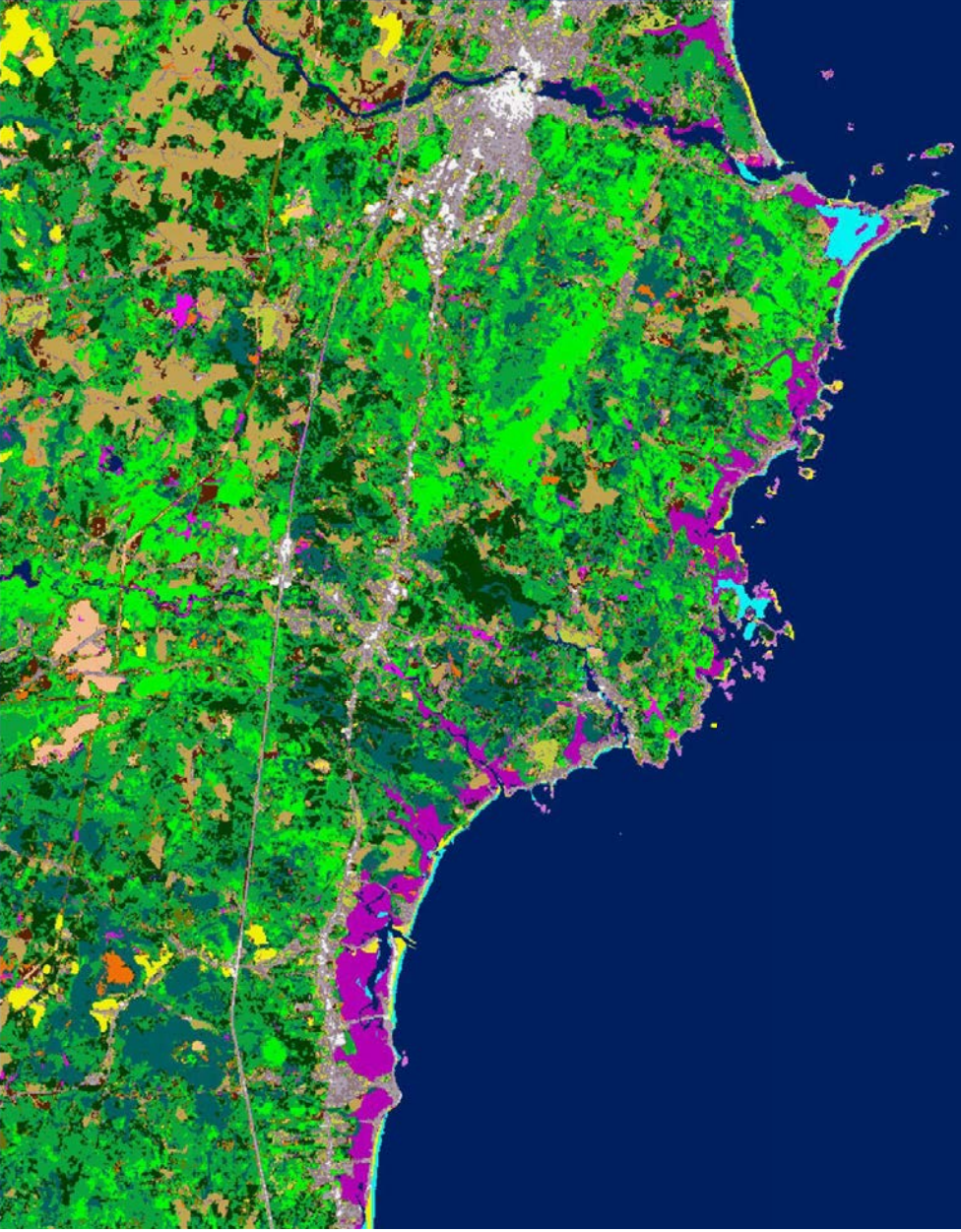

Using Land Cover Data to Understand Wetland Trends

Wetland Mapping Consortium
Webinar
May 21, 2014

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Outline

- Coastal Change Analysis Program (C-CAP) Overview
- Recent improvements to C-CAP wetland classes
- Comparison of C-CAP to detailed wetland inventories of change
- C-CAP on the Digital Coast
- The Land Cover Atlas
- High Resolution land cover

The Coastal Change Analysis Program (C-CAP)

- National coastal land cover and change mapping program
- Inventory of intertidal areas, wetlands, and adjacent uplands
- Consistent, accurate products through the use of standard data and methods
- Designed to help improve understanding of linkages between land use / change and the environment
- Authoritative source for land cover in coastal U.S.
  - Federal Geographic Data Committee (FGDC) designated National Geospatial Data Assess (NGDA)

C-CAP Regional Land Cover and Change

- NOAA maps 25% of the contiguous U.S.
- Coastal expression of the NLCD (National Land Cover Database)

  NLCD is 90%+ C-CAP in coastal areas
- Added focus on wetlands detail
- National snapshot, updated every five years (1996, 2001, 2006, 2011)

  Some areas go further back
- Produced through change detection and update mapping process

Coastal Land Cover Classes

Developed
- Developed, High Intensity
- Developed, Medium Intensity
- Developed, Low Intensity
- Developed, Open Space

Agricultural
- Cultivated Crops
- Pasture/Hay

Rangeland
- Grassland and Herbaceous
- Scrub / Shrub

Forest Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest

Barren Land
- Barren Land
- Perennial Ice/Snow

Water
- Open Water
- Palustrine Aquatic Bed
- Estuarine Aquatic Bed

Wetlands
- ***Woody Wetlands***
  - *Palustrine Forested Wetland*
  - *Palustrine Scrub/Shrub Wetland*
  - *Estuarine Forested Wetland*
  - *Estuarine Scrub/Shrub Wetland*
- ***Herbaceous Wetlands***
  - *Palustrine Emergent Wetland*
  - *Estuarine Emergent Wetland*

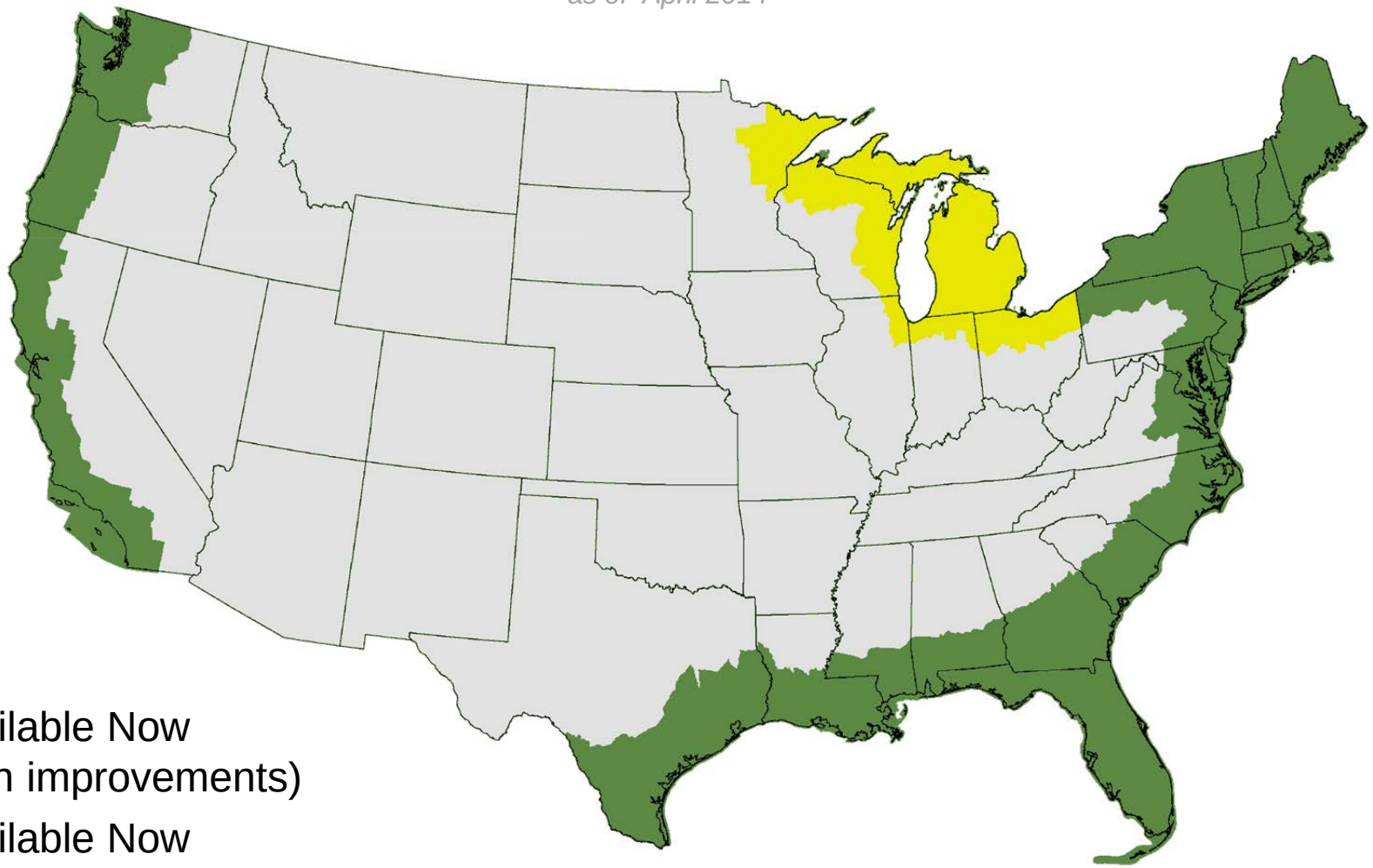
- Unconsolidated Shore

Alaska Only Classes*
- Dwarf Scrub
- Sedge/Herbaceous
- Lichens
- Moss

These go to Eleven...

2010 / 2011 C-CAP update status

as of April 2014



- Available Now (with improvements)
- Available Now (without improvements)

Wetland Potential Modeling

Background:

- Improve wetland mapping accuracies
- Use data and methods extendable nationally
- Align with Federal Geographic Data Committee (FGDC) wetland mapping standard
- Provide flexibility for multiple wetland definitions
- Integrate RS and ancillary data

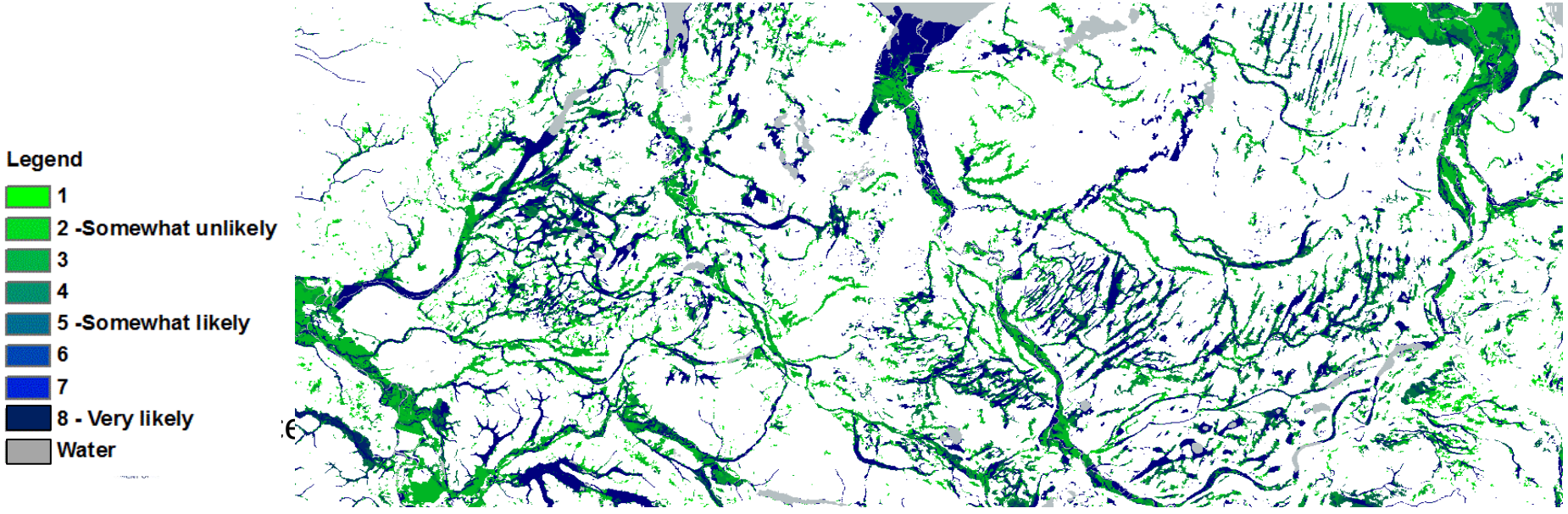
Challenges:

