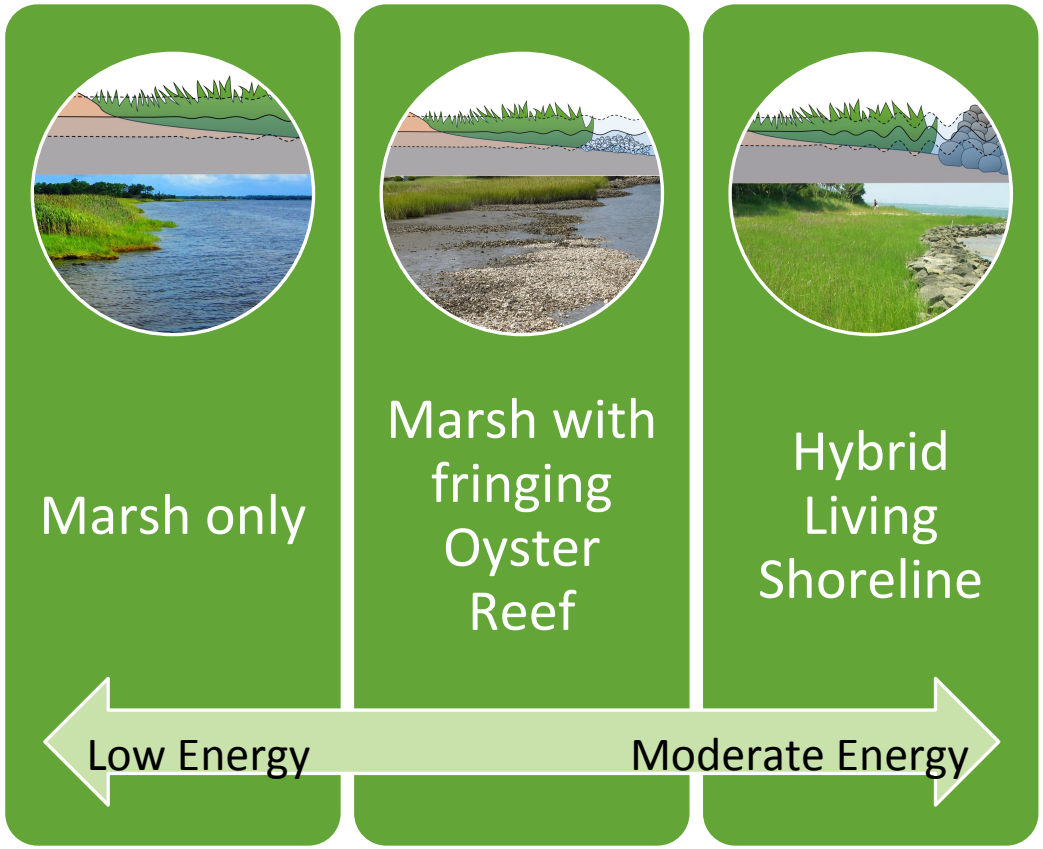
The Living Shoreline application: A tool for planning and siting

Lora Eddy, Coastal Engagement Coordinator

NEW Living Shorelines app

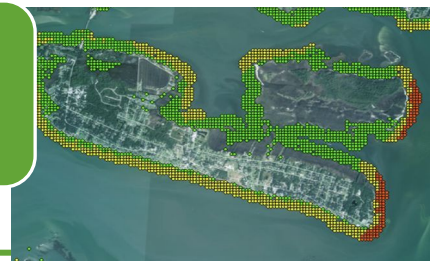


- Users
  - Permitting staff
  - Practitioners
  - Shoreline property owners
- Maps areas where a living shoreline can be a suitable erosion control strategy.
- To locate and target living shoreline restoration locations and to match living shoreline design to site specific shoreline wave energy conditions.

Living Shorelines Suitability Analysis

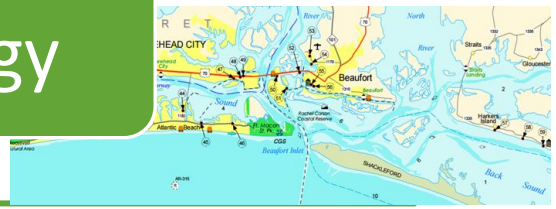
Wind Wave Energy

WEMo model



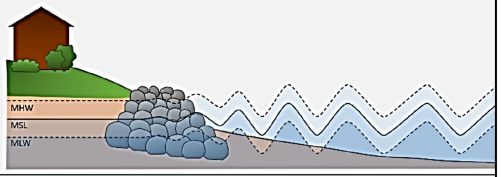
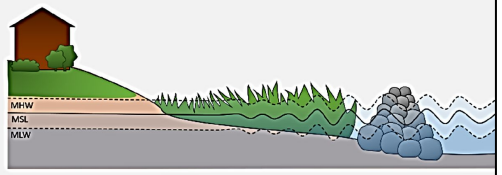
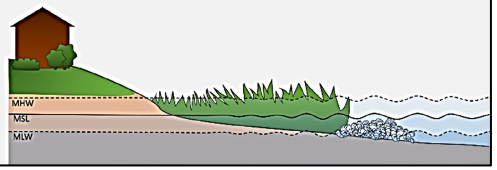
Boat Wake Energy

