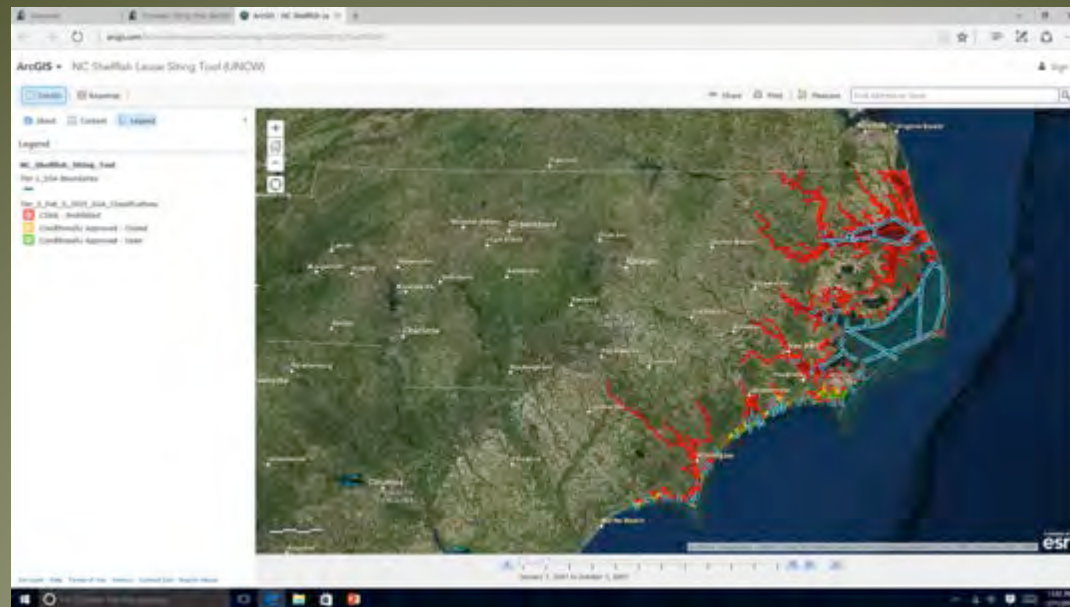


How to use North Carolina Shellfish Aquaculture Siting Tool

Troy D. Alphin,

University of North Carolina Wilmington, Center for Marine Science



Why Do We Need Tools Like This?

- Already in use.
 - Predictive tool
 - GIS models
 - Trend analysis
- We are an information society
- We want to know what to expect



But Only as Good as the Data



Today

- Goals for creating tool
 - Why use it.
- What is the tool?
 - Development
- Tutorial
- Coming soon
- Future direction



NC Shellfish GIS Based Siting Tool

- Here we have developed an interactive online tool, specifically designed to help potential Shellfish growers with site selection for further investigation.
- Here we provide visualization of public datasets related to coastal conditions.

Troy's Disclaimer “This is not a substitute
for on site verification”



Special Thanks and Acknowledgments to

- Sharon Tatem
- Megan Rudolf
- Jay Styron
- Patti Fowler
- Brian Conrad
- Brad Pogue
- Matt Hayes



Trend Indicate a Greater Need

- According to NOAA
 - Aquaculture needs to fill a great portion of demand
- Obstacles to the overall industry
 - Regulations
 - Market factors
 - Timing
 - Siting of new operations



NC Grower's Concerned

- Water Quality
- **Storms!!!!!!**
- Human interactions
 - Not everyone agrees
 - Community Engagement
- Locations
- Others
 - Marketing
 - Distribution
 - Finance

North Carolina's Shellfish Industry: Site Conditions and Economic Impacts

A statewide survey of shellfish leaseholders



Marc J. Turano, North Carolina Sea Grant
Martin Posey, University of North Carolina Wilmington
Troy Alphin, University of North Carolina Wilmington

North Carolina Coast from Ocracoke to Bald Head Island.

Orthoimagery from NC
Dept. of Agriculture and
Consumer Services.

NCDENR

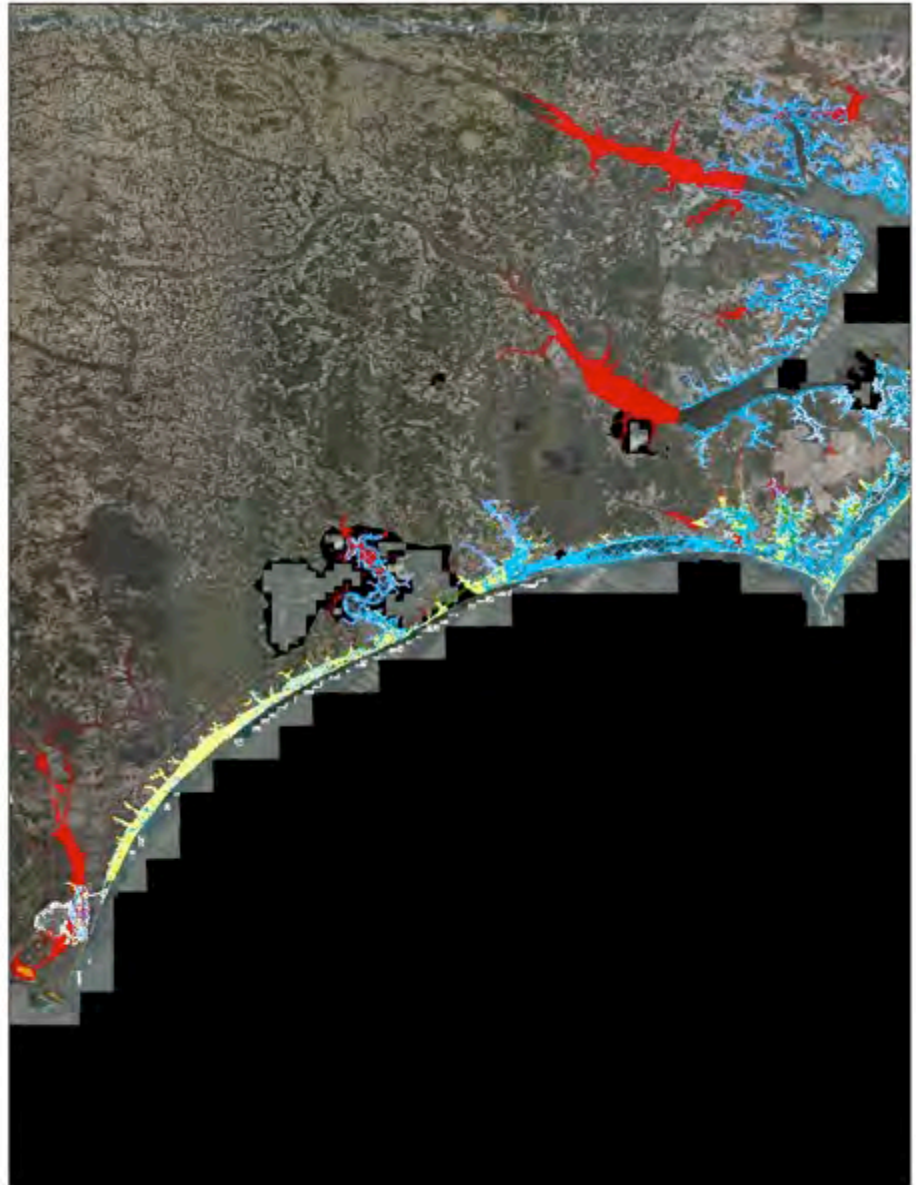
DMF

DCM

NOAA

NCONE MAP

SOSM



How to Select New Areas

- New to the industry or new to the area
- Provides some info on classification and conditions
 - Always changing/ updating
- Provides only public information
 - Many time from unintended uses
- For those that are familiar with your growing area tool
 - Historical data and metadata
 - Past might be a good predictor

Starting points

All images display January 2012 Shellfish Growing Areas



Masonboro Sound



Stump Sound



Core Sound

What Parameters are Most Important?