- Wetlands are not always wet
- Canopy is not easy to see through
- Landsat is often not the best scale for wetlands
- Ancillary data has not been available historically
- Best available data all have warts of their own

Input Data Included: National Wetlands Inventory (NWI), Gridded Soil Survey Geographic (gSSURGO) Database, National Hydrography Dataset (NHD), National Elevation Data (NED), Landsat TM Imagery, Existing C-CAP Land Cover

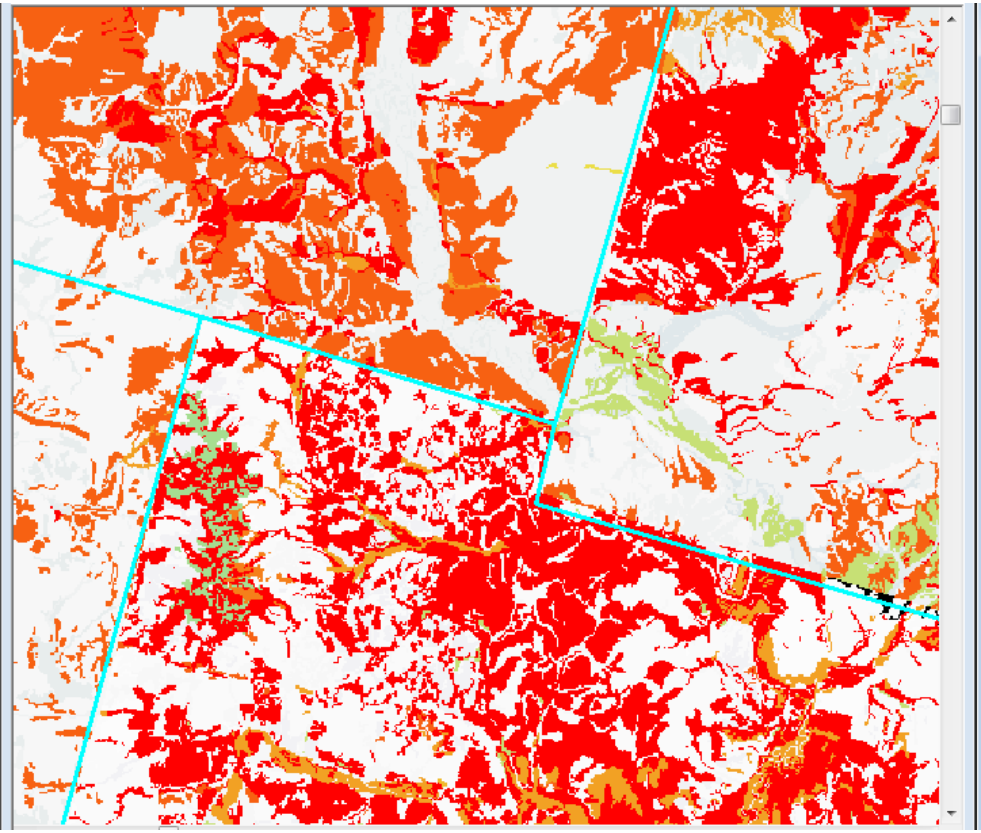
Wetland Potential Modeling

- <u>Step 1:</u> Create a wetland potential surface from nationally available / standard data sets.
  - Use the strengths of each to overcome the weaknesses of others.
- <u>Step 2:</u> Use this layer to flag and correct the mapping of wetlands land cover categories.
  - Flag uplands that could be wet and wetlands that might not be.

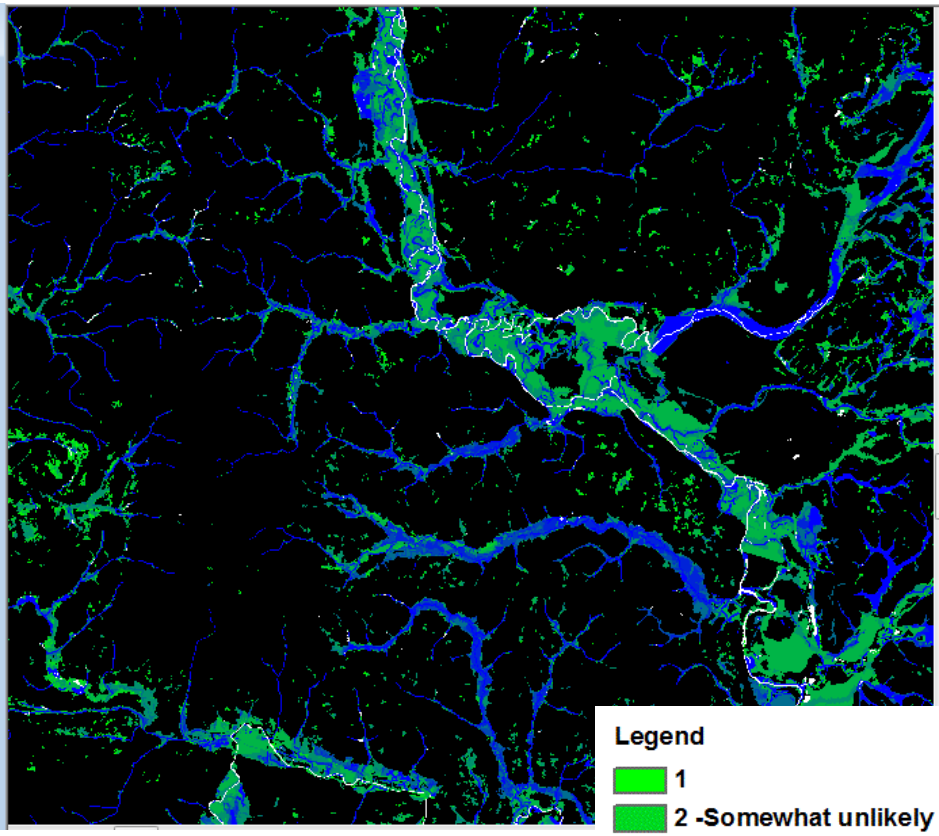


Wetland Potential Modeling

A Comparison of Input and Output



Input gSSURGO



Output Potential Layer

Comparisons of C-CAP to the National Wetlands Inventory

Inventories of Change Case Studies

Horry County, South Carolina

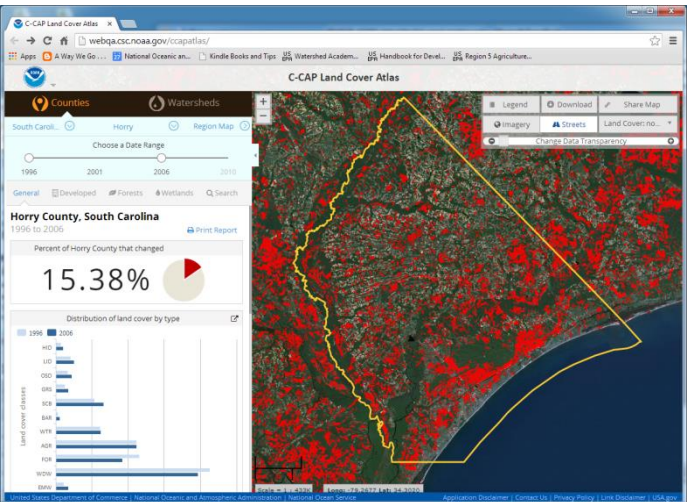
Jasper County, South Carolina

Harrison County, Mississippi

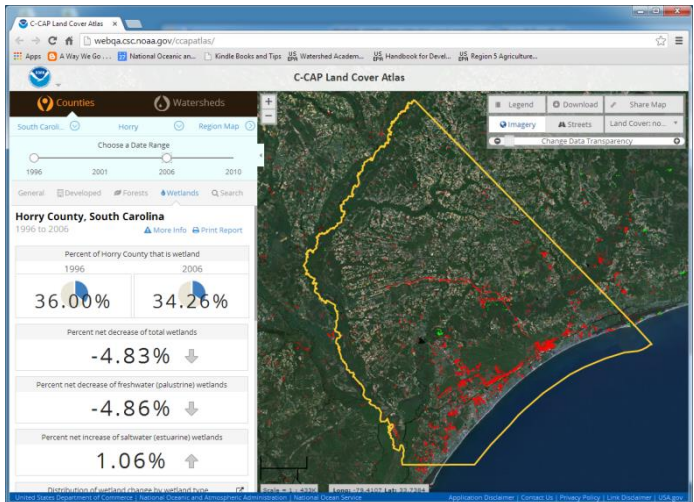
Horry County, South Carolina

Area of Wetlands by Type, 2006

Wetland Type	NWI	C-CAP
Palustrine Forested	217,218 (79.6%)	234,869 (73.2%)
Palustrine Scrub	36,832 (13.5%)	62,330 (19.4%)
Palustrine Emergent	9,094 (3.3%)	21,827 (6.8%)
Estuarine	2,479 (0.9%)	1,736 (0.6%)
Ponds	7,342 (2.7%)	N/A
TOTAL	**272,964 acres**	**320,755 acres**



Areas of Change
1996 to 2006



Areas of
Wetland Change
1996 to 2006

Horry County, South Carolina

Wetland Loss by type

Wetland Type Lost	NWI	C-CAP
Palustrine Forested	11,941 (81.8%)	7,364 (89.8%)
Palustrine Scrub	2,299 (15.7%)	601 (7.3%)
Palustrine Emergent	365 (2.5%)	236 (2.9%)
TOTAL	**14,605 acres**	**8,201 acres**

Wetland Loss by Cause

Lost To	NWI	C-CAP
Development	7,769 acres	6,997 acres
Agriculture	800 acres	594 acres
Barren Land	N/A	610 acres
Transportation / Utility	985 acres	N/A
Rangeland	435 acres	N/A
Timber / Silviculture	4,316 acres	N/A

Horry County, South Carolina

- C-CAP mapped 8,201 acres of direct loss
  - Compared to 14,605 acres in the NWI inventory of change
  - C-CAP picks up 56 percent of those losses directly
- C-CAP also mapped an additional 3,226 acres of change within these NWI loss areas
  - Mapped as changes in wetland type, not loss to upland
  - If included C-CAP picks up 78 percent of these features

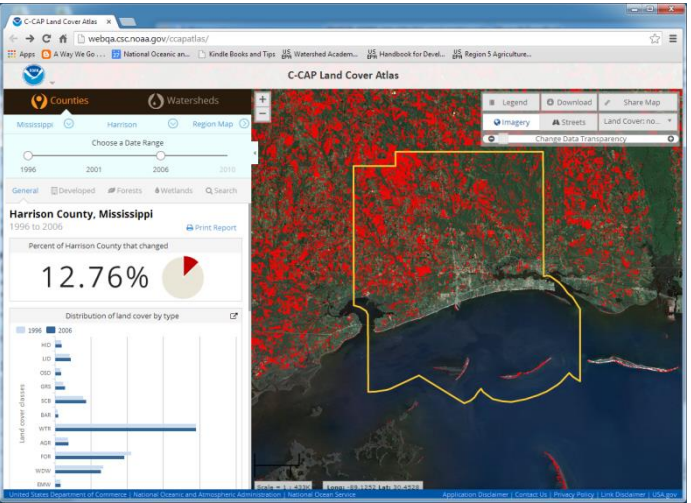
Horry County, South Carolina

- Many changes C-CAP mapped did not result in a loss
  - There were 27,597 acres of change within NWI features
  - 24,371 did not result in change in hydrology
- C-CAP mapped 35,597 acres of change and loss
  - Compared to 27,926 acres in the NWI inventory of change (total of 14,605 acres of loss and 12,926 acres of change)

Harrison County, Mississippi

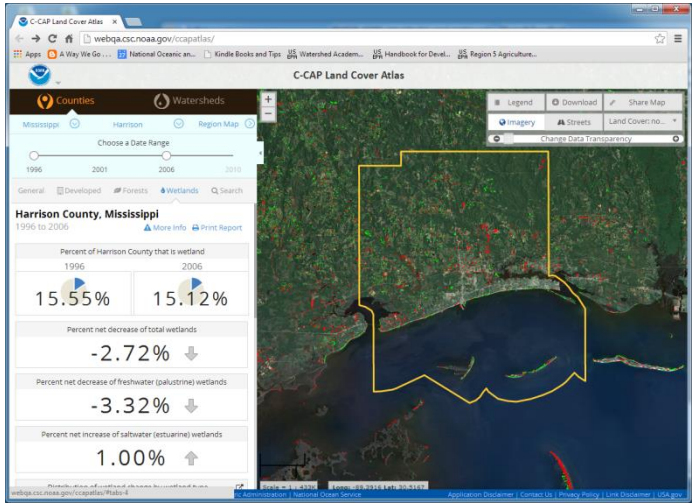
Area of Wetlands by type, 2006

Wetland Type	NWI	C-CAP
Palustrine Forested	58,401	85,670
Palustrine Scrub	7,400	18,829
Palustrine Emergent	4,243	3,821
Estuarine	4,875	7,686
Unconsolidated Shore	1,013	1,702
Aquatic Bed	324	19
TOTAL	**78,675 acres**	**117,746 acres**



