# Assessing the State of Estuarine Tidal Marsh in the Northern Gulf of Mexico
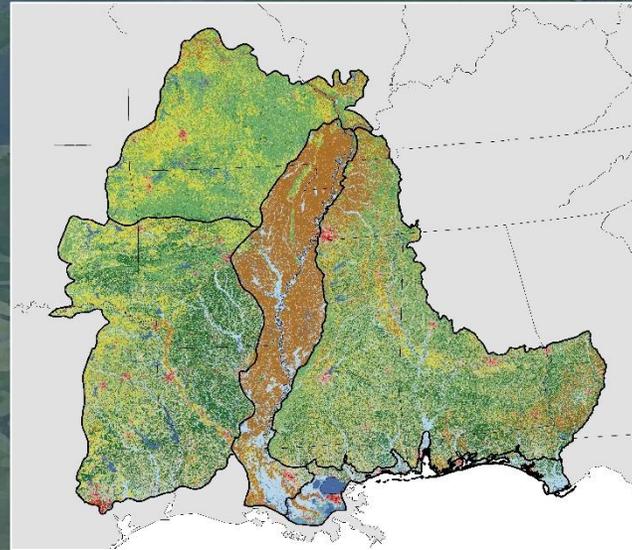
Kristine O. Evans, Yvonne Allen, Todd Jones-Farrand

Florida Coastal Habitat Integrated Mapping and Monitoring Program 2015 Workshop

September 14-15

St. Petersburg, FL

Gulf Coastal Plains & Ozarks
Landscape Conservation Cooperative

MISSISSIPPI STATE
UNIVERSITY

Landscape Conservation Cooperatives

- 22-self directed partnerships with a vision of landscapes capable of sustaining natural and cultural resources.

Gulf Coastal Plains and Ozarks LCC
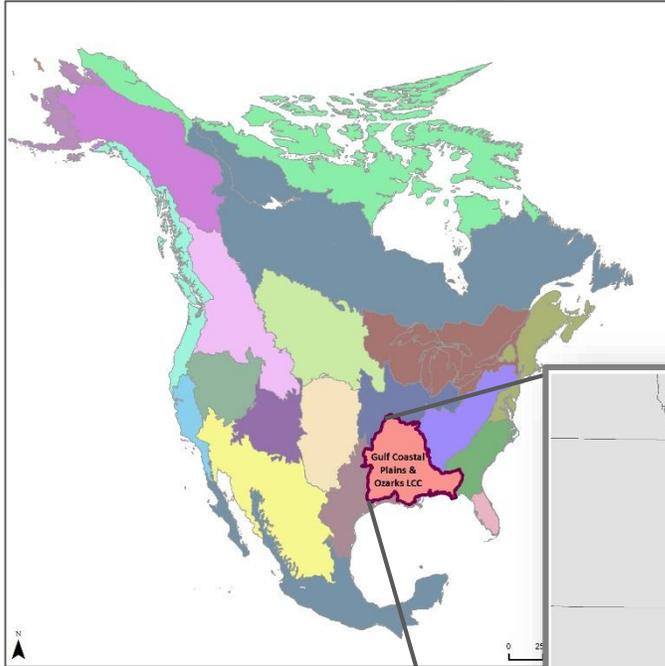
- 12 states, 180 million acres (22 organization steering committee)
- Mission: Define, Design, Deliver sustainable landscapes
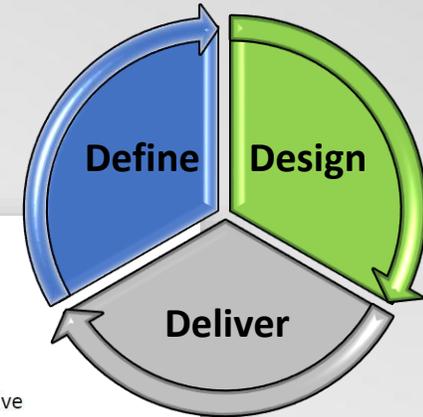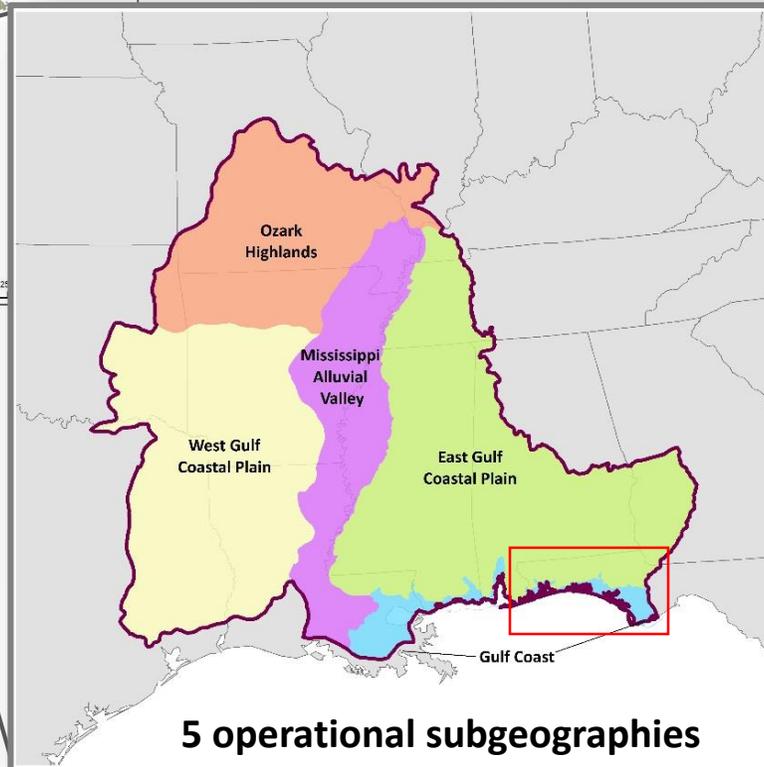
5 operational subgeographies

DRAFT v4

Integrated Science Agenda

Gulf Coastal Plains & Ozarks

Landscape Conservation Cooperative

BACKGROUND

The mission of the Gulf Coastal Plains & Ozarks Landscape Conservation Cooperative (GCPOLCC) is to define, design, and deliver landscapes capable of sustaining natural and cultural resources at desired levels now and into the future.

