easements,

Goal: Protect existing natural shoreline habitats and restore vulnerable areas with high recovery potential to serve as the foundation for **long-term coastal resilience**.







Strategic land acquisition with structure & bulkhead removal

- Investment in CPF & Risk-based planning tools to support it
- Explore post-storm recovery zoning and protection policies (buyout bonus, tax incentives)

Goal: strategically acquire properties to remove structures and restore vulnerable areas with high recovery potential to serve as the foundation for long-term coastal resilience.







Contractor and practitioner support

- Explore local licensing program
- Technical Tools, Resources & Expertise catered to stakeholder perspectives

Goal: Improve permit application quality and project outcomes through professional standards for practitioners.





111

Preservation of natural shorelines

Strategic land acquisition with structure & bulkhead removal

Contractor and practitioner support

Tools, resources, and expertise

Tools, resources, & expertise

- Continue development of resources: Model
- Develop a region-specific Peconic Estuary guidance document
- Knowledge-sharing seminars led by organizations like New York Sea Grant (NYSG).

Goal: Enhance regulatory decision-making with **access to technical, legal, and scientific support.** Robust technical resources empower practitioners, regulators, and community stakeholders to implement more **effective, science-based shoreline protection.**



Preservation of natural shorelines

Strategic land acquisition with structure & bulkhead removal

Contractor and practitioner support

Tools, resources, and expertise

Adaptive Management & Regional Learning

Adaptive Management & Regional Learning

- **Collect data** via region-specific Peconic Estuary guidance documents and adapt strategy
- Require adaptive management plans as part of shoreline permit conditions.
- Compare project outcomes regionally to identify and disseminate best practices.
- Integrate monitoring best practices



Goal: Improve projects proposed and agency learning through **consistent monitoring and information sharing**.







1. Internal Agency Procedures

Early Engagement in Permitting Communication & Coordination Regulatory Knowledge Transfer Code and Policy Updates Incentivizing Resilient Shorelines

2. Interagency Coordination

Communication and coordination Permit submission sequence & decision

3. Estuary-wide Priorities

Preservation of natural shorelines

Strategic land acquisition with structure & bulkhead removal

Contractor and practitioner support

Tools, resources, and expertise

Adaptive Management & Regional Learning



Tools, resources, and expertise

Technical resources empower practitioners, regulators, and community stakeholders to implement more effective, science-based shoreline protection.

If implemented thoughtfully & collaboratively...

- Useful Technical Resource
- Increased Transparency across agencies
- Aid in regulatory process

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Peconic Estuary Shoreline Summit



Break

2:30-2:45	Break
2:45-3:30	Shoreline Management Model
3:30-3:45	PEP Datasets Lightning Talks
3:45-3:55	Moving Forward
3:55-4:00	Closing Remarks



PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Shoreline Management Model

Karinna Nunez PhD, VIMS

Adaptation of the VIMS' Shoreline Management Model to Assess Site Suitability of Living Shorelines and Emphasize Best Shoreline Management Practices in the Peconic Estuary

- Karinna Nunez -

Peconic Estuary Shoreline Summit



VIRGINIA INSTITUTE OF MARINE SCIENCE Center for Coastal Resources Management

Outline

- 1. Background
- 2. Shoreline Management Model (SMM)
- 3. Model Inputs & Outputs
- 4. Model Validation
- 5. General Applications & Regional Customization

Next... (Pam Mason)

- Specific Examples of Model Application
- Use of Model Outputs in State Guidance and Regulatory Processes



 Shoreline erosion involves the landward movement of the coast due to both short-term forces (waves, tides, storms) and long-term changes (like sea level rise). It results from a unique combination of natural and man-made conditions, creating in many cases, significant challenges for property owners and environmental planners.

 Increasing trend to adopt and implement strategies that provide the best management alternatives to conventional hardening for erosion protection with minimum adverse effects on riparian and intertidal habitats

Shoreline Management Model (SMM)

This model was developed to inform, assist, enhance, and streamline regulatory decisions by identifying best management practices (BMPs) for tidal shoreline erosion control.



Shoreline Management Model (SMM)

Purpose & Intent

- 1. Provide living shoreline site suitability assessment.
- 2. Generate shoreline management best practice recommendations.

For natural & currently defended shorelines with determined problems







Upland Bank Erosion

Marsh Edge Erosion

Failing Defense Structures¹⁰⁰

Shoreline Management Model (SMM)

- The SMM is a spatially-explicit model that provides a recommended approach for tidal shoreline erosion control
- It identifies BMPs, in particular where living shorelines are suitable.





