Mapping & Evaluating Wetlands in Coastal NC: Project Overview

Ken Richardson – NC Division of Coastal Management

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Outline: NC DCM Wetlands Mapping

1. Background
2. Methodology & Output
3. GIS Products
4. Where are we in 2020?

1 Background: Acknowledgments

- **James (Jim) Stanfill**
- Kelly Williams
- Chase Barnard
- Lori Sutter
- Mac Haupt
- Mike Wood
- Jim Wuenscher
- Brian Bledsoe
- Chris Bruce
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- Sheila Balsdon
- Sean McGuire
- Greg Meyer
- Cherri Smith
- Steven Stichter
- …and many others

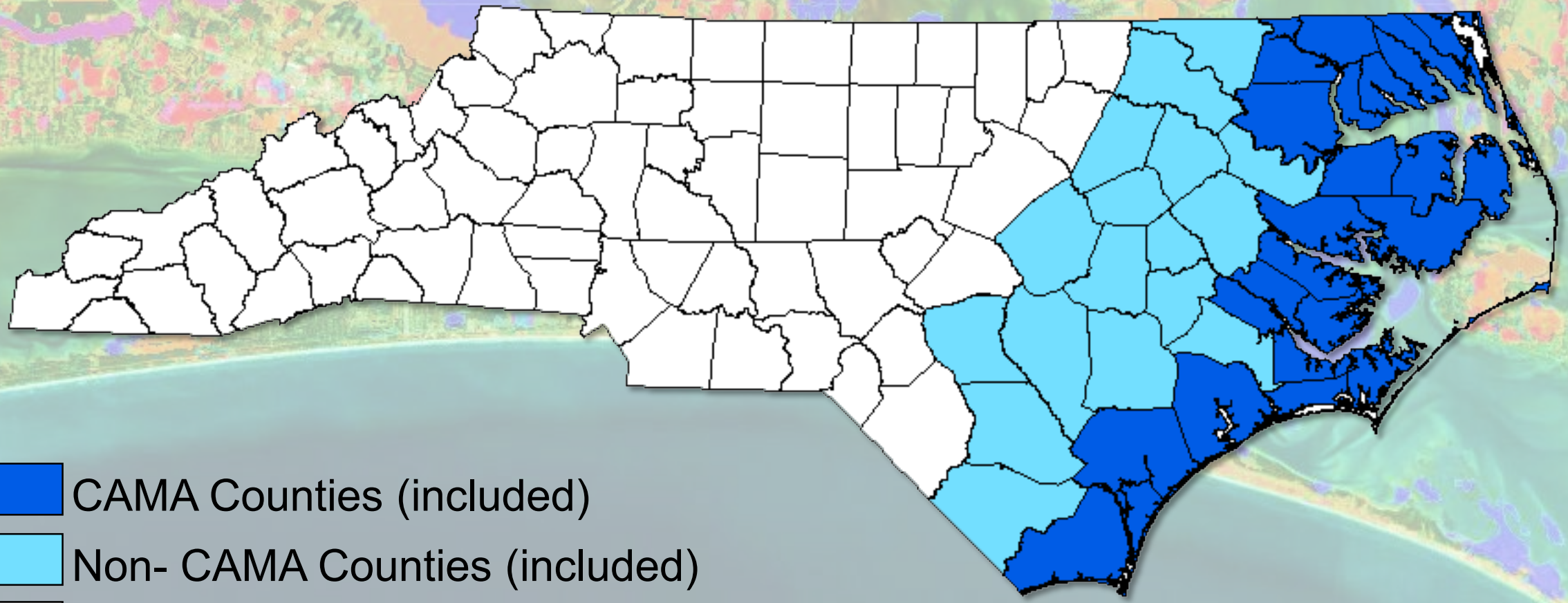
jim.stanfill@ncdenr.gov

1 Background: Conception and Components

1991 to 1999

1. **Wetlands Mapping & Inventory**
2. **Functional Assessment of Wetlands (NC-CREWS)**
3. **Wetland Restoration Identification & Prioritization**
4. Coordination with Wetland Regulatory Agencies
5. Potential Coastal Area Wetlands Policies
6. Local Land Use Planning

2 Methodology & Output: Geographic Extent



CAMA Counties (included)

Non- CAMA Counties (included)

No Data (not included)

2 Methodology & Output: Initial Considerations

1. **Limited Resources**
2. **Limited Time Frame**
3. **Large Geographic Area** *(over 2.5 million acres of wetlands)*

- **Wide range of users**
- **Planning Tool**
- **Basis of Functional Assessment and Potential Restoration Efforts**

Accurate, Comprehensive, Understandable GIS Method

2 Methodology: Wetland Inventory

Goal #1: Identify location, type, amount of wetlands in coastal NC starting with GIS data

- **National Wetland Inventory Maps**
  - Most comprehensive inventory of wetlands
- **NRCS Digital Soils Maps**
  - Particularly useful in marginal areas
  - Identify omitted areas
- **Landsat 30M TM Imagery - 1988, 1994**
  - Most recent data source
  - Identify omitted areas
  - Identify cut-over and cleared wetlands
- **Hydrography**
  - Utilized in HGM Classification

2 Methodology & Output: Wetland Classification

Data Inputs:

- Cowardin Classifications
- Water Regime
- Soil Type
- Satellite Imagery
- Landscape Position
- Hydrography
- Over 400 Field Site Evaluations

DCM Wetland Types:

- Bottomland Hardwood
- Pocosin
- Pine Flat
- Hardwood Flat
- Managed Pine
- Freshwater Marsh
- Salt/Brackish Marsh
- Estuarine Scrub Shrub
- Estuarine Forest
- Maritime Forest
- Headwater Swamp
- Human Impacted

