Introducing the

NORTH CAROLINA COASTAL ATLAS

a partnership of

renci @ East Carolina University
Center for Coastal System Informatics and Modeling

Joyner Library

N.C. DIVISION OF COASTAL MANAGEMENT

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

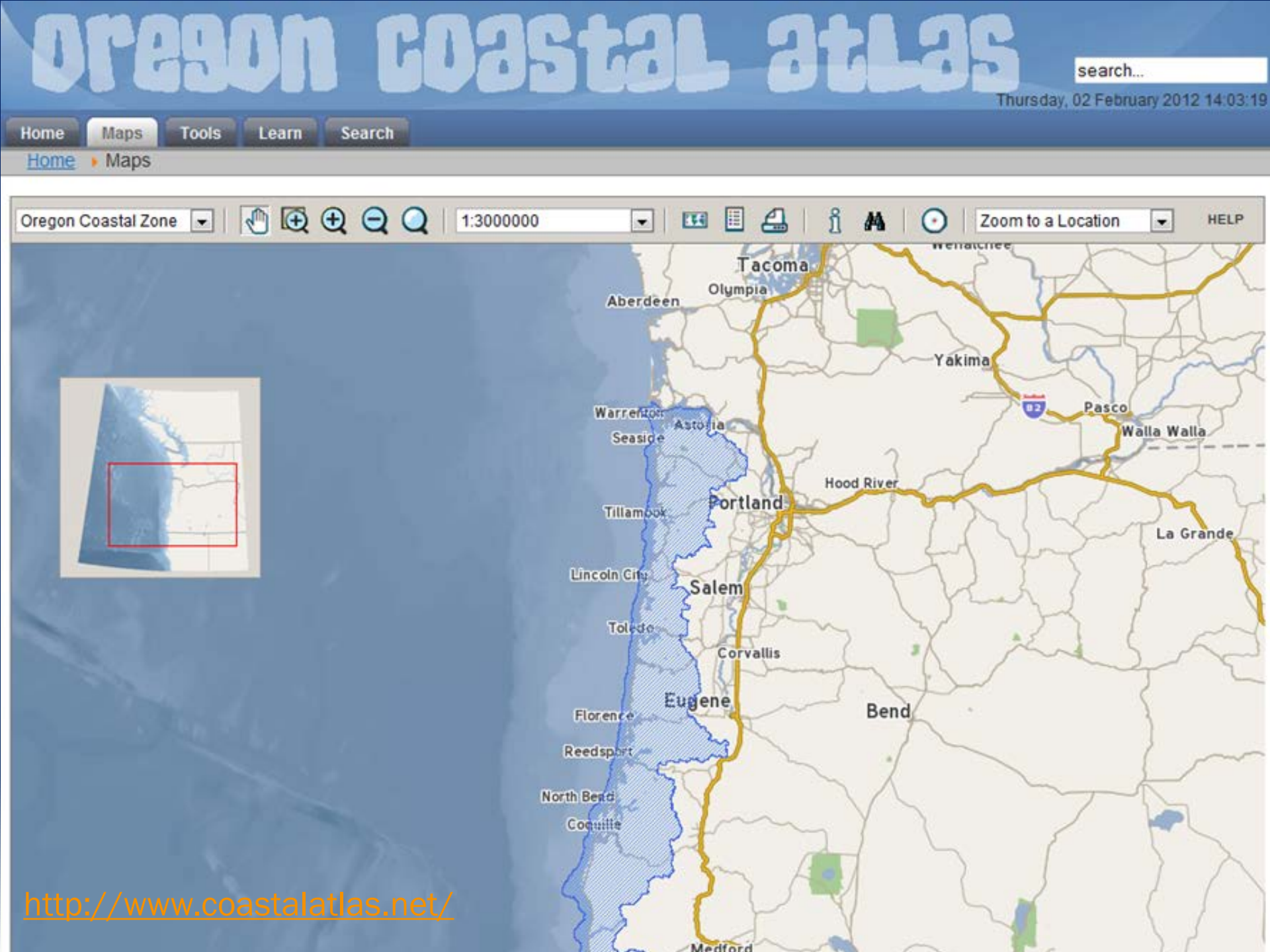
Sea Grant
North Carolina

CICS
Cooperative Institute For Climate & Satellites

NORTH CAROLINA COASTAL ATLAS

Background

- Need for online atlas identified by managers and researchers to make coastal data available
  - Shoreline data
  - Ocean and coastal resources
  - Sea-level rise potential
- Other states using digital coastal atlases: Virginia, Maryland, Oregon, Washington…


Oregon Coastal Atlas
search...
Thursday, 02 February 2012 14:03:19
Home
Maps
Tools
Learn
Search
Home ▸ Maps
Oregon Coastal Zone
1:3000000
Zoom to a Location
HELP
Tacoma
Olympia
Aberdeen
Yakima
Pasco
Walla Walla
Warrenton
Astoria
Seaside
Hood River
Portland
Tillamook
La Grande
Lincoln City
Salem
Toledo
Corvallis
Eugene
Florence
Bend
Reedsport
North Bend
Coquille
Medford
http://www.coastalatlas.net/

COASTAL ATLAS: Shorelines

About

Streets | Aerial

Garrett
Allegany
Washington
Frederick
Carroll
Baltimore
Harford
Cecil
Howard
Kent
Montgomery
Anne Arundel
Queen Anne's
Caroline
Prince George's
Talbot
Charles
Calvert
Dorchester
Wicomico
St. Mary's
Worcester
Somerset

Layer List

Layer Visibility

- Shoreline Rates of Change
- Historical Shorelines
- Shoreline Inventory
- Living Shoreline Suitability
- Sea Level Rise Vulnerability
- Sea Level Rise Vulnerable Wetlands
- Storm Surge Areas
- Bruun Profile Study
- Erosion Vulnerability Assessment