SMM – Decision Tree Logic

Recommended erosion control strategies are based on **decision trees,** developed to inform shoreline decision-making reflective of:

- Current scientific knowledge of how shorelines respond to natural conditions and anthropogenic measures.
- The direct and cumulative impacts of conventional shoreline stabilization.
- Best professional judgment from over 4000 shoreline site visits.









EXPLORE YOUR COASTAL COMMUNITY



Virginia Coastal Viewer

Explore haveline conditions throughout costati Winglink. View winnexed was level rise scenarios through 2100; compare 2 different years of ortholmogeny from Winglink Base Mapping Program; view reference layers that include bathymetry, conservation lands and essements, submerged aquatic vegetation (SAV) and more. Shoreline inventory layers and Shoreline Management lyses have classified popul obscriptions.



Dashboards

There are three offerent databaards: Locality Shoreline Inversory, River System Shoreline Inversory, and Shoreline Management Model (SMM). Summary data is displayed by locality, or river system (Inversory only). Shoreline Inversory displays a summary information that includes table menth types, structures such as docks and breaknesters, riparian land use, and more. The SMM calabaard displays best management precise recommendations for shoreline conditions.



SMM v 6.0 - Preferred Shoreline Best Management Practices (BMP) E Zoom to

Install Marsh-based Living Shoreline / Reuse Stone

Best Management Practice Definition: Install marsh. Plant marsh vegetation at appropriate elevations. Use clean sand or native sediment to achieve proper elevation to plant marsh. Reuse revetment materials for marsh toe or sill.

Shoreline is currently Defended. This shoreline was observed to be defended with Revetment.





Shoreline Management Model v 6.0

General Classification

- Living Shoreline

Replace Structure with Living Shoreline

- Traditional Structure
- No Action





Suitable Oyster Structure Areas

Consider: Oyster Shell Bags

Setting: Intertidal -- Low Wave Energy

No Conflicts

with Conflict: Private Leases

Consider: Constructed Oyster Reef (a,b,c)

Setting: Intertidal --Medium/High Wave Energy

No Conflicts

with Conflict: Private Leases Setting: Shallow Subtidal --Low/Medium Wave Energy

No Conflicts

Consider: Constructed Oyster Reef (b,c)

Setting: Shallow Subtidal --High Wave Energy

No Conflicts

with Conflict: Private Leases

Setting: Subtidal

No Conflicts 105 over Baylor Grounds





EXPLORE YOUR COASTAL COMMUNITY



Living Shoreline **Beach Shoreline** Marina Shoreline Defended and Natural Shoneline Select a Local 1.5 miles 12.1 miles 3.8 miles Ordensted 1 Distanti 775 Tidal Marsh Shoreline Tidal Marsh Area 110.9 miles 1 2,324 acres Tidal Marsh Community Types Isle of Wight Court James City Courts -Onshore Protection Structures 43.3 miles Riperian Land Use/Land Cove ikatumi 47 O Date of the Taken Prod Life Objident 31 Clarge 425 C Unco Wheel Th Unsurveyed Tidal Marsh 775.1 acres Access Structures

Dashboards

There are three different dashboards: Loading Shoreline Inventory, River System Shoreline Inventory, and Shoreline Management Model (SMM). Summary das is displayed by locality, or river system (inventory only). Shoreline Inventory displays a unmary information that includes sidel manh peak, actuates such as docks and breakwaters, riperian land use, and 1 (more. The SMM dishboard displays as management protective economications for shoreline conditions.

Virginia Coastal Viewer

Explore shareline conditions throughout costati Winghia. View animated sate level rise scenarios through 2100; compare 2 different years of ortholmagery from Virginia Base Mapping Program, View reference layers that include tastlymetry, conservation lands and essements, submerged squate vegetation (SAV) and more. Shoreline inventory layers and Shoreline Management layers have deside popul descriptions.



Model Validation

Objective: Assess the agreement between model outputs and expert field recommendations.

Method:

- Compared SMM output with 40 on-site shoreline management recommendations from VIMS scientists.
- Field data included a variety of shoreline energy settings for comprehensive evaluation.
- Error matrix (confusion matrix) used to assess classification accuracy: Kappa Statistics = 0.72 (substantial agreement).

Conclusion:

- SMM outputs align well with expert judgment.
- The model is robust and reliable for guiding shoreline management decisions.