2 Methodology& Output: Wetland Classification

Each wetland polygon generated by the overlay analysis contains the following information:

- All attributes from the source data layers
- DCM wetland type
- Hydrogeomorphology (HGM) Class (used in later analysis)

Some wetlands are given a "modifier"

- Drained or Ditched
- Cut-over
- Cleared

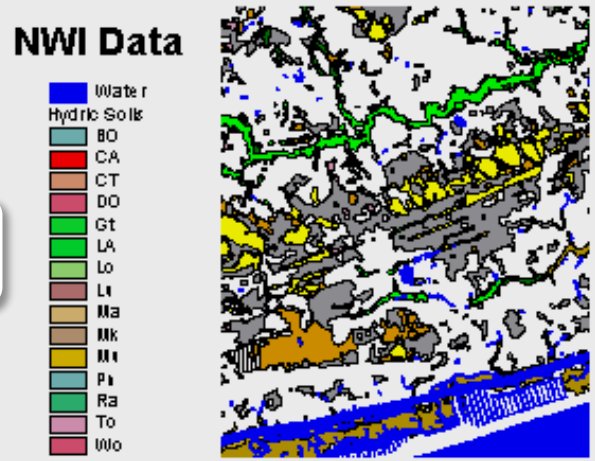
2

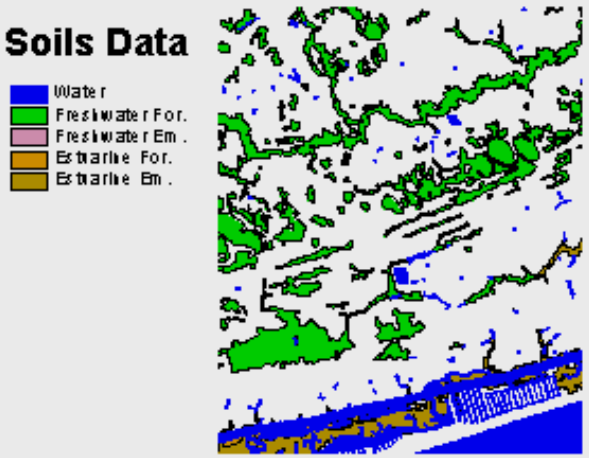
GIS Data Layers for DCM Wetland Mapping

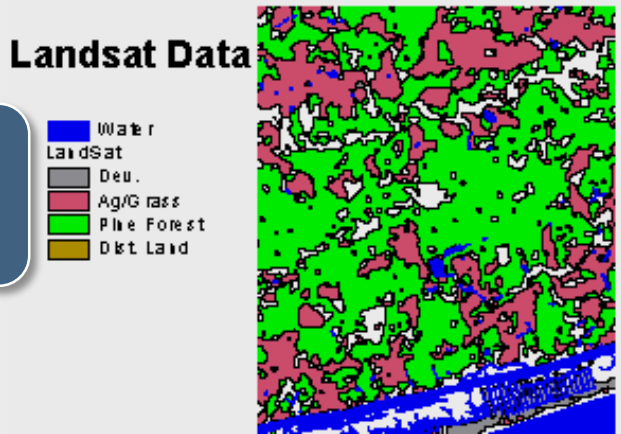
NWI Data

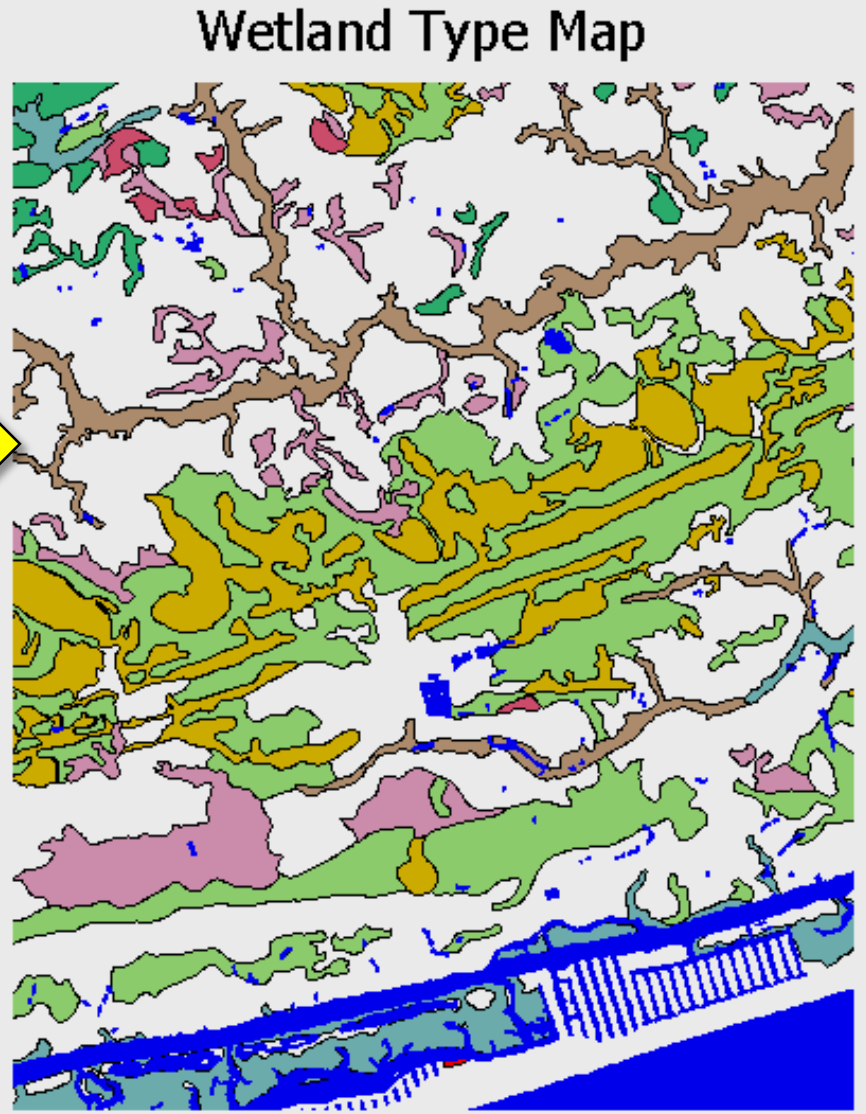
Soils Data

Landsat Data









2 Methodology & Output: Accuracy Assessment

- Over 600 field sites visited
- Accuracy
  - 89% for wetlands overall
  - 97% (marsh, bottomland hardwoods, swamps & pocosin