100 km
50 mi

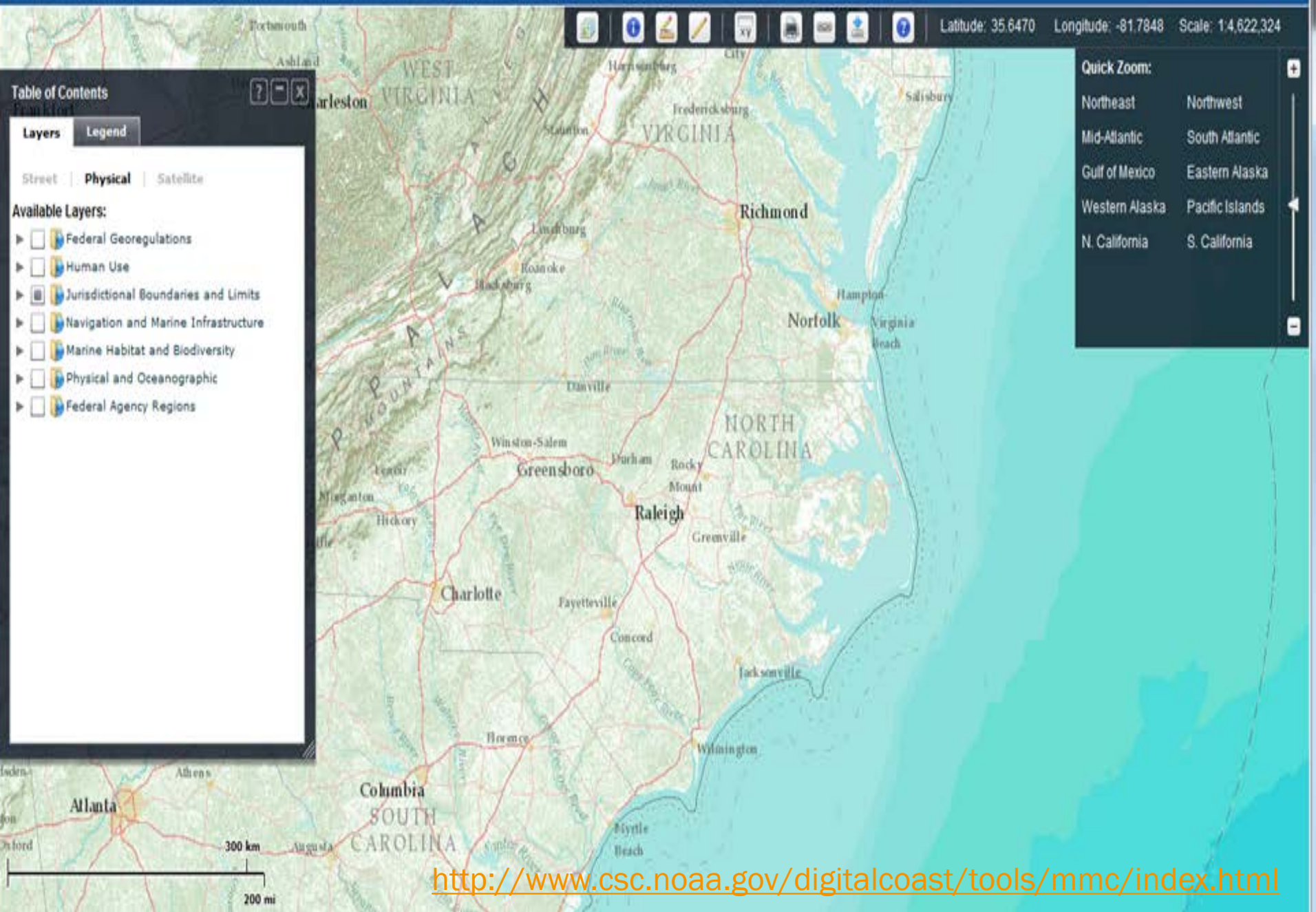
POWERED BY esri

International Coastal Atlas Network

- Web-based atlas
- Cybercartography
- WebGIS
- Open source and proprietary systems
- Public Participatory GIS
- http://ican.science.oregonstate.edu/

Multipurpose Marine Cadastre

BUREAU OF OCEAN ENERGY MANAGEMENT AND NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