- Tier I
 - Classification
 - Depth
 - Salinity
 - Existing Leases
- Tier II
 - Bottom Type
 - Land-use
 - % impervious surface
 - Rainfall
- The Tier system is phasing out



Classification Only



Legend

Classification SGA_2012_01_23

<all other values>

HA_CLASS

Approved



CSHA - Prohibited



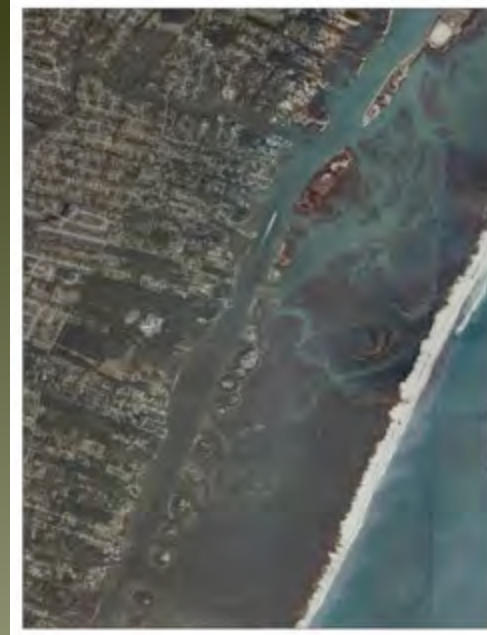
Conditionally Approved - Closed



Conditionally Approved - Open

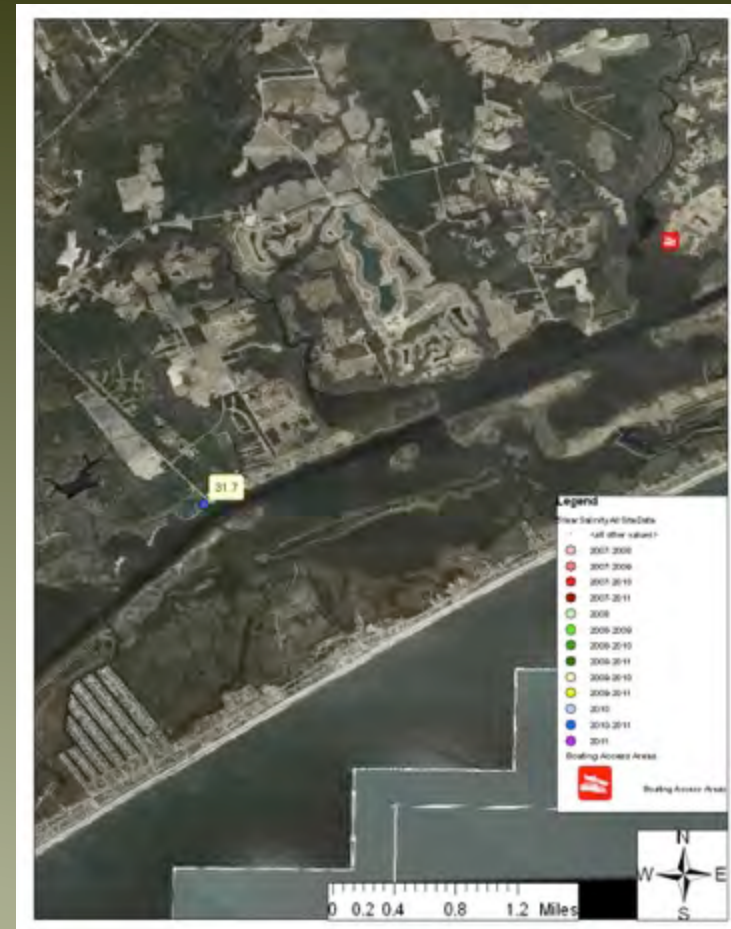
Depth Contour

- Multiple file types
- Differences in precision
- Clarity
- Raster data currently available



Salinity

- No clear comprehensive data set
 - Missing metadata
- 5 yr mean
 - Min and Max



Existing Leases

- Draft data
 - Only shows relative size and position
 - Acreage
 - No identifier in dataset
 - Lease vs Franchise