  - 65%-75% headwater forest, hardwood flats & managed pines.

2 Methodology & Output: Limitations of Wetlands Maps

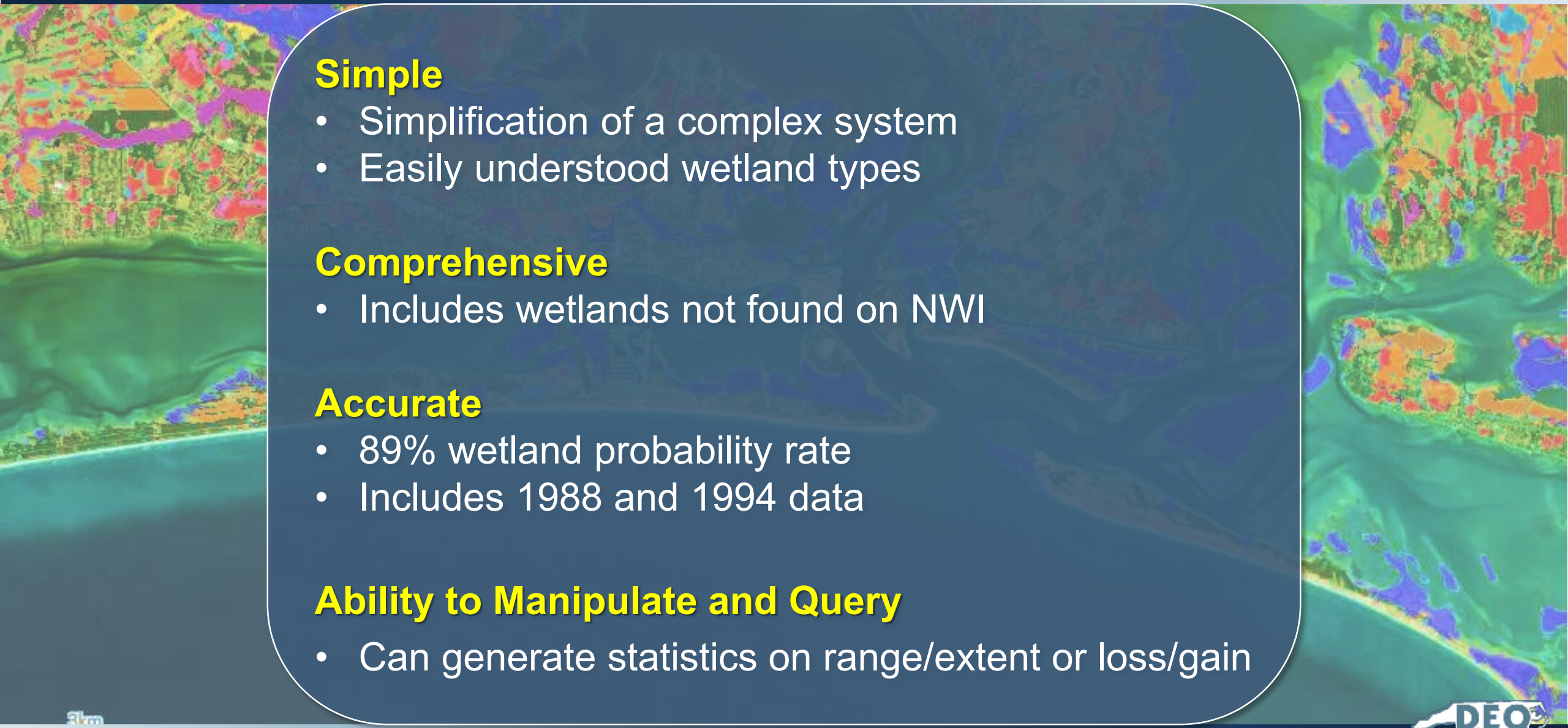
Limitations

- Minimum Mapping Size: 1 acre
- Source data is not perfect
- Maps show only the probability of finding a wetland in a particular area

Implications

- Small wetlands not included
- Data are an **Underestimation** of wetlands
- Maps **Cannot** be used for on-site wetland determinations

3 Methodology & Output: Strengths of Wetlands Maps



Simple
- Simplification of a complex system
- Easily understood wetland types

Comprehensive
- Includes wetlands not found on NWI

Accurate
- 89% wetland probability rate
- Includes 1988 and 1994 data

Ability to Manipulate and Query
- Can generate statistics on range/extent or loss/gain