Areas of Change
1996 to 2006

Areas of
Wetland Change
1996 to 2006



Harrison County, Mississippi

Wetland loss by cause

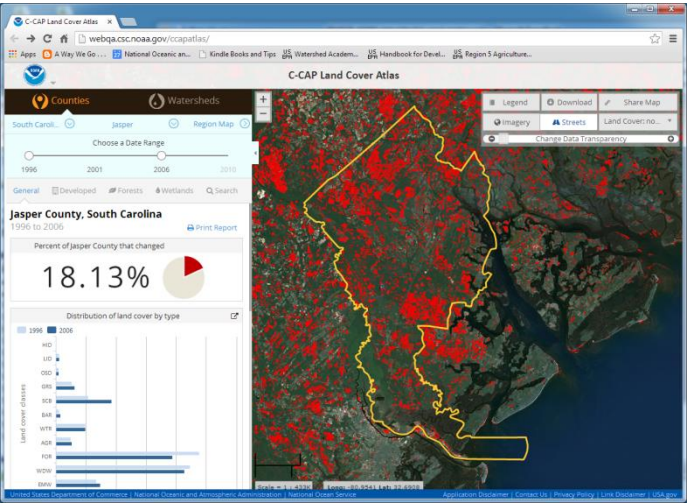
Lost To	NWI	C-CAP
Development	1,299 (62%)	1,273 (62%)
Agriculture	82.3 (4%)	353 (17%)
Barren Land	695.4 (34%)	441 (21%)
TOTAL	2,077 acres	2,067 acres

- **Primary driver of loss was development**
- **Little to no losses due to Silviculture activities**
  - Only 487 acres of change was mapped by NWI inventory
- **Trend has continued in the county**
  - C-CAP mapped 1,242 acres of loss (2006 to 2010)

Jasper County, South Carolina

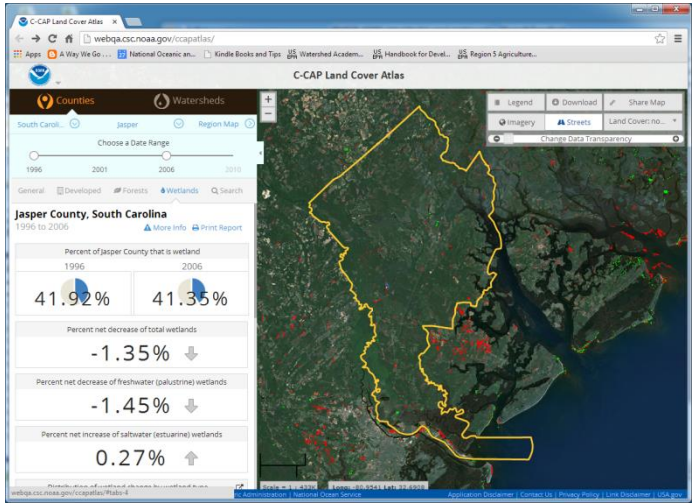
Area of Wetlands by type, 2006

Wetland Type	NWI	C-CAP
Palustrine Forested	109,178 (59.4%)	128,128 (60.6%)
Palustrine Scrub	21,467 (11.7%)	32,576 (15.5%)
Palustrine Emergent	19,904 (10.8%)	22,528 (10.6%)
Estuarine	32,404 (17.6%)	26,784 (12.7%)
Unconsolidated Shore	709 (0.3%)	1,549 (0.7%)
TOTAL	**183,662 acres**	**211,565 acres**



Areas of Change
1996 to 2006

Areas of
Wetland Change
1996 to 2006



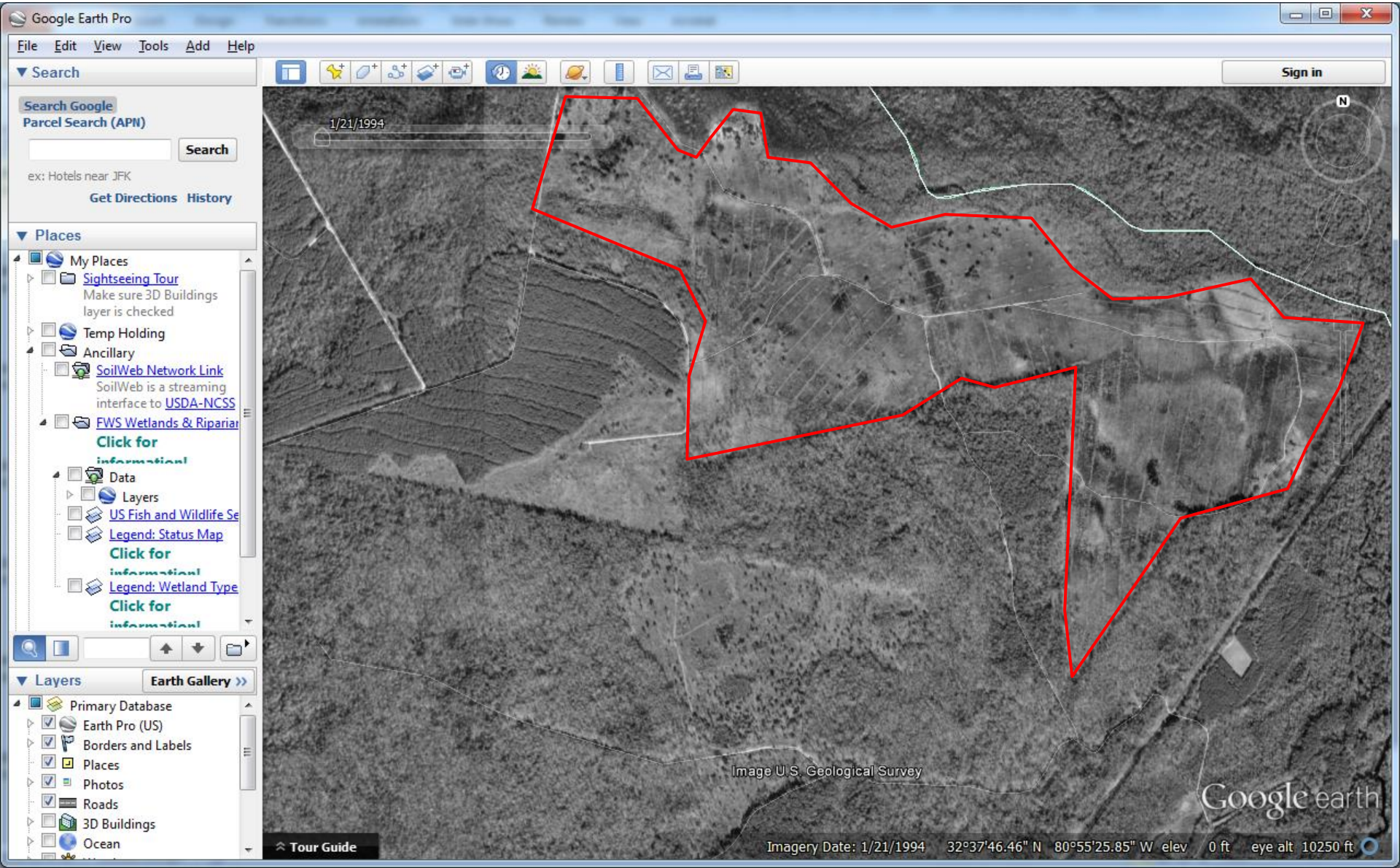
Jasper County, South Carolina

Wetland loss by cause

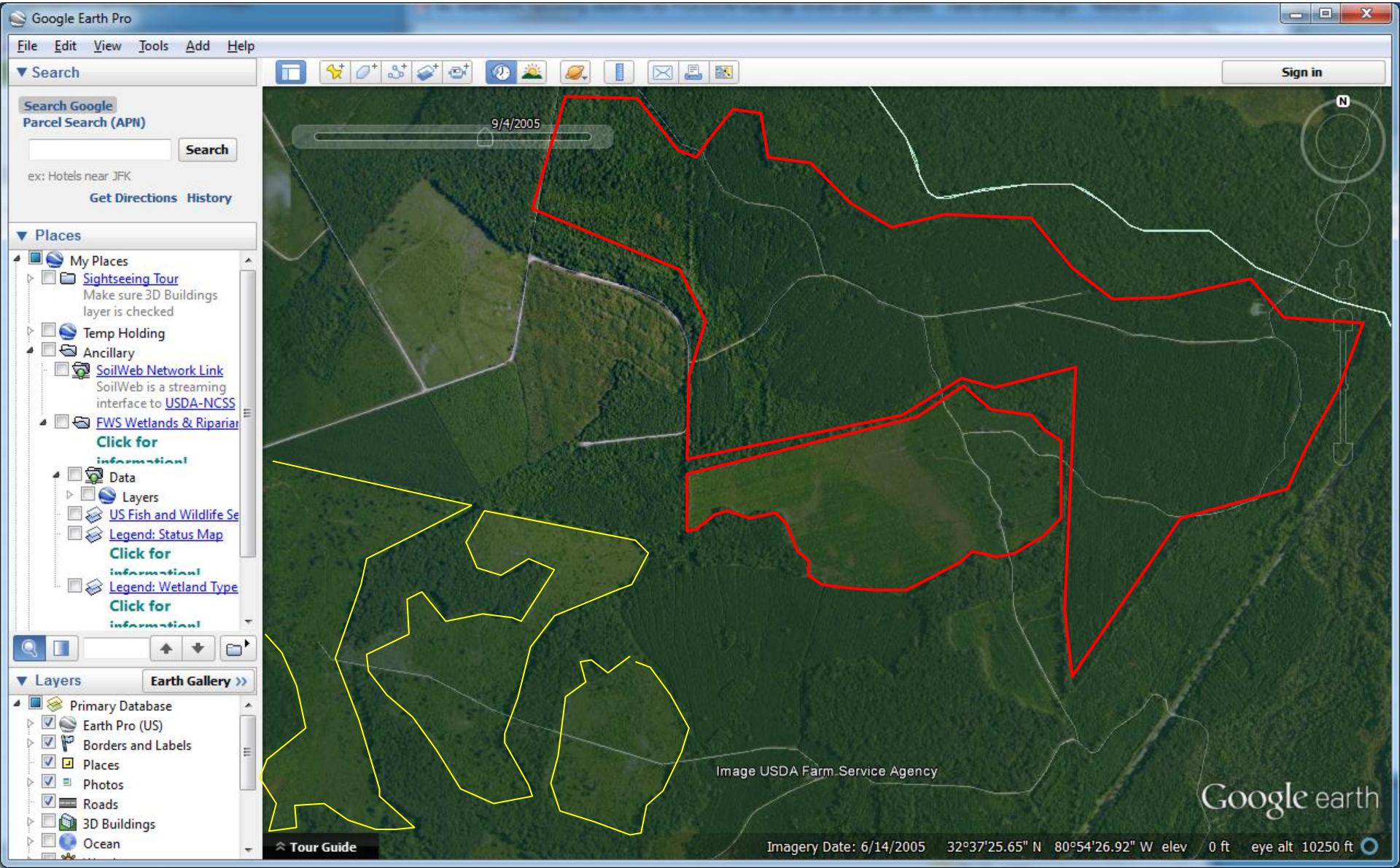
Lost To	NWI	C-CAP
Development	790.7	194.4
Agriculture	501.5	198.8
Barren Land	N/A	113.2
Transition	400.8	N/A
Rangeland	331.4	N/A
Timber / Silviculture	4,931.9	N/A
TOTAL	**6,956**	**506.4**
Change	10,322	16,698
TOTAL (Loss and Change)	**17,277**	**16,698**