http://www.csc.noaa.gov/digitalcoast/tools/mmc/index.html

NCCOHAZ Portal

http://www.coastal.geology.ecu.edu/NCCOHAZ/

Surge Awareness Tools

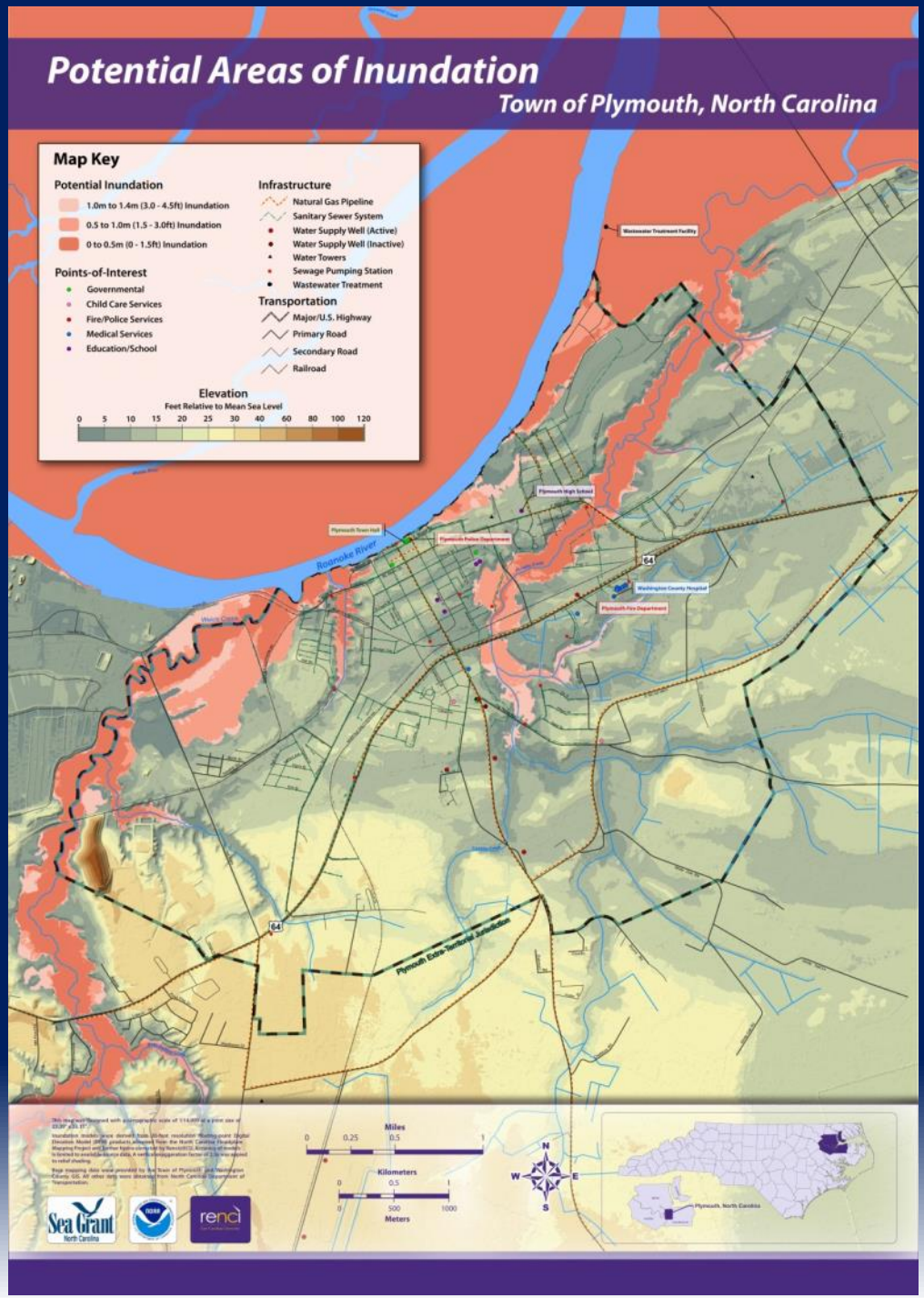
- Landmarks
- Place-based
- Hyper-local

http://nccohaz.ecu.edu/stormvis/index.html

Hazard Mapping

Town of Plymouth

- Problem:
  - How can our community evaluate infrastructure vulnerability?
- Solutions:
  - Risk awareness
  - Build capacity
  - Reveal vulnerabilities



- **What can it do?**
  - Online mapping and investigation
  - Static and interactive maps
  - Spatial data, base maps, and reference layers
  - Research and literature
- **How?**
  - Explore, analyze, and learn about North Carolina's **coastal issues** and **resources**
- **For whom?**
  - Students, managers, scientists, teachers, and the public.

Needs Assessment

- Conducted via internet survey, by invitation
- September 2012
- 85 participants
- Questions:
  - Characteristics of participants and work
  - Atlas use, themes, data types
  - Atlas tools and functions
  - Viewer preferences

Needs Assessment Participants

NORTH CAROLINA COASTAL ATLAS

- 85 participants
- Many job types- coastal managers, planners, researchers, GIS specialists, contractors
- Employees of government (14 Fed, 28 state, 19 local), private firms (15), NGOs (7), academic (2)
- Most work statewide (21%) or in part of the state(29%); local (26%) and regional (15%)
- Few expert GIS, most knowledgeable users but novice data managers

Needs Assessment
Use of Atlas

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View historic information	92%
Communicate info to others	87%
Locate areas of concern	84%
Access info about infrastructure	78%
Coordinate data	64%
Conduct research	60%
Make decision/spatial planning	54%
Access real-time data	54%

Other (please specify)
erosion rates, land use planning, conservation planning, property data, permitting support, public access info, BIMP implementation, and more.
Species of Concern, Communities of concern
To monitor and tract littoral boundaries of private and public land owners
to do cumulative and secondary assessments
Fishing Areas
Query data in user specified areas
Permit Data
Scoping restoration projects
economic and demographic
Establish detailed waterside elevation changes & to re-evaluate floodplain heights(many of which are outdated or in error).
Use as research tool to located environmental sensitive areas
Teaching upper level and masters students
assess habitat and biological occurrence overlaps

Thematic Needs Ranking

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Response	1	2	3	4	5	6	7
Water quality and ecosystem health	20	20	12	11	5	5	4
Biological resource areas, habitat, and conservation-restoration status or potential	20	18	13	14	4	6	4
Shoreline erosion (estuarine and ocean) and inlet-opening potential	17	8	12	15	13	8	4
Flooding and storm surge	10	22	18	10	12	4	1
Infrastructure (transportation, energy, ports)	8	6	9	6	21	19	13
Real-time meteorological/oceanographic information	6	2	6	14	10	15	27
Recreation and tourism	2	6	9	8	11	20	23

Needs Functions

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Function	Essential	Useful
Zoom by address (geocode service)	44%	48%
Print map to a PDF	56%	36%
Library of pre-complied PDF maps by theme and area.	21%	64%
Catalog of photographs, images and graphics for themes and locations	23%	64%
Searchable links to library holdings (theses, research articles, government reports)	27%	52%
View map output as GoogleEarth KML	32%	53%

www.nccoastalatlas.org

NORTH CAROLINA COASTAL ATLAS

Welcome to the North Ca... | Welcome to the North Ca...

nccohaz.ecu.edu/CoastalAtlas/

Restore Down

NORTH CAROLINA COASTAL ATLAS

HOME | ABOUT US | MAPS | DATA CATALOG | PUBLICATIONS | SUPPORT | Search

Welcome to the North Carolina Coastal Atlas

The coast of North Carolina is extensive, dynamic and rich with natural resources and vibrant culture. The North Carolina Coastal Atlas is a collaborative effort to enable access to coastal data and inform coastal managers, scientists, students and the interested public. The Atlas provides selected geospatial data, visualization tools, and thematic maps focused on coastal resources and hazards. We hope these data and map tools can help inform decision-making for sustainable use of the coast.