2 Methodology & Output: NC-CREWS

Goal #2: North Carolina Coastal Region Evaluation of Wetland Significance

48 Separate Parameters Analyzed

Water Quality

- Nonpoint Source Removal
- Floodwater Cleansing

Hydrology

- Surface Runoff Storage
- Floodwater Storage
- Shoreline Stabilization

Wildlife Habitat

- Terrestrial Wildlife
- Aquatic Life

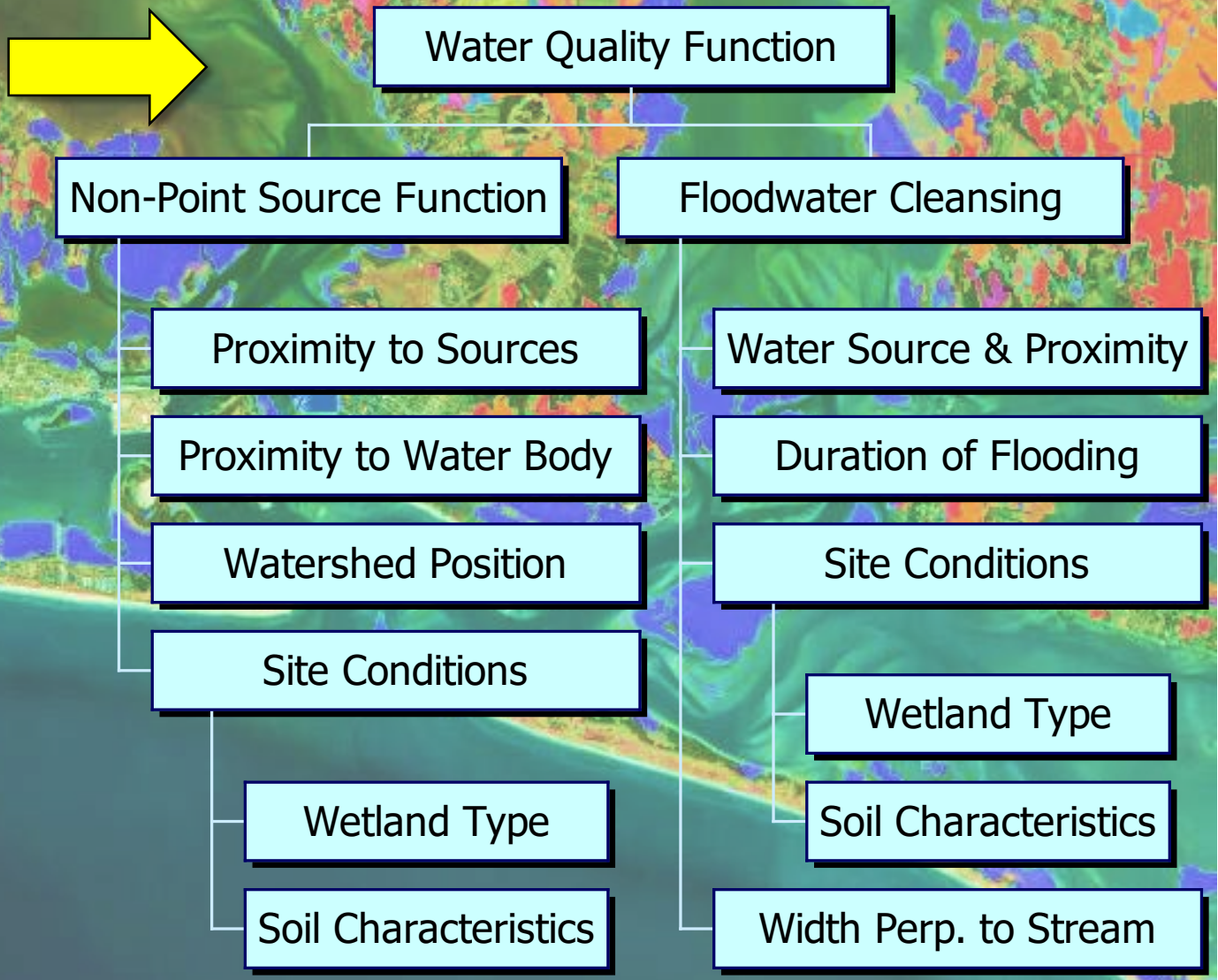
Potential Risk

- Wetland Extent and Rarity
- Replacement Difficulty
- Land Use Characteristics

2 Methodology & Output: NC-CREWS

Example: Water Quality Function

Considerations of both the capability and the opportunity to perform a specific function.



2 Methodology & Output: NC-CREWS

The model produces ratings for each wetland polygon:

- **Beneficial** Functional Significance
- **Substantial** Functional Significance
- **Exceptional** Functional Significance

Wetlands can be evaluated on the basis of an overall rating or in terms of individual functions.