To achieve this mission, the GCPOLCC has adopted Strategic Habitat Conservation (SHC) as an overarching conservation framework and identified two specific roles – integrating priorities across resource perspectives and incorporating future change into current conservation planning. To serve these roles and make SHC operational in the Gulf Coastal Plains & Ozarks (GCPO) region, the Steering Committee established the Adaptation Science Management Team (ASMT).

That group met in Starkville, MS in September 2012 to outline the technical approach for meeting the GCPOLCC's mission. This document is a product of that meeting and subsequent discussions.

PURPOSE OF THIS DOCUMENT

Because the Landscape Conservation Cooperative (LCC) enterprise encompasses multiple disciplines, scales, and resource interests, many regard LCC science as a similarly broad enterprise – one that can encompass nearly any question of interest to anyone anywhere. However, to be effective, the GCPOLCC recognizes that it must focus its investments on a specific subset of science needs most relevant to achievement of its mission. Using SHC as a guiding principle, the science needs identified by the GCPOLCC through its ASMT seek to integrate science across disciplines, scales, and resources as well as the different aspects of conservation – planning, delivery, monitoring, and research. The purpose of this document is to articulate the initial subset of science needs that are the specific priorities of the GCPOLCC and the logic behind their identification. By identifying, justifying, and communicating the needs and knowledge gaps explicitly, the GCPOLCC seeks to provide a more tangible definition of the functions of the LCC to the broader conservation community (i.e., THIS is what the LCC does). In addition, the GCPOLCC seeks to share its planning framework, enable partners to see and understand how their needs fit and are met within the LCC (and how they can influence, support and/or derive benefit from a partnership with this type of science as its goal), and finally, to guide investment of its assets in accordance with the direction outlined by the Steering Committee in the GCPOLCC Strategic Plan.

GCPOLCC partners should recognize that neither conservation nor science is a linear process – by necessity and value it operates on multiple fronts simultaneously. However, this reality may also make a

5/6/2013

1

GCPO Science Priorities

Operational subgeographies

➡️ **Priority ecological systems**

   ➡️ **Desired ecological states**

      ➡️ **Landscape endpoints**

        ➡️ **Amount**

        ➡️ **Configuration**

        ➡️ **Condition**

        ➡️ **Temporal**

      ➡️ **Species endpoints**

DRAFT v4
Integrated Science Agenda
Gulf Coastal Plains & Ozarks

High gradient streams/rivers
Upland hardwoods

Mainstem "big river systems
Forested wetlands

Medium-low gradient streams/rivers
Open pine woodland/savanna
Grassland/prairie/savanna

Medium-low gradient streams/rivers
Open pine woodland/savanna
Grassland/prairie/savanna

Tidal marsh
Beaches/dunes

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Desired Ecological State

"Stable marsh systems comprised of native vegetation and limited open water conditions occurring in large blocks with natural hydrology present"

Attribute Type	Gulf Coast Estuarine Tidal Marsh
Amount	• Adequate marsh acreage, no loss
Configuration	• Large blocks unbroken marsh (>250 ac) • Connectivity of habitat, interdigitation of marsh types • Moderate amount of edge w/in large marsh blocks • Presence of barrier islands in riverine-dominated systems
Condition	• Emergent vegetative cover: >70% • Limited open water: <20% • Submergent vegetative cover: 15-30% • Dominated by native marsh plants • Salinity aligned along natural gradient • Adequate freshwater flows and tidal influence

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Rapid Ecological Assessment

State of the Gulf Coastal Plains and Ozarks

Phase I: An Ecological Assessment of Priority Landscape Endpoints of the Integrated Science Agenda

Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative

Draft Version 1.0

September 2014

Objectives

- **How much** habitat is in desired ecological state?
- **How much more** habitat is needed?
- **Where** is habitat in desired ecological state?
- **Where** are opportunities to manage?

Outcomes

- Comprehensive "State of the GCPO" report
- Baseline information for conservation design
- Identify and prioritize data acquisition needs

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Tidal Marsh Data

National Wetlands Inventory (NWI)
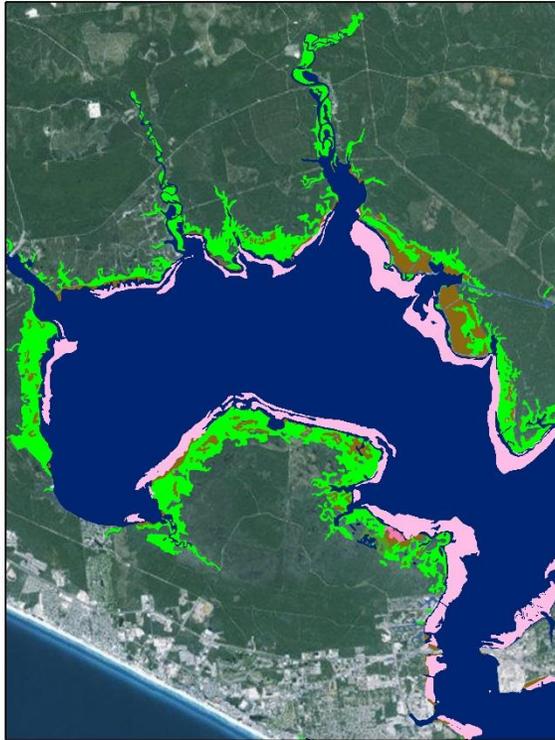
Coastal Change Analysis Program (C-CAP)