Legend

Shellfish_Leases_and_Franchises_1APR2011

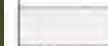
<all other values>



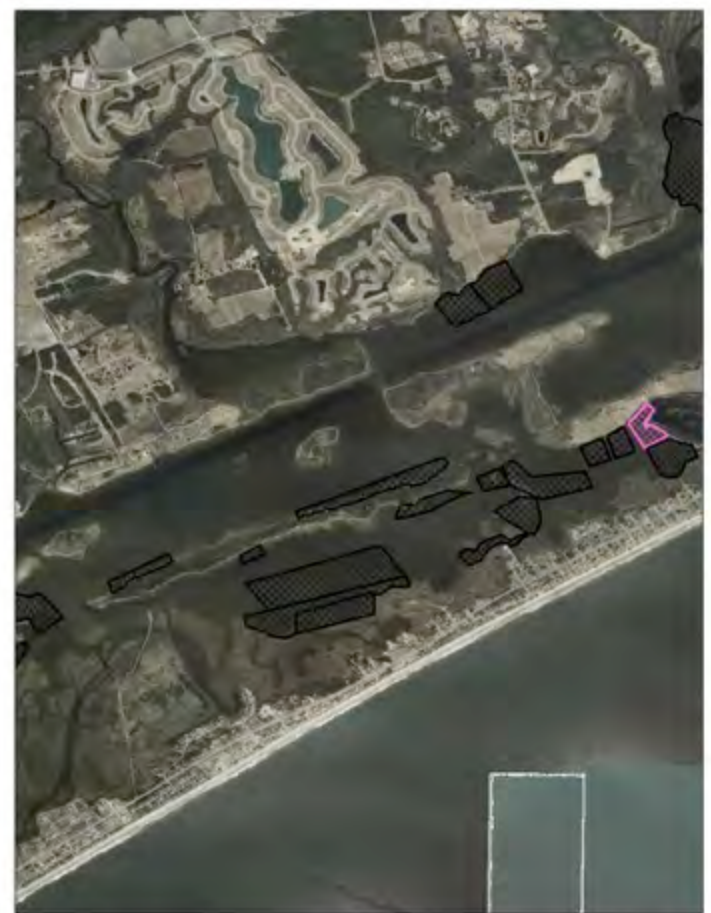
Active



Legal

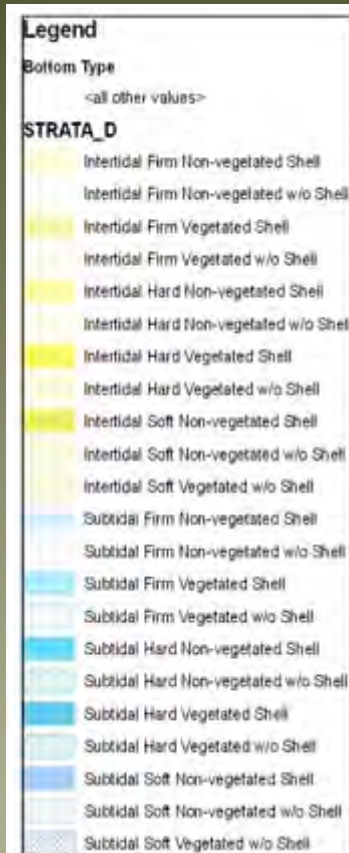


Proposed



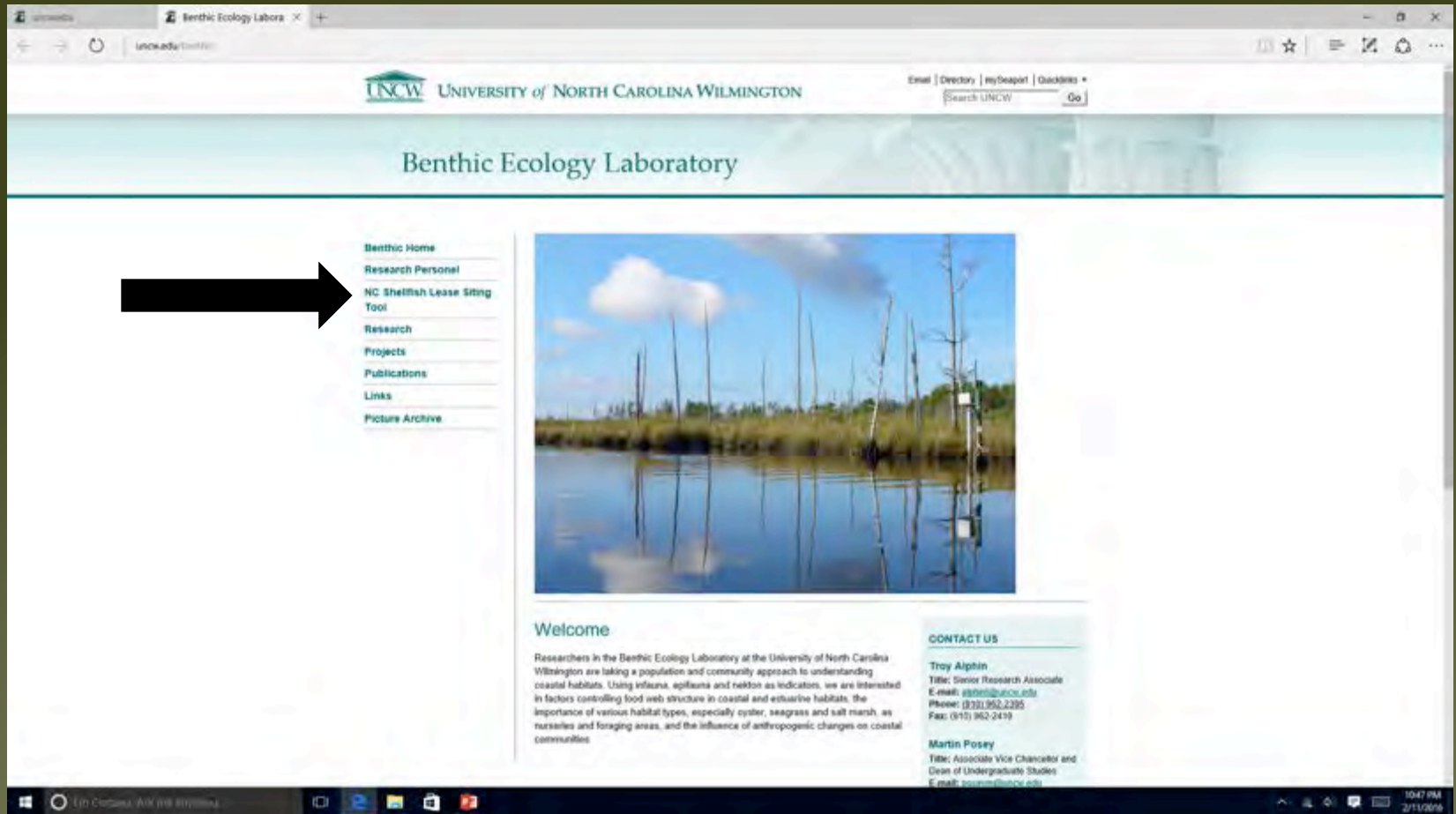
Bottom Type Information

- Draft data
- Data verification
- Note date data was collected



How does it work

<http://uncw.edu/benthic/>



Contact Info and Tutorials

Tutorials

Contact information

UNCW UNIVERSITY OF NORTH CAROLINA WILMINGTON

The North Carolina Shellfish Siting Tool

Benthic Home

Research Personnel

NC Shellfish Lease Siting Tool

About the Shellfish Industry

Tutorials

Layers

Acknowledgements

Research

Projects

Publications

Links

Picture Archive

The North Carolina Shellfish Siting Tool

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5000 Marvin K. Moss Lane
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IMPORTANT LINKS

**Shellfish Lease and Erosion
Program**

NC Shellfish Lease Application

**NC Shellfish Industry Report (2009-
2011) (PDF)**

Project Objectives

Provide shellfish aquaculture and expand the industry in North Carolina by:

- Increase access to, and knowledge of, publicly available datasets.
- Reduce time involved in selecting an aquaculture site location.
- Help streamline the shellfish bottom lease site selection process by providing an overview of likely sites in a shellfish growing area.