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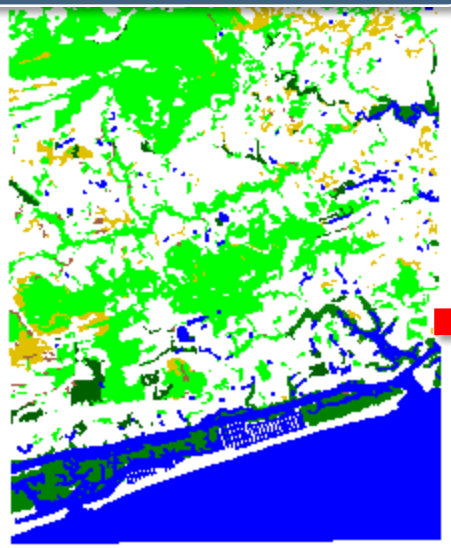
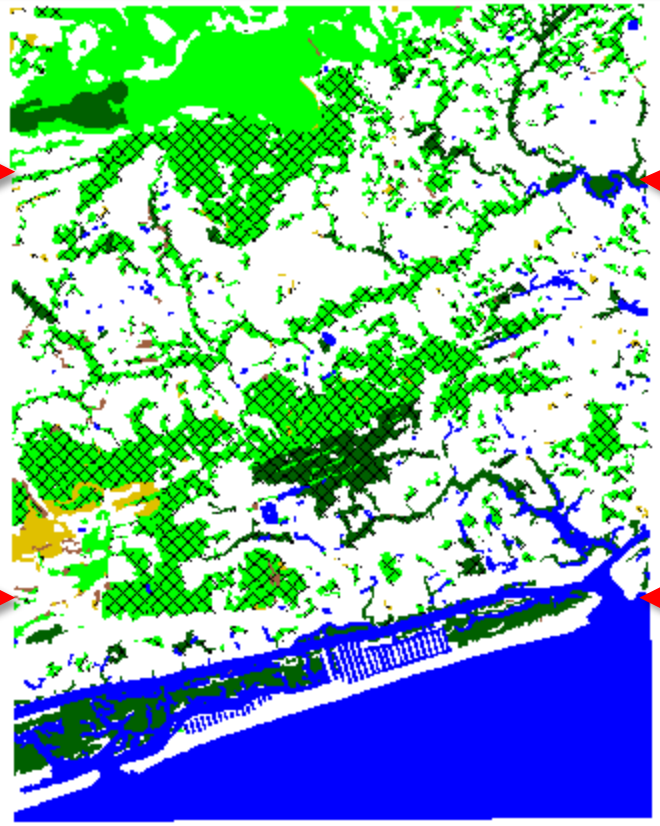
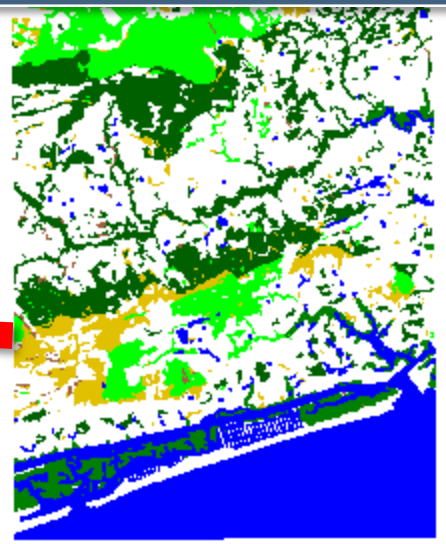
Water Quality Functions



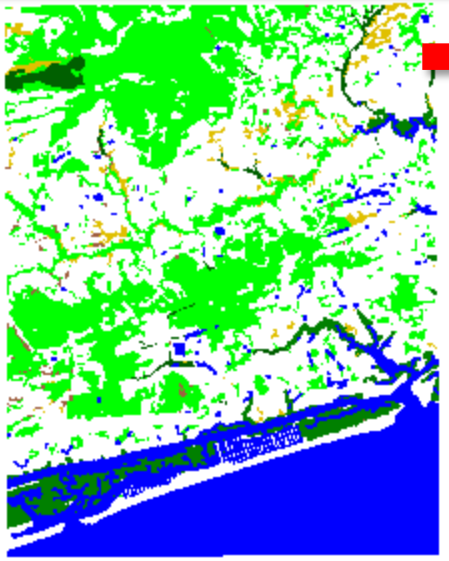
Overall Wetland Functional Significance



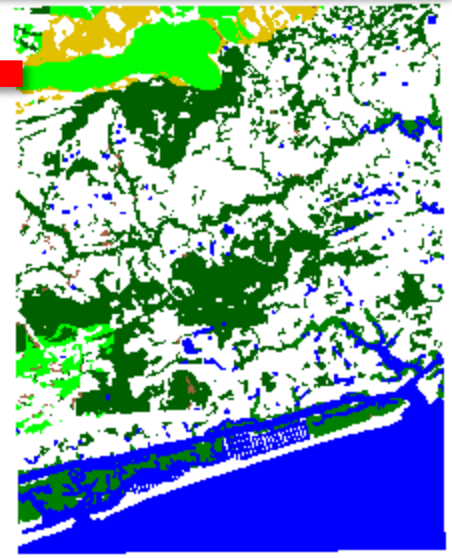
Habitat Functions



Hydrologic Functions



Potential Risks



2 Methodology & Output: NC-CREWS Applications

Development and Transportation Planning

- Wetland Identification of Most Significant Wetlands
- Wetland Avoidance of Most Significant Wetlands
- Identification of Functional Impacts

CAMA Land Use Planning

- Identification of Fragile Areas
- Development of Conservation Classification and Land Use Classification Maps

Acquisition of Ecologically Significant Wetlands

2 Methodology & Output: Enhancement, Restoration, & Creation

Goal #3: Wetland Enhancement, Restoration & Creation Potential

- **Wetland Creation** is the process of creating a wetland where none has existed before.
- **Restoration** refers to creating a wetland on a site which was at one time a wetland but currently is not.
- **Enhancement** is the process of enhancing an existing wetland to a higher level of functioning.

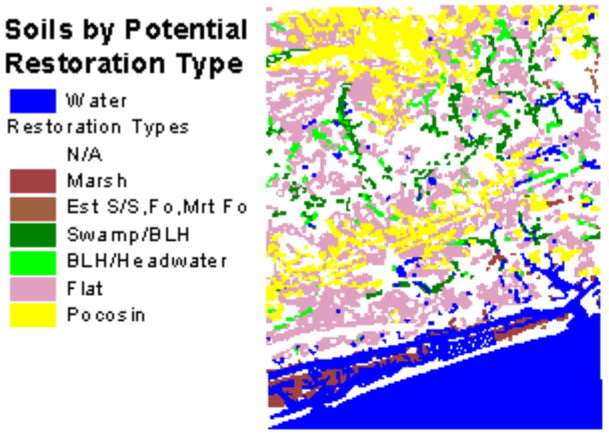
2 Step Process:

- **Step 1:** Classification of restoration type
- **Step 2:** Identification of Sites

