Predicting Wetland Functions at the Landscape Level for Coastal Georgia

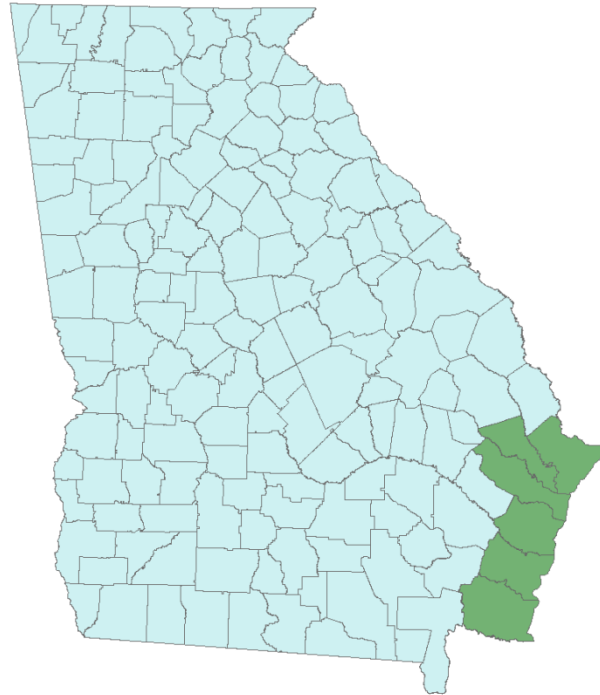June 8, 2012

Jan Mackinnon

Coastal Georgia

Coastal Georgia Study Area

Coastal Georgia

Original Georgia NWI

Historic Base Imagery Scale

1:48,000

MMU of 5 acres

Collateral Data

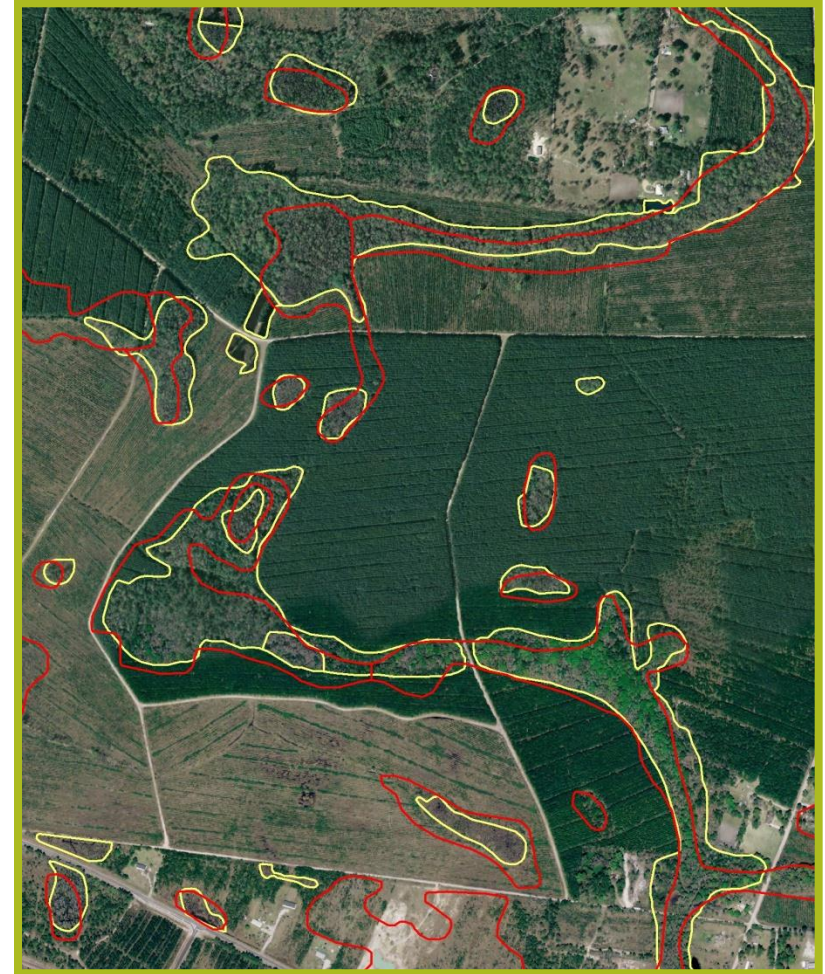-1980's NWI

-Soil Survey Geographic Database (NRCS)