Distance from channels



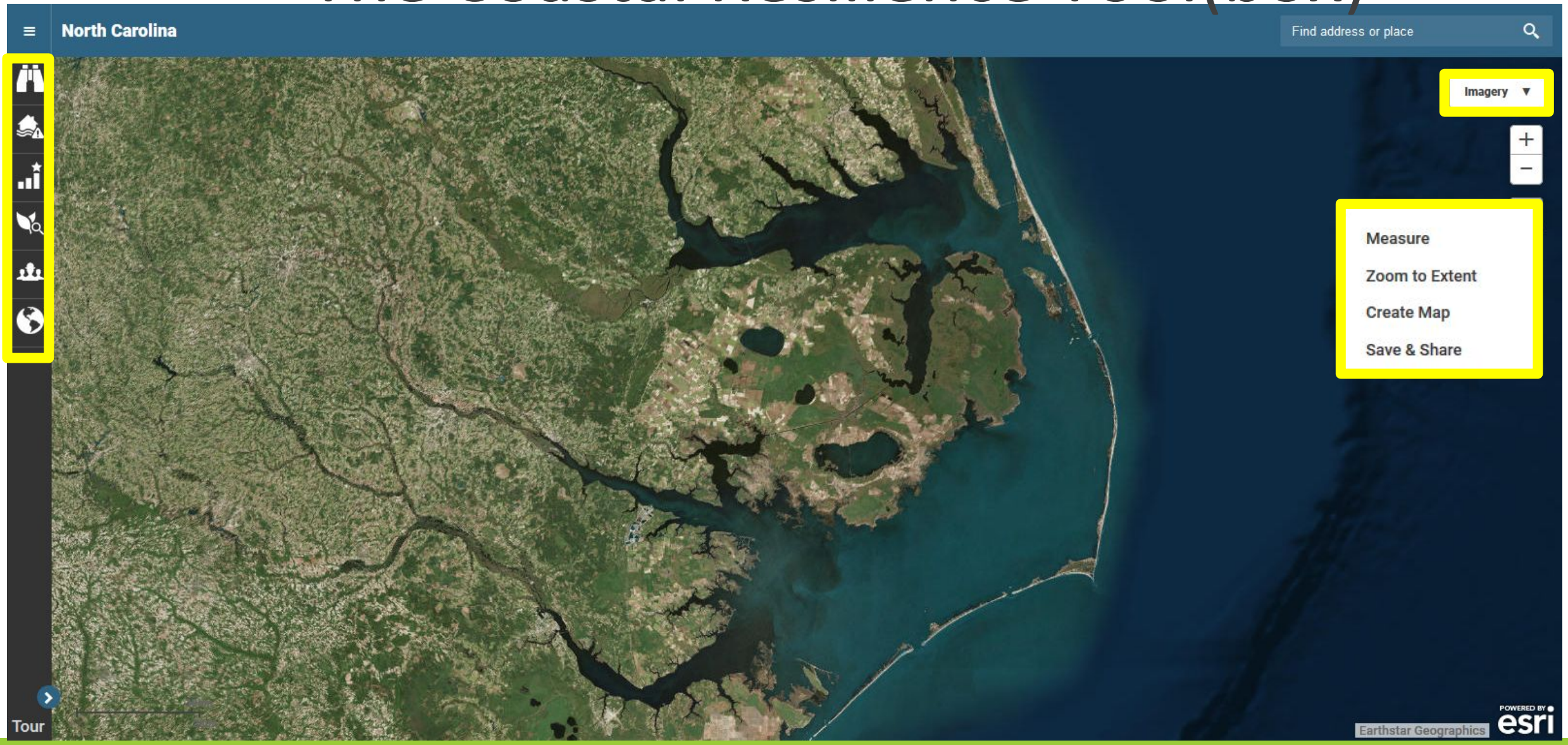
Marsh Proximity

Distance from natural marsh

Wind	Boat	Marsh	Cumulative	Suitability Score	Suitable Shoreline Stabilization Type Examples
0	0	0	0	0 – 5 Living Shorelines not suitable	
0	5	0	5		
5	0	0	5		
0	10	0	10	10 – 20 Hybrid Living Shoreline	
5	5	0	10		
10	0	0	10		
0	0	10	10		
0	5	10	15		
5	10	0	15		
10	5	0	15		
5	0	10	15		
0	10	10	20		
5	5	10	20		
10	10	0	20		
10	0	10	20		
5	10	10	25	25 – 30 Marsh alone or with oyster reef	
10	5	10	25		
10	10	10	30		

And now to the live demonstration!

