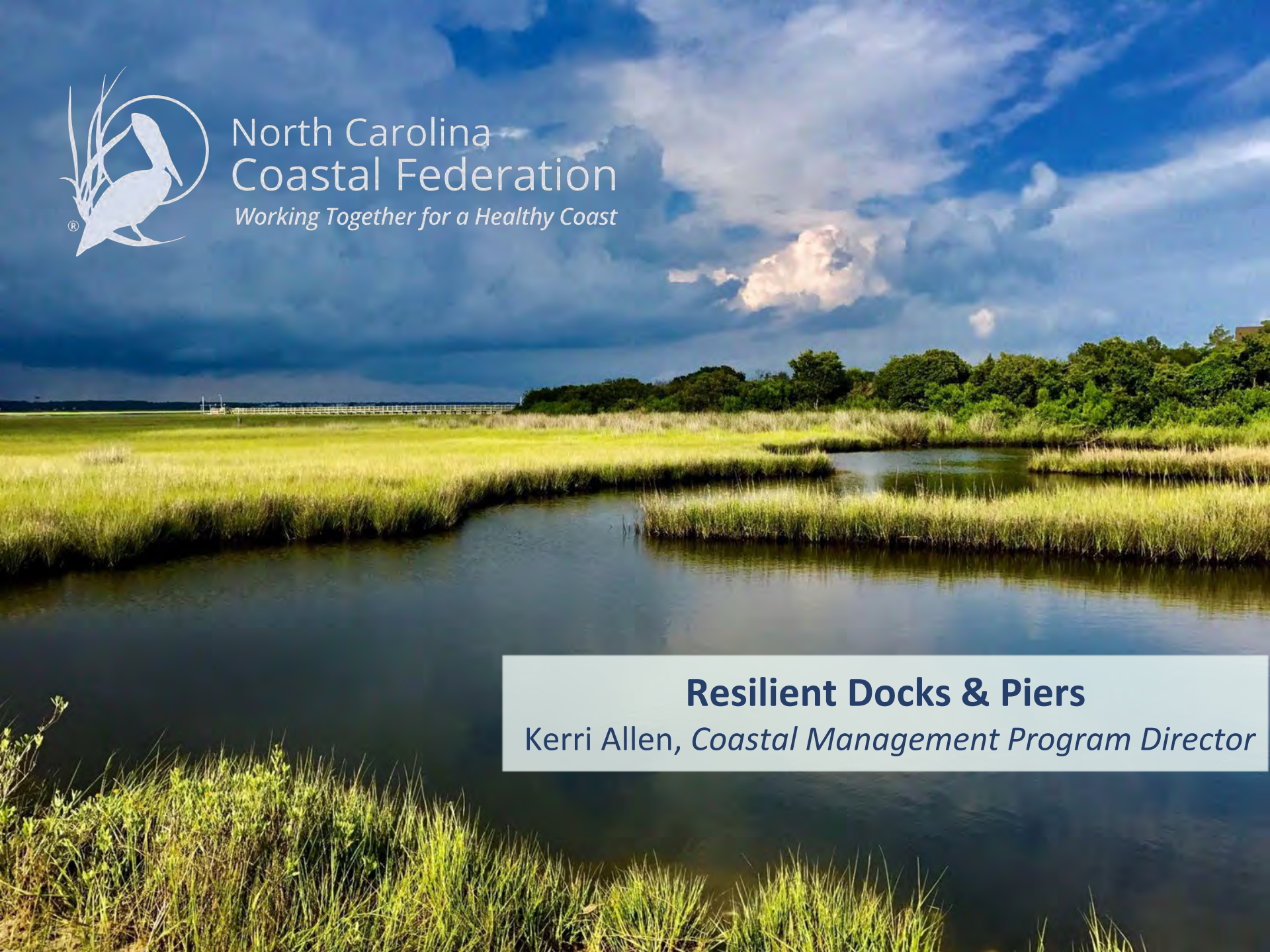

North Carolina
Coastal Federation
Working Together for a Healthy Coast
Resilient Docks & Piers
Kerri Allen, Coastal Management Program Director