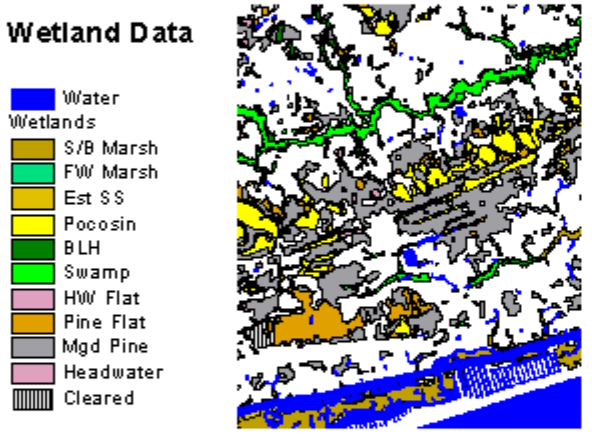
2

GIS Data Layers for Potential Wetland Restoration Site Map

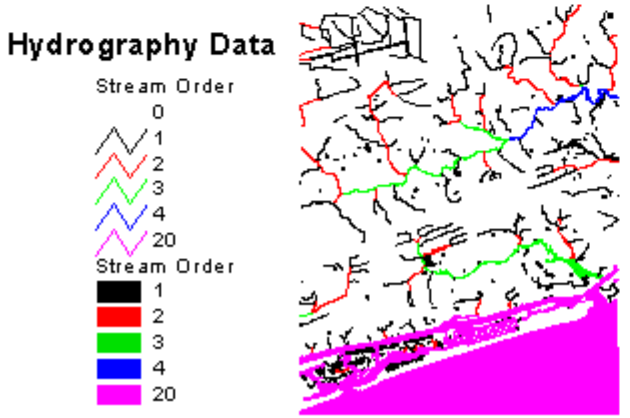
Soils by Potential Restoration Type



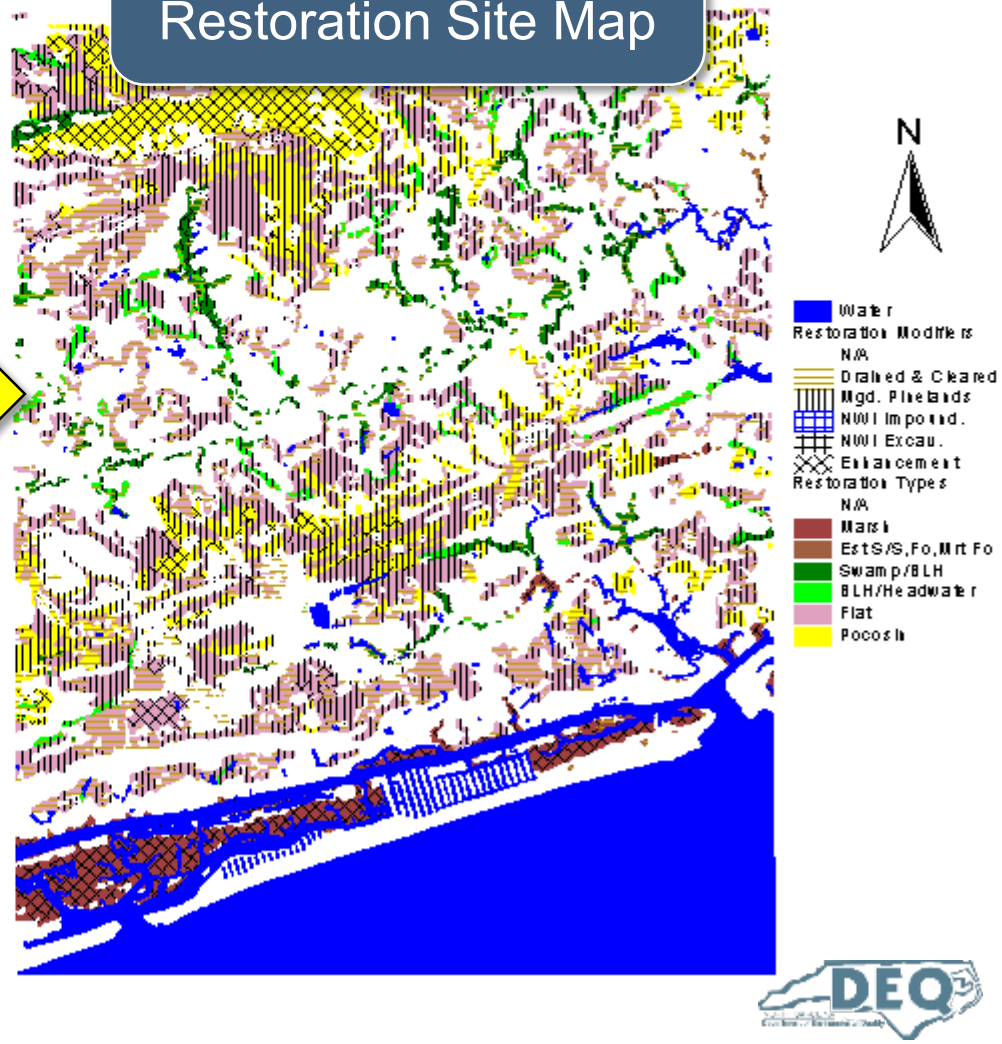