-NAIP imagery (1-meter resolution), 2007

-USGS NHD

-USGS DOQQ, color-infrared, 1-meter resolution imagery

-USGS 1:24,000 Topographic Quadrangle

-LIDAR Elevation Data-Glynn County

-Georgia DNR WRD Habitat Assessment

NWI Updates

Updated Base
Imagery Scale

1:12,000

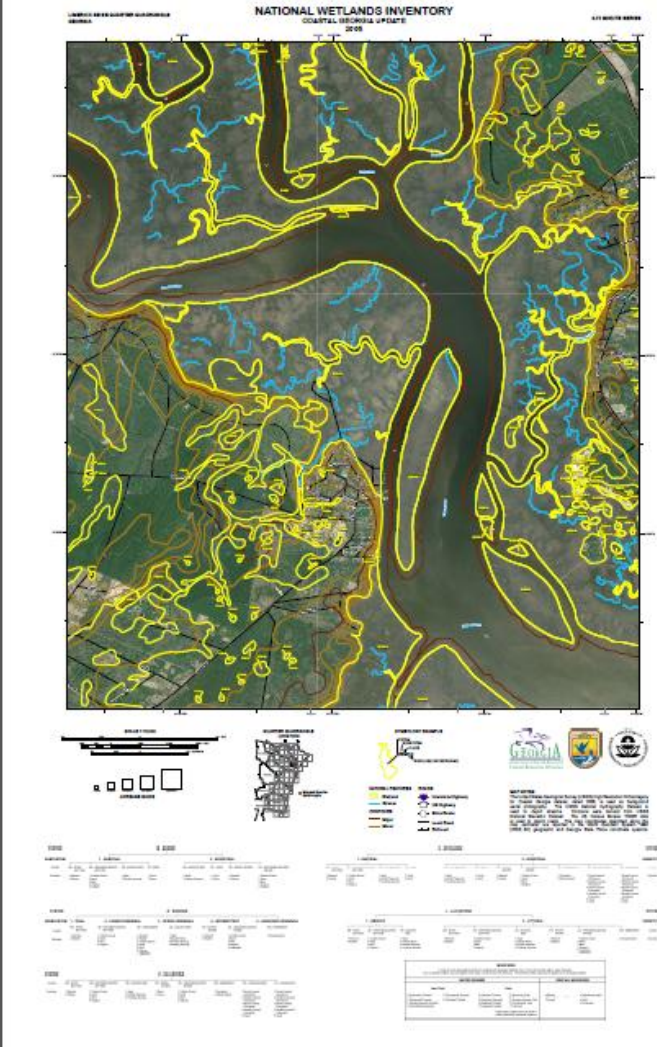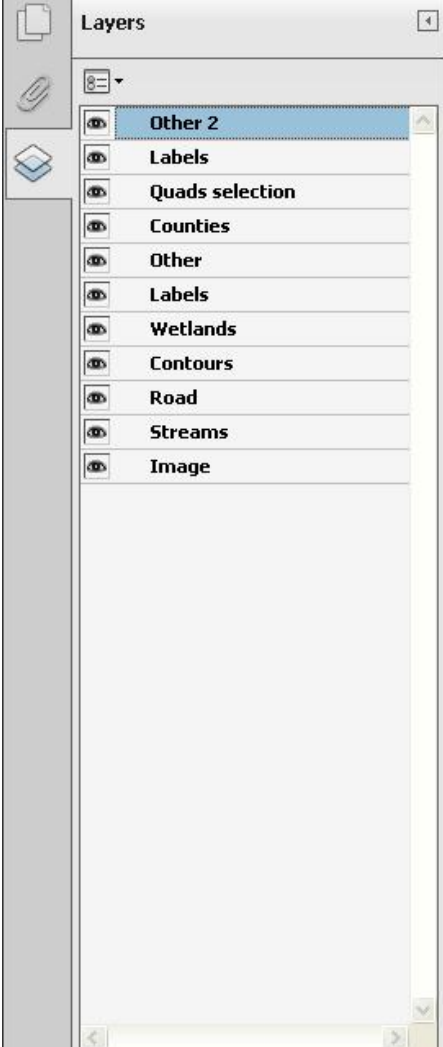MMU of ¼ - ½ acre
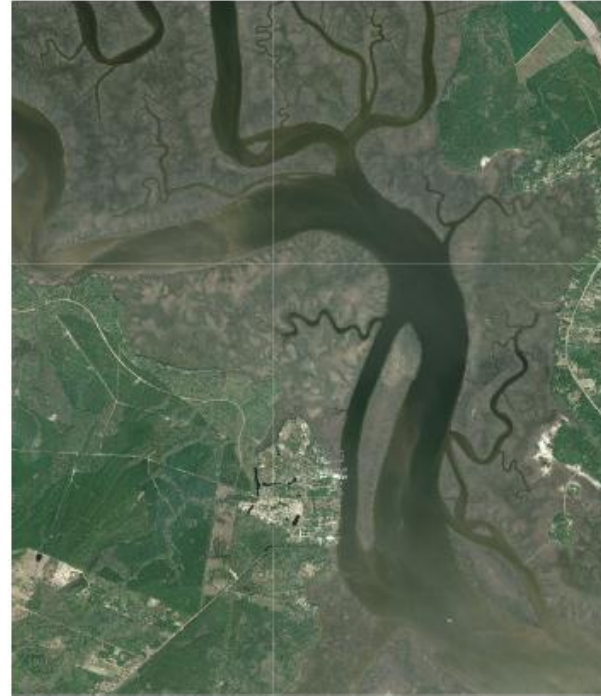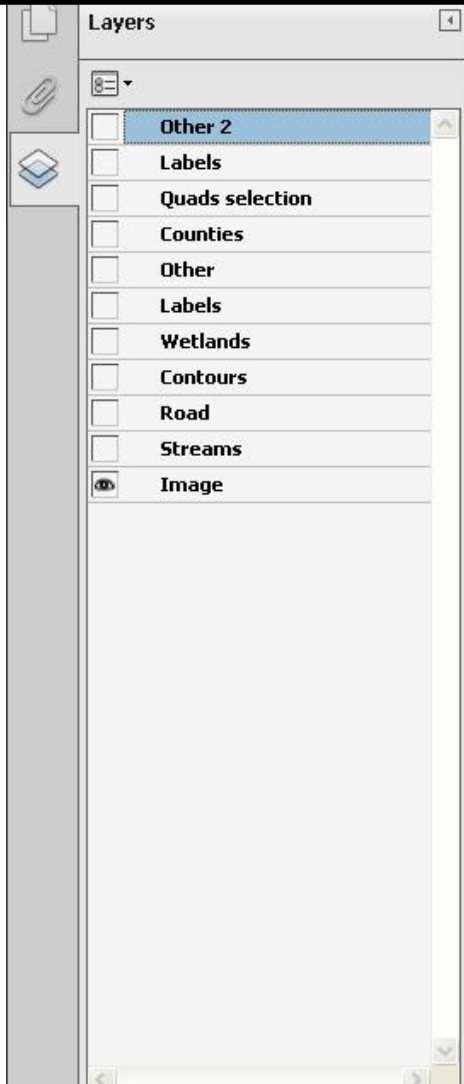
NWI Products