Florida Cooperative Land Cover (CLC)

Southeast GAP

NWI classes

E1AB3L	E2EM1/SS4P	E2SS3/EM1P	E2USM
E1UBL	E2EM1N	E2SS3/USP	E2USN
E1UBLh	E2EM1P	E2SS3P	E2USNh
E1UBLx	E2EM1Pd	E2SS4/EM1P	E2USP
E2AB3L	E2EM1Ph	E2SS4P	E2USPh
E2EM/SS1P	E2SS1/4P	E2US/EM1P	
E2EM1/FO4P	E2SS1P	E2US2P	

C-CAP Classes

- Estuarine Aquatic Bed
- Estuarine Emergent Wetland
- Estuarine Scrub/Shrub Wetland
- Open Water
- Unconsolidated Shore

CLC_STATE

- Estuarine (5000)
- Estuarine Salt Marsh (5240)

GAP Ecological Classifications

- Mississippi Sound Salt and Brackish Tidal Marsh
- Open Water (Brackish/Salt)
- Open Water (Fresh)
- Unconsolidated Shore

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W. St. Andrew Bay, FL

Tidal Marsh Amount

Adequate acres to meet needs of tidal wetland wildlife at desired levels; no loss

1) **Amount in any condition**

2) **Amount in desired ecological state**

3) **Net loss or gain**

- *Data uncertainties (e.g., water level, temporal)*
   *→ ≥2 layers must agree*

W. St. Andrew Bay, FL

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Tidal Marsh Amount (any condition)

Estuarine Tidal Marsh Classification Agreement (Emergent/Scrub-Shrub)
- Specified by 2 layers
- Specified by 3 layers

Perdido Bay

Pensacola Bay

Choctawhatchee Bay

St. Andrew Bay

St. Joseph Bay

Apalachicola Bay
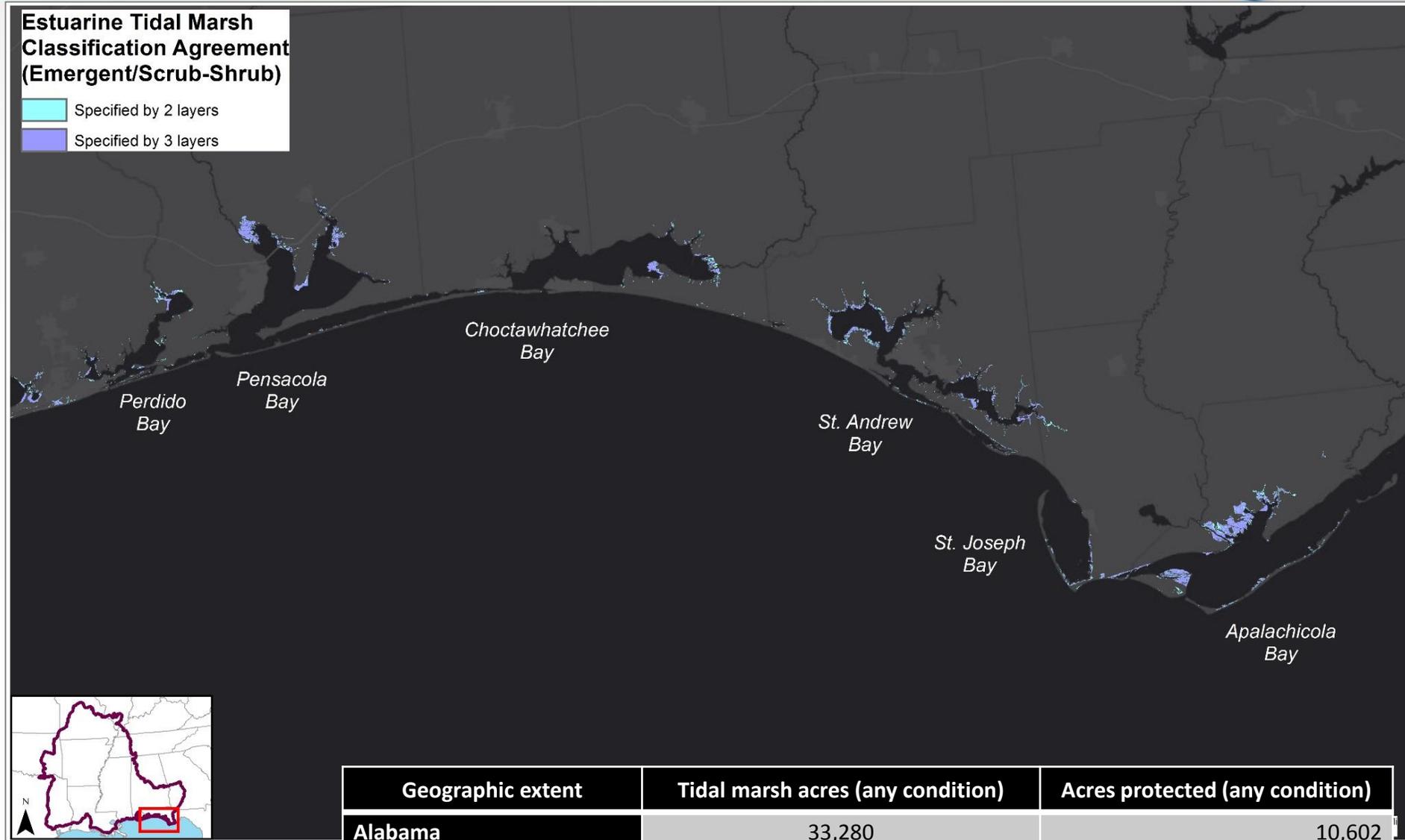
Geographic extent	Tidal marsh acres (any condition)	Acres protected (any condition)
Alabama	33,280	10,602
Florida (GCPO only)	36,888	19,892
Louisiana (GCPO only)	89,083	21,850
Mississippi	43,002	29,377
GCPO Total	202,253	81,721