The Coastal Resilience Tool(box)



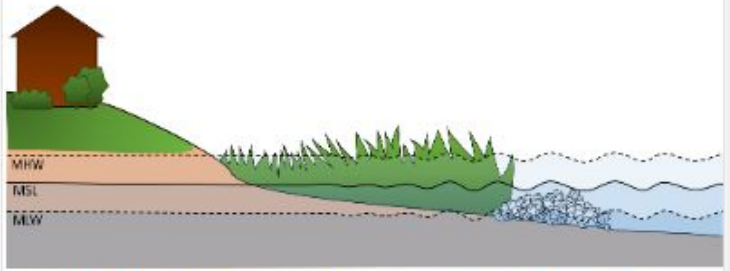
maps.coastalresilience.org/northcarolina/

Coastal Resilience North Carolina

Find address or place

Living Shorelines

Marsh plants alone or with oyster reef



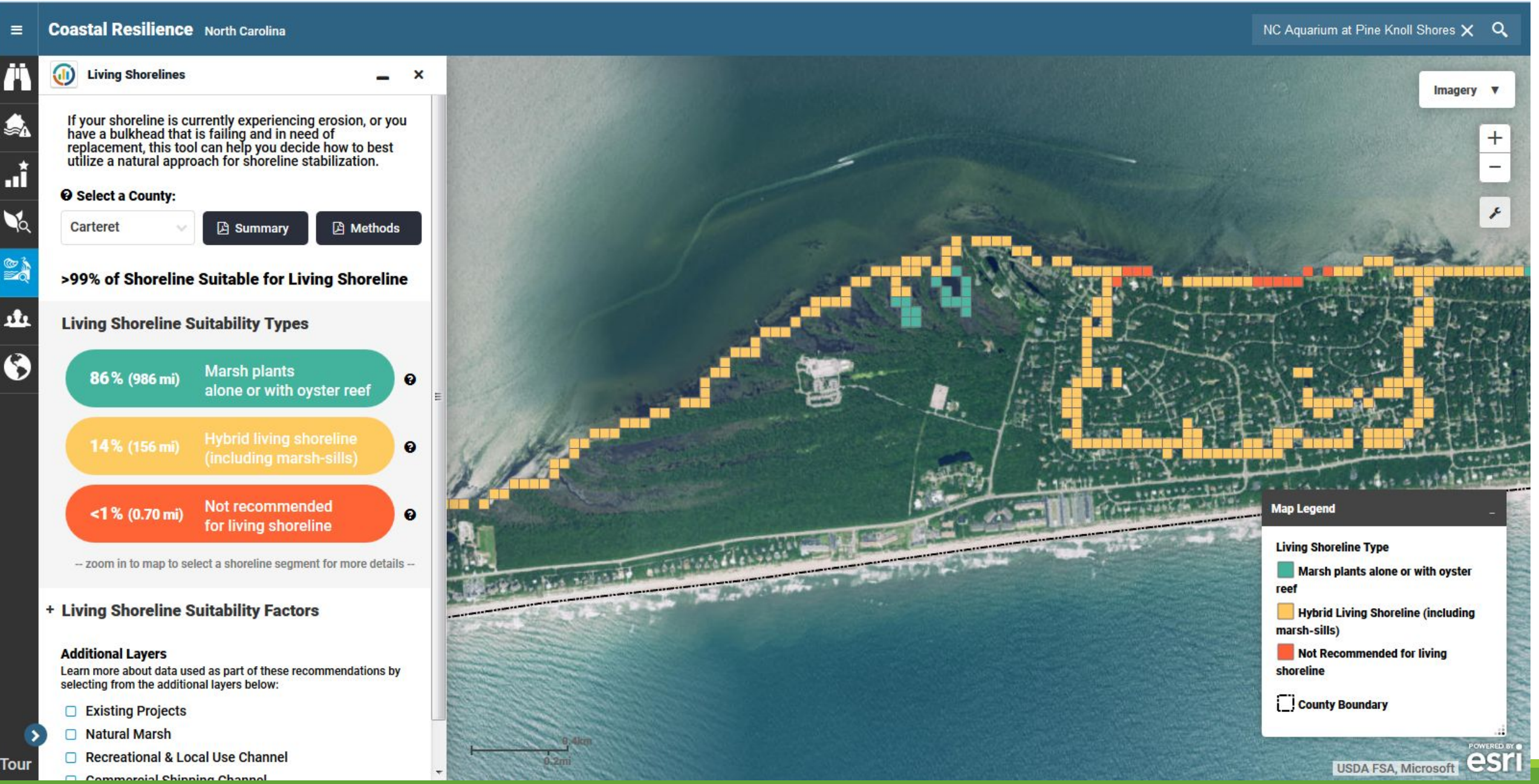
Wetland vegetation absorbs wave energy and helps to hold soil in place. On many low wave energy shorelines, vegetation can effectively protect against erosion. In areas that are conducive to oysters, a fringing oyster reef can provide further protection against waves and increase habitat complexity. This living shoreline type is recommended for locations with both low wave energy AND nearby marsh.