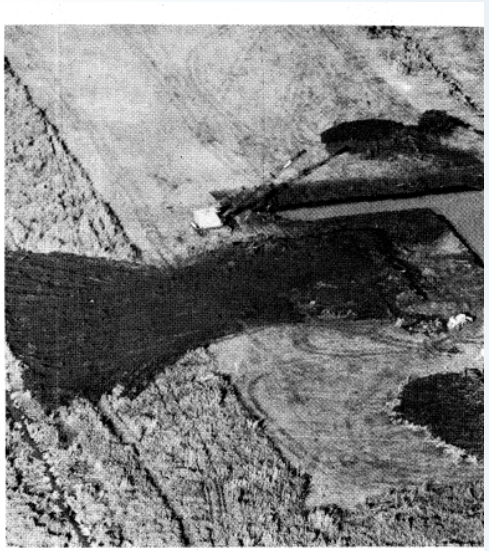
North Carolina Coastal Federation

Our Mission

The Coastal Federation empowers coastal residents and visitors from all walks of life to protect and restore the water quality and critically important natural habitats of the North Carolina coast.

Our Vision

A natural, beautiful and productive coast that is a great place to live, work and visit.



Peat Methanol Associates broke ground on its proposed plant Dec. 31, 1982

PEAT MINING UPDATE

Since 600 people attended the April 20 forum on peat mining organized by the North Carolina Coastal Federation, significant new approaches for addressing public concerns about peat mining have been proposed in the permit applications submitted by Peat Methanol Associates (PMA). The company plans to convert 15,000 acres of eastern North Carolina's peat bogs to methanol fuel using $465 million in federal price and loan guarantees drew intense criticism at the April meeting.

But Derb Carter, Director of the Carolina Wetlands Project in Raleigh, claims that the company's attempts to address certain concerns raises serious new issues.

"The project is like a fly in a spiderweb," Carter notes. "When it tries to free itself it only succeeds in getting more tangled."

In response to active o... to the project by citize... throughout the sta...

commercial fishing interests, PMA proposed to handle problems caused by freshwater runoff by building lagoons and a central lake to increase evaporation, retention time, and management capabilities for the drainage. Carter says this proposal raises the following unresolved issues:

- Will it work? What happens to the system during major storm events?
- Is the existing rate of runoff from a site that has already been ditched an acceptable standard for the company's claims that it will not increase freshwater runoff above natural levels?
- How will these permanent hydrological modifications affect water quality? Will toxic metals or other contaminate be concentrated in the lagoons and lake? Will the lake discharge comply with water quality...