(Nunez, K., Rudnicky, T., Mason, P., Tombleson, C., Berman, M. (2022). A geospatial modeling approach to assess site suitability of living shorelines and emphasize best shoreline management practices. Ecological Engine&Bg. 179. 106617. <u>https://doi.org/10.1016/j.ecoleng.2022.106617</u>)
Model Applications

Parcel – Scale Shoreline Management

- Regulatory agencies and Wetland Boards (VA)
- Shoreline professionals & contractors
- Private citizens

Pollutant Load Reduction Potential

- Tidal marsh creation & shoreline management BMPs
- Defended shoreline retrofits

Community Resiliency

- Targeting protection & restoration of natural and nature-based features
- Living shoreline ranking & co-benefits

Regional Customization

Exportable Code + Regional Terminology & Regulations







Regional Applications - Customized Recommendations

Virginia

Maryland

Texas

Florida – Tampa Bay

Louisiana – Lake Pontchartrain

Alabama – Mobile Bay

Alabama & Florida – Pensacola Bay

SMM





Texas



Alabama and

Louisiana

CASIS

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Florida



https://myfwc.maps.arcgis.com/apps/webappviewer/index.html?id=e4d76fa267dc4bac97d407d20566ae42

Maryland



Q

Peconic Estuary

<u>Goal:</u>

To customize (based on stakeholders' input) and apply the VIMS' Shoreline Management Model (SMM) to the **Peconic Estuary** to identify areas suitable for living shoreline construction, map best management practices, and facilitate efforts to improve shoreline management decision-making in New York.



Center for Coastal Resources Management

SHORELINE BEST MANAGEMENT PRACTICES

Shoreline Management Model Home > CCRM > Shoreline Management > Shoreline Best Management Practices > Shoreline Management Model

Shoreline Management Model - SMM



Questions

Karinna Nunez Center for Coastal Resources Management Virginia Institute of Marine Sciences 804-684-7273

<u>karinna@vims.edu</u>



VIRGINIA INSTITUTE OF MARINE SCIENCE CENTER FOR COASTAL RESOURCES MANAGEMENT





Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Model Validation

Pam Mason, VIMS Advisor

Connecting the Shoreline Management Model to Resource Management and Funding

Pamela Mason

Marshmaven Consulting









SMM Focus on Nature-Based Solutions

Problem: Coastal Squeeze Wetlands retreat restricted by structures drown in place



Solution: Protect against erosion while preserving wetlands and allowing retreat





~ 18% of the Chesapeake Bay shoreline has been armored





Habitat loss & fragmentation – Wetlands¹ & Forest

Sediment supply & transport altered, increased scouring, turbidity $^{\rm 2}$

Increase in invasive species³

Declines in fish, invertebrate, & marsh bird diversity, terrapin presence $^{\rm 4}$

Prevents natural migration of habitats with SLR

Decline in seagrass resilience⁵



 1 Peterson and Lowe 2009; Dugan et al 2011, 2 Bozek and Burdick 2005, NRC 2007, 3 Chambers et al 1999, 4 Peterson et al 2000, Chapman 2003, King et al 2005, Bilkovic et al 2006, Seitz et al 2006, Bilkovic & Roggero 2008, Morley et al 2012, Isdell et al. 2015, Balouskus & Targett 2012, 2016, Kornis et al. 2017a,b, 5 Patrick et al. 2014 122



Application: Reduce Erosion and Achieve Ecological Uplift





- Create necessary physical conditions for self-supporting ecological community
- Habitat mosaic for net increase in habitat & species diversity
- ✓ Connect motile animals to different habitats & critical nursery areas
- Allow dynamic processes like tides, shifting sand, sediment accretion, annual & inter-annual variability, landward marsh migration
- Counter cumulative losses and adverse impacts of conventional erosion control



SMM recommendations support Management and Funding: Focus on Nature Based

- Multi-benefit
 - o Legal requirements in Virginia and Maryland
 - State wetland area net gain commitments
- Water Quality
 - Approved Best Management Practice by the Chesapeake Bay Program
- Habitat Restoration
 - o Oysters, mussels, fish habitat
- Flood and Erosion Protection
 - o CRS open space



Living Shorelines Required

MARYLAND

- Shall use a nonstructural shoreline stabilization measure.
- If a structural component is necessary... nonstructural shoreline stabilization measure may include the use of:

(1) A breakwater, sand containment structure, or sill that is acceptable to the Department; or

(2) A beach that is acceptable to the Department, when used for the purpose of habitat enhancement

TITLE 26 Subtitle 24 Tidal Wetlands Chapter 01 General3

Authority: Environment Article, Title 16, Annotated Code of Maryland

VIRGINIA

....Shall permit only living shoreline approaches to shoreline management unless the best available science shows that such approaches are not suitable. If the best available science shows that a living shoreline approach is not suitable, the Commission shall require the applicant to incorporate, to the maximum extent possible, elements of living shoreline approaches into permitted projects.