NWI Products

COASTAL GEORGIA LANDSCAPE-LEVEL
WETLAND FUNCTIONAL ASSESSMENT

Legend

ESTUARINE WETLANDS

OTHER WETLANDS

DEEPWATER

0   2.5   5   10   15   20   25 Miles

UTM Grid North

ATKINS
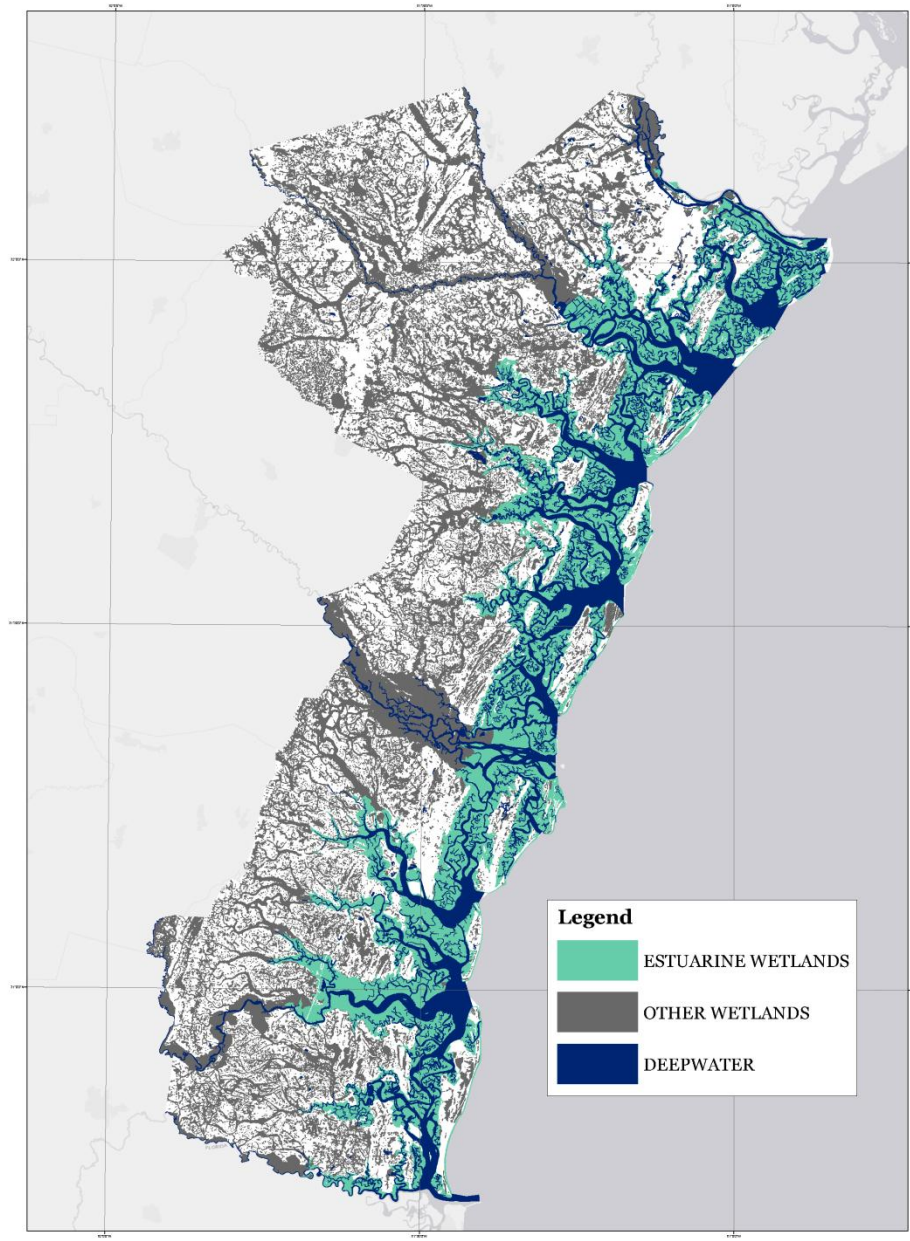
Coastwide Statistics

Coastal Georgia Landscape Level Wetland Functions

LLWW[1]

Code	Acreage	Percentage
ESFRBT	341187	42
LRFPBT	91523	11
LSBATH	85985	11
TEBAOU	74261	9
TEFLOU	55036	7
ESBABT	27334	3
LSBATA	23558	3
TEBAIS	22975	3
LSFLTH	21710	3
LRFPTH	13457	2
TEBAOA	11335	1
LSFLTA	8034	<1
TEFLOA	7230	<1
TEFLIS	6550	<1
PDIS	5912	<1
MAFRBT	3084	<1
PDOU	2100	<1
LRFPTA	1081	<1
PDTH	622	<1
LEFRIS	355	<1
PDTA	266	<1
PDME	233	<1
PDOA	133	<1
LEFROU	99	<1
LRFRBT	73	<1
LSBAOU	57	<1
TEILIS	26	<1
TEFLTA	13	<1