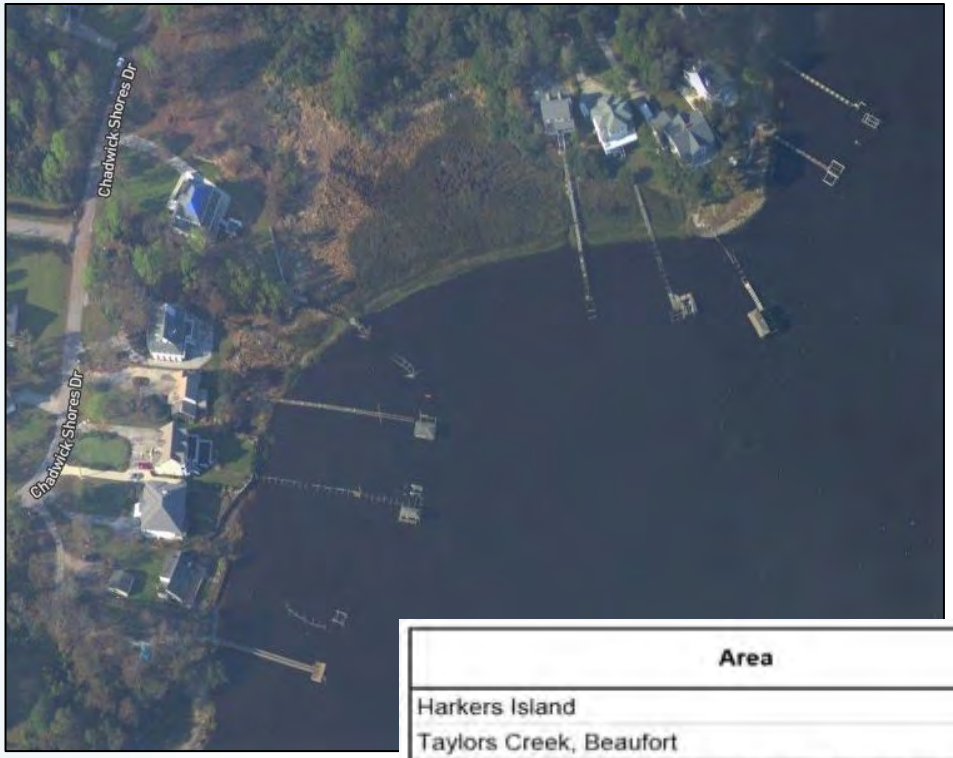
will result if the scheme is abandoned? Recommendation 16 of the State Peat Mining Task Force Report states, "In addition to hydrological questions, perpetual pumping raises legal and institutional questions which must be resolved before a permit should be issued which involves perpetual pumping.

The application for a water...

times state water quality standards have been found by the company. The highest mercury levels are near a reclaimed experimental peat mine. These findings tend to support the conclusion that mercury in surface waters at the peat mine are associated with the disturbance of organic peat soils, which are a heavy metal sink in a...

Marine Debris: The Problem

Resilient Docks & Piers: A Case Study

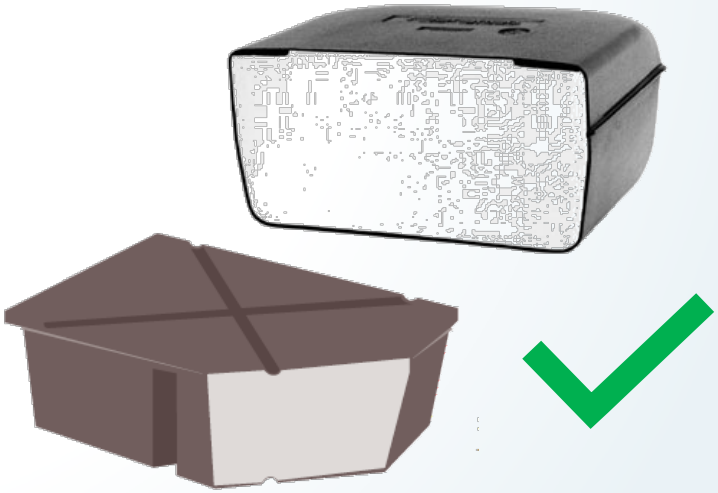


Area	Estimated Total Docks	Visibily Damaged Docks	Percentage Damaged
Harkers Island	143	103	72%
Taylors Creek, Beaufort	159	37	23%
Bogue Sound (Mainland, AB bridge to EI bridge)	417	290	70%
Bogue Sound (Island, AB bridge to EI bridge)	638	440	69%
Cedar Point (EI bridge to twin bridges)	100	56	56%
Swansboro (twin bridges to Hammocks Beach State Park)	96	60	63%
New River, Sneads Ferry, Chadwick Bay	192	110	57%
Topsail Island (New River Inlet to Topsail Inlet)	608	205	34%
Corcus Ferry Road to Figure 8 Bridge	225	109	48%
Figure 8 Bridge to Masonboro Inlet (Wrightsville Beach)	600	260	43%
Masonboro Inlet to Snows Cut	320	175	55%
Snows Cut to Carolina Beach	338	158	47%