Explore the Coast

Launch interactive maps and tools to access geospatial data layers for on-line mapping and download.

View Thematic Maps

Examine estuarine and ocean shorelines, potential impacts of sea-level rise, and other natural and cultural resource thematic maps.

Learn More

Discover research papers, scientific reports, articles, data and other digital products with a bibliography provided by Joyner Library.

NORTH CAROLINA COASTAL ATLAS

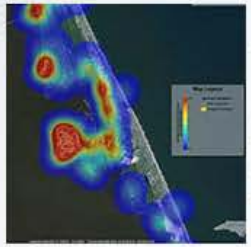
View Thematic Maps

Click on images of maps to go directly to the thematic map viewer.

Sea-Level Rise Maps

Because of its vast areas of low-lying land near the coast, North Carolina is considered the third most vulnerable state in the U.S. Sea level rise influences rates of shoreline erosion, health of salt marshes and other wetlands, and salinity levels in estuarine rivers. Higher sea levels will increase the likelihood of flooding during heavy rainfall and may cause stronger storm surges and property damage as a result of coastal storms. The Sea Level Rise thematic maps feature potential inundation regions based on elevations and depict critical infrastructure in selected municipal areas.

More information



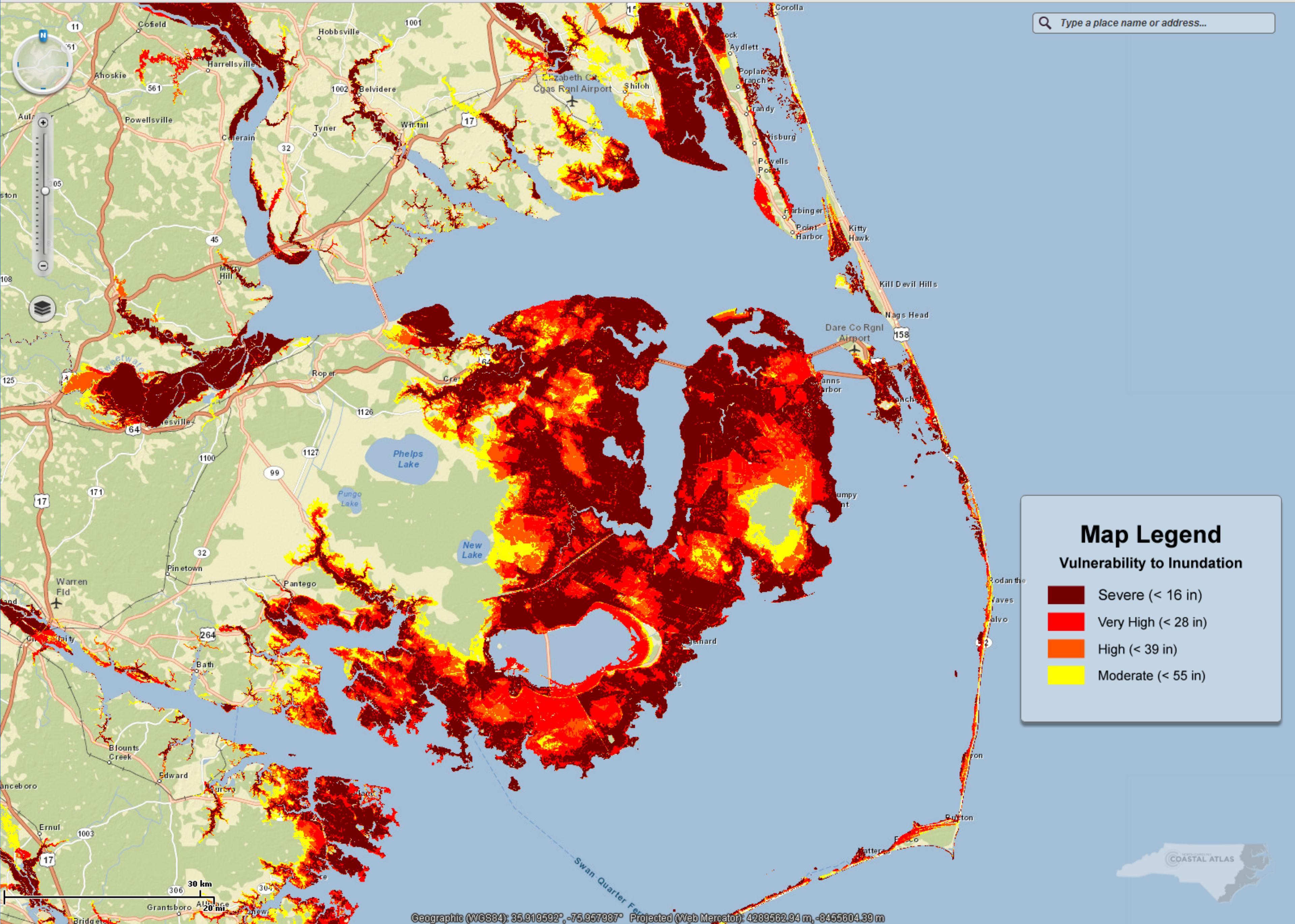
Ocean and Estuarine Shoreline Maps

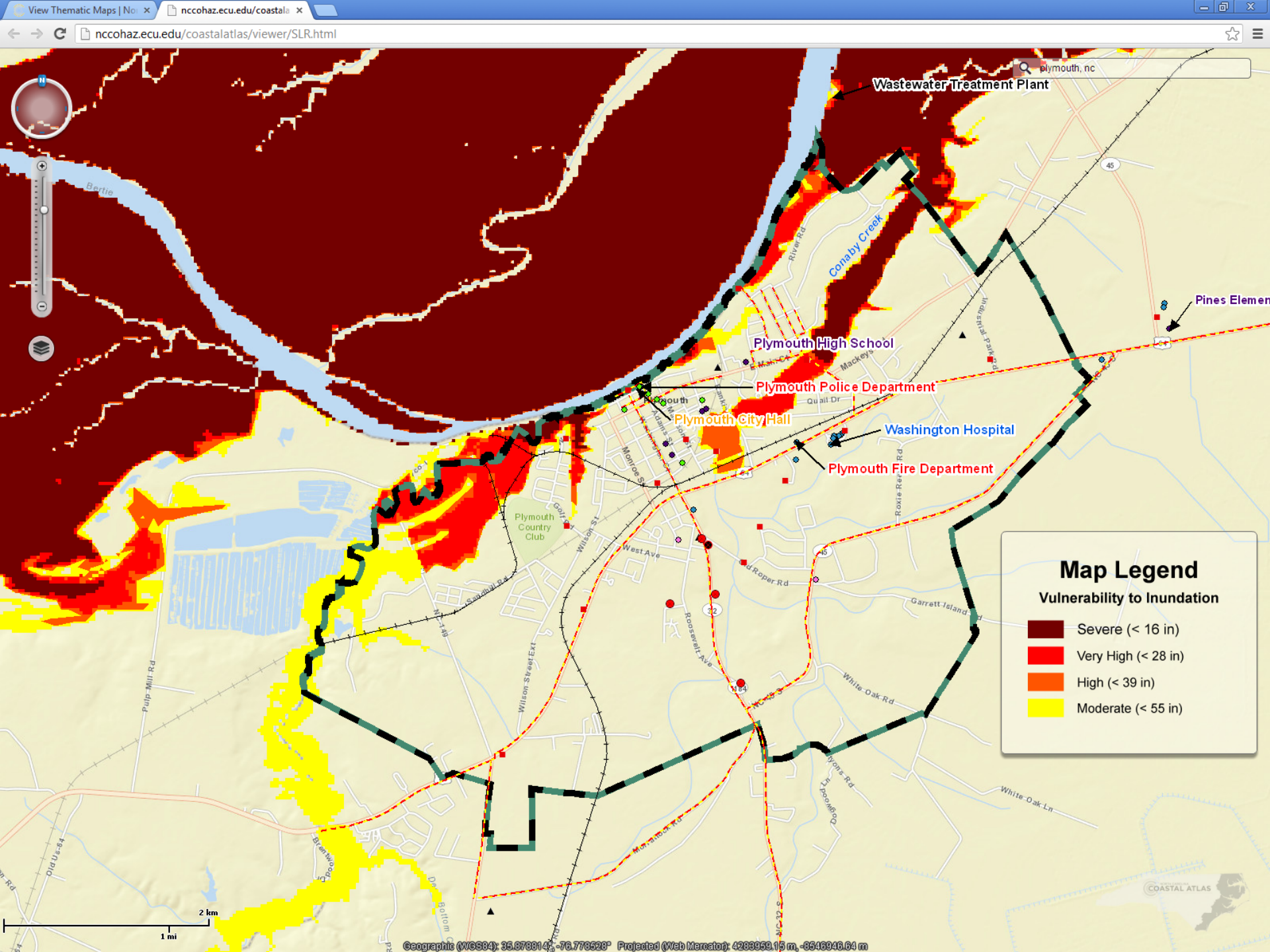
Shoreline erosion is a significant problem within the North Carolina's coastal area. Barrier islands and coastal wetlands protect shorelines and waterfront communities by absorbing the impact of storm surges, wind and waves. Sea level rise and intense storms put our public infrastructure, coastal communities and habitats for fish and other wildlife at risk. The Estuarine Shoreline thematic maps allow users to distinguish between undeveloped and stabilized shorelines, and depict where docks, piers and other structures are located.