[Code of Virginia § 28.2-104.1]

Chesapeake Bay Program Outcomes (CBP)

- Partnership commitment to the Chesapeake Bay
- Outcomes linked to the overall improvement of Bay health
- Wetlands outcome of 2014 has not been achieved by 2025
- Program Assessment underway for new, updated or removed outcomes
- Proposed Wetland Outcome:
 - Restore, create, enhance and protect wetlands to support people and living resources, including waterbirds and fish, provide water quality, flood and erosion protection, recreation and other valuable benefits.

SMM Calculations for Total Maximum Daily Load

Use SMM to calculate potential pollution load reductions

Vegetated shoreline BMPs provide the greatest reductions

Identify Living shoreline and enhancement recommendations.

Assume a minimum width for the vegetated area based on monitoring

Use the area to calculate the pollution reduction

Can be applied by project, locality, watershed

Already calculated for Virginia Maryland calculations underway

				Total Suspended
		Total Nitrogen	Total Phosphorus	Sediment
Protocol	Submitted Unit	(lbs per unit)	(lbs per unit)	(lbs per unit)
1.Prevented				
Sediment	Linear Feet	Project-Specific [*]	Project-Specific [*]	Project-Specific
	Acres of			
2. Denitrification	re-vegetation	85	NA	NA
	Acres of			
3. Sedimentation	re-vegetation	NA	5.289	6,959
	Acres of			
4. Redfield Ratio	re-vegetation	6.83	0.3	NA
Non-conforming/		MD= 0.04756	MD= 0.03362	MD= 164
Existing Practices [*]	Linear Feet	VA = 0.01218	VA = 0.00861	VA = 42



Chesapeake Bay Program BMP Qualifying Criteria

Shoreline Management Practice	The Practice Must Meet these Criteria for TMDL Pollutant Load Reduction ¹		
Living Shoreline – a) nonstructural; b)hybrid system including a sill; and c)hybrid system including a breakwater	 The site is currently experiencing shoreline erosion or is replacing existing armor. The site was graded, vegetated, and excess sediment was removed or used.² AND When a marsh fringe habitat (a or b) or beach/dune habitat (c) is created, enhanced, or maintained. 		
Revetment AND/OR Breakwater system without a living shoreline	 The site is currently experiencing shoreline erosion, AND A living shoreline is not technically feasible or practicable as determined by substrate, depth, or other site constraints. AND When the breakwater footprint would not cover SAV, shellfish beds, and/or wetlands. 		
Bulkhead/Seawalls	 The site is currently experiencing shoreline erosion. AND The site consists of port facilities, marine industrial facilities, or other marine commercial areas where immediate offshore depth (e.g., depths deeper than 10 feet 35 feet from shore) precludes living shoreline stabilization or the use of a breakwater or revetment. 		





- SMM recommendations provide an initial site consideration assessment
- Provides cost-share for practices that address resource concerns and provide water and soil benefits
- Living Shorelines are an approved CBP practice
- Operated by the VA Association of Soil and Water Conservation Districts
- Covers all non-Agricultural lands
- Applications reviewed at local conservation District and State-wide Committee
- Covers up to 80% cost with a cap of 30,000



- Living Shorelines approved CBP BMP practice
- Implemented by Soil and Water Conservation Districts
- Focus practice to edge of field on working agricultural lands
- Cost share 75% with options for additional partner funding
- Cross-walk to Natural Resources Conservation Service practice 580
- First approved and implemented project 2024.



Linking SMM recommendations to Funding Opportunities

NGO

- National Fish and Wildlife Program
 - Innovative Nutrient and Sediment Removal
 - Small Watershed Grants
- Partners for funding, planting, more State
- Clean Water Revolving Fund
- Coastal Zone

Federal

- NOAA- Sea Grant, NERRs
- Federal Emergency Management Agency Building Resilient



Questions?