Predicted Functions[2]

Surface Water Detention	Acreage	Percentage
High	122923	15
Moderate	206768	26
Low or No Potential	474536	59

Coastal Storm Surge Detention	Acreage	Percentage
High	462862	58
Moderate	20059	2
Low or No Potential	321307	40

Streamflow Maintenance	Acreage	Percentage
High	57965	7
Moderate	126006	16
Low or No Potential	620256	77

Nutrient Transformation	Acreage	Percentage
High	680893	85
Moderate	101185	13
Low or No Potential	22149	3

Carbon Sequestration	Acreage	Percentage
High	679414	84
Moderate	119280	15
Low or No Potential	5533	<1

Retention of Sediments	Acreage	Percentage
High	567281	71
Moderate	157944	20
Low or No Potential	79002	10

Bank/Shoreline Stabilization	Acreage	Percentage
High	605410	75
Moderate	16598	2
Low or No Potential	182219	23

Fish/Aquatic Invert Habitat	Acreage	Percentage
High	470370	58
Moderate	38883	5
Low or No Potential	294973	37

Waterfowl/Waterbird Habitat	Acreage	Percentage
High	456224	57
Moderate	43552	5
Low or No Potential	304451	38

Other Wildlife Habitat	Acreage	Percentage
High	738574	92
Moderate	42566	5
Low or No Potential	23088	3

Unique, Diverse Communities	Acreage	Percentage
Palustrine Vegetated (H WR)	78	<1
Selected PEM (N,R,T WR)	21462	3
Selected PSS (N,R,T WR)	8843	1
Barrier Island (F,T,H WR)	1307	<1
Carolina Bays (Relatively Intact)	919	<1

Coastal Georgia Counties

Cowardin Classification[3]

System/Class		Acreage	Percentage
Estuarine			
	Emergent	351236	44
	Unconsolidated Shore	10700	1
	Scrub-Shrub	4495	<1
	Forested	2053	<1
Lacustrine			
	Aquatic Bed	108	<1
	Unconsolidated Shore	32	<1
	Emergent	10	<1
Marine			
	Unconsolidated Shore	3084	<1
Palustrine			
	Forested	339743	42
	Emergent	52511	7
	Scrub-Shrub	30899	4
	Unconsolidated Bottom	8242	1
	Aquatic Bed	832	<1
	Unconsolidated Shore	193	<1
Riverine			
	Unconsolidated Shore	90	<1

[1]Tiner, R.W. 2011. Predicting Wetland Functions at the Landscape Level for Coastal Georgia Using NWIPlus Data. U.S. Fish and Wildlife Service, National Wetlands Inventory Program, Region 5, Hadley, MA. In cooperation with the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, GA and Atkins North America, Raleigh, NC. 29 pp.
[2]Wetland Functional Assessment Map Series Available From Georgia DNR Coastal Resources Division, August 2011.
[3]Cowardin, L.M., V. Carter, F.C. Golet, E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.

Page 1 of 1

Coastal Georgia Counties

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Georgia Department of Natural Resources
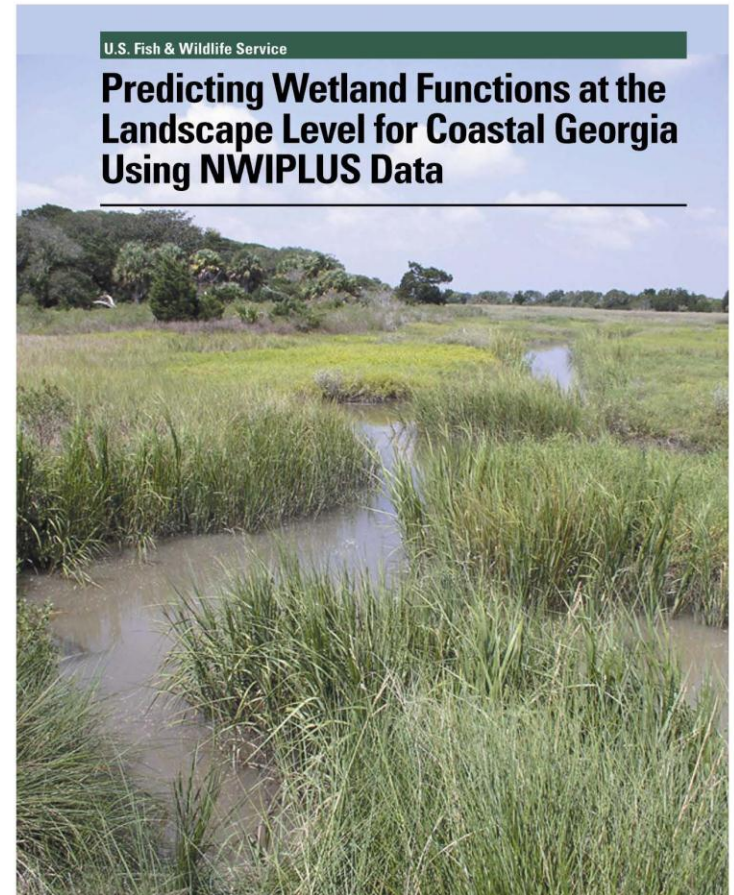**Coastal Resources Division**