Wetland Data



Hydrography Data



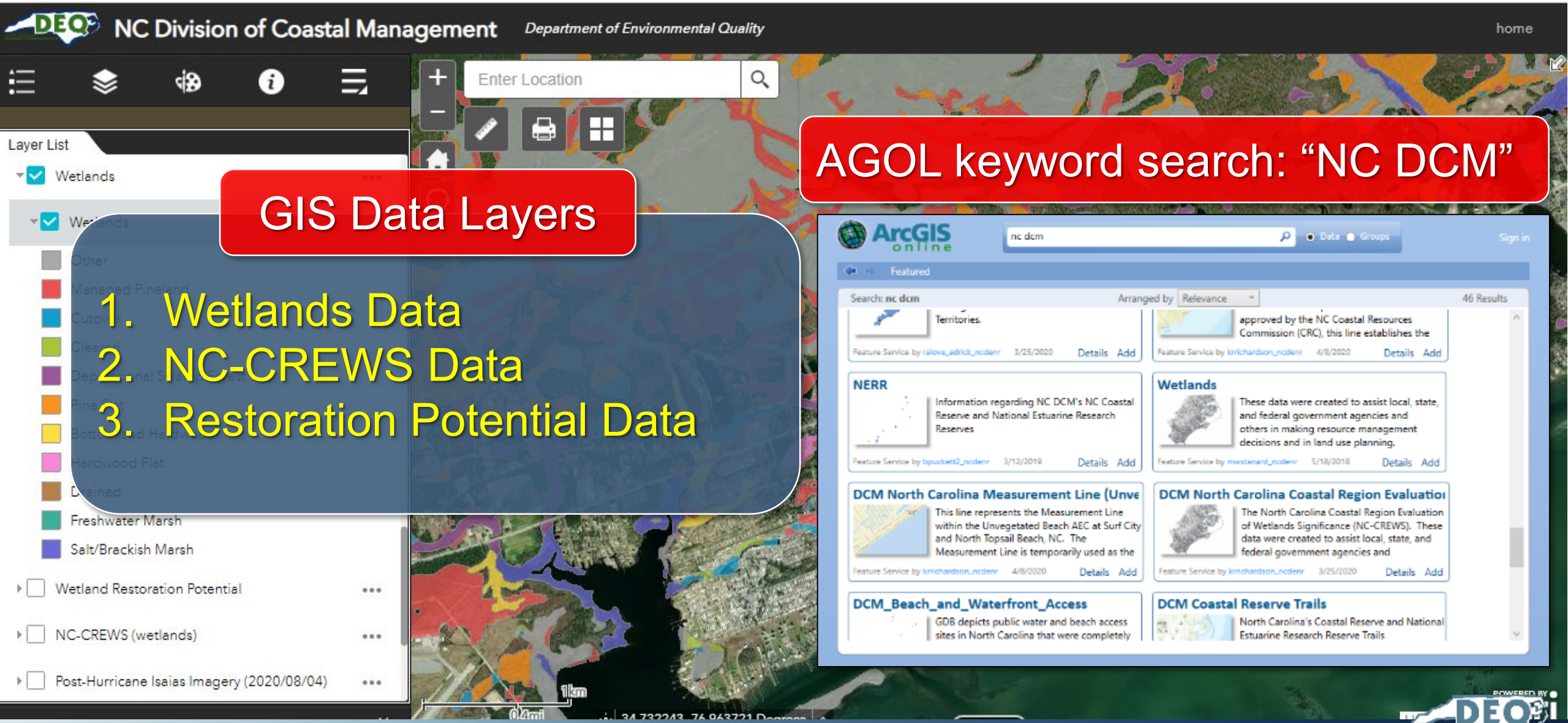
Potential Wetlands Restoration Site Map



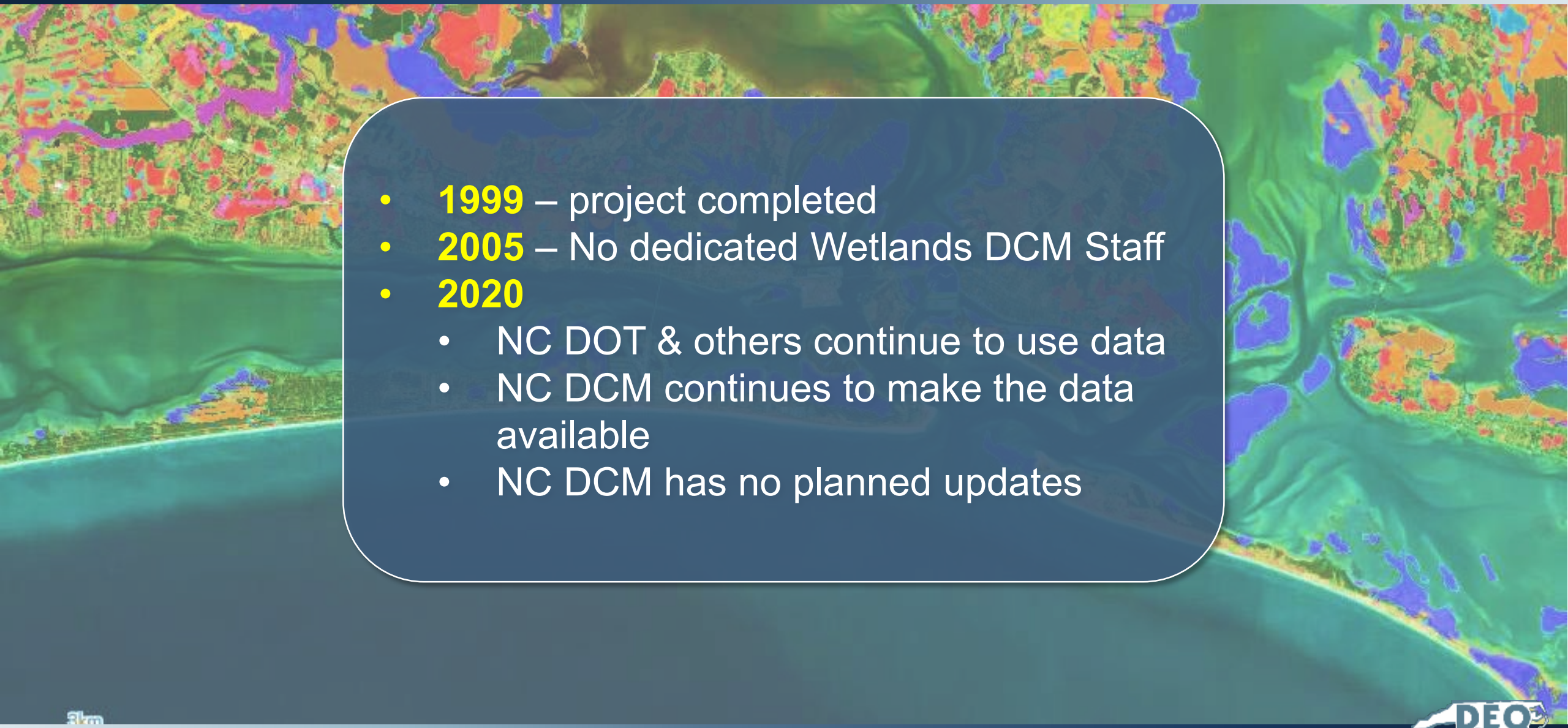
2 Methodology & Output: Benefits of Restoration Potential Data