Existing Projects

Tour

"Living Shoreline" means using natural techniques to protect your shoreline from erosion. A Living Shoreline enhances near-shore habitat while making your shoreline safer and more natural.*

*This tool predicts the most appropriate shoreline stabilization strategy for a given shoreline based on wave energy conditions. Additional local factors like nearshore land use, bathymetry, topography, and salinity should also be considered. Consult with local regulatory experts/engineers to determine site-specific design options and permitting requirements.


Coastal Resilience North Carolina
NC Aquarium at Pine Knoll Shores
Living Shorelines
If your shoreline is currently experiencing erosion, or you have a bulkhead that is failing and in need of replacement, this tool can help you decide how to best utilize a natural approach for shoreline stabilization.
Select a County:
Carteret
Summary
Methods
>99% of Shoreline Suitable for Living Shoreline
Living Shoreline Suitability Types
86 % (986 mi) Marsh plants alone or with oyster reef
14 % (156 mi) Hybrid living shoreline (including marsh-sills)
<1 % (0.70 mi) Not recommended for living shoreline
-- zoom in to map to select a shoreline segment for more details --
+ Living Shoreline Suitability Factors
Additional Layers
Learn more about data used as part of these recommendations by selecting from the additional layers below:
Existing Projects
Natural Marsh
Recreational & Local Use Channel
Commercial Shipping Channel
Tour
Imagery
Map Legend
Living Shoreline Type
Marsh plants alone or with oyster reef
Hybrid Living Shoreline (including marsh-sills)
Not Recommended for living shoreline
County Boundary
0.4km
0.2mi
USDA FSA, Microsoft
POWERED BY esri

Coastal Resilience North Carolina

Living Shorelines

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Select a County:

Carteret

Summary | Methods

>99% of Shoreline Suitable for Living Shoreline

Living Shoreline Suitability Types

Details of Living Shoreline Suitability

Factor	Criteria	Score
Wind Wave Energy	> 700	0
Boat Wake Energy	>200 Rec >500 Com	10
Distance to Marsh	≤ 100	10
Hybrid living shoreline (including marsh-sills)		20

+ Living Shoreline Suitability Factors

Additional Layers

Learn more about data used as part of these recommendations by selecting from the additional layers below:

- Existing Projects

Tour


NCCOS

North Carolina Living Shorelines application

October 2017

Purpose

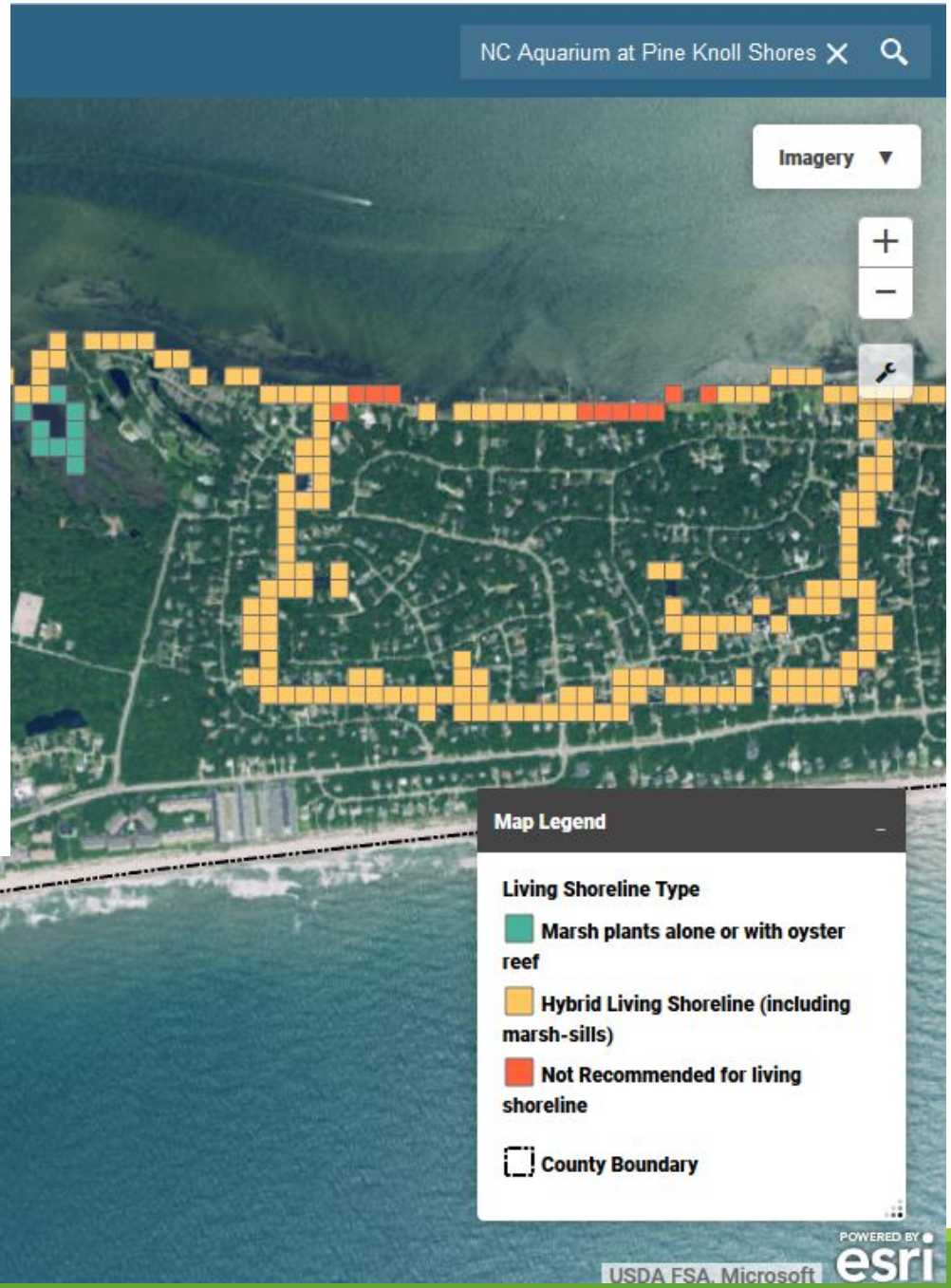
Living shorelines are an erosion control strategy that incorporate native wetland vegetation either alone, or in combination with structural elements like natural fiber logs, bagged oyster shell, rock, or wooden sills parallel to shore to provide an initial wave break. Living shorelines that include both natural and structural elements are commonly referred to as Hybrid Living Shorelines. Site-specific living shoreline design is largely a function of wave energy. The Living Shoreline application [app] allows users to visualize shoreline wave energy conditions to determine which living shoreline approach is most suitable. The tool's areal coverage extends north from the New River Estuary through Bogue, Back, and Core Sounds in eastern NC. The data included in this tool are: 1) Shoreline Wind Wave Energy, 2) Shoreline Boat Wake Energy, 3) Distribution of Natural Shoreline Marsh and, 4) Living Shoreline Suitability.