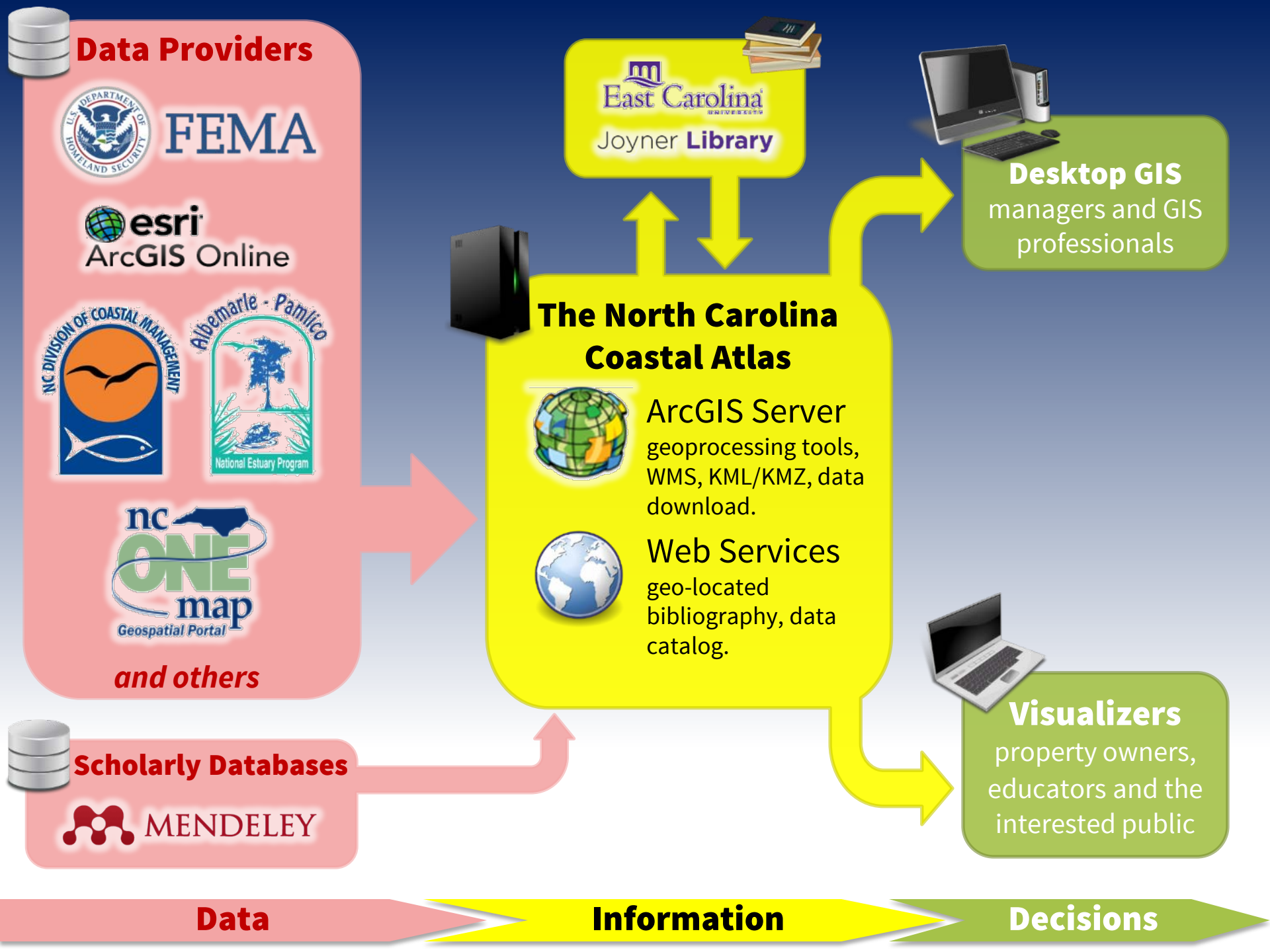
More information

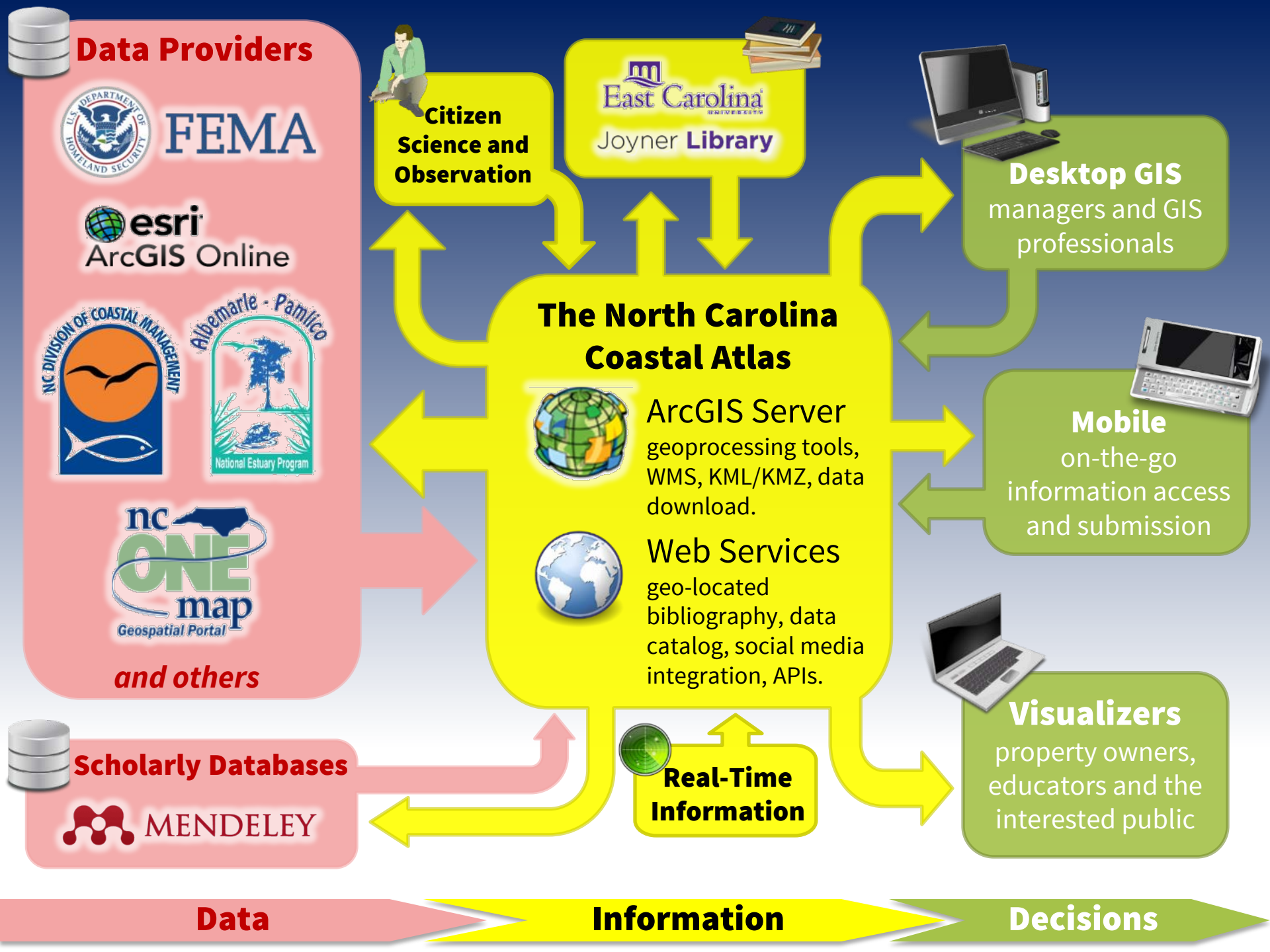
View Thematic Maps | No
nccohaz.ecu.edu/coastala

nccohaz.ecu.edu/coastalatlas/viewer/SLR.html




View Thematic Maps | No
nccohaz.ecu.edu/coastala
nccohaz.ecu.edu/coastalatlas/viewer/SLR.html
plymouth, nc
Wastewater Treatment Plant
Pines Elemen
Plymouth High School
Plymouth Police Department
Plymouth City Hall
Washington Hospital
Plymouth Fire Department
Conaby Creek
Bertie
Plymouth Country Club
Map Legend
Vulnerability to Inundation
Severe (< 16 in)
Very High (< 28 in)
High (< 39 in)
Moderate (< 55 in)
2 km
1 mi
COASTAL ATLAS
Geographic (WGS84): 35.878814°, -76.778528° Projected (Web Mercator): 4288959.15 m, -8548946.64 m