- **Primary driver of loss was Silviculture activities**

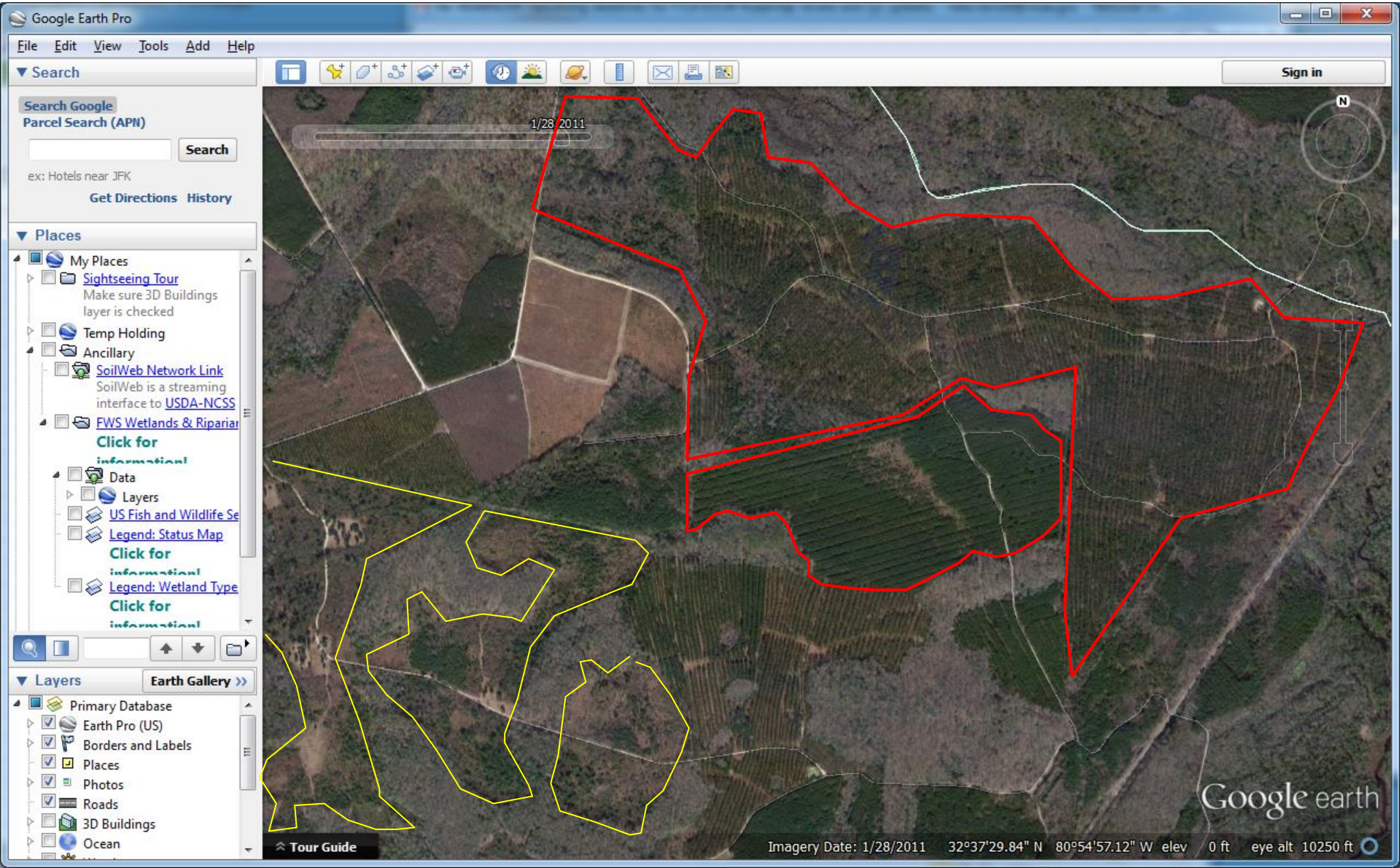
Jasper County - 1994



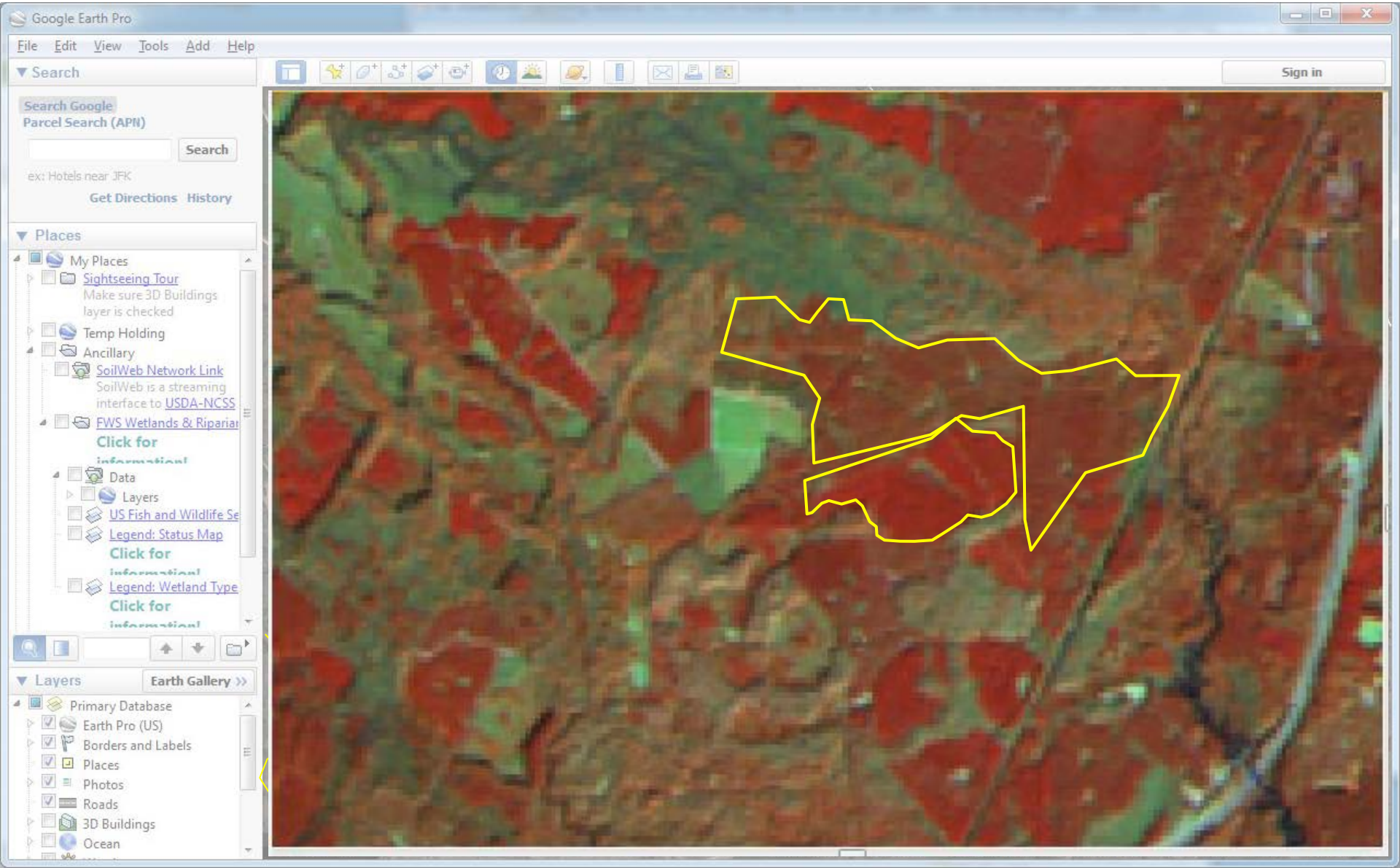
Jasper County - 2005



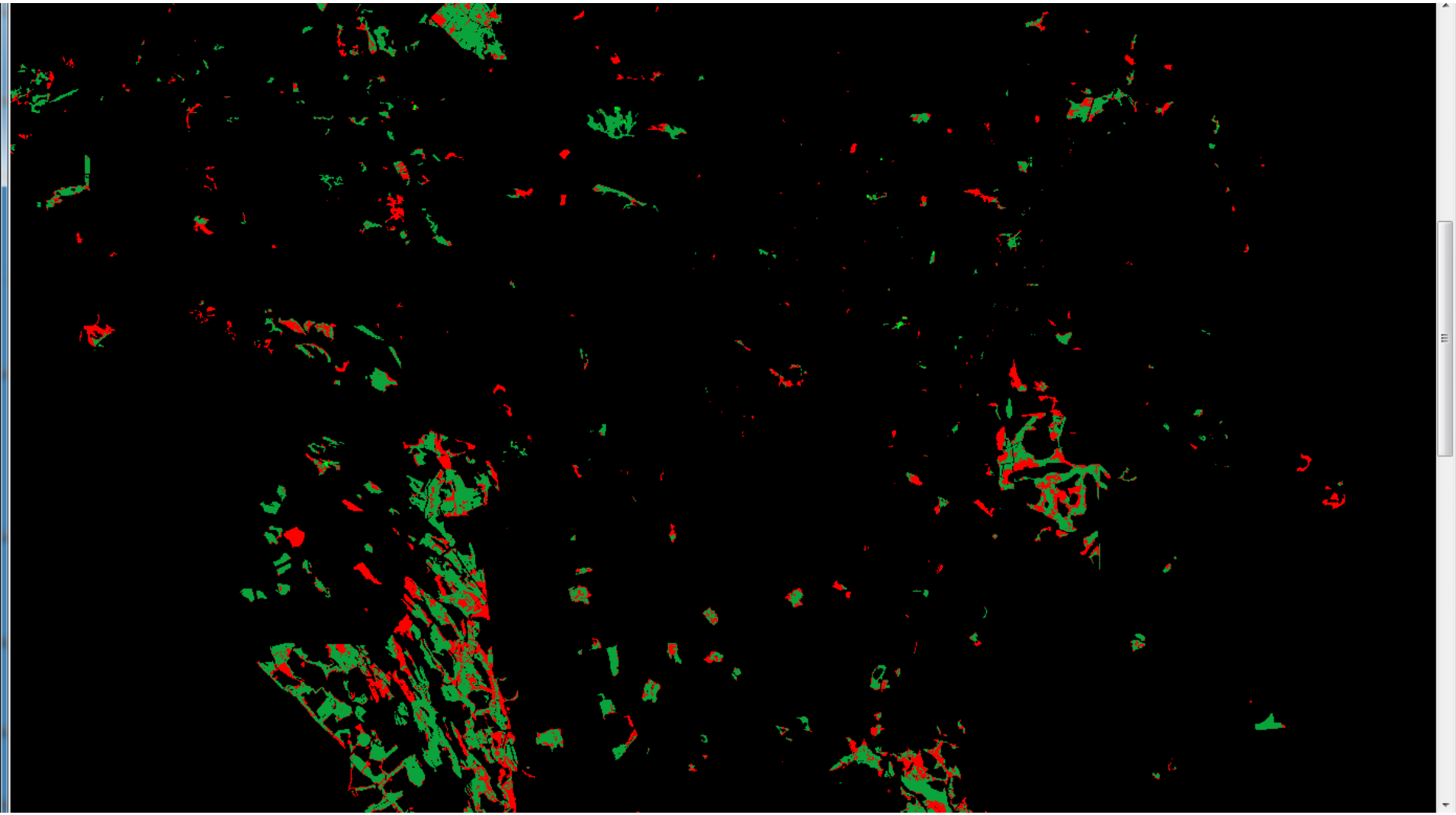
Jasper County - 2011



Jasper County - 2011

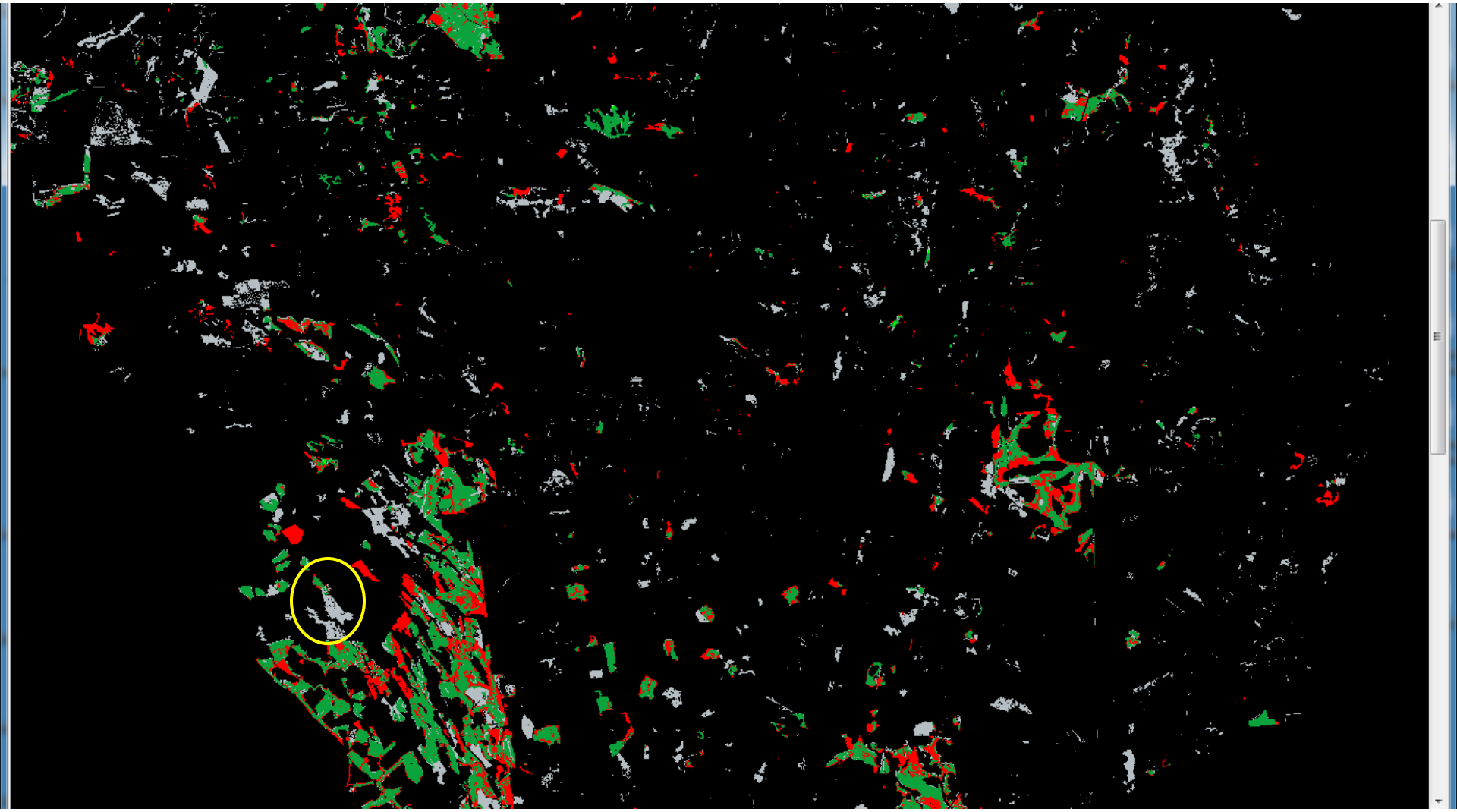


Jasper County, South Carolina



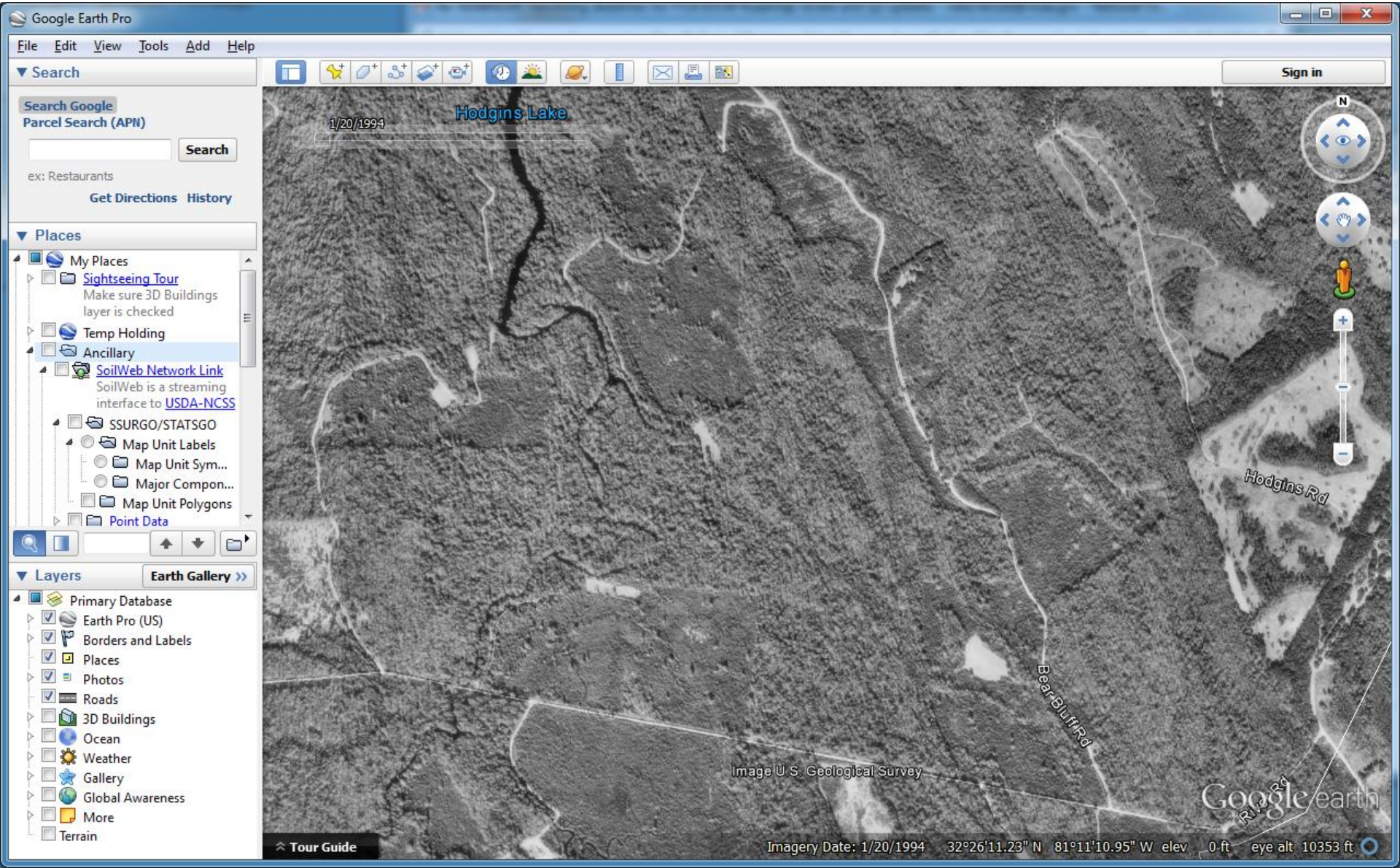
NWI only loss/change Agreed loss/change

Jasper County, South Carolina

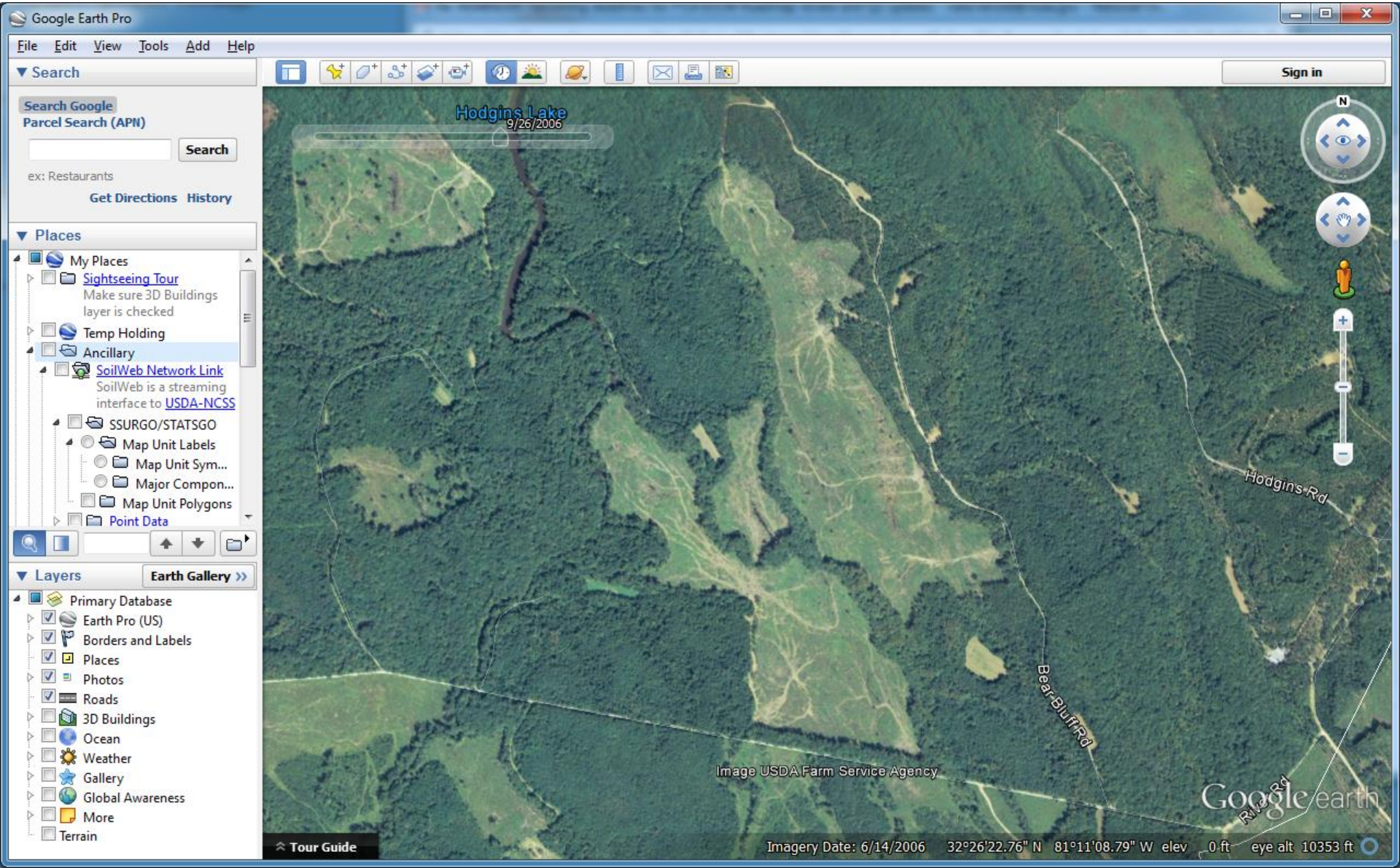


NWI only loss/change Agreed loss/change C-CAP only loss/change

Jasper County - 1994



Jasper County - 2006



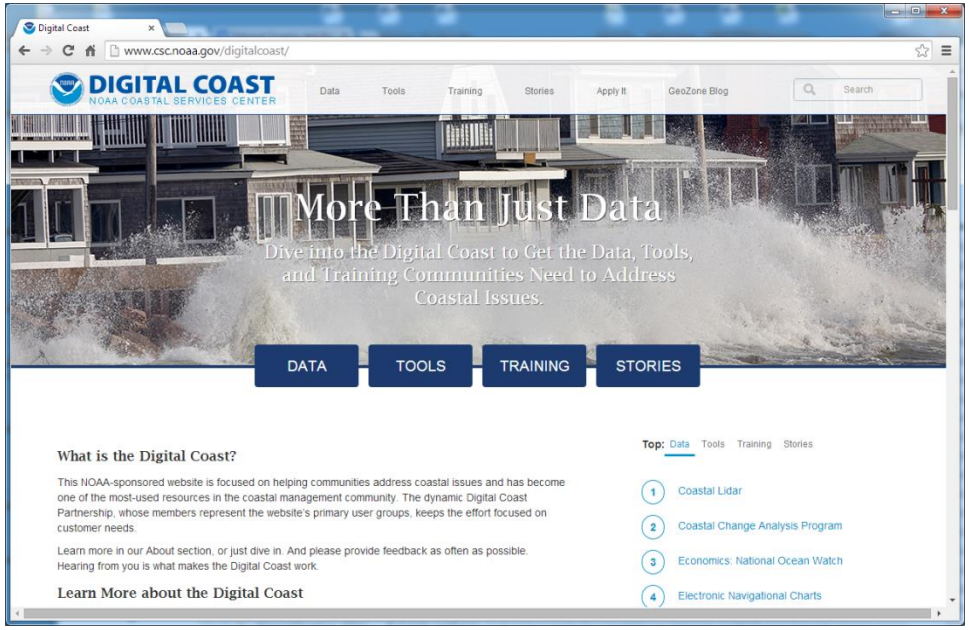
Summary

- C-CAP can be used as a reasonable indicator of wetland change (and loss) related to NWI wetlands