Field Observations

- ➔ Significant amounts of debris, hidden in marsh, most from Florence, also debris layers from past storms
- ➔ High number of lost, heavily damaged, abandoned crab pots in the marsh
- ➔ Marine construction treated wood “cut-offs” (old/new) pervasive and significant issue
- ➔ Floating dock polystyrene pervasive and difficult to recover

Unencapsulated Polystyrene



TOWN OF TOPSAIL BEACH NORTH CAROLINA

ORDINANCE NO. 2022-002

AN ORDINANCE OF THE TOWN BOARD OF COMMISSIONERS OF THE TOWN OF TOPSAIL BEACH, NORTH CAROLINA, AMENDING THE TOWN CODE OF ORDINANCES, CHAPTER 6, BUILDINGS AND BUILDING REGULATIONS, ARTICLE III PIERS AND DOCKS, DEFINITIONS AND SECTIONS 98 AND 100, TO PROHIBIT UNENCAPSULATED POLYSTYRENE DOCKS.

WHEREAS, during a coastal debris cleanup sponsored by the Coastal Federation, large quantities of Polystyrene were found in all areas of our waters and marshlands along our coast. Polystyrene is a petroleum product, commonly known as Styrofoam. It is often used in dock floats because of its buoyancy; and

WHEREAS, polystyrene is neither readily recyclable nor biodegradable and takes hundreds of years to degrade in the environment. When exposed to the elements, it fragments into unsightly, small, nonbiodegradable pieces that may be ingested by marine life, wild and domestic water birds and other wildlife blocking the digestive system and killing them through starvation.; and

WHEREAS, the deterioration of larger polystyrene floats into beads and smaller pieces create a pollution line along shorelines, intertidal land and other places where buoyant debris collects. Such pollution must be picked up and removed at the expense of the public and private citizens.

WHEREAS, to prevent such degradation, pollution and hazard to water dependent mammals and birds, polystyrene floats should be encapsulated in a hard polyethylene shell, which prevents the deterioration and spread of beads and smaller sections of polystyrene floats.

NOW, THEREFORE, BE IT ORDAINED by the Topsail Beach Town Board of Commissioners that Chapter 6 of the Land Development Code, Article III – Piers and Docks, Definitions and Section 98 and 100 is hereby amended subsequent to read as follows:

1. Section 16-33. Definitions. *(by adding the following definitions to be inserted according to alphabetical order)*

Polystyrene is a thermoplastic polymer or copolymer comprised of at least 80 percent styrene or para-methyl styrene by weight. (Commonly known as Styrofoam)

Unencapsulated polystyrene means polystyrene that is not completely encased within a polyethylene shell or within other comparable materials that protects against cracking, peeling, sloughing, and deterioration from ultraviolet exposure and physical trauma.

Hold the foam? Topsail Island looking at ordinance to prohibit foam docks

Chase Jordan
Wilmington StarNews

Published 6:00 a.m. ET March 18, 2022 | **Updated 11:09 a.m. ET March 21, 2022**

View Comments

Topsail Beach was the **first town in NC** to adopt an ordinance restricting polystyrene in floating docks. Now North Carolina is the **first state in the country** to do so!

Marine Debris Program

OFFICE OF RESPONSE AND RESTORATION

https://www.nccoast.org/protect-the-coast/marine-debris/

North Carolina Coastal Federation
Working Together for a Healthy Coast

Protect the Coast | What You Can Do | What's New | About Us | Resources | Give | Sponsors | Gift Shop

Help protect our coast from microplastics

Resources

- N.C. Marine Debris Strategic Plan
- N.C. Marine Debris Action Plan
- N.C. Marine Debris Assessment
- K12 Marine Debris Educator Resources
- NPR: Earthwise Podcast on Microplastics
- An Assessment Report on Microplastics
- Microplastics Fact Sheet for Consumers
- North Carolina Marine Debris Emergency Response Guide
- NRCS Marine Debris Removal Results 2021
- Recommendations for Improved Marine Construction