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Emergent Vegetative Cover >70% ➡️ Unbroken patches >250 ac

Estuarine Tidal Marsh
Mean % Veg Cover
(Estuarine Emergent/Scrub-Shrub)

- 10 - 20%
- 20 - 30%
- 30 - 40%
- 40 - 50%
- 50 - 60%
- 60 - 70%
- 70 - 80%
- 80 - 90%
- 90 - 100%

0   0.45   0.9   1.35   1.8 Mi

Estuarine Tidal MarshPatches
(>70% emergent cover)

- Patches >250 ac
- Patches <250 ac
- GCPO LCC Extent

0   0.45   0.9   1.35   1.8 Mi

Gulf Coastal Plains & Ozarks
Landscape Conservation Cooperative
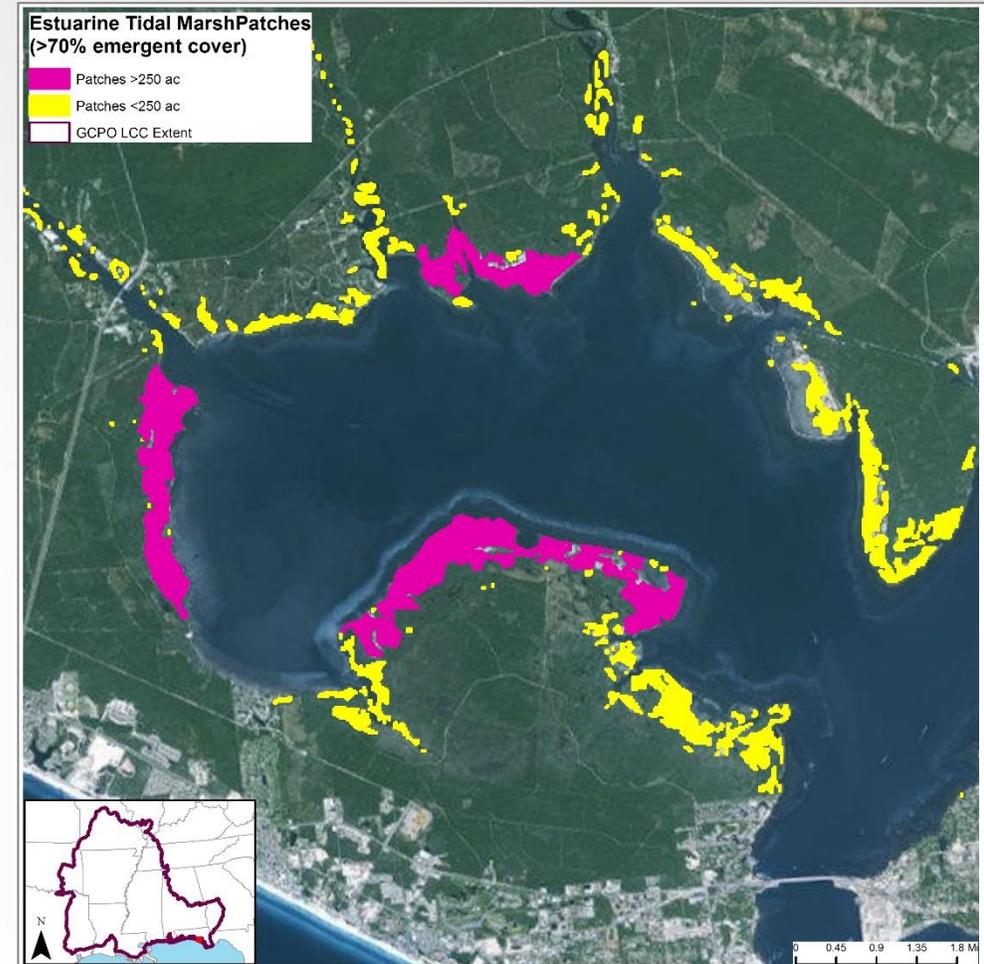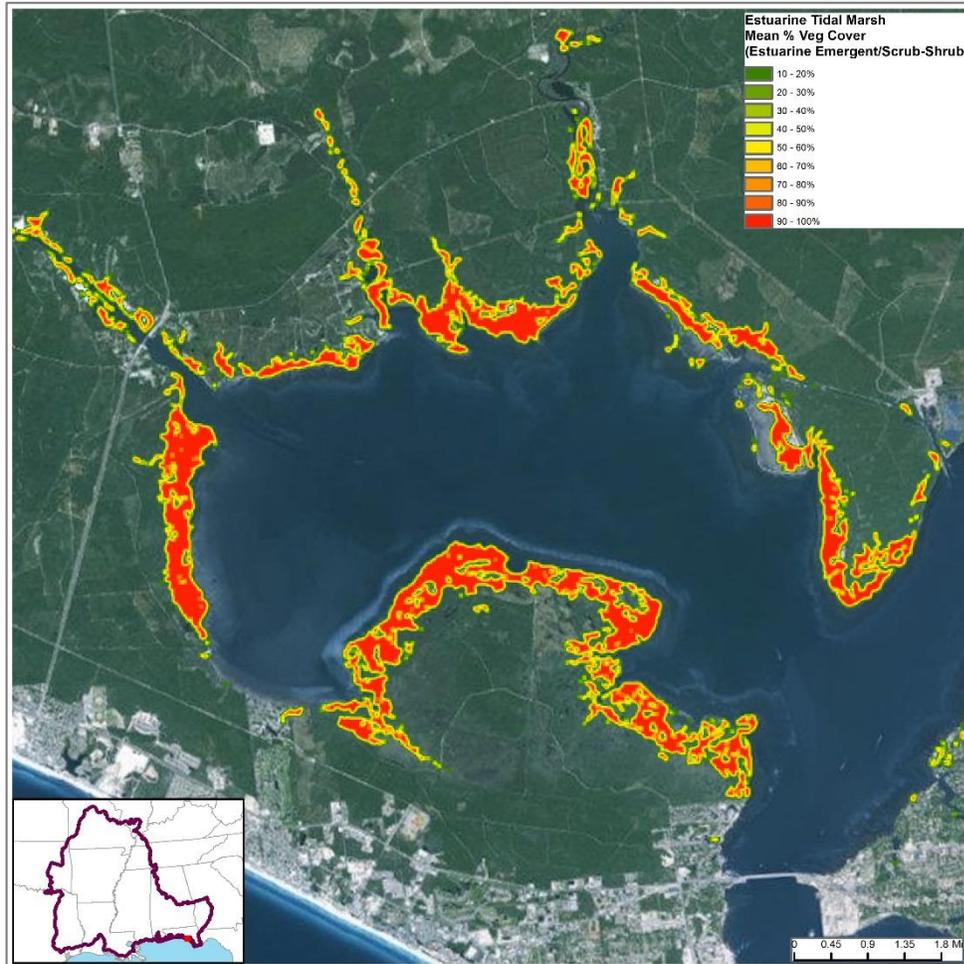
Large Blocks of Unbroken Marsh (>250 ac)
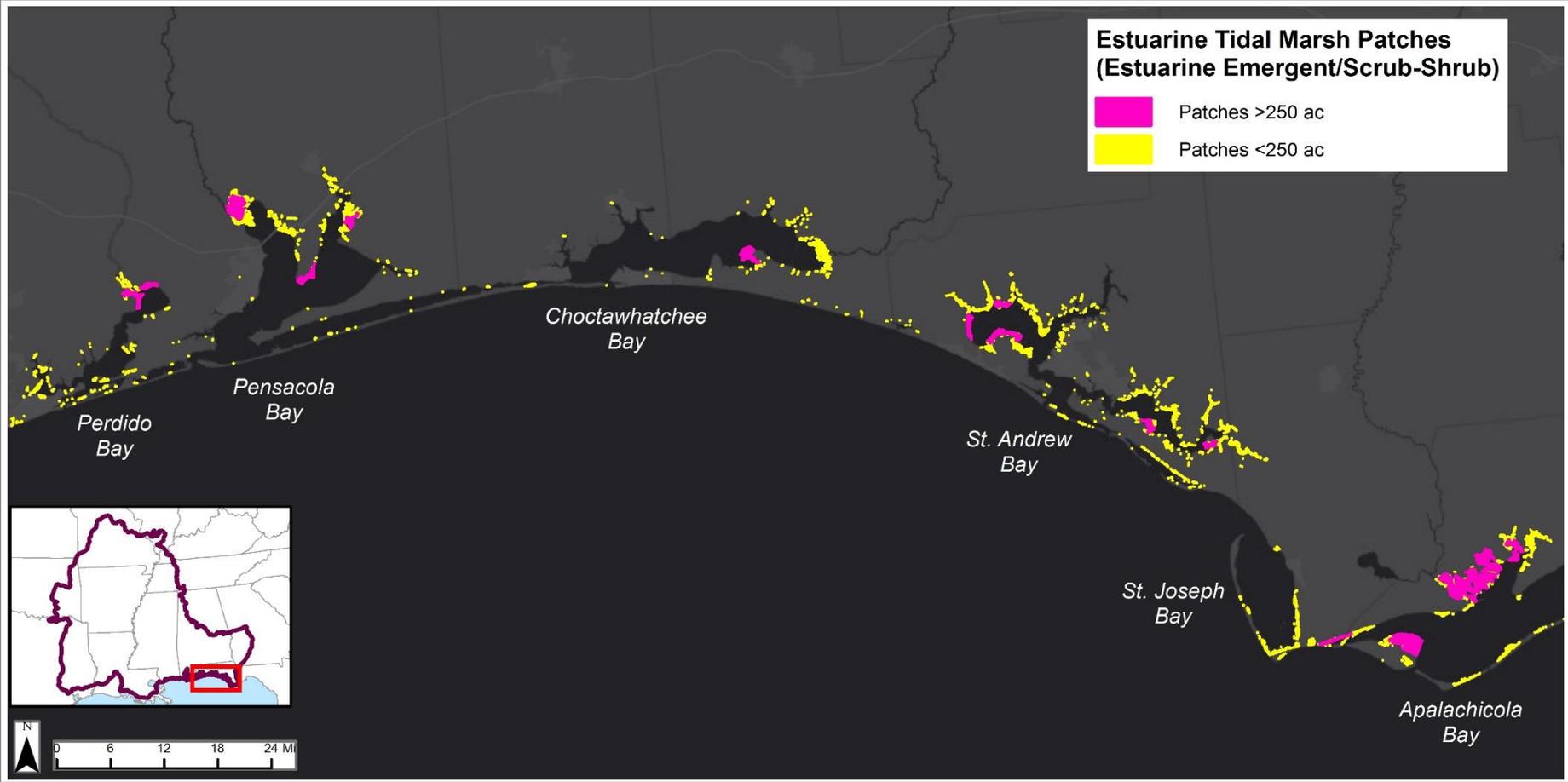
	Patches >250 ac		Patches <250 ac		All patches		
	# patches	# acres	# patches	# acres	# patches	# acres	% all patches >250 ac
Florida (GCPO)	24	16,531	1313	10,934	1,337	27,465	60%
GCPO	110	131,980	3979	38,030	4089	170,010	78%