- Quick identification or scan of potential restoration sites.
- Better management of sites over a large geographic area.
- Landscape level/Ecological approach vs. “For Sale“ Sign.
- Further analysis can be used to prioritize sites based upon potential to perform specific functions.

3 GIS Products: ArcGIS Online (AGOL) & Downloads



4 Where are we in 2020?



- **1999** – project completed
- **2005** – No dedicated Wetlands DCM Staff
- **2020**
  - NC DOT & others continue to use data
  - NC DCM continues to make the data available
  - NC DCM has no planned updates

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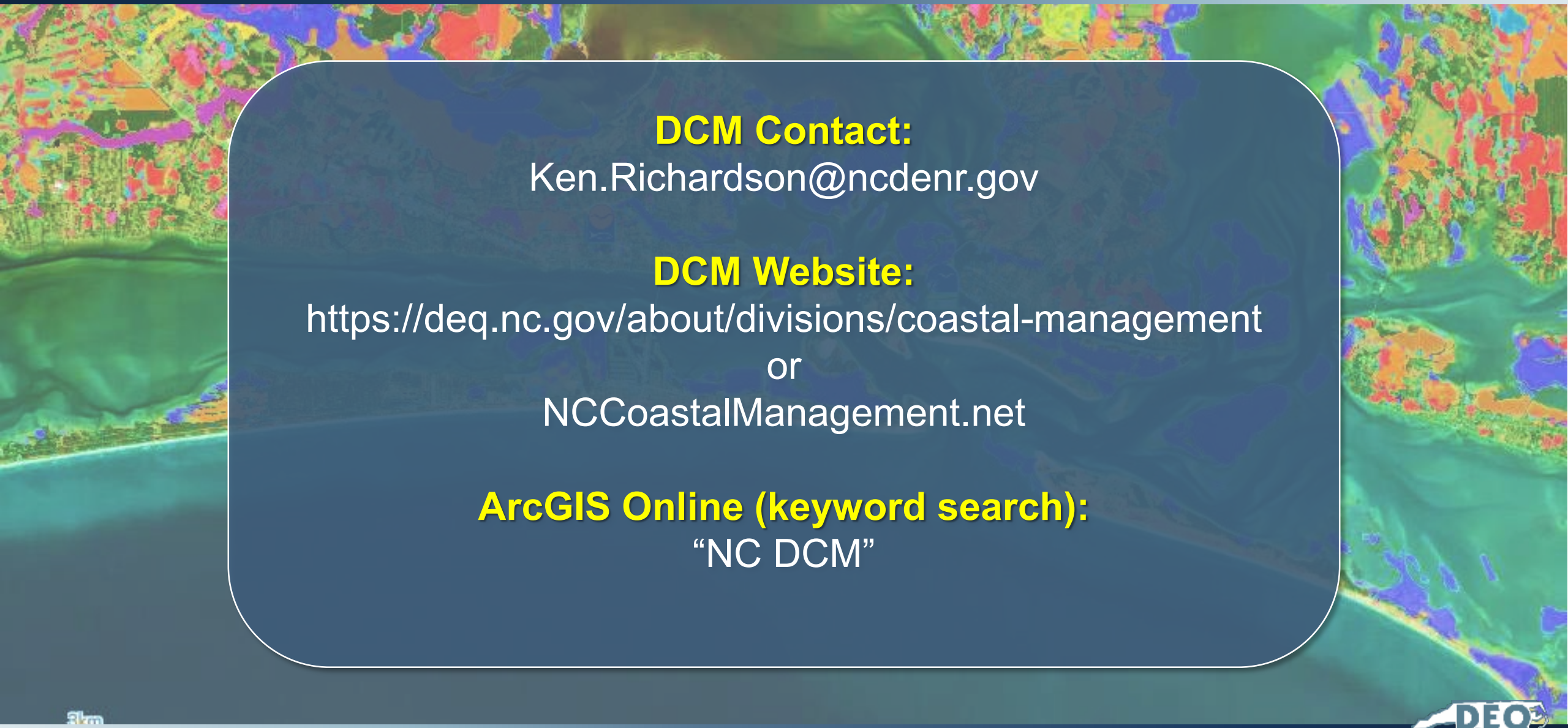

DCM Contact:
Ken.Richardson@ncdenr.gov

DCM Website:
https://deq.nc.gov/about/divisions/coastal-management
or
NCCoastalManagement.net

ArcGIS Online (keyword search):
“NC DCM”