Project Background

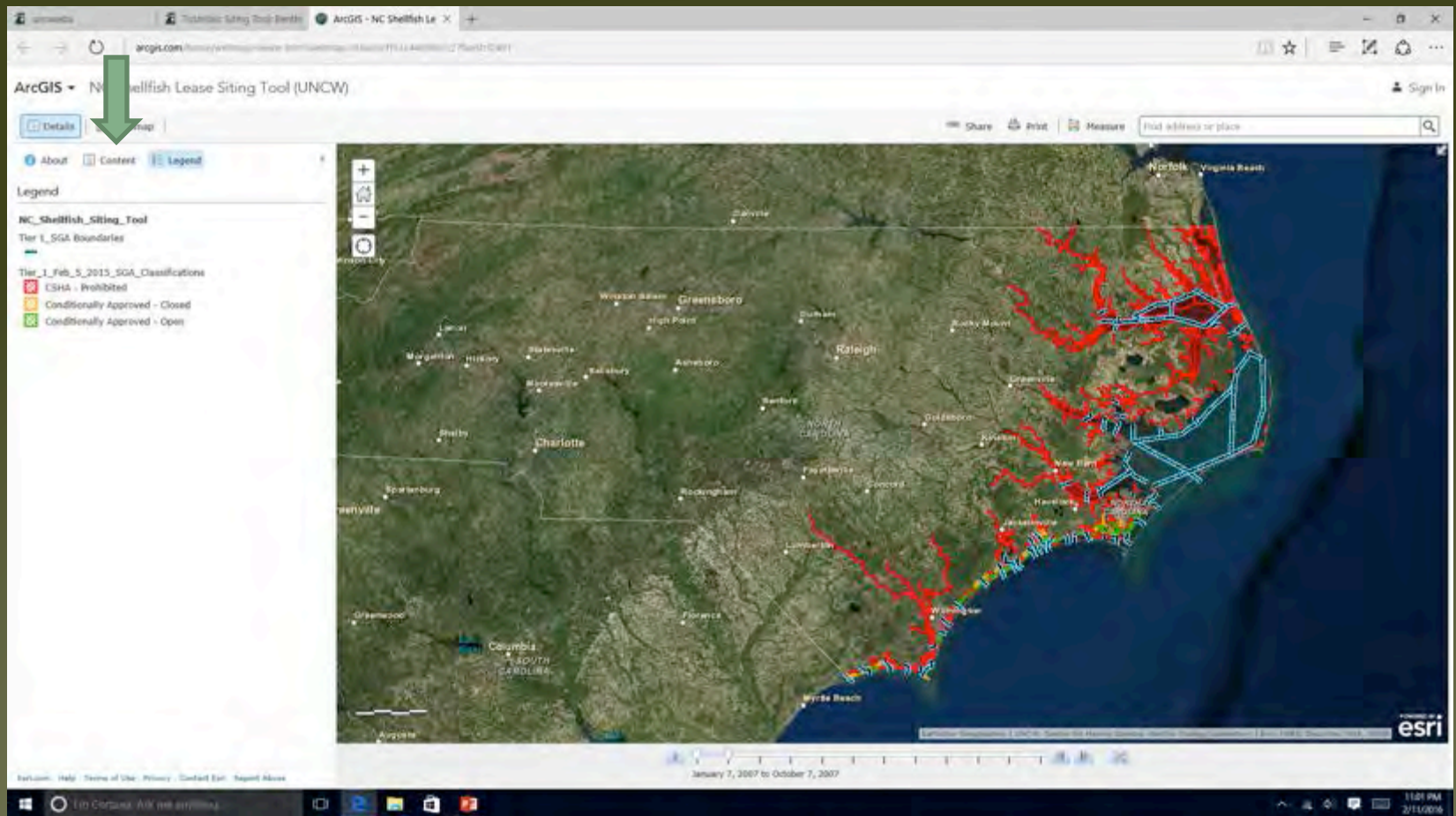
Select Tutorial or Get Started

The screenshot displays the website of the Benthic Ecology Laboratory at the University of North Carolina Wilmington. The page is organized into several sections:

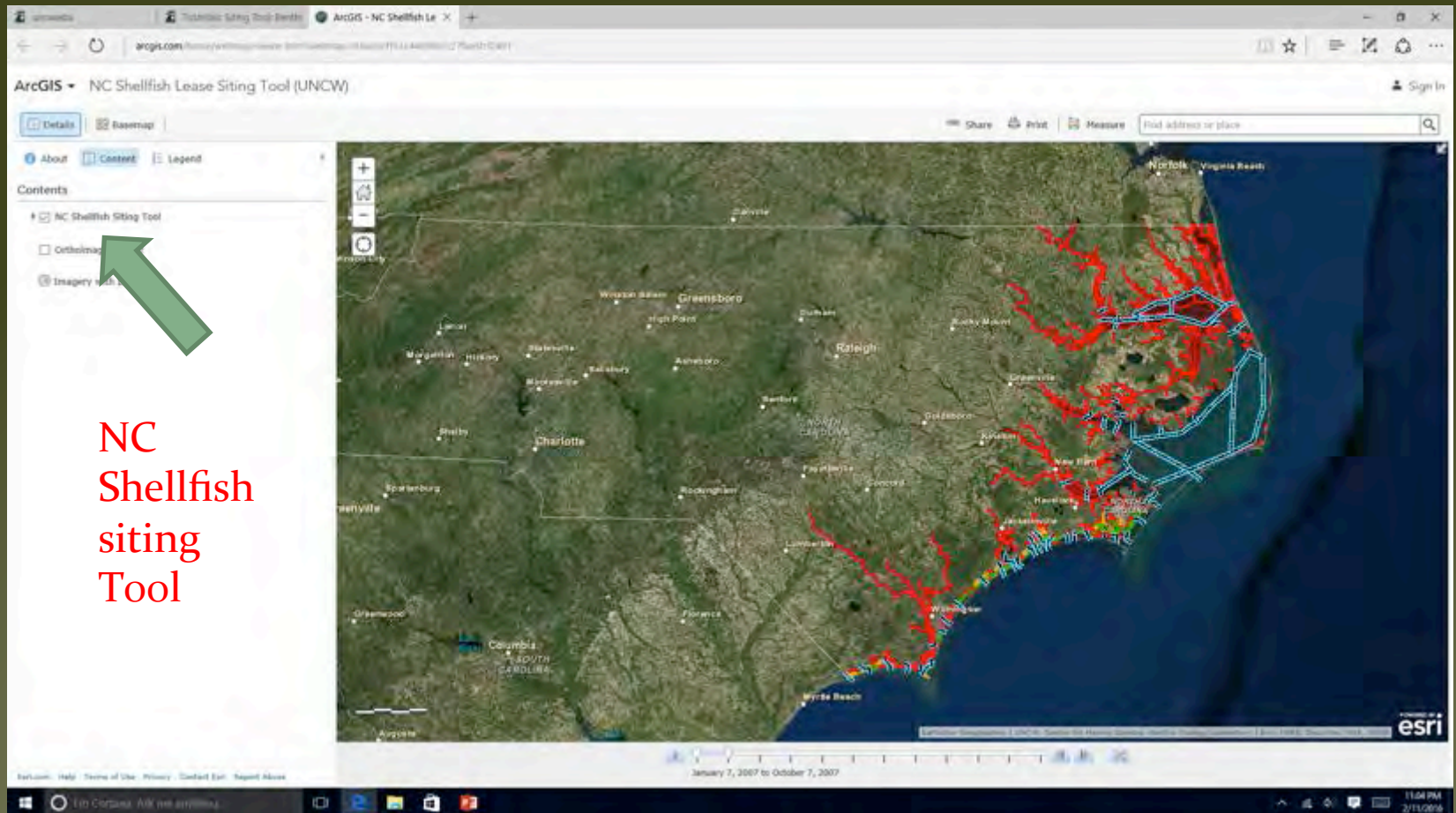
- Navigation:** Includes links for Email, Directory, myDesktop, and Quicklinks, along with a search bar.
- Left Sidebar:** Contains links for Benthic Home, Research Personnel, NC Shellfish Lease Siting Tool, About the Shellfish Industry, Tutorials, Layers, Acknowledgements, Siting Tool Map, Research, Projects, Publications, Links, and Picture Archive.
- Tutorials Section:** Features two video thumbnails:
 - How to Use the NC Shellfish Siting Tool:** Described as a step-by-step guide to navigating the online map and its functions. Functions include expanding the legend, turning on/off layers, zooming into areas, measuring areas/distances, GPS coordinates, and search/query options.
 - Details of the Layers:** Described as an in-depth review of the layers, including time-enabled data of the SGA Classification layer.
- Right Sidebar:** Contains a section titled **THE SITING MAP TOOL** with a thumbnail image, a link to **Siting Tool Layers**, and a section titled **IMPORTANT LINKS** with links to Shellfish Lease and Franchise (Coastal), NC Shellfish Lease Application, NC Shellfish Industry Report (2009-2011) (PDF), NC Shellfish Enumeration, NC Shellfish Closure Maps, and NC Shellfish Closure Exemptions.