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Moderate amounts of edge within large blocks of marsh
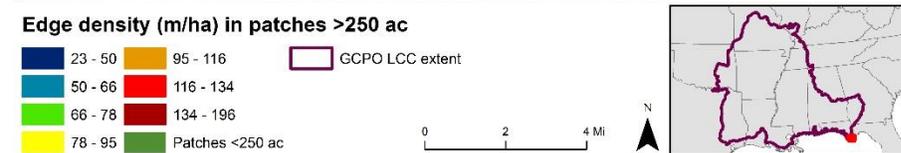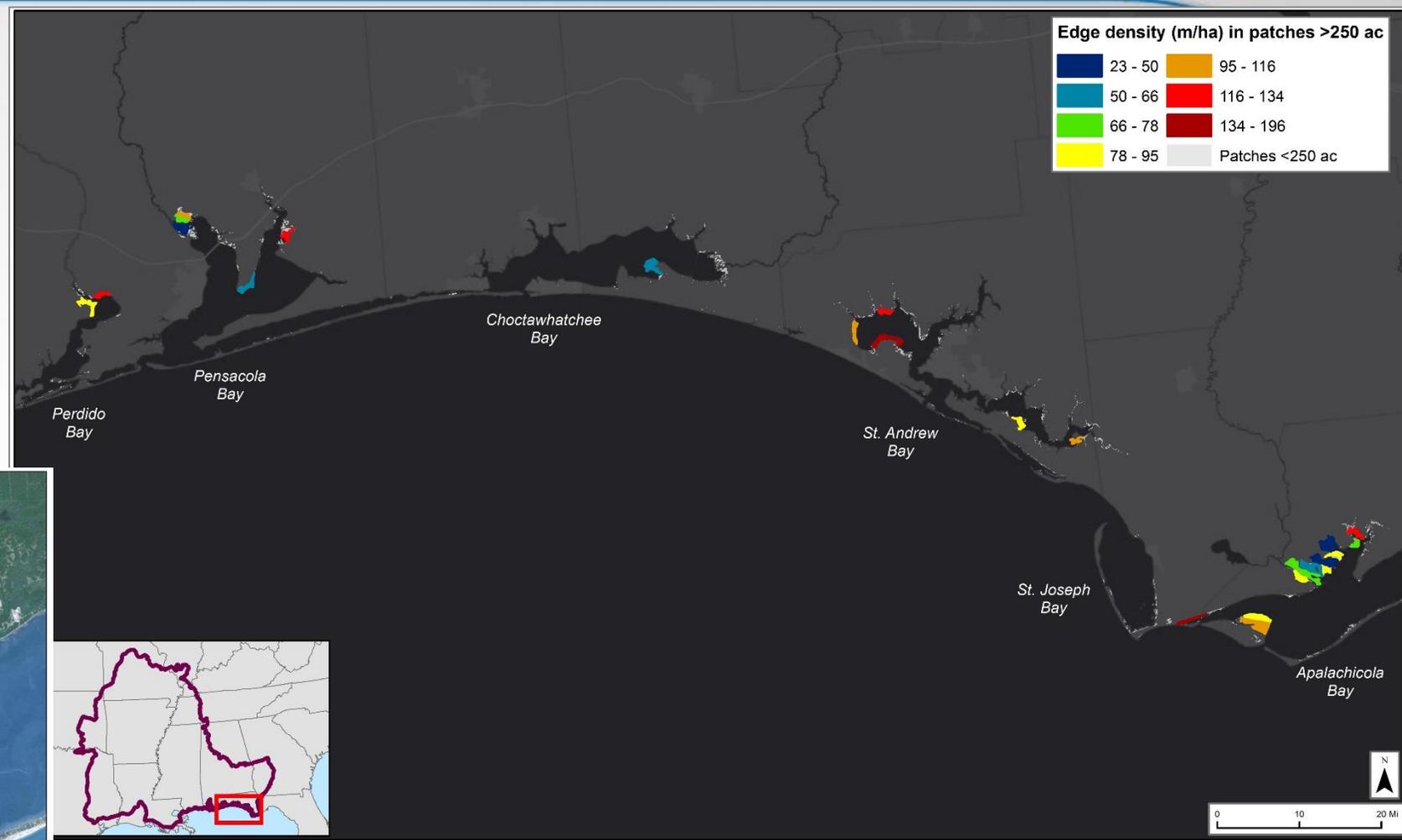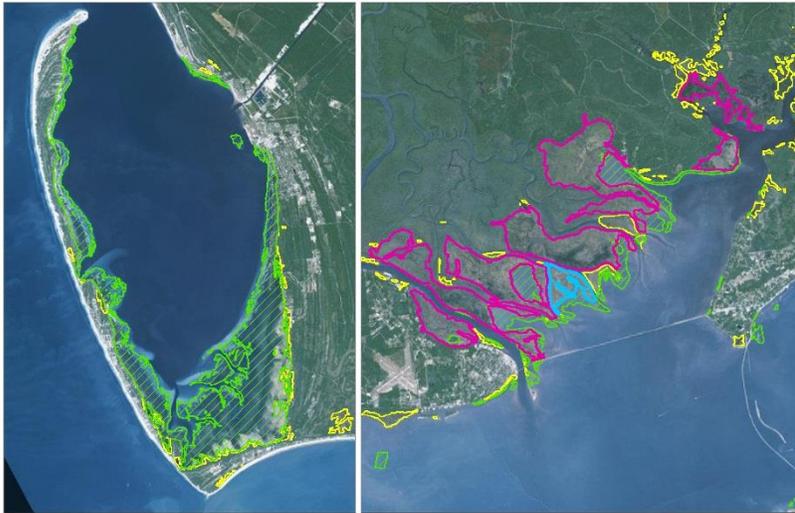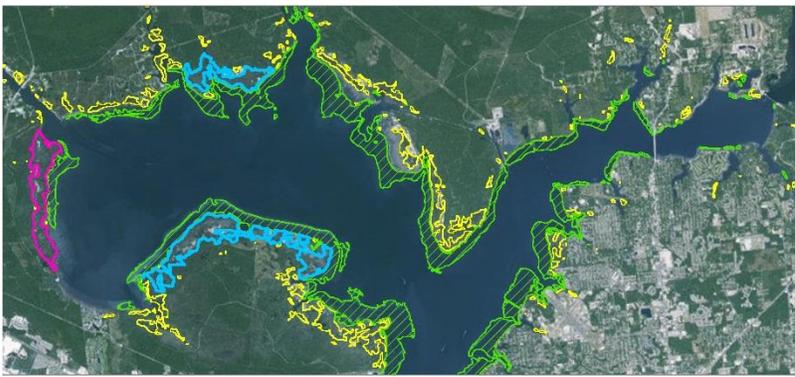
Edge density (m/ha) in patches >250 ac