Overview of NWI+

- Hydrogeomorphic-type descriptors
- Better characterize wetlands
- Predict wetland functions
- Preliminary landscape-level assessment

NWI Plus Attributes

- Landscape Position

- Landform

- Water Flow Path

- Waterbody Type

U.S. Fish & Wildlife Service

**Predicting Wetland Functions at the Landscape Level for Coastal Georgia Using NWIPLUS Data**

Coastal Georgia Wetland Functions

1. Surface Water Detention
2. Coastal Storm Surge Detention
3. Streamflow Maintenance
4. Nutrient Transformation
5. Carbon Sequestration
6. Retention of Sediment and Other Particulates
7. Bank and Shoreline Stabilization
8. Provision of Fish and Aquatic Invertebrate Habitat
9. Provision of Waterfowl and Waterbird Habitat
10. Provision of Other Wildlife Habitat
11. Provision of Habitat for Unique, Uncommon, or Highly Diverse Plant Communities

Wetlands by Water Flow Path

- Bidirectional-tidal = 463,201 (58%)
- Throughflow = 153,837 (19%)
- Outflow = 148,017 (19%)
- Isolated = 29,906 (4%)

Wetlands by Water Flow Path

Water Flow Path
- Bidirectional-tidal
- Isolated
- Outflow
- Throughflow
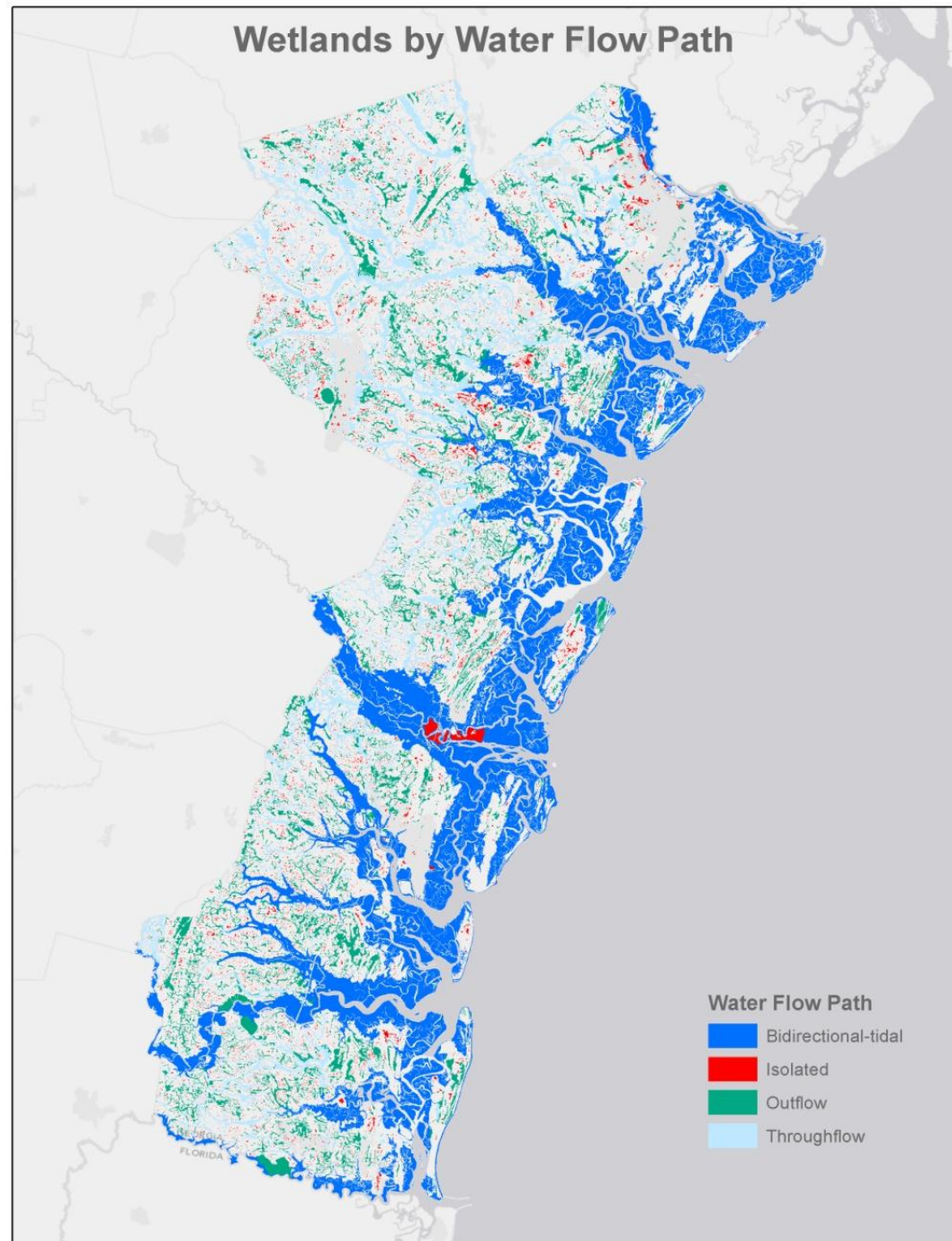
County Totals by Water Flow Path

- Bidirectional-tidal – Bryan (26), Camden (60), Chatham (78), Glynn (71), Liberty (36), McIntosh (71)