What's New

Review of a Great Year
December 28, 2021

1 Million Pounds of Marine Debris
Removed from NC Coast

NOAA MARINE DEBRIS PROGRAM

North Carolina Coastal Federation
Working Together for a Healthy Coast

North Carolina Coastal Federation NOAA Marine Debris Program

Award Number NA19NOS9990033

Recommendations for Improved Marine Construction to reduce damage, losses, and marine debris resulting from storms in North Carolina

Project Title: North Carolina Hurricane Florence Marine Debris Clean-up

Project Period: September 1, 2019 – August 31, 2021

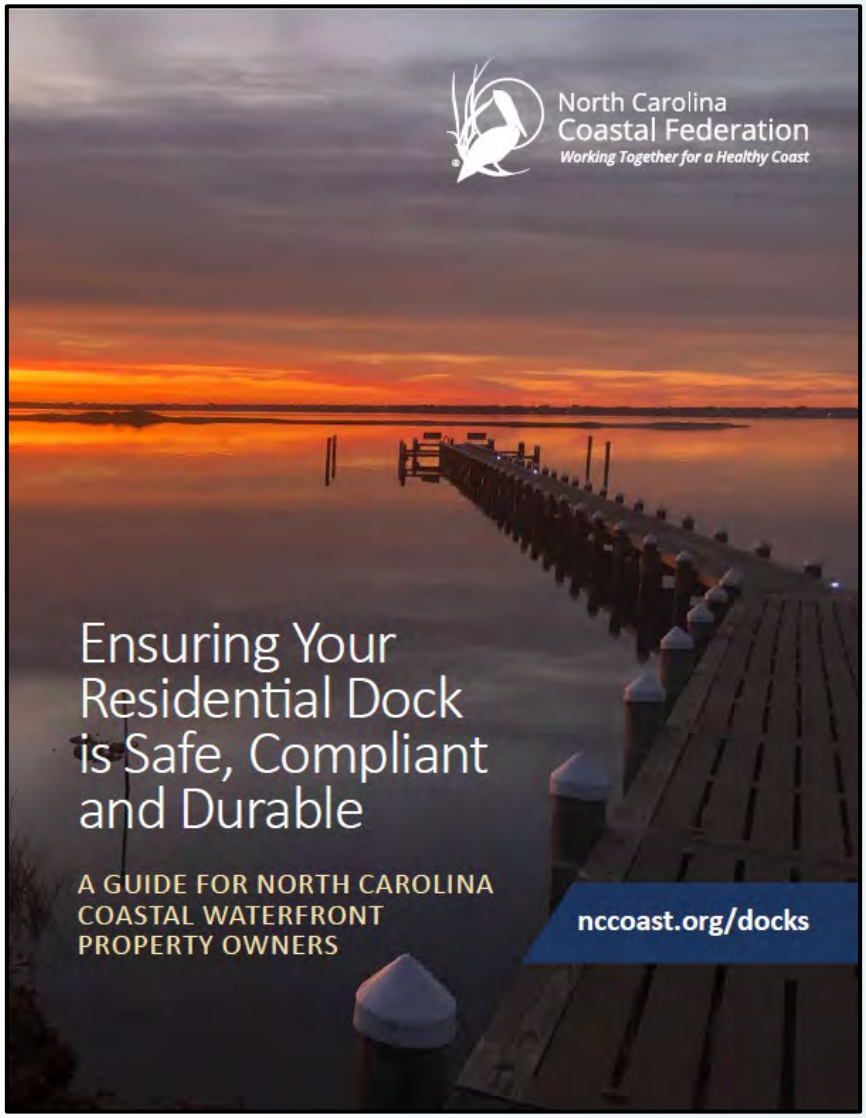
Publication Authors: Kerri Allen, Ana Zivanovic-Nenadovic, Tracy Skrabal, Ted Wilgis, Kelsey Albert

Publication Date: September 1, 2021

North Carolina Coastal Federation, a 501(c)(3) non-profit organization, founded in 1982, that engages the community in protecting and restoring the health and productivity of the N.C. coast.