- 23 - 50
- 50 - 66
- 66 - 78
- 78 - 95
- 95 - 116
- 116 - 134
- 134 - 196
- Patches <250 ac

Perdido Bay

Pensacola Bay

Choctawhatchee Bay

St. Andrew Bay

St. Joseph Bay

Apalachicola Bay

Edge density (m/ha) in patches >250 ac

- 23 - 50
- 50 - 66
- 66 - 78
- 78 - 95
- 95 - 116
- 116 - 134
- 134 - 196
- Patches <250 ac
- GCPO LCC extent

Submergent vegetative cover 15-30%

Legend (left):
- Submergent vegetative cover (GCPO LCC)
- Marsh patches >250 ac w/15-30% SAV w/in 500 m
- Marsh patches >250 ac
- Marsh patches <250 ac

Legend (right):
- Submergent vegetative cover (GCPO LCC)
- Marsh patches >250 ac w/15-30% SAV w/in 500 m
- Marsh patches >250 ac
- Estuarine tidal marsh (GCPO LCC)

Map labels: Perdido Bay, Pensacola Bay, Choctawhatchee Bay, St. Andrew Bay, St. Joseph Bay, Apalachicola Bay

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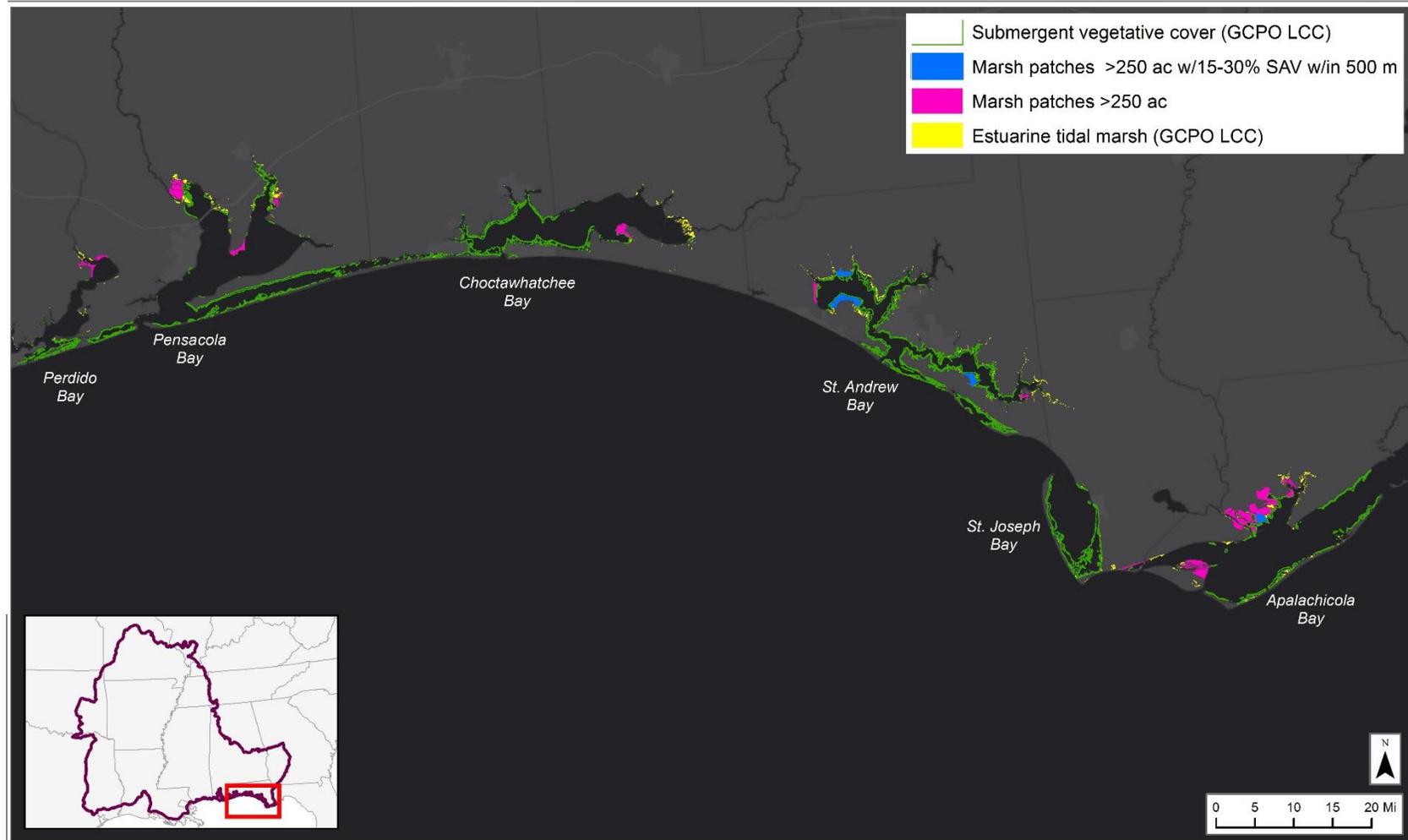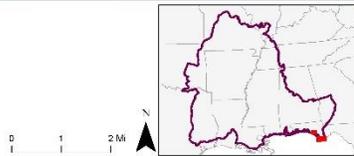
Other Tidal Marsh Endpoints