Pamela Mason Marshmaven Consulting <u>mason@vims.edu</u>



https://www.vims.edu/ccrm/

https://www.vims.edu/ccrm/topics/shoreline/







PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS

Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Shoreline Management Model Q&A

Karinna Nunez, PhD, VIMS & Pam Mason, VIMS Advisor



PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

PEP Datasets <u>Lightning</u> Talks





PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Hardened Shoreline Assessment & Ground Truthing

Kaitlin Morris CCE - Marine Program

Field Validation of GIS Mapped Hardened Shoreline Structures in the Peconic Estuary

Kaitlin Morris, Stephen Havens, Joe Costanzo and Matthew Sclafani Cornell Cooperative Extension of Suffolk County



Cornell University Cooperative Extension of Suffolk County





Backgroud

- Increases in the frequency and severity of storms, rising sea levels, and coastal flooding
- Coastal protection is a growing concern, and communities bordering the Peconic Estuary have seen an upward trend in shoreline hardening
- PEP has been focusing efforts on
 - Quantifying the extent of shoreline hardening within the Peconic Estuary
 - Assessing the impacts of these structures on intertidal wildlife, natural processes, and coastal community resilience

Hardened Shoreline Impacts

Loss of intertidal and marsh habitats

- Critical habitats for horseshoe crabs, diamondback terrapins, migratory shorebirds, juvenile fish, and other wildlife
- Decline in ecosystem productivity
- Loss of ecosystem services such as atmospheric carbon sequestration

Reduced coastal resilience

 Reduced ability of shoreline to buffer wave energy, mitigate flooding, and for salt marsh habitats to grow vertically and inland in response to rising sea level

Loss of riparian rights

 As intertidal shoreline area decreases with rising sea levels, the community also loses access to public beaches

PEP Shoreline Aerial Inventory

- In 2019, PEP completed a GIS-based inventory to document the extent of hardened shoreline coverage along the Peconic Estuary
- · Goals of this inventory were to:
 - Assess the number of bulkheads, revetments, piers, groins, jetties, and docks using 2016 Orthoimagery from the NYS GIS Clearinghouse
 - Create a tool for local governments to inform decision-making regarding land preservation
 - Form the basis of the PEP Shoreline Hardening Strategy and future projects









PEP Shoreline Inventory Results

 It is important to verify data through ground-truthing to confirm the accuracy of aerial interpretation of these shoreline structures



Objectives of Project

- Confirm the accuracy of PEP's 2019 Survey through ground-truthing a sub-sample of the hardened shoreline structures as a quality control measure
- Inform PEP's future habitat restoration and shoreline protection initiatives, including strategies for natural resources
- Fit PEP's GIS work and this field validation effort into the VIMS model

Field Validation Methods

- PEP's 2019 survey was used to randomly select GPS coordinates of a subsample of the structures
- Randomly selected 10% of bulkhead and rock revetment segments within each of the 5 towns bordering the Peconic Estuary, and 5% of docks within East Hampton Town (n = 147)
- Adjoining structures were often counted as single segments



- Each structure was validated by three staff members via vessel
- Data independently recorded by two staff members:
 - Presence / Absence
 - Structure Type (Bulkhead, Rock Revetment, Dock)
 - Material
 - Condition
 - Estimated Length
 - Nearby landmarks (roads, house #'s)
 - Shoreline features (SAV, sediment type, wildlife)
 - Spatial coordinates of end points
- Each structure was photographed
- Percent (%) Accuracy of PEP's 2019 aerial assessment was calculated
- Data were incorporated into a detailed GIS database to be used by PEP, local Townships, and other stakeholders

Field Verification Methods

GIS Map of Sampled Structures




The Hardened Shoreline Field Verification map also has layers displaying several other features that can be toggled on and off by the user.

- Field notes, details, and photos corresponding to each structure can be viewed when each line segment is selected (right).
- PEP's existing hardened shoreline GIS layers can be toggled on and off. The image below shows bulkheads in the Peconic Estuary in addition to several of the randomly-selected structures we validated in three of the five townships (structures within Southold, Shelter Island, and Southampton are shown below).





Results – Percent Accuracy

Percent (%) accuracy of PEP's 2019 hardened shoreline survey was calculated based on the ratio of structures confirmed by vessel survey data compared to the total sampled.



Summary

- Overall percent (%) accuracy of PEP's 2019 hardened shoreline survey: 95.92%
- Confirms the usefulness of GIS-based surveys when combined with field validation
- Results of this project can be used to better inform stakeholders in future development and shoreline conservation efforts, including
 - PEP's future habitat restoration and shoreline protection initiatives
 - Resource managers
 - Researchers
 - Environmental and coastal planners



Questions?