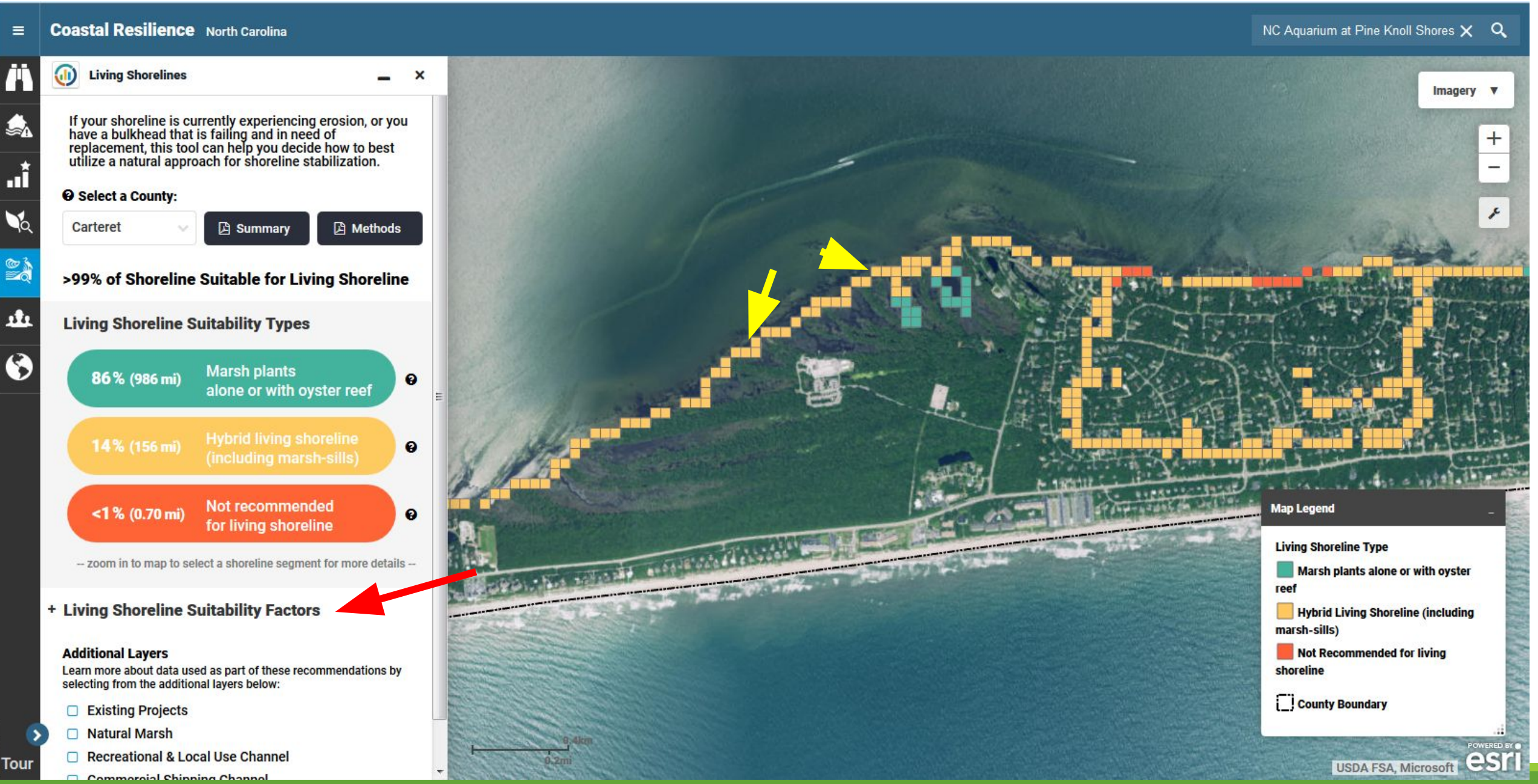
Disclaimer: This tool predicts the most appropriate shoreline stabilization strategy for a given shoreline based on wave energy conditions. Additional local factors like nearshore land use, bathymetry, topography and salinity are also important to consider when designing a living shoreline. Consult with local regulatory experts/engineers to determine site-specific design options and permitting requirements.

How It Works

A shoreline shape file available through the North Carolina Division of Coastal Management was converted to points with a spacing of 50 m. At each of these 50 m points (~ 45,200 in study area), the shoreline wave energy inputs from wind waves and boat wakes as well as distance to the nearest natural shoreline marsh were evaluated. For each of the wave energy parameters, a given shoreline point received a value of 0, 5, or 10 depending on the specific criteria described below. Each site received a proximity to natural marsh shoreline score of 0 or 10. The scores for each layer were then summed to provide a cumulative value ranging from 0-30. The cumulative score determines the living shoreline suitability for that site as follows: living shorelines are not recommended for points with a score of 0-5 (red points on map), hybrid living shorelines are suitable for sites with a score of 10, 15, or 20 (yellow points) and marsh vegetation alone or marsh with oyster are suitable when scores are 25 or 30 (green points).

Wind	Boat	Marsh	Cumulative	Suitability Score	Suitable Shoreline Stabilization Type Examples
0	0	0	0	0 - 5 Living Shorelines not suitable	
0	5	0	5		
5	0	0	5		