- Outflow – Bryan (26), Camden (26), Chatham (9), Glynn (15), Liberty (22), McIntosh (13)

- Isolated – Bryan (4), Camden (3), Chatham (3), Glynn (3), Liberty (6), McIntosh (4)

- Throughflow – Bryan (44), Camden (11), Chatham (10), Glynn (12), Liberty (37), McIntosh (12)

Nutrient Transformation

- High = 85%
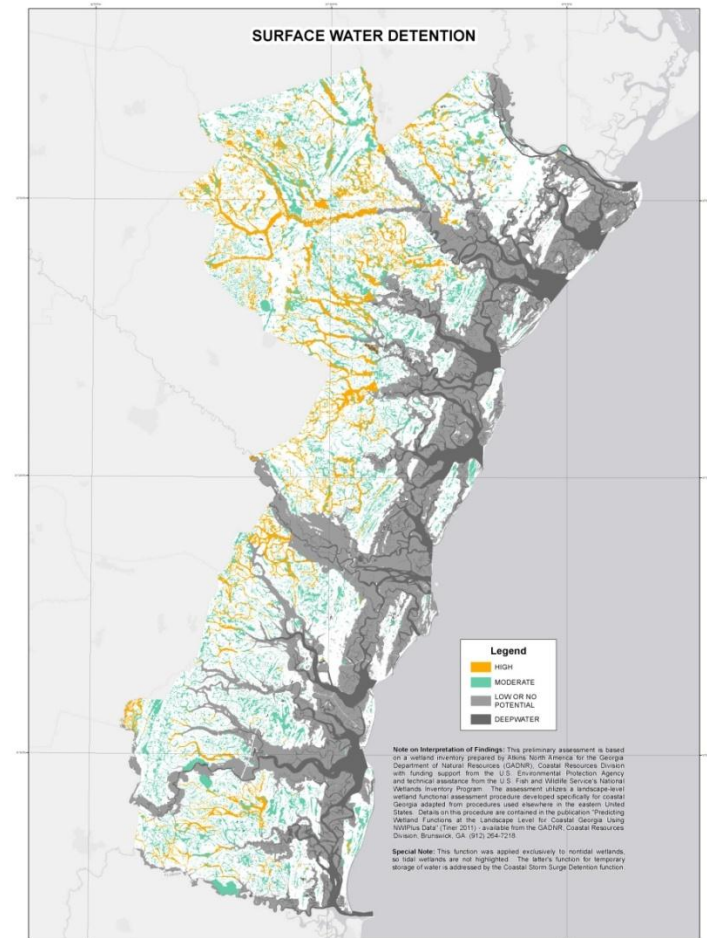
- Moderate = 13%

- Low or No = 3%

COASTAL GEORGIA LANDSCAPE-LEVEL
WETLAND FUNCTIONAL ASSESSMENT

NUTRIENT TRANSFORMATION

Legend
- HIGH
- MODERATE
- LOW OR NO POTENTIAL
- DEEPWATER
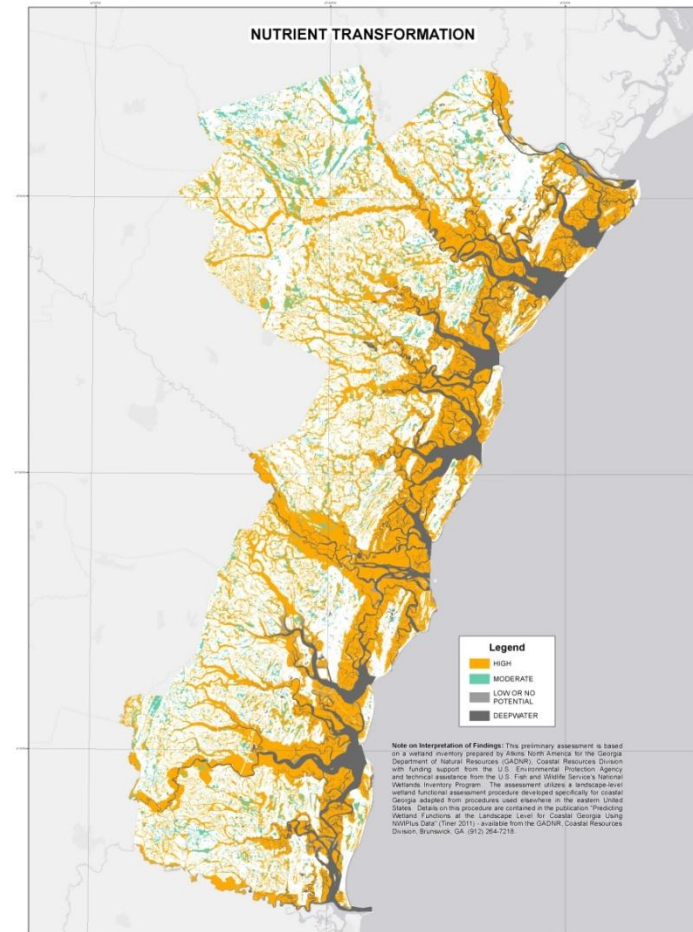
Surface Water Detention