Acknowledgements: Peconic Estuary Partnership Stony Brook University Town of Riverhead Town of Southold Town of Shelter Island Town of East Hampton Town of Southampton CCE Staff: Michael Sautkulis, Kevin Lazzaro, Isabella Imbo, Ashley Lopez, Nancy Liang, and Peter Martin.



Hardened Shoreline Structures

Our project focuses on three main types of hardened shoreline structures:

- Bulkheads
- Rock Revetments
- Docks
- Main impacts are loss of inter-tidal beach habitats





Volunteers Rescue Stranded Horseshoe Crabs at Tiana Bayside



Christopher Walsh on May 14, 2024

f 🎔 in 🖾

On Long Island's South Shore, an ancient species is once again receiving a helping hand from the very animal that is also responsible for its decline. Last week, several volunteers... more





Example of Other Structural Impacts to Intertidal Species

- High tides allow intertidal wildlife access above some hardened shorelines, stranding them when the tide recedes.
 - Example: gabion (rocks enclosed within steel mesh) along the shoreline at Tiana Bayside Facility
 - Aerial photos show that this gabion extends the full length of the shoreline at Tiana Bayside, stranding horseshoe crabs after spawning

Horseshoe Crab Restoration & Protection Strategy

- A Peconic Estuary Horseshoe Crab workgroup will be facilitated by Seatuck Environmental Association
- CCE will provide technical support to the workgroup, providing data and input to help guide conservation decisions
- Meetings will be held to develop a multi-year plan to identify current monitoring gaps and generate an estuary-wide habitat restoration and protection strategy
- Once a strategy is developed, a work plan for a document will be produced to outline action steps and priorities for conservation
- This Horseshoe Crab Workgroup will work alongside PEP's Peconic Estuary Shoreline Adaptation Initiative to help guide decisions regarding shoreline protection and conservation





Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Submerged Aquatic Vegetation

Kristen Hutz Stony Brook University

Mapping and Managing Data of the PEP Long-Term Eelgrass Monitoring Program

Kristen Hutz Advisor: Dr. Sung-Gheel (Gil) Jang School of Marine & Atmospheric Sciences Stony Brook University

Background



Cornell University Cooperative Extension of Suffolk County





Data Management System





PEP Maps and GIS Datasets

Peconic Estuary Partnership - Protecting & Restoring Long Island's Peconic Bays

Q Search for Data

Explore the PEP GIS Data Hub

This platform allows users to view and download GIS data curated by the Peconic Estuary Partnership. Explore and view data online using ArcGIS Web Maps and the featured Story Maps. Datasets are available for download in various formats including ESRI Shapefiles and File Geodatabases.

Eelgrass Monitoring Story Maps





PEP Maps and GIS Datasets

Peconic Estuary Partnership - Protecting & Restoring Long Island's Peconic Bays

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GIS Datasets













Eelgrass

Hardened Shorelines

Water Quality

Land Use

Boundaries













Bullhead Bay Eelgrass

A multi-decadal look into eelgrass presence and habitat at Bullhead Bay.

Kristen Hutz October 14, 2024

Eelgrass Extent

The extent of the eelgrass meadow at Bullhead Bay was estimated using aerial imagery from 2000, 2004, 2010, 2012, and every year thereafter until 2021. Similarly to shoot density, eelgrass meadow extent declined between 2000 and 2004, and hit its lowest extent in 2010 with an estimated area of only 2.3 ha. Since 2010 eelgrass extent has steadily increased, only falling slightly around 2016. Eelgrass extent at Bullhead Bay was last estimated in 2021 at 26.5 ha. The 2021 dip seen in eelgrass shoot density was not reflected in the extent data, which suggests the two variables of eelgrass growth are not always coupled. Overall, the extent of eelgrass present at Bullhead Bay has grown 19.6% from 22.2 ha in 2000 to 26.5 ha in 2021. Additionally, the area of the eelgrass meadow has grown more than tenfold since 2010 and appears to be steadily increasing since the near loss of eelgrass in 2010.



1930

The earliest inventory of eelgrass coverage across the Peconic Estuary comes from a survey of historical eelgrass meadows conducted using 1930's aerial imagery. Here is a look into the historical extent of eelgrass at Bullhead Bay. In 1930 eelgrass was estimated to be 40.0 hectares.