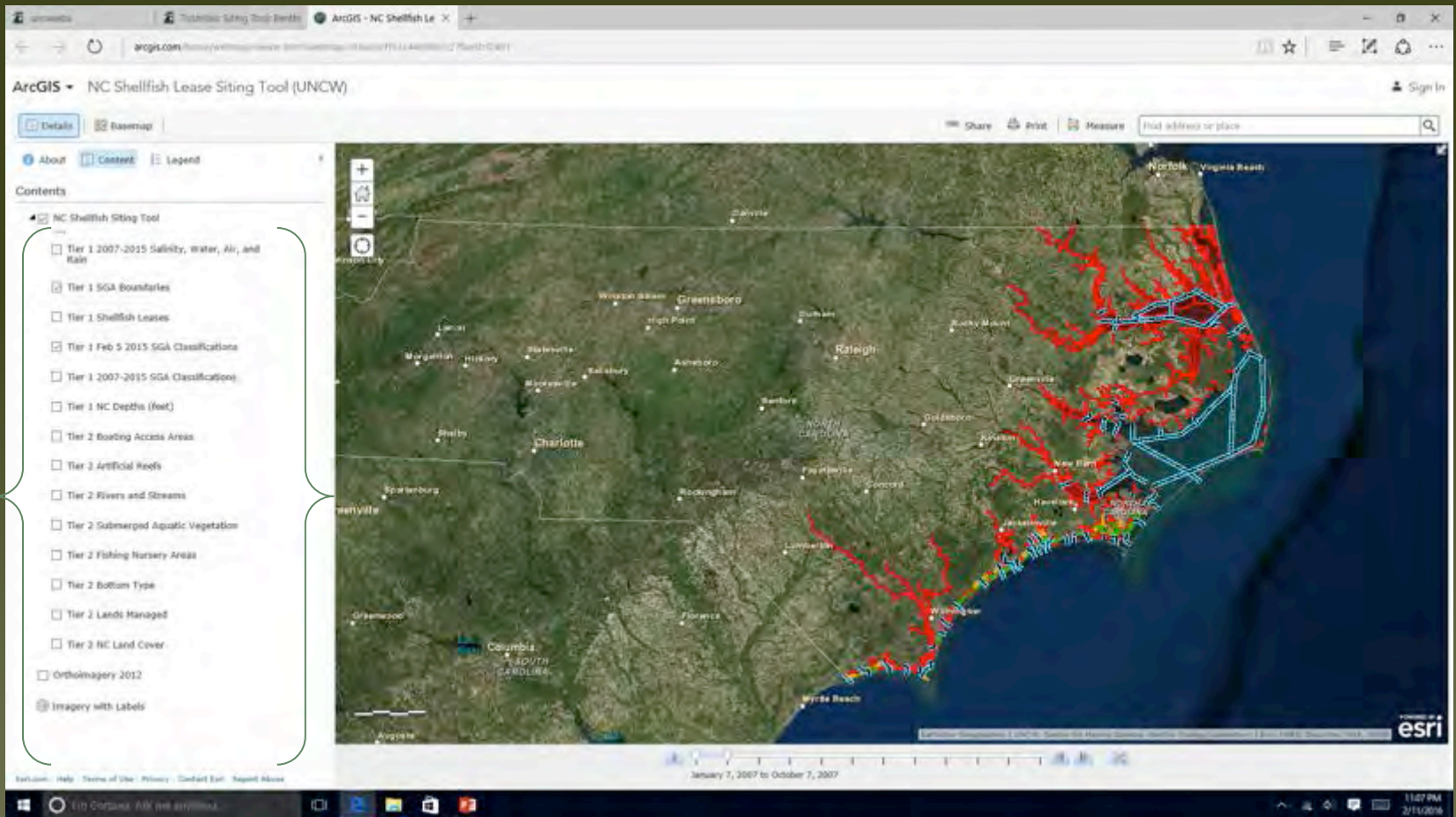
A red arrow points to the **THE SITING MAP TOOL** link in the right sidebar.