A Coastwide Effort

- ➔ Technical recommendations
- ➔ Helping property owners choose a contractor
- ➔ Pre-hurricane preparedness
- ➔ Coastwide public education campaign
  - Local gov't toolkit
  - Cost benefit analysis
  - Guidebook
  - Video testimonials
  - Social media posts



What does a resilient dock look like?

As a coastal waterfront property owner, ensuring your dock is safe, compliant, and durable is crucial.

This guide will help you understand why and how to build a residential dock designed and built to meet the North Carolina Building Code.

PILINGS
- Pilings driven, not jetted in
- Ensure that ~ 1/3 of a piling is driven below grade

STRUCTURAL SUPPORT
- Attach structural supports with galvanized/hot dipped through bolts
- Structural supports can be tied to Helix anchors before a storm

DECKING
- Flow-through/slatted decking allows waves and water to easily flow through the structure and keep boards in place
- If using wood, make sure it is treated, and is washed regularly
- Increase deck spacing to minimize "lift" during storm events

FASTENERS
- Stainless steel screws, not nails to secure decking

FLOATS
- Foam inside floating structures should be fully encapsulated

To ensure the appropriate design, location, and construction of your dock or pier, it's important to identify the needs and conditions of your soundside property and select a licensed, reputable marine contractor with adequate experience, expertise, and a commitment to quality and responsible construction techniques.

nccoast.org/docks

- Don't let your floating dock drift away! It's crucial for your floats to be fully encapsulated and securely bolted to the dock frame with stainless steel fasteners.

- Depending on your wave energy, cross ties can significantly increase the resiliency of your structure. Structural supports can also be tied to helix anchors before storm events for extra durability.

MATERIAL CHOICE

Flow-Through/Open-Slatted Decking

Materials

Flow-through/open slatted decking involves composite or heavy rubber-coated flow-through decking, which is sold in varying sizes of decking modules.

Composite docks are made of durable dock surface materials. In both freshwater and saltwater environments, these polyethylene docks will not rot or splinter like wooden docks.

Design and Construction Methods

Open-slatted or other open designs that allows water to easily flow through during storm events, preventing boards from popping off due to high wave energy.

Upkeep

There is minimal upkeep compared to wooden or aluminum docking options.

Warranties for composite docks average about 50 years under normal conditions.

Benefits

Allows for water to easily flow through, potentially reducing the pressure and potential failure of the structure during periods of extreme storm surges and waves associated with coastal storms and hurricanes.

The open structure allows for significant light penetration below the deck, preserving marsh and coastal plants' growth, leading to greater stabilization of the shoreline during storms.

The mobility of the relatively lightweight sections could allow for the removal of some or all of the sections prior to hurricanes, extreme storm surges, etc. If a resin or plastic dock section is damaged, it can be easily replaced.

Examples of flow-through decking at the Morris Landing Clean Water Preserve

nccoast.org/docks

Marine Pilings

When determining the best type of dock piling, you should consider the water conditions that your dock will have to withstand as well as the overall weight and load of the dock.

Pile Driving vs. Jetting

A driven pile is a relatively long, slender column that offers support or resistance to forces and is made of material with a predetermined shape and size that can be physically inspected prior to and during installation. It is installed by impact hammering, vibrating, or pushing into the earth. Driven piles maintain their shape during installation, do not bulge in soft soil conditions, and are typically not susceptible to damage from the installation of subsequent piles.

Driven piles displace and compact the soil. Other deep foundation options can require the removal of soil and considerable subsidence, which can undermine the support of adjacent structures and cause excessive deformations, both of which can result in structural problems.

"Pile jetting" is a technique that is frequently used in conjunction with, or separate from, pile-driving equipment for pile placement. Pile jetting utilizes a directed and pressurized flow of water to assist in pile placement. The application of a concentrated jet of water at the pile tip disturbs a ring of subgrade soils directly beneath it. The jetting technique liquefies the soils at the pile tip during pile placement, reducing the friction and interlocking between adjacent subgrade soil particles

Pile Driving Techniques

Drop Hammer (left), Screwing (right), and Steam (not shown)