Coastal Resilience North Carolina
NC Aquarium at Pine Knoll Shores
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Methods
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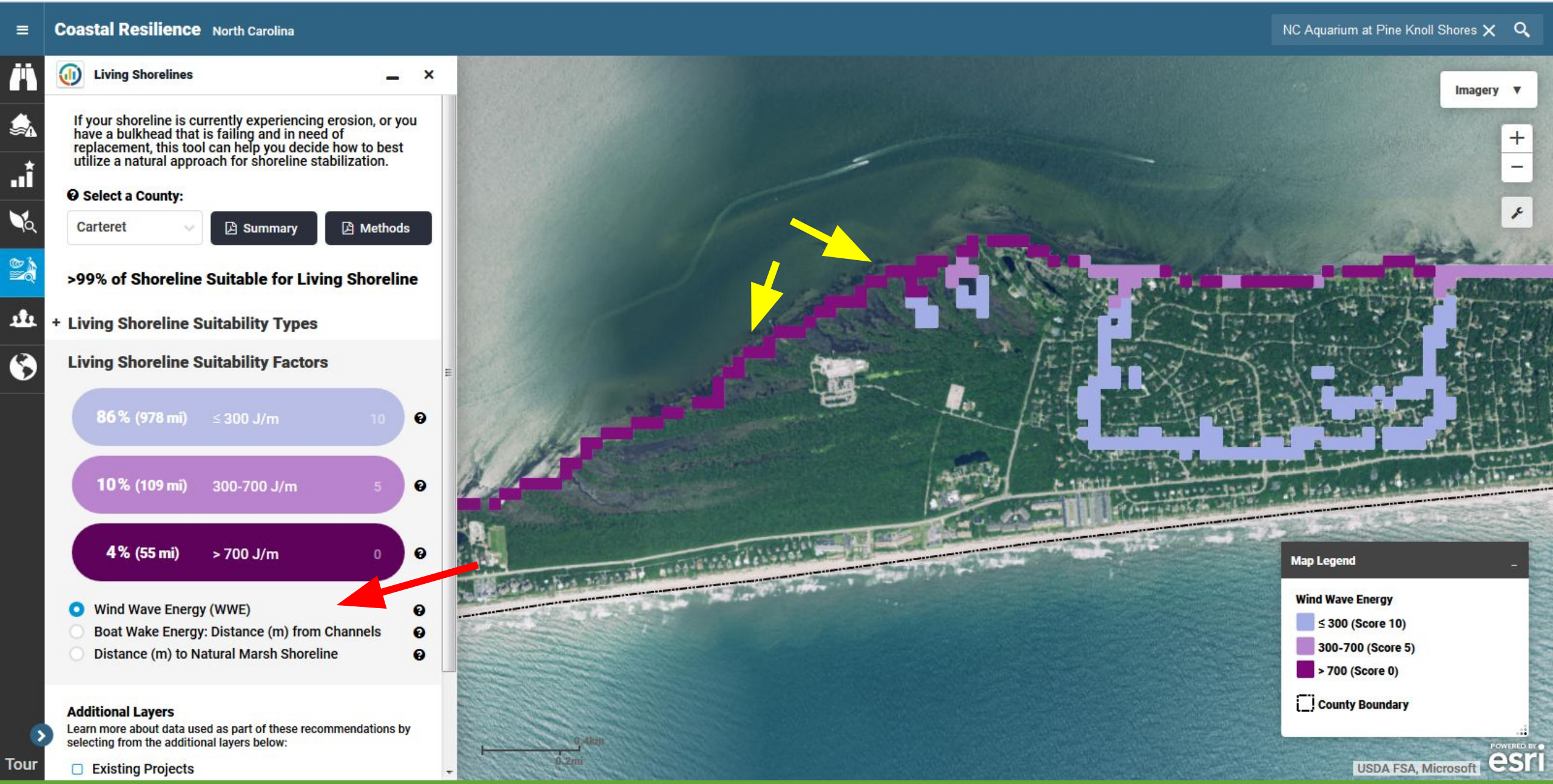
86 % (986 mi) Marsh plants alone or with oyster reef
14 % (156 mi) Hybrid living shoreline (including marsh-sills)
<1 % (0.70 mi) Not recommended for living shoreline
-- zoom in to map to select a shoreline segment for more details --
+ Living Shoreline Suitability Factors
Additional Layers
Learn more about data used as part of these recommendations by selecting from the additional layers below:
Existing Projects
Natural Marsh
Recreational & Local Use Channel
Tour
Imagery
Map Legend
Living Shoreline Type
Marsh plants alone or with oyster reef
Hybrid Living Shoreline (including marsh-sills)
Not Recommended for living shoreline
County Boundary
USDA FSA, Microsoft
POWERED BY esri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Carteret
Summary
Methods
>99% of Shoreline Suitable for Living Shoreline
Living Shoreline Suitability Types
Living Shoreline Suitability Factors
86 % (978 mi) ≤ 300 J/m 10
10 % (109 mi) 300-700 J/m 5
4 % (55 mi) > 700 J/m 0
Wind Wave Energy (WWE)
Boat Wake Energy: Distance (m) from Channels
Distance (m) to Natural Marsh Shoreline
Additional Layers
Learn more about data used as part of these recommendations by selecting from the additional layers below:
Existing Projects
Tour
Imagery
Map Legend
Wind Wave Energy
≤ 300 (Score 10)
300-700 (Score 5)
> 700 (Score 0)
County Boundary
USDA FSA, Microsoft
esri

Coastal Resilience North Carolina

NC Aquarium at Pine Knoll Shores

Living Shorelines

>99% of Shoreline Suitable for Living Shoreline

+ Living Shoreline Suitability Types

Living Shoreline Suitability Factors

94% (1,073 mi)	>200 m Rec >500 m Comm	10
5% (51 mi)	100-200 m Rec 200-500 m Comm	5
1% (18 mi)	<100 m Rec <200 m Comm	0

- Wind Wave Energy (WWE)
- Boat Wake Energy: Distance (m) from Channels
- Distance (m) to Natural Marsh Shoreline

Additional Layers

Learn more about data used as part of these recommendations by selecting from the additional layers below:

- [x] Existing Projects
- [ ] Natural Marsh
- [x] Recreational & Local Use Channel
- [x] Commercial Shipping Channel
- [ ] Relative Wave Energy

Opacity

Tour

Topographic

NC Aquarium at Pine Knol...