Q Kriste



Comprehensive Estuary-wide Surveys

> 8,729 acres of eelgrass in 1930; 1,550 acres in 2000; and 458 acres in 2014

Long-term Eelgrass Monitoring Program - thirteen monitoring sites

- Complete loss of eelgrass at four sites
- Eelgrass meadow extent increased at four sites
- Eelgrass shoot density increased at four sites but shoot density and extent were not always coupled
- Light was only limiting at Southold Bay, but water temperatures were often above the suitable range particularly at western sites

Thank You

This system was developed by the Geospatial Center in the School of Atmospheric Sciences at Stony Brook University. The project was completed by Marine Science graduate student Kristen Hutz under the guidance of Dr. Sung-Gheel Jang with the support of the Peconic Estuary Partnership.



Long-term Eelgrass Monitoring Program Peconic Estuary Partnership Data Management System



Geospatial Center, School of Marine and Atmospheric Sciences, Stony Brook University

Background



Edgress Monitoring Sites The Peconic Estuary Partnership, in collaboration with the Cornell Cooperative Extension, conducted the Long-term Eelgrass Monitoring Program at a total of twelve sites across the Peconic Estuary from 1997 to 2021. The monitoring program collected data on meadow extent, shoot density, macroalgae cover, water temperature, and light availability. The two decades worth of data has been largely unavailable and unusable since its collection because of a lack of a data management system. This project created a GIS data management system for the PEP to upload files into a searchable database and share their eelgrass findings with the public.



Data Management System





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PEP Maps and GIS Datasets



StoryMap: Bullhead Bay



Bullhead Bay Eelgrass



Results

- > 8,729 acres of eelgrass in 1930; 1,550 acres in 2000; and 458 acres in 2014
- > Complete loss of eelgrass at four sites
- > Eelgrass meadow extent increased at four sites
- Eelgrass shoot density increased at four sites but shoot density and extent were not always coupled
- > Light is only a limiting factor for eelgrass growth at Southold Bay
- Temperature is above the acceptable range for eelgrass success at five sites, however some sites with elevated temperatures are still experiencing eelgrass growth, such as Bullhead Bay
- > The risk for heat stress increases moving west into the Peconic Estuary
- The date management system offers an online platform to store PEP datasets on eelgrass

Thansystem was search and the subject of Atmospheric Sciences at Stony Brook University. The project was completed by Marine Science graduate student Kristen Hutz under the guidance of Dr. Sung-Gheel Jang with the support of the Peconic Estuary Partnership.



PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Shoreline Inventory

Sung-Gheel Jang PhD Stony Brook University



PEP Shoreline Inventory

Building Toward the PEP Geospatial Information Hub

Sung-Gheel (Gil) Jang, Ph.D.

Geospatial Center



PEP GIS Data Hub

 \equiv Q <u>Sign In</u> Peconic Estuary PEP Maps and GIS Datasets PEP Data Hub PEP Homepage **PEP Maps and GIS Datasets** Peconic Estuary Partnership - Protecting & Restoring Long Island's Peconic Bays Q Search for Data Explore the PEP GIS Data Hub This platform allows users to view and download GIS data curated by the Peconic Estuary Partnership. Explore and view data online using ArcGIS Web Maps and the featured Story Maps. Datasets are available for download in various formats including ESRI Shapefiles and File Geodatabases.

GIS Datasets



Natural Resources



Hardened Shorelines



Water Quality



Land Use







Boundaries



More GIS datasets

- Suffolk County GIS
- NYS GIS Clearinghouse

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PEP GIS Data Hub

Peconic Estuary PEP Maps and GIS Datasets PEP Data Hub PEP Homepage

PEP Tools & Story Maps

Peconic Estuary Long-Term Eelgrass Monitoring Story Maps



Peconic Estuary Critical Lands Protection Strategy Criteria and Ranking Tool

The Critical Lands Protection Strategy (CLPS) Ranking Tool was designed to help decision makers not only decide which lands to acquire, but also evaluate which adaptation strategy is appropriate.





PEP GIS Data Hub

Peconic Estuary PEP Maps and GIS Datasets PEP Data Hub PEP Homepage

Nitrogen Load Reduction BMPs

This map tools provides a view of nitrogen reduction BMPs available technologies for each parcel in the Peconic Estuary Watershed.



<u>View</u>

Nitrogen Loading in the Peconic Estuary

An overview of the sources of nitrogen pollution and impacts of nitrogen pollution in the Peconic Estuary.



<u>></u>

Contact Information

pepgis@stonybrook.edu

 www.peconicestuary.org



Curating the Eelgrass Extent Datasets

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Updating the CLPS Tool Datasets



Updating the CLPS Tool Datasets

From the PEP TAC meeting on May 7th, 2025.