- Losses due to development and pre-development activities are well represented
- Losses due to ditching and draining in areas of timber activities are difficult to separate from similar changes that do not result in change to hydrology
- Areas mapped are not identical
- C-CAP is not a replacement for detailed wetland change mapping, but can be used to help focus resources associated with such mapping

The Digital Coast

www.csc.noaa.gov/digitalcoast

- **Access to coastal Data, Tools, and Training**
  - Curated, authoritative sources
- **More than just data**
  - Case studies and example uses highlight what can be done
  - How-to guides and toolkits walk user through how



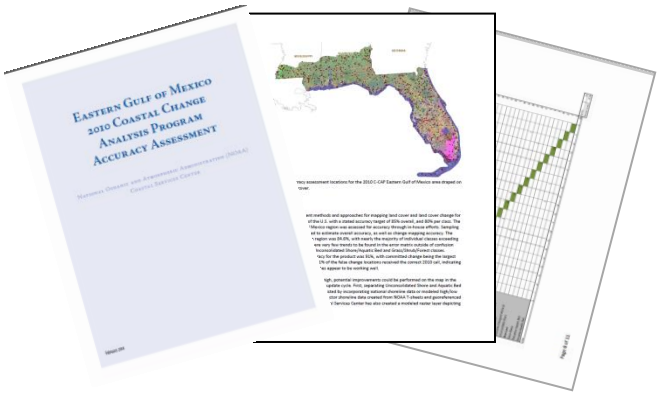
Partner organizations include:

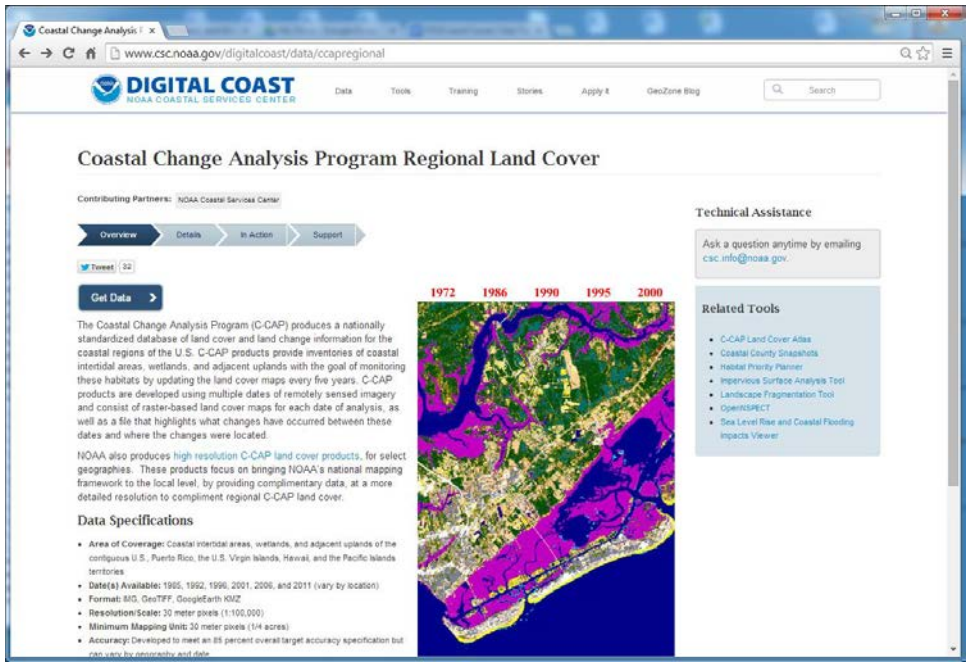
- American Planning Association
- Association of State Floodplain Managers
- Coastal States Organization
- National Association of Counties
- National Estuarine Research Reserve Association
- National States Geographic Information Council
- The Nature Conservancy
- Urban Land Institute
- NOAA

C-CAP Data on the Digital Coast

www.csc.noaa.gov/landcover

- **Access to the data**
- **Technical documentation and support items**
- **Example applications**
- **Related tools**





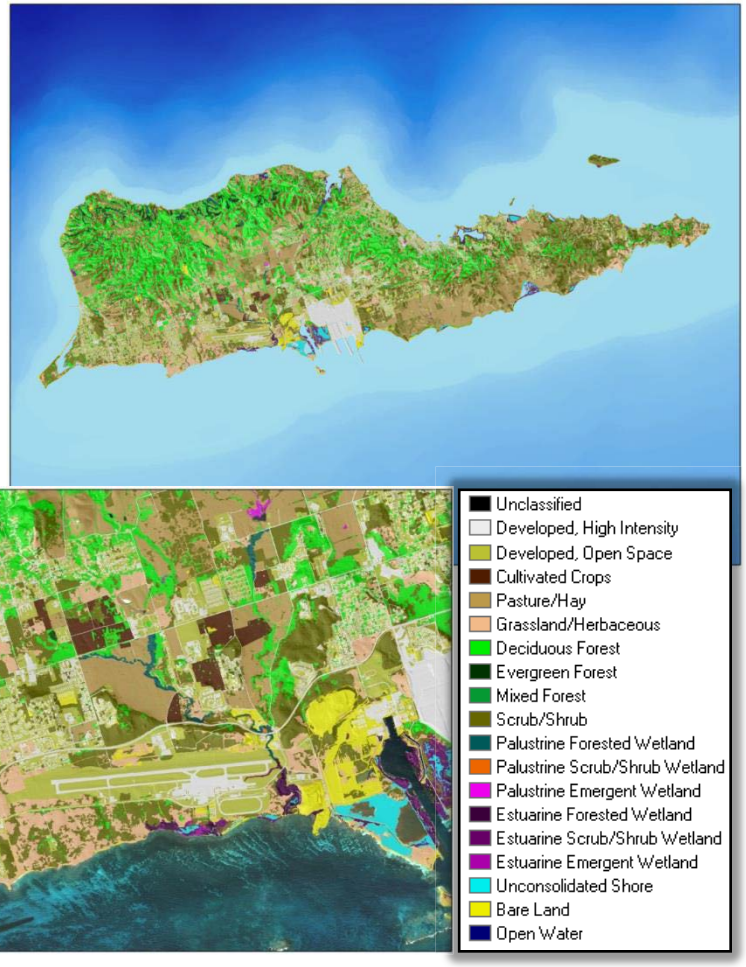
High Resolution C-CAP Land Cover

- Response to customer demand and imagery and technology available
- Consistent with national products
- National framework for local level data
- "Hot spot" analysis based on need
- Partner driven
- Cost-share

High Resolution C-CAP Land Cover

Areas mapped include the U.S. Virgin Islands, Hawaii, the Pacific territories, and hot spots within the lower 48

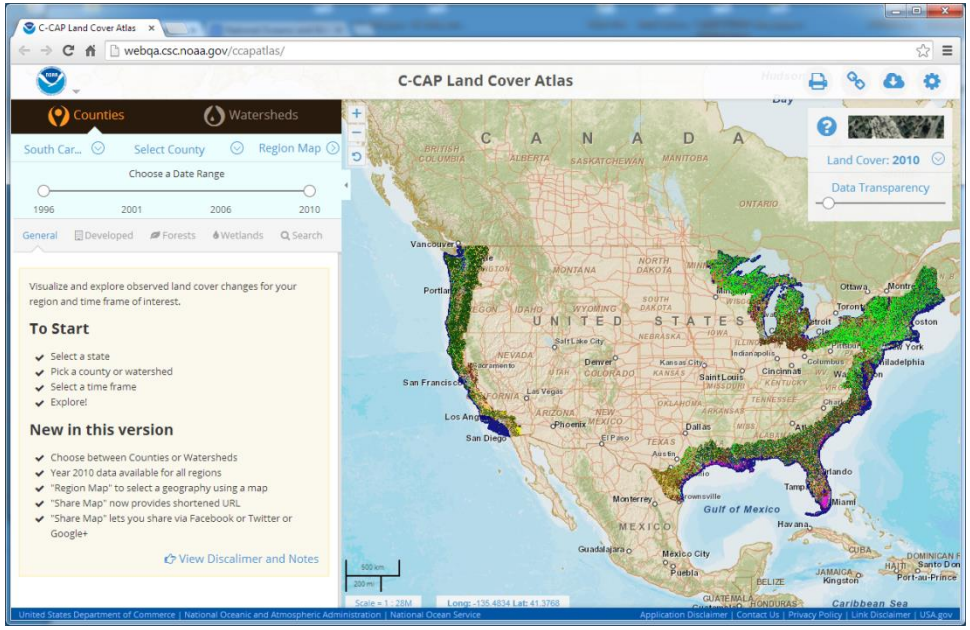
Currently mapping Puerto Rico and updating the U.S. Virgin Islands and Hawaii to 2010



New Land Cover Atlas

www.csc.noaa.gov/landcoveratlas

- **Online data viewer**
- **User-friendly access**
- **Summarizes general land change trends**
- **Allows for custom analysis**
- **No need for desktop software or advanced expertise**

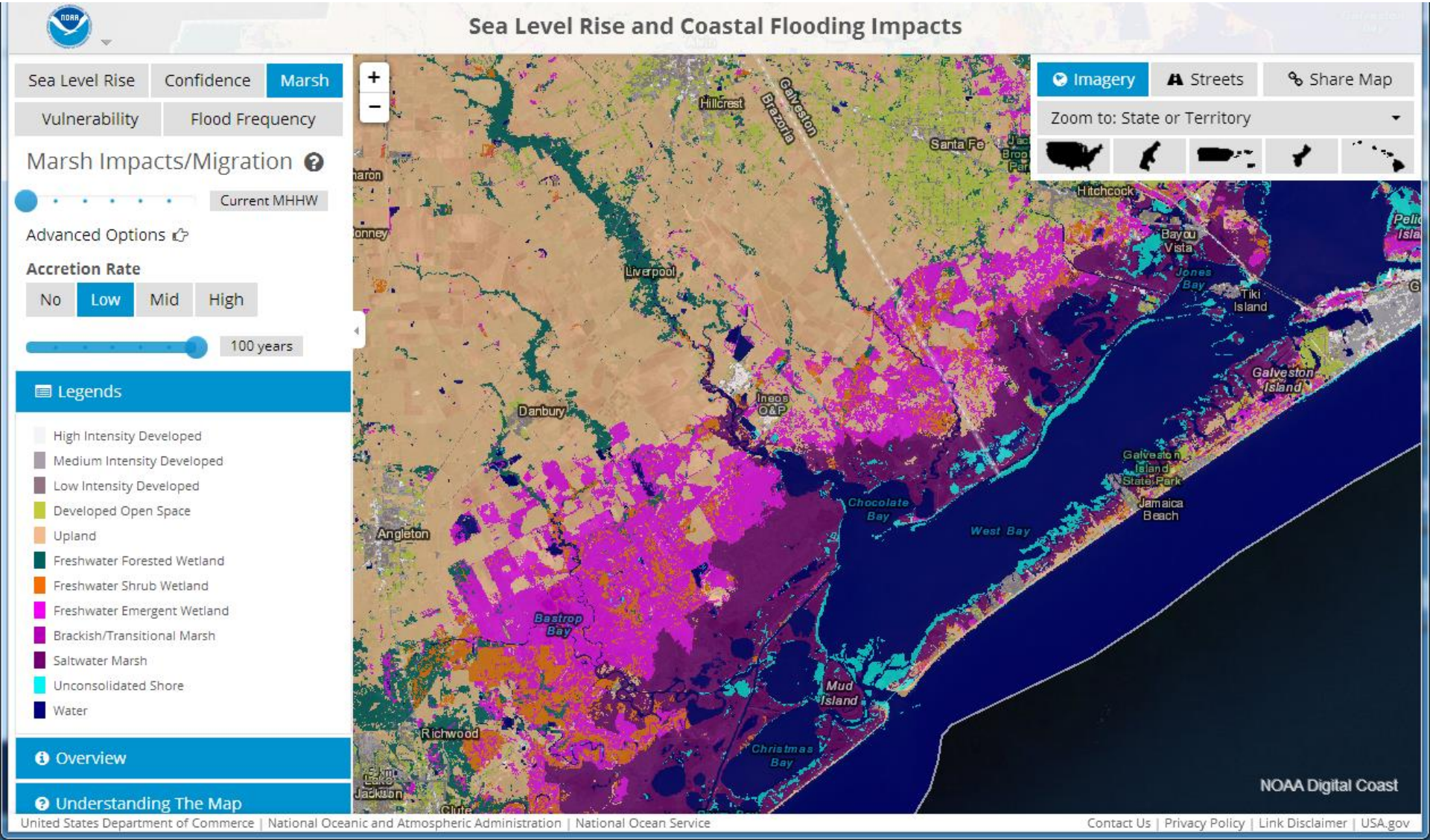


Recent improvements:

- 2010 Data Included
- Watershed statistics
- Printable Reports
- Ability to add historic dates (and islands) will be added soon