Shoreline Project Areas

NC Aquarium at Pine Knoll Shores

Organization

North Carolina Coastal Federation (Central Office)

252-393-8185

Map Legend

- Existing Living Shoreline Projects
- Recreational and Local Use Channel
- Commercial Shipping Channel

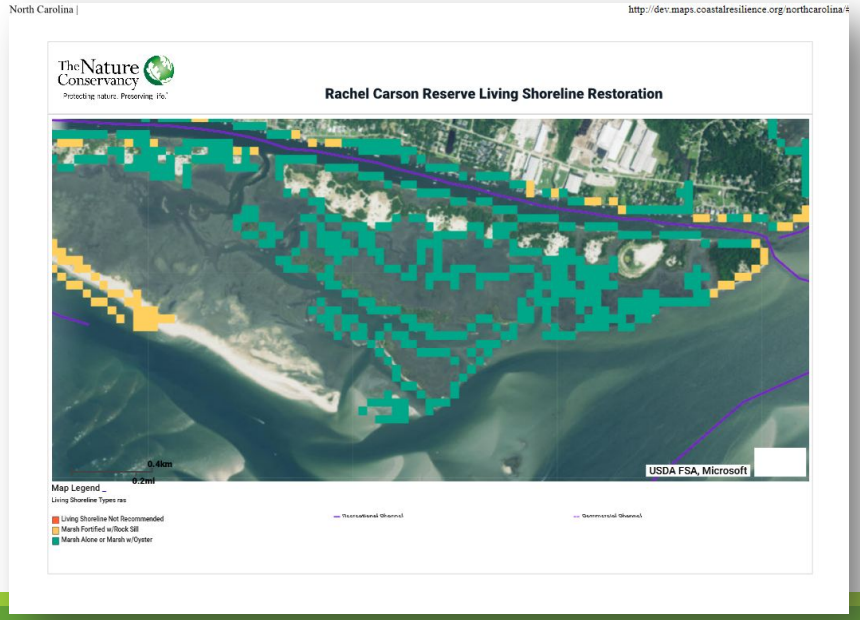
Boat Wake Energy: Distance from Recreational & Commercial Channels

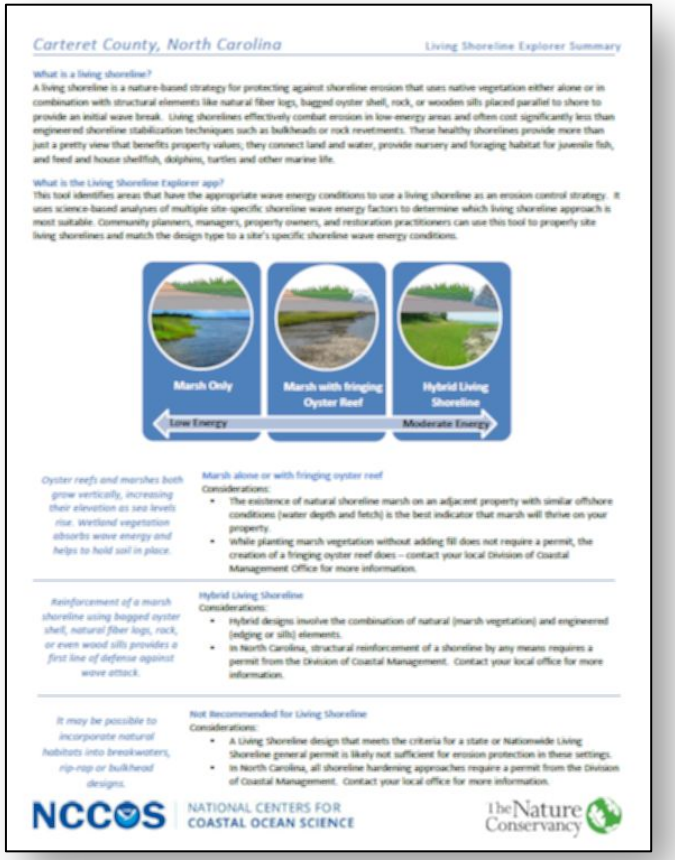
- > 200m from Rec. and > 500m from Comm. (Score 10)
- 100-200m from Rec. or 200-500m from Comm. (Score 5)
- < 100m from Rec. or <200m from Comm. (Score 0)
- County Boundary

0.4km
0.2mi

Tool take-aways

- County Summary
- .pdf map of their site
- “Save & Share” link





County Summary

Feedback & Implementation

- Contact Information: Lora Eddy – lora.eddy@tnc.org
- NEXT STEPS: hear from you how it can be improved AND
- examples of how this tool was put into practice.