Dataset / Category	Original Source (Year)	Most Recent Source (As of 2025)	Notes / Link
Property boundaries, ownership, use codes	Suffolk County Tax Map Data (2018)	Suffolk County Real Property Tax Service Agency (2024) - TOWN info more accurate	Suffolk County GIS Viewer
Land use categories	Suffolk County Land Use (2016)	Suffolk County - TOWN info more accurate	
Freshwater or tidal wetlands	USFWS National Wetlands Inventory (2018)	USFWS NWI (Ongoing updates)	<u>NWI Program</u>
Inundation areas / Sea level rise (SLAMM)	NYSERDA / Warren Pinnacle (2015)	NYSERDA-funded modeling (2020-2023 projects)	NY Climate Science Clearinghouse
Present-day flood zones	FEMA DFIRM (2009)	FEMA Preliminary or Effective FIRMs (Updated 2020–2023)	FEMA Map Service Center
Significant habitat / water quality	NYSDOS Significant Coastal Fish and Wildlife (2015)	NYS Office of Planning / OPDCI (latest formal updates per area)	SCFWH Rating Forms
Current groundwater table	USGS (2016)	USGS Long Island Groundwater Reports (2021–2024) - subwatersheds plans?	USGS LI Groundwater
Rising groundwater table (SLR impact)	Suffolk County / CDM Smith (2016)	NYSERDA/USGS recent modeling?	
Groundwater travel time to surface waters	Suffolk County / CDM Smith (2016)	SC Subwatershed plan?	
Special Groundwater Protection Areas (CEAs)	NYSDEC (2016)	NYSDEC (Map static; latest as of 2023)	NYS DEC Lands, NYS GIS

Building the Shoreline Inventory Database



For all information related to PEP Mapping initiatives, please email

pepgis@stonybrook.edu



PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Moving Forward

Jade & Kathleen PEP and NYSG

Early Successes



Today's Summit

- Holding space for difficult conversations
- Facilitating and coordinating communications

Code Amendments

• Involved in code review and updates

Reviewing permit requirements

Improving review procedures to promote NBF





Next Steps, in process....

Continue to document the process, lessons learned, & engage agencies

Explore local government participation in :



<u>Digital Connections:</u> Active agency collaboration for updates, amendments, and tracking to build consistency. **An interagency email address** can be used to log application movement through agencies with shared jurisdiction, allowing agencies to easily communicate with each other, and search for an address submission to other agency for context.



<u>In-Person Connections:</u> Support regulator in- person connections. Good working relationships across agencies foster collaboration.





Next Steps, in process....



Continue to document the process, lessons learned, & engage agencies

Explore local government participation in :

- <u>Code Amendments and Training:</u> Update local codes to include key protective measures such as shoreline setbacks that provide clear standards for review and enforcement. Support these updates with ongoing training.
- <u>LWRP:</u> investing time in thoughtful LWRP for protection.
- <u>Suggested Permit Sequence</u>: Based on if township has an LWRP





Next Steps, in process....



Continue to document the process, lessons learned, & engage agencies

Explore local government participation in :

<u>Training:</u> Create, connect, and train inter-municipal and inter-department enforcement collaborations to identify, report, and follow up on violations

<u>Violations:</u> Update violation penalties to modern standards.




Deliverables, in process....

Finalize the Viability Assessment Report

- Based on feedback from TODAY!
- All attendees will receive final product digitally and in print

Host Local Government Workshop - Part 2

- Finalize recommendations for towns
- Publish local permitting roadmaps

NBF Literature Review







Deliverables, in process....

Shoreline Adaptation Website and Story Map

NYSG Law & Policy Fellowship

- Finalize Code Assessment Report
- Publish Code Amendment Factsheet

Shoreline Management Model

- Identifying datasets
- Work with VIMS to build model



PEP-funded Bulkhead Removal Study & Partnerships to document lessons learned





Next steps, but broader....



Further stakeholder engagements

• Property owners, contractors, consultants, permit expediters, etc.

Additional Guidance Documents = Address Data Gaps

- Evaluating sites for NBF
- Standardized, Peconic-specific monitoring protocols

Opportunity to identify more

Open to additional suggestions







PROTECTING AND RESTORING LONG ISLAND'S PECONIC BAYS



Peconic Estuary Partnership & NY Sea Grant June 5th, 2025

Closing Remarks

Joyce Novak, PEP



Peconic Estuary Shoreline Summit



Jade Blennau

Jade.blennau@stonybrook.edu

Please hand in feedback cards!

Talk soon!

Kathleen Fallon

Kmf228@cornell.edu