The Starting Map

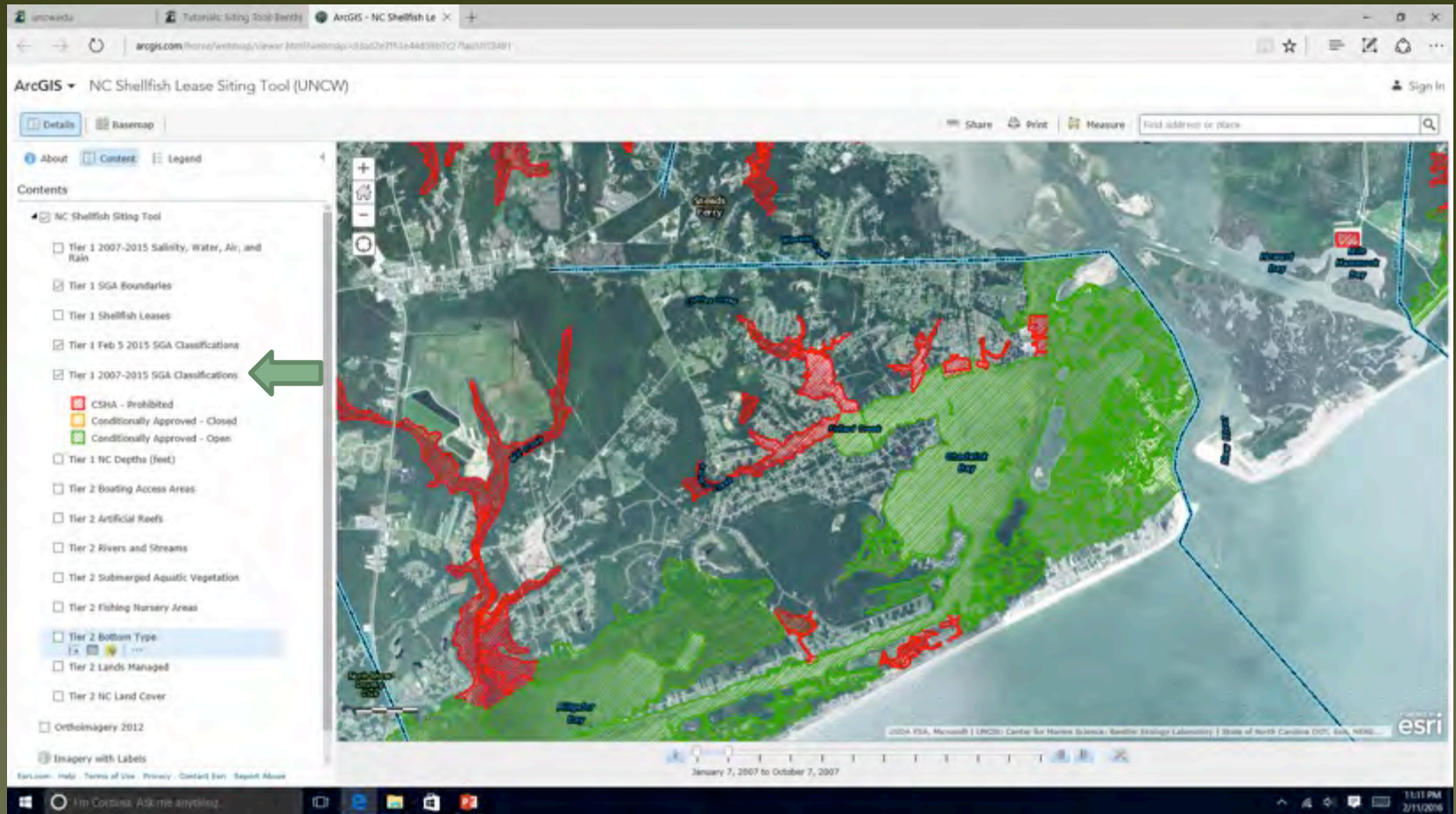


Reveal the Layers

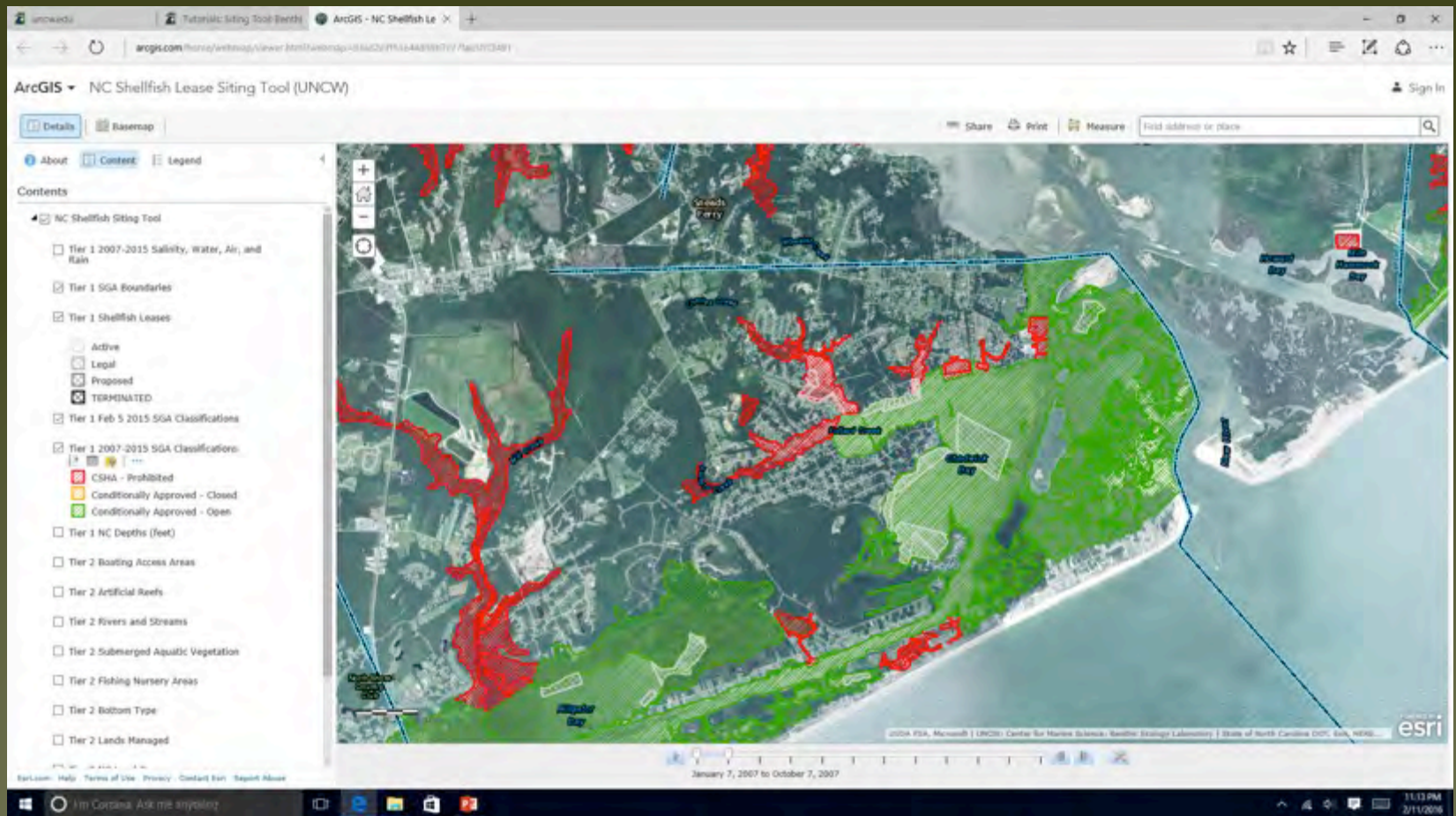




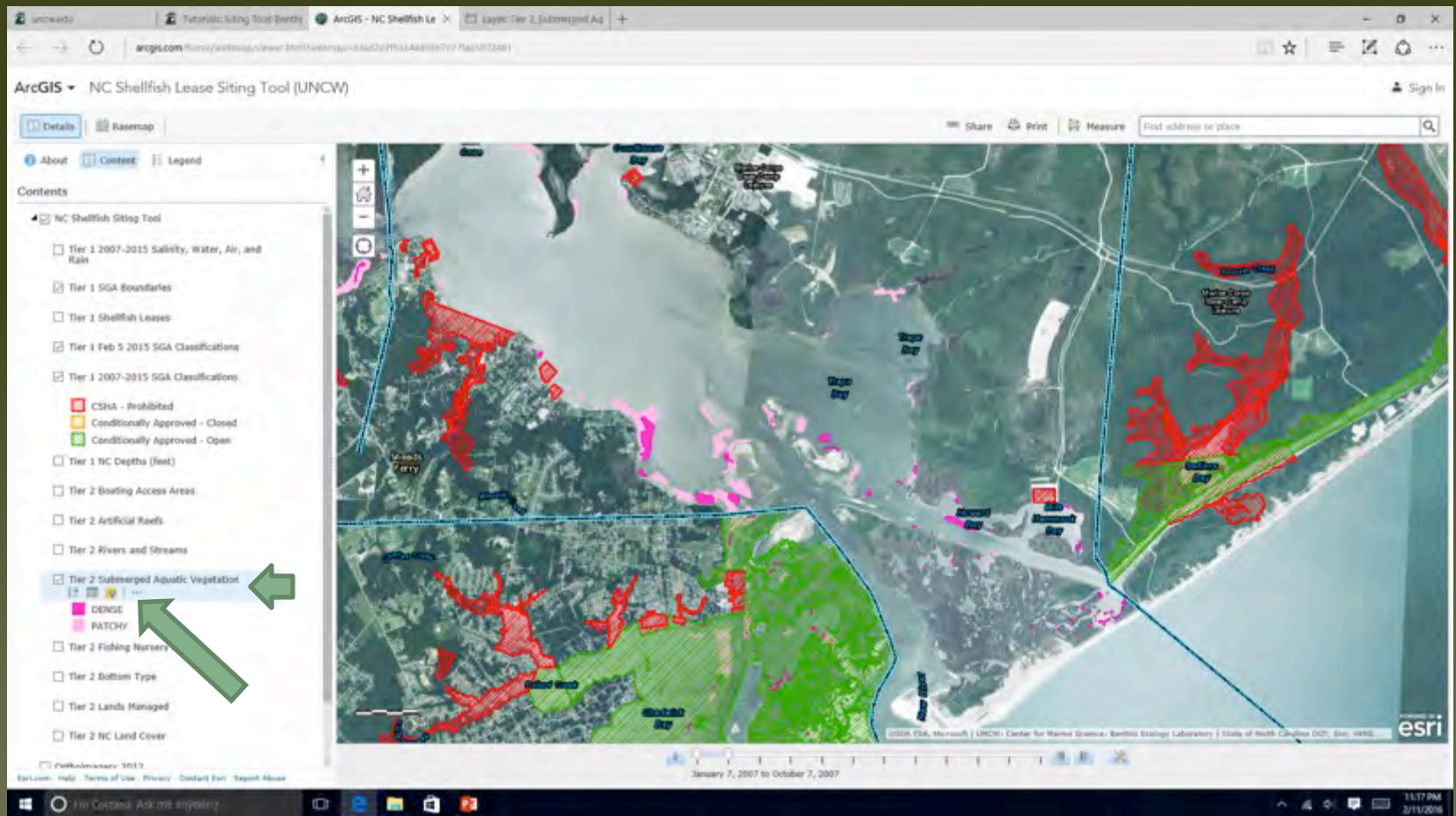
Focus on Target area



Turn on as Many Layers as Needed



Explore the Data Source and Attributes



Information on Data Source



The screenshot shows a web browser displaying the ArcGIS REST Services Directory. The breadcrumb navigation path is: Home > services > NCStateGIS > NC State Submerged Aquatic Vegetation > Tier 2 Submerged Aquatic Vegetation. The page title is "Layer: Tier 2 Submerged Aquatic Vegetation (ID: 9)".

Layer: Tier 2 Submerged Aquatic Vegetation (ID: 9)

Name: Tier 2 Submerged Aquatic Vegetation

Display Field: Class

Type: Feature Layer

Geometry Type: esriGeometryPolygon

Description: Layer Name: Tier 2 Submerged Aquatic Vegetation File Name: Tier_2_Submerged_Aquatic_Vegetation.shp Layer File Source: The_Map_2015 Jan Layer Source Organization: NC One Map, NC DENR Layer Contact: Anne Deaton anne.deaton@ncdenr.gov Date Taken: August 2011 Date Updated: Horizontal Datum: NAD_1983_StatePlane_North_Carolina_FIPS_3200_Feet