Data Providers
FEMA
esri
ArcGIS Online
NC Division of Coastal Management
Albemarle - Pamlico
National Estuary Program
nc ONE map
Geospatial Portal
and others
Scholarly Databases
MENDELEY
East Carolina University
Joyner Library
The North Carolina Coastal Atlas
ArcGIS Server
geoprocessing tools, WMS, KML/KMZ, data download.
Web Services
geo-located bibliography, data catalog.
Desktop GIS
managers and GIS professionals
Visualizers
property owners, educators and the interested public
Data
Information
Decisions


Data Providers
FEMA
esri ArcGIS Online
NC Division of Coastal Management
Albemarle - Pamlico National Estuary Program
nc ONE map Geospatial Portal
and others
Citizen Science and Observation
East Carolina University Joyner Library
The North Carolina Coastal Atlas
ArcGIS Server
geoprocessing tools, WMS, KML/KMZ, data download.
Web Services
geo-located bibliography, data catalog, social media integration, APIs.
Desktop GIS
managers and GIS professionals
Mobile
on-the-go information access and submission
Visualizers
property owners, educators and the interested public
Real-Time Information
Scholarly Databases
MENDELEY
Data
Information
Decisions

Potential Future Capabilities

NORTH CAROLINA COASTAL ATLAS

- Decision support tools
- Upload/download
- Editing web services
- Real-time data
- Public participation and citizen science

Sample citation:

NORTH CAROLINA COASTAL ATLAS

An integrated hypothesis for regional patterns of shoreline change along the Northern North Carolina Outer Banks, USA

E.D. Lazarus; B. Murray

Abstract

Combining analyses of plan-view shoreline change and shoreline curvature with existing nearshore geologic and bathymetric data and the results of a recent theoretical, large-scale shoreline-evolution model that couples geologic framework to alongshore sediment transport, we propose an integrated explanation for persistent patterns of shoreline change observed on the northern Outer Banks of North Carolina, USA. Concentrated sources of coarse-grained sediment, derived from relict fluvial stratigraphy or densely grouped relict inlet channels excavated from the shoreface, may both enable persistence of nearshore bathymetric anomolies and control multi-km-scale undulations in shoreline curvature, which in turn affect gradients in wave-driven alongshore sediment transport that drive long-term shoreline change. 2010 Elsevier B.V.

Place Published: Senator George J. Mitchell Center for Environmental and Watershed Research, University of Maine, 5710 Norman Smith Hall, Orono, ME 04469-5710, United States

Complete Citation

Lazarus, E. D., & A Murray B. (2011). An integrated hypothesis for regional patterns of shoreline change along the Northern North Carolina Outer Banks, USA. Marine GeologyMarine Geology. 281(1-4), 85-90.

NORTH CAROLINA COASTAL ATLAS

Bibliography Intentions

- Targeted bibliography
  - journal articles
  - technical reports
  - Books
  - theses/dissertations, and other works
- Display citation, and, if present, abstracts
- Provide links to electronic materials

Decision Support

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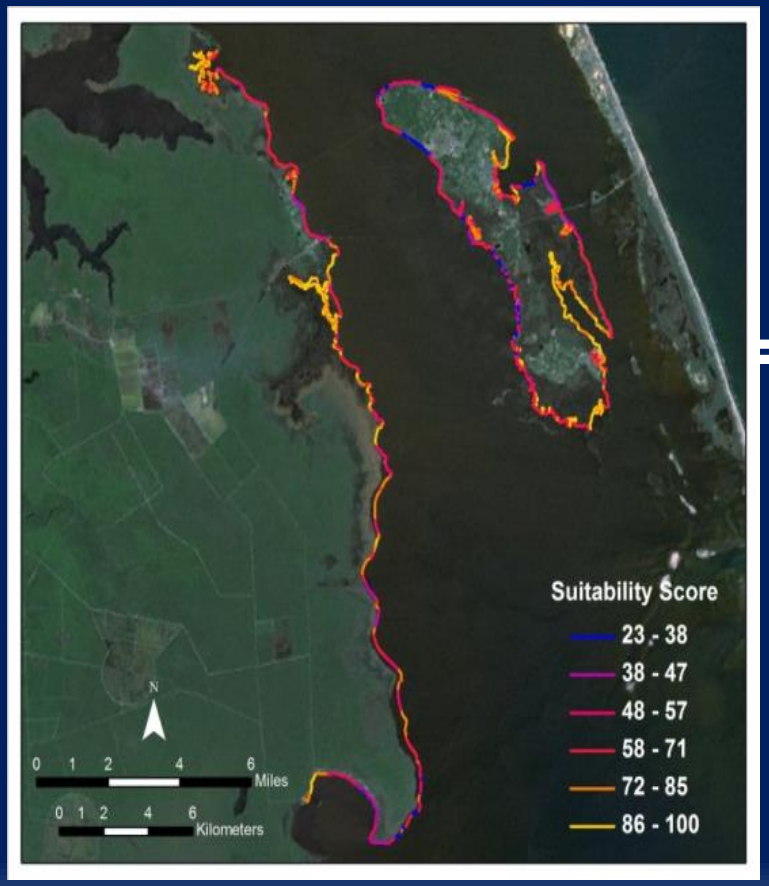
- Thematic maps
- Geoprocessing and user-interactive tools e.g.:
  - Living shoreline suitability
  - Marsh Equilibrium Model
- Interactive reference maps and catalog
  - Table of contents
  - Potentially 100s of map layers