- High = 15%

- Moderate = 26%

- Low or No = 59%

COASTAL GEORGIA LANDSCAPE-LEVEL
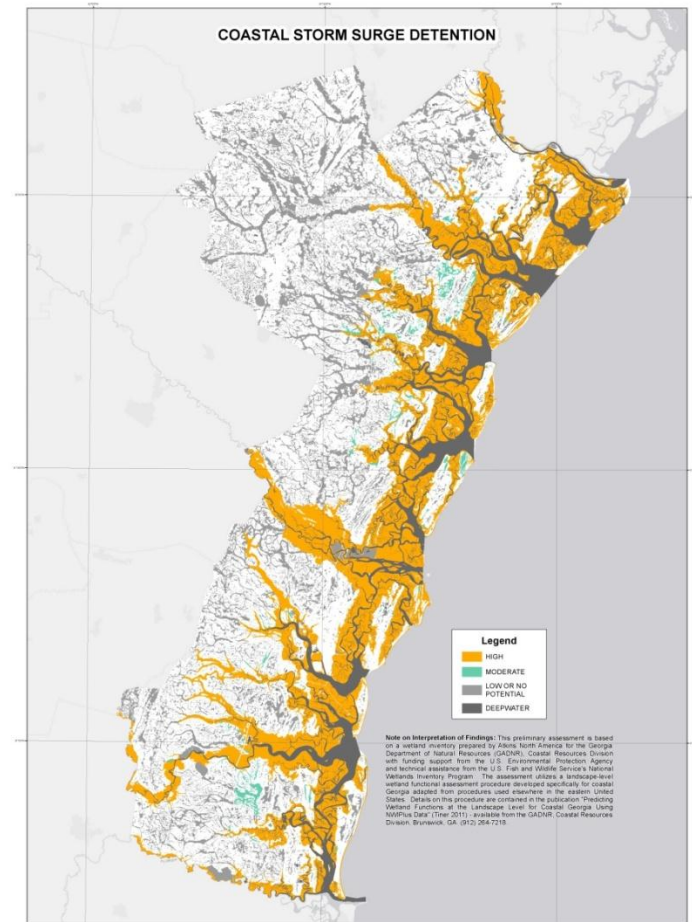WETLAND FUNCTIONAL ASSESSMENT

SURFACE WATER DETENTION

Coastal Storm Surge Detention

- High = 58%

- Moderate = 2%

- Low or No = 40%

COASTAL GEORGIA LANDSCAPE-LEVEL
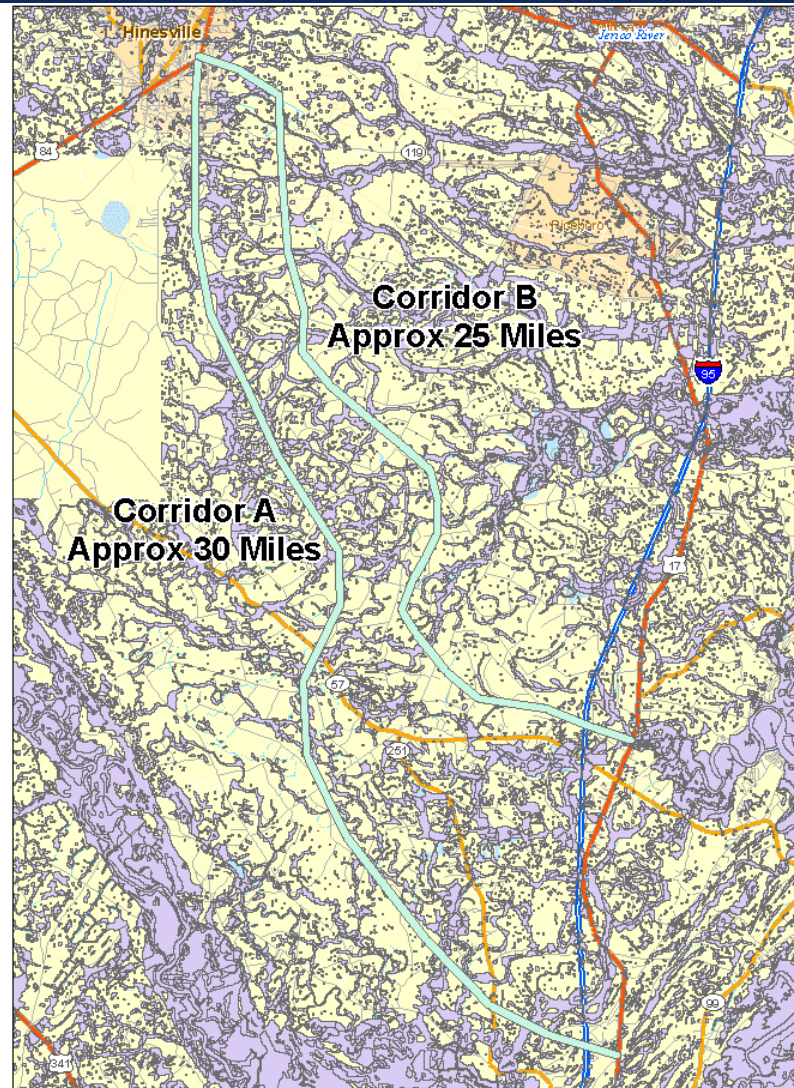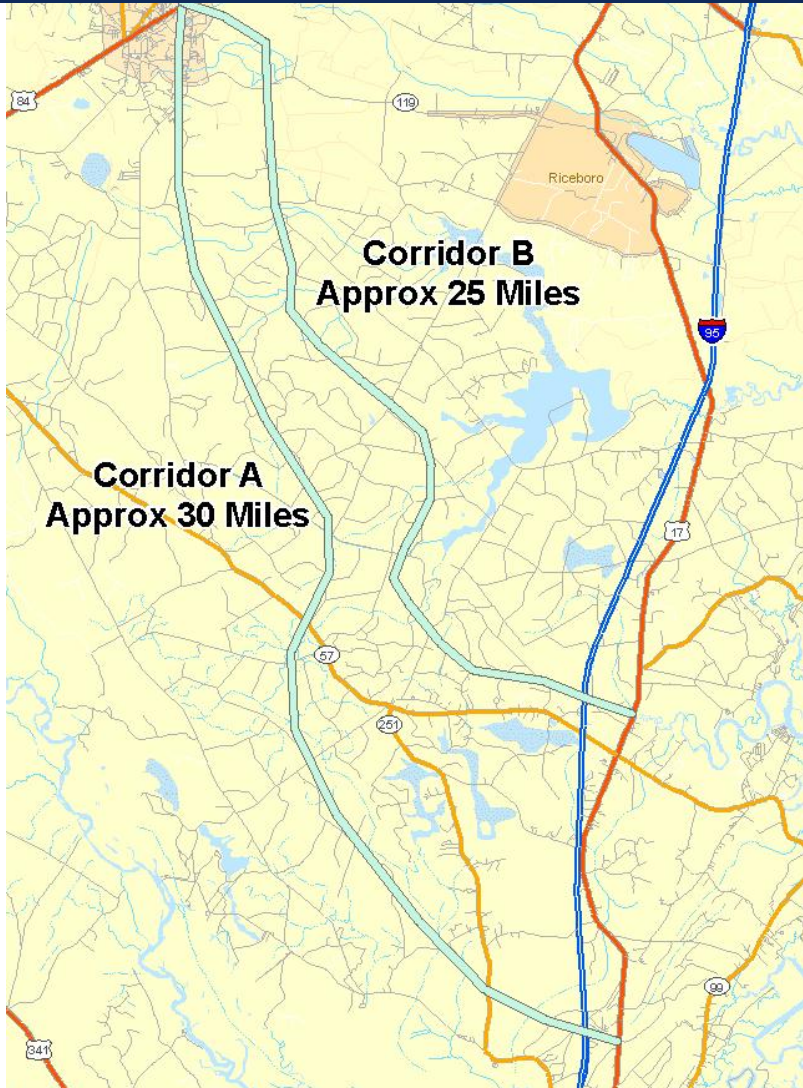WETLAND FUNCTIONAL ASSESSMENT