Scale/Measurement Reference: Scale Range: No Scale Range: Don't show layer when zoomed: Out beyond: Layer Symbology: Category - Unique values - Value Field: Class Symbol: (solid fill) - Colors: Ginger Pink (DENSE), Rhodolite Rose (PATCHY) Labels: No Label Field: Label Scale Range: Don't show layer when zoomed: Out beyond: Label Symbology: Alterations/Other Information: Clipped file so only areas nearshore and inshore are displayed for coastal North Carolina. Removed 'aquaculture', 'Dense_I', and 'Patchy_I' from class field. Dense = 70%+ coverage Patchy = 10%-70% coverage

Definition Expression: N/A

Copyright Text:

Default Visibility: false

MaxRecordCount: 1000

Supported Query Formats: JSON, AMF

Min Scale: 0

Max Scale: 0

Supports Advanced Queries: false

Supports Statistics: false

Has Labels: false

Can Modify Layer: false

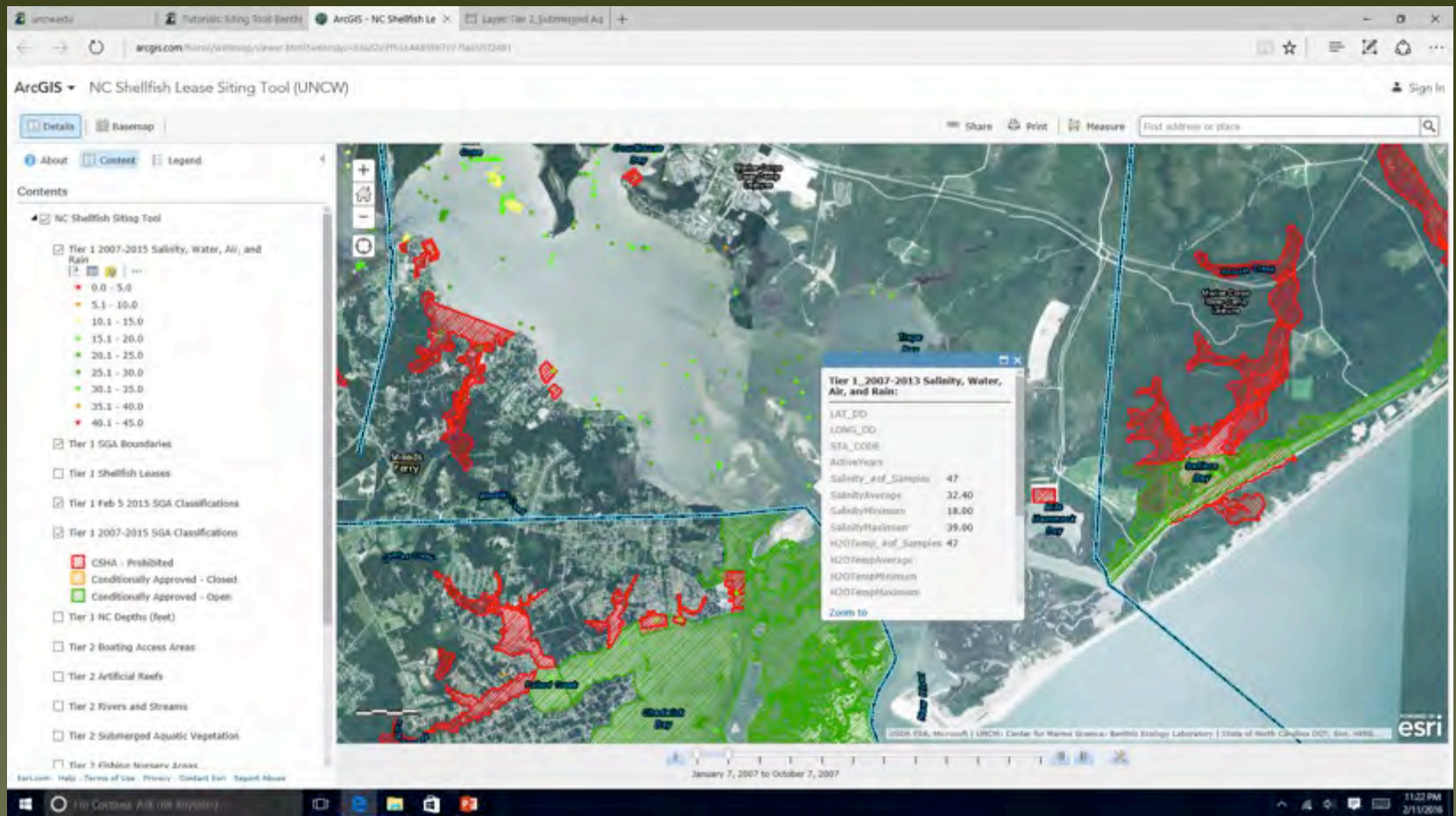
Can Scale Symbols: false

Use Standardized Queries: true

Extent:

XMin: 659303.0130999982
YMin: 13507.672899998724
XMax: 929591.2920000032
YMax: 332770.27380000055
Spatial Reference: 32119 (32118)