Sea Level Rise and Coastal Flooding Impacts Viewer

www.csc.noaa.gov/slr



Sea Level Rise and Coastal Flooding Impacts Viewer

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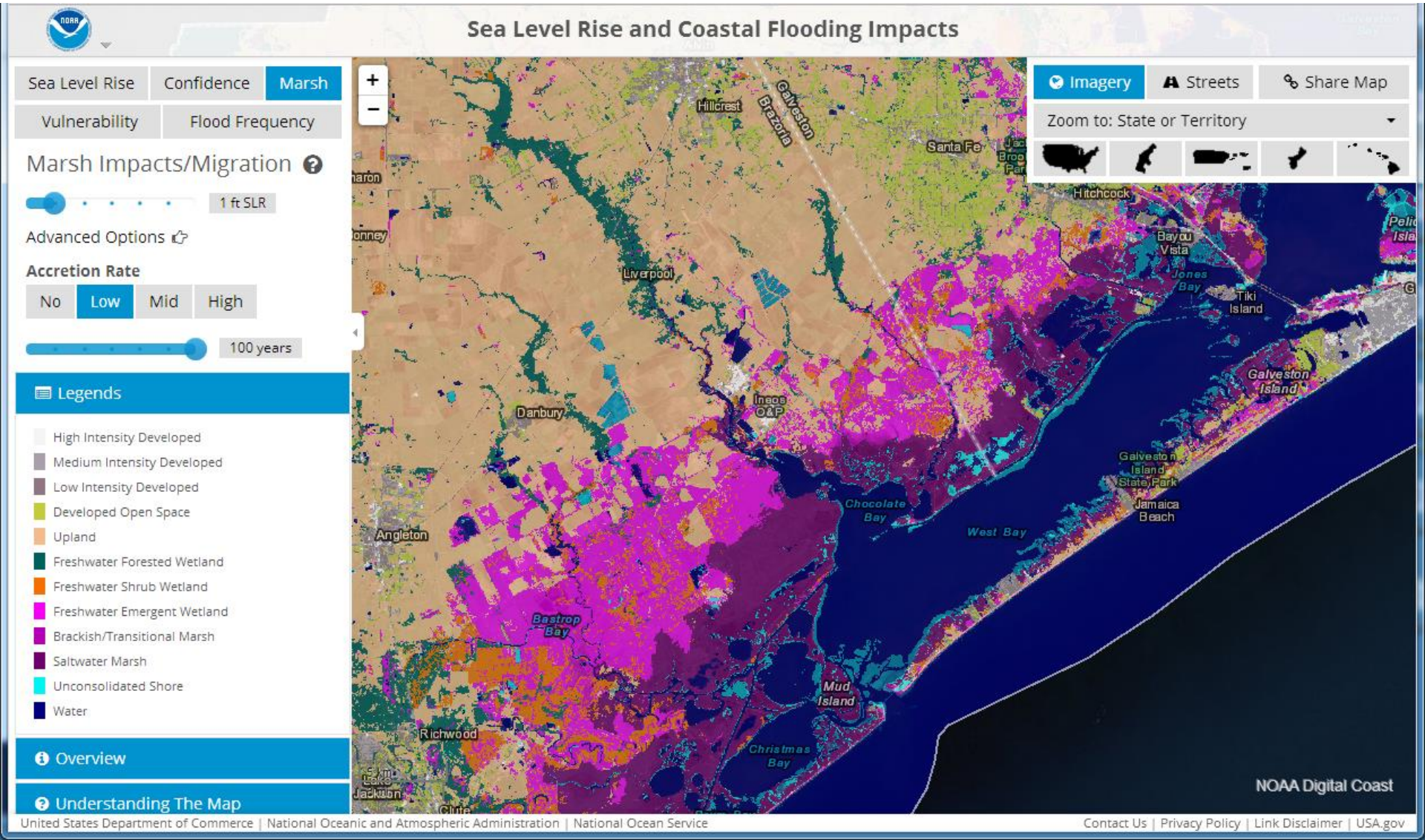

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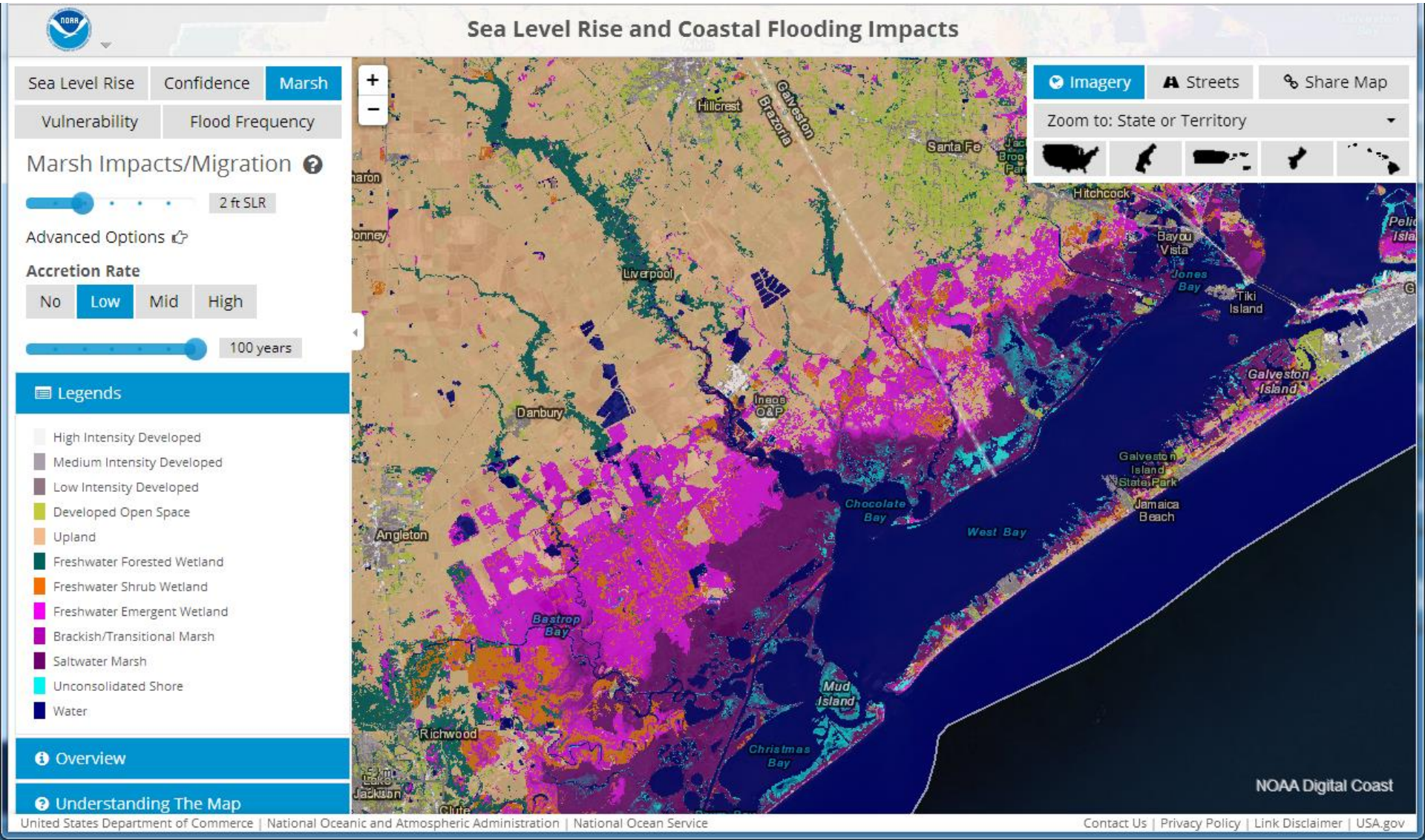

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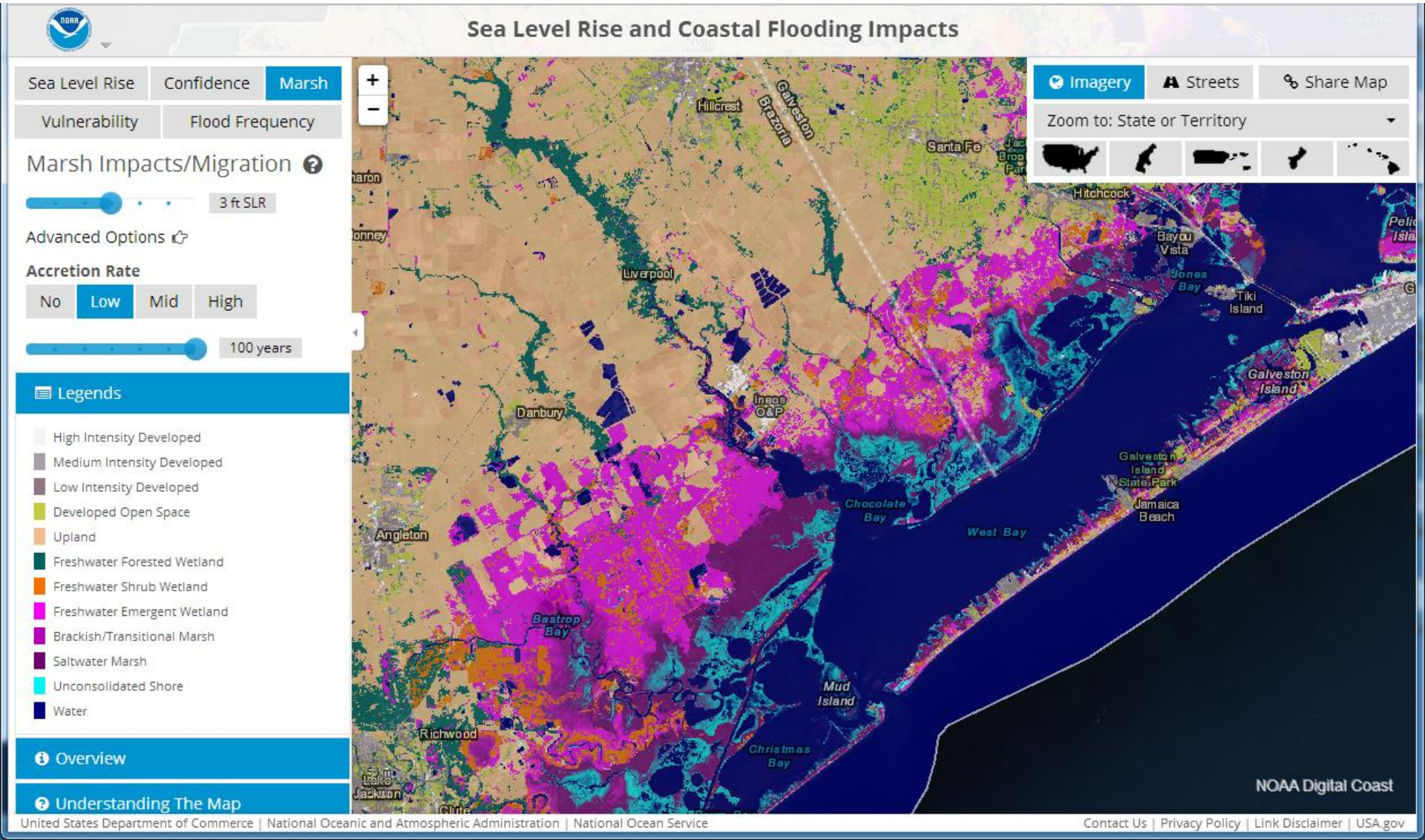

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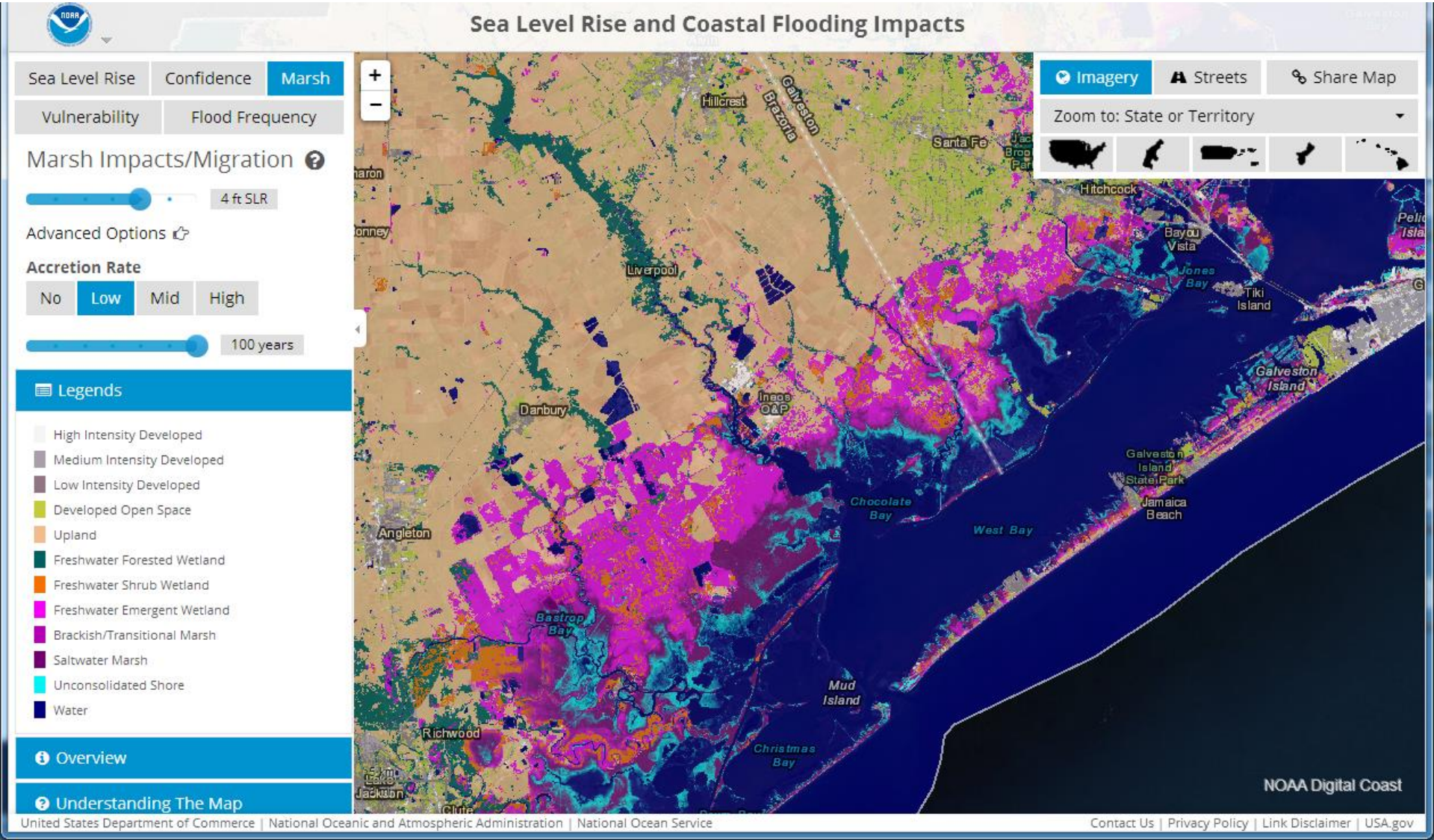