COASTAL STORM SURGE DETENTION

Legend
HIGH
MODERATE
LOW OR NO
POTENTIAL
DEEPWATER

Road Corridor Alternatives

Road Corridor Alternatives

Corridor A

Description	Type	Acres
Palustrine Emergent	PEM	55.5
Palustrine Forested	PFO	787.2
Palustrine Scrub-Shrub	PSS	61.5
Palustrine Ponds	PUB	6.0
	Total	910.2

Corridor B

Description	Type	Acres
Estuarine Open Water	E1U	5.9
Estuarine Emergent	E2EM	47.7
Estuarine Forested	E2FO	1.3
Palustrine Emergent	PEM	56.8
Palustrine Forested	PFO	423.1
Palustrine Scrub-Shrub	PSS	34.3
Palustrine Ponds	PUB	22.1
	Total	591.2

Surface Water		Acres
	HIGH	536.6
	MOD	345.9
	Grand Total	882.4

Surface Water		Acres
	HIGH	282.8
	MOD	241.2
	Grand Total	524.0

Coastal Storm Surge		Acres
	HIGH	26.6
	Grand Total	26.6

Coastal Storm Surge		Acres
	HIGH	48.9
	MOD	13.3
	Grand Total	62.2

Streamflow Maintenance		Acres
	HIGH	386.7
	MOD	221.6
	Grand Total	608.3

Streamflow Maintenance		Acres
	HIGH	178.0
	MOD	217.5
	Grand Total	395.5

Nutrient Transformation		Acres
	HIGH	755.2
	MOD	149.1
	Grand Total	904.2

Nutrient Transformation		Acres
	HIGH	517.1
	MOD	46.1
	Grand Total	563.2

Carbon Sequestration		Acres
	HIGH	755.2
	MOD	155.0
	Grand Total	910.2

Carbon Sequestration		Acres
	HIGH	517.1
	MOD	68.2
	Grand Total	585.3

Retention of Sediment		Acres
	HIGH	558.4
	MOD	213.0
	Grand Total	771.3

Retention of Sediment		Acres
	HIGH	322.0
	MOD	218.5
	Grand Total	540.5

Bank and Shoreline Stabilization		Acres
	HIGH	589.4
	Grand Total	589.4

Bank and Shoreline Stabilization		Acres
	HIGH	325.9
	Grand Total	325.9

Limitations

- Provides a static snapshot of wetland function
- Limited by our understanding of wetland functions
- Starting point, not an end point
- Users should have some GIS manipulation skills

Benefits of NWI+

- Formulating wetland conservation strategies to prioritize wetlands for evaluation, acquisition, restoration
- Educating the public on wetland functions
- Cumulative impact assessment tool to evaluate the impact of wetland losses and gain on watershed functions
- Can be layered with other GIS databases for complex analyses

Next Steps

Prepare Summary Report and Users Guide

Conduct Trend Analysis

Expand NWI+ and Functional Assessment to the second tier of counties

Thank you!

Environmental Protection Agency
Wetland Program Development Grant
CD-96456206-0

Atkins
    John Hefner
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