Living Shoreline Screening Tool

Matt Carey, MA Geography, 2013, NOAA Coastal Services Center

- Multi-Criteria Evaluation
  - Depth
  - Fetch and wave energy
  - Erosion rate
  - Marsh type
  - Boat wake
  - Water clarity & SAV



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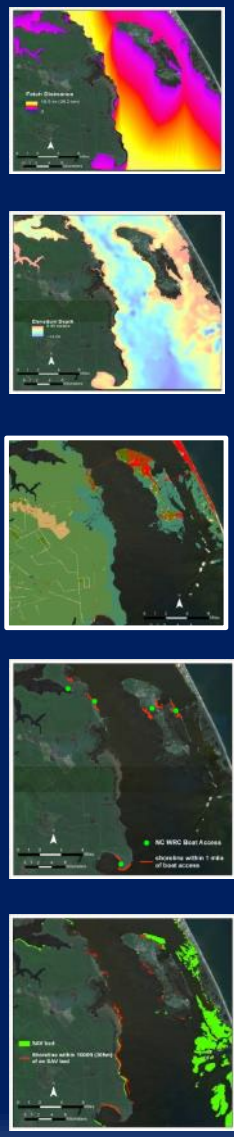
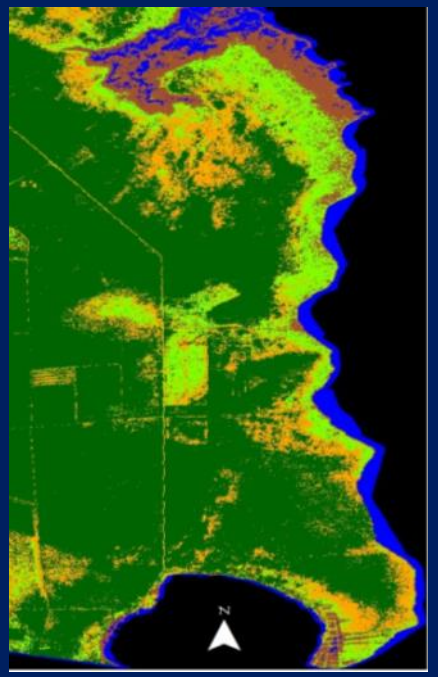
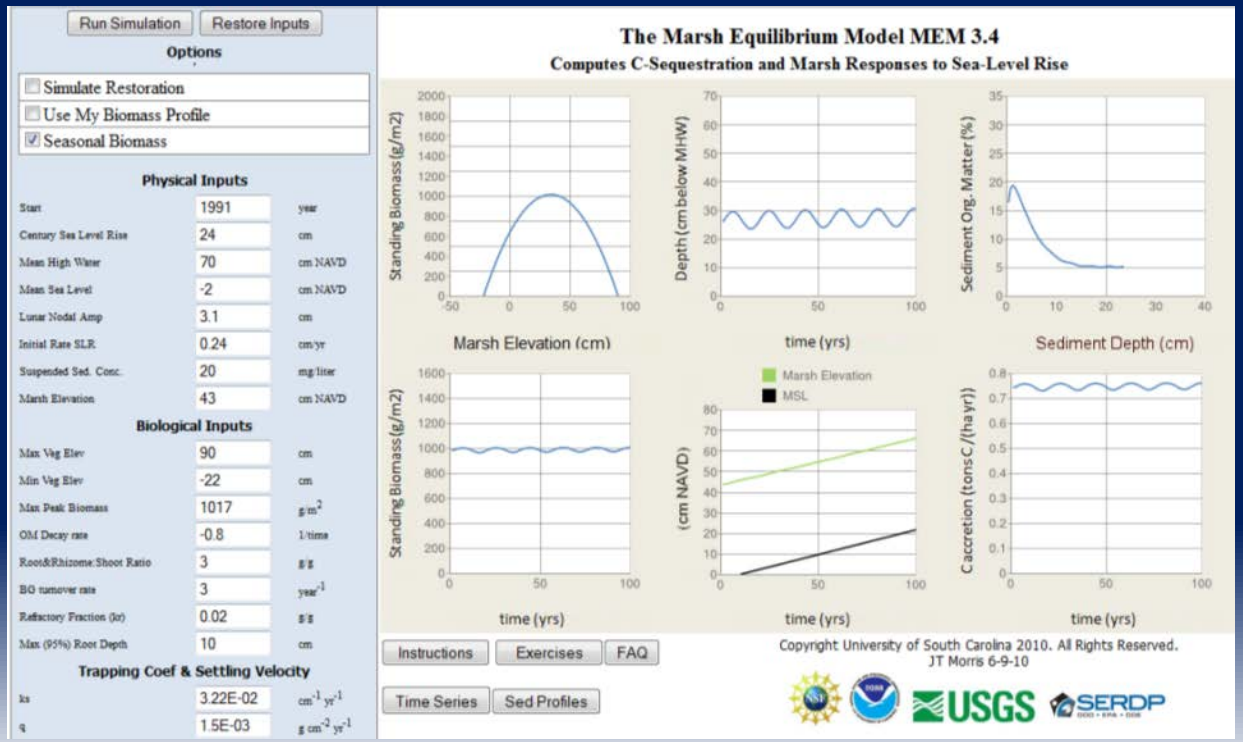


Wetlands: Green and Blue Infrastructure

- Community water resource infrastructure vulnerability (CISA)
- Marsh mapping and vulnerability (SALCC)





You can help

- Guide a coastal hazards theme of the atlas
  - Partnership between university researchers, students, and emergency mgt.
  - Priority case study/tool for an unmet need
- Visit the atlas and give feedback
- Use the atlas for coastal hazards planning
- Show the atlas and raise awareness