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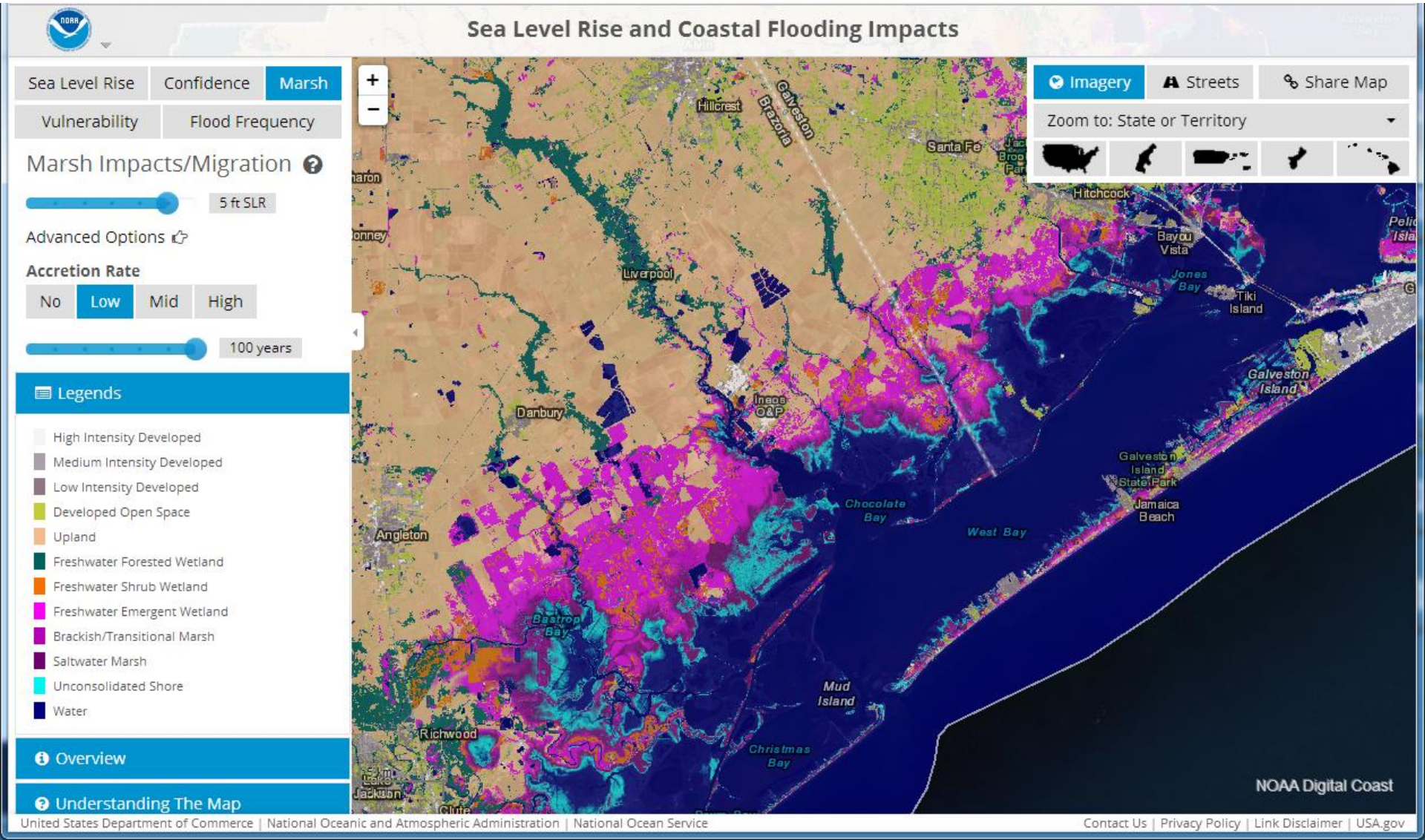

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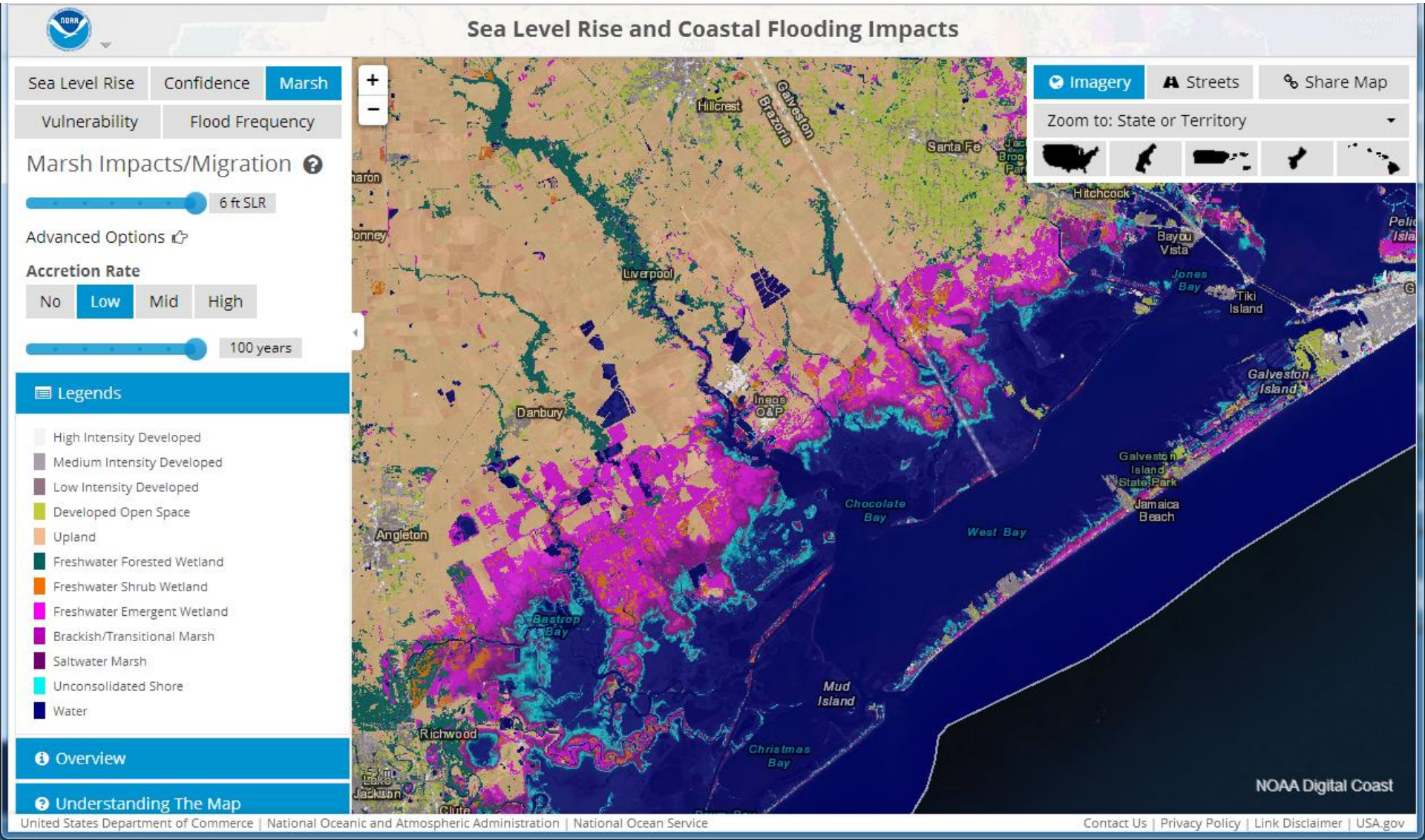

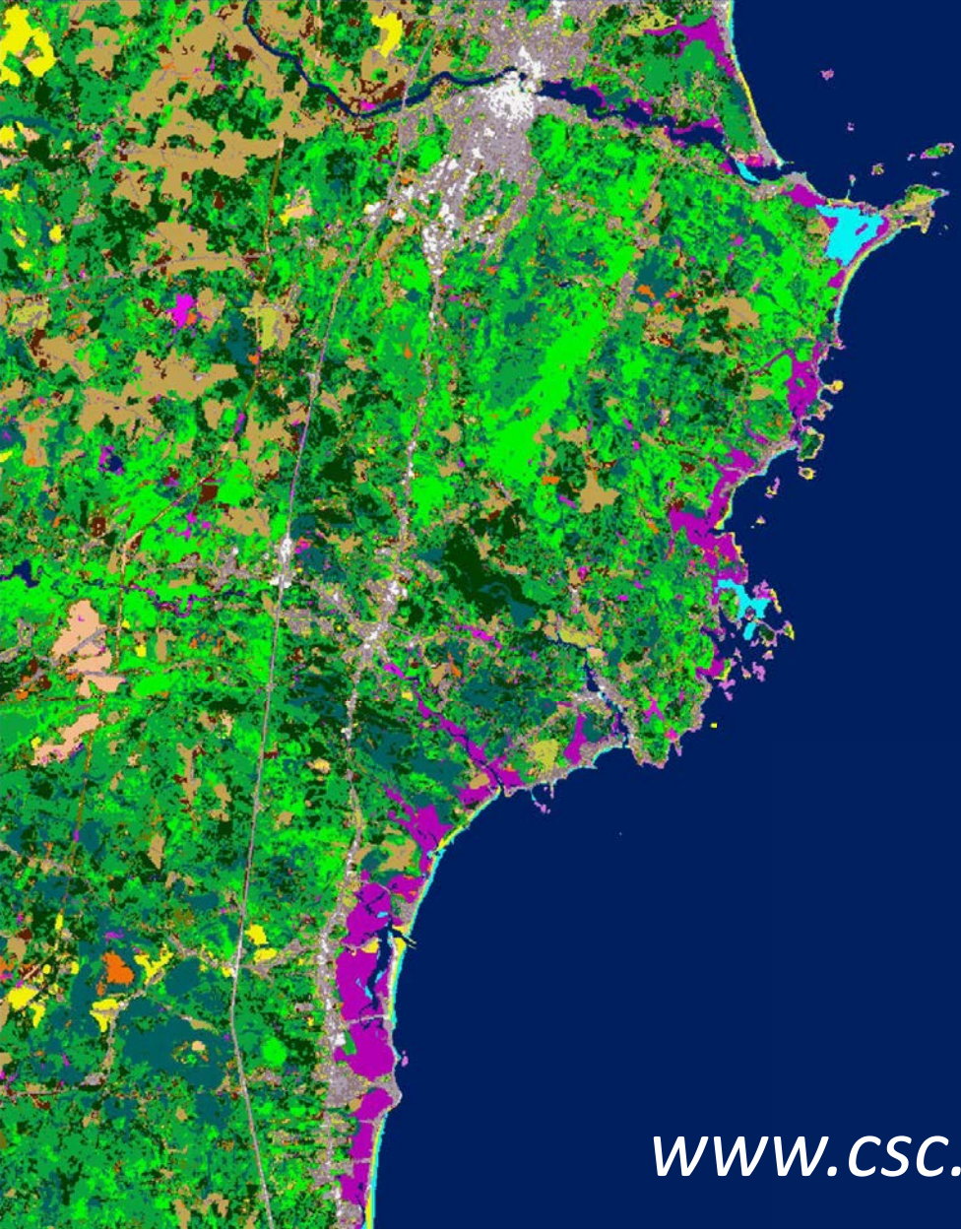

Questions?

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