Explore Information cont'd



Coming Soon

- Rainfall data (source and documentation)
- Chl *a*
- Verification of existing data and % change
- Data Gap ID
- More user friendly
- Feedback tool

NC Siting Tool Reference Information for Shellfish Lease Sites

Leasee: _____ Contact Information: _____

Site Label: _____

GPS Location: _____ W _____ N

Tier 1:

Shellfish Growing Area: _____

Shellfish Growing Area Classification (circle appropriate answer): _____ Open

CSHA-Prohibited Conditionally Approved-Open Conditionally Approved-Closed

Leases present in area (circle one): None Yes

If Yes, give information: _____

Depth: _____ meters _____ feet

Tier 2:

Submerged Aquatic Vegetation status (circle one): None Yes

If Yes (circle appropriate answer): Aquaculture Dense Patchy

Fishing Nursery Area Classification (circle appropriate answer): None Yes

If Yes (circle appropriate answer): Permanent Secondary Nursery Area

Primary Nursery Area Special Secondary Nursery Area

Bottom Type (circle appropriate answers): Non-vegetated Vegetated

Intertidal Subtidal

Firm Hard Soft

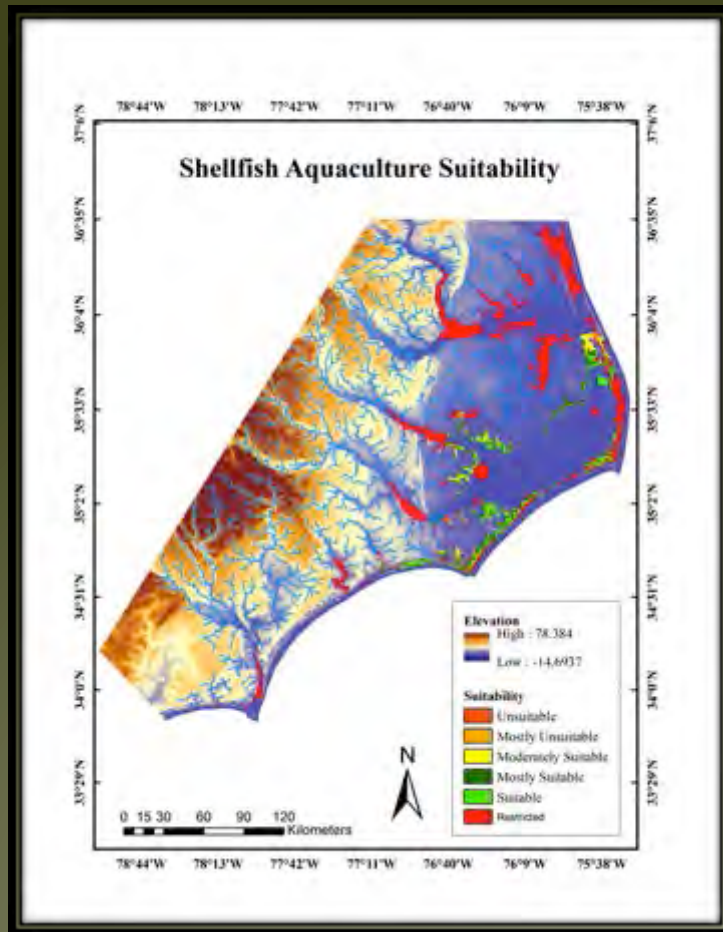
With Shell Without Shell

Land Management Area(s): _____

Land Cover Classification(s): _____

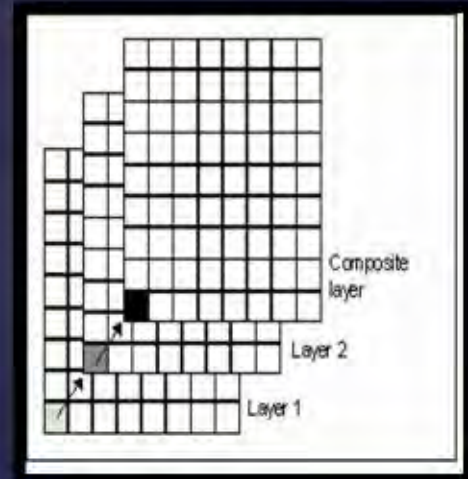
Other information/distances/course references to site location: _____ acres

Suitability Index



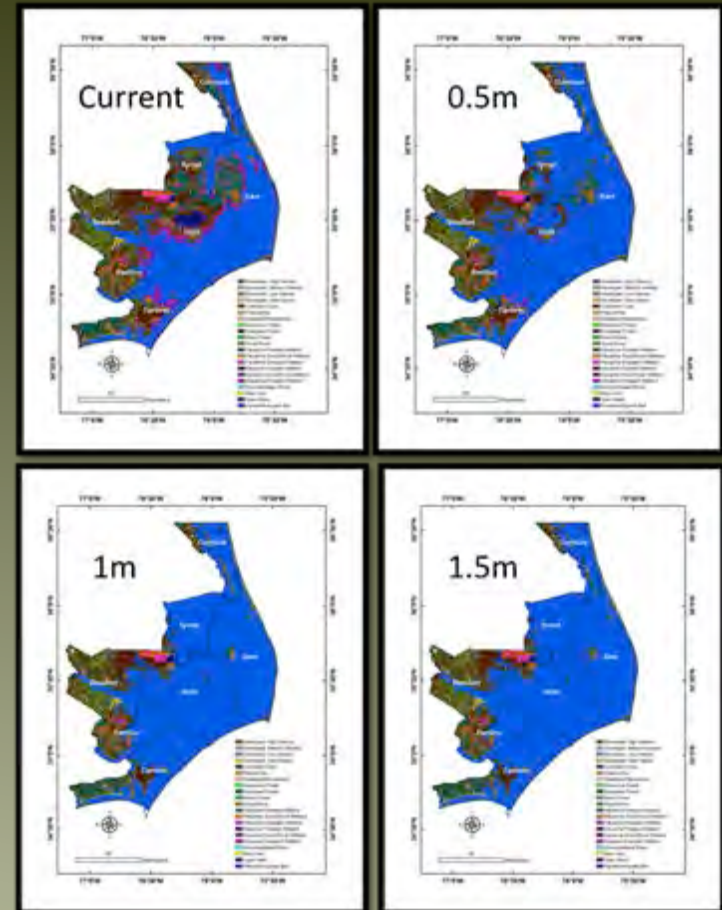
Model Design

- Raster Format (Grid)
- Cell Size ½ acre
- 12 Layers
- 2 Components
- Weighted Overlay
- Composite Map



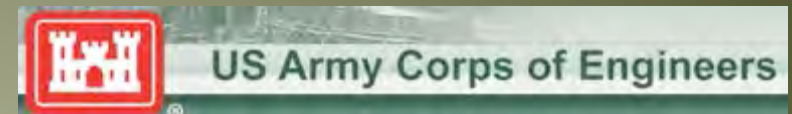
Major Risk Factors and Constraints

- Changing salinity
- Water quality classifications
- Missing data
- Changing regulatory environment
- An additional interface for legislators and managers



Acknowledgements

- Parker Moran - UNCW Operations and Systems Administration
- Tony Copeland - UNCW Operations and Systems Administration
- Dr. Joanna Halls - UNCW Dept. of Geography and Geology
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Questions?