❖ *Connectivity of habitat types*

Legend:
- Fresh Marsh
- Intermediate Marsh
- Brackish Marsh
- Salt Marsh
- Water
- Other
- GCPO Patches >250 ac

❖ *Salinity aligned along natural gradient*

Low season   High season

❖ *Adequate freshwater flows and tidal influence*

Great Diurnal Range
- High : 0.82 m (2.69 ft)
- Low : 0.09 m (0.31 ft)

Mean annual flow (cubic ft/sec)
- <10
- 10 - 75
- 75 - 400
- 400 - 2,000
- 2,000 - 6,000
- 6,000 - 40,000
- 40,000 - 74,9454

❖ *<20% open water*

Estuarine Tidal Marsh Patches (Estuarine Emergent/Scrub-Shrub)
- C-CAP open water
- Patches >250 ac AND <20% open water
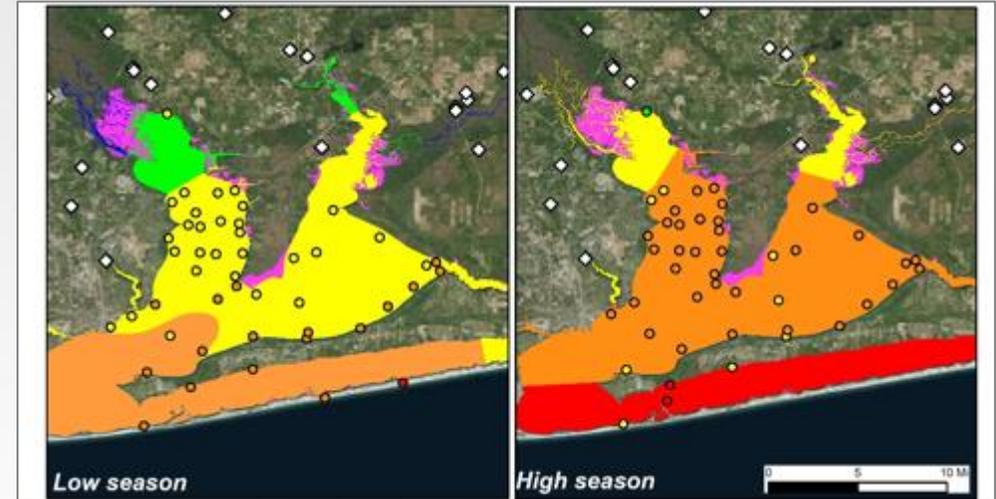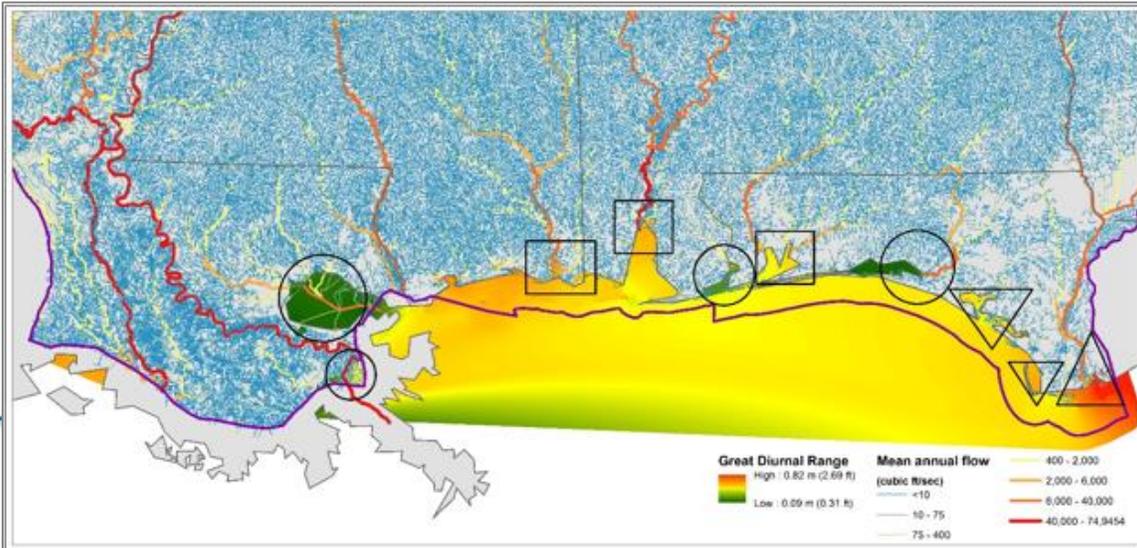
<0.05% open water
3.8% open water
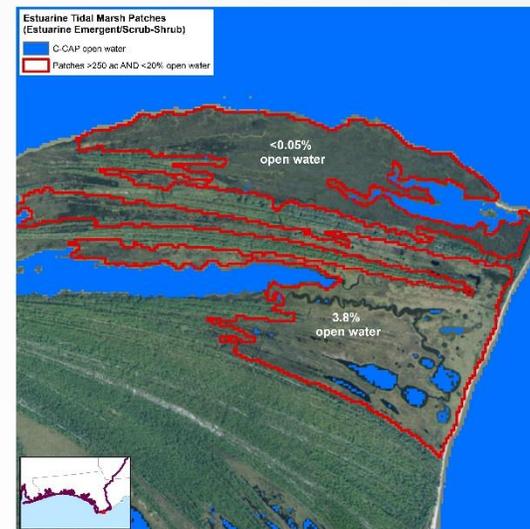
❖ *Native plant dominance*

❖ *Presence of riverine barrier islands*

Putting it all together:

Marsh patch quality (relative to GCPO landscape endpoints)

- 6 (High) — magenta
- 5 — cyan
- 4 — green
- 3 — yellow
- 2 — orange
- Patches <250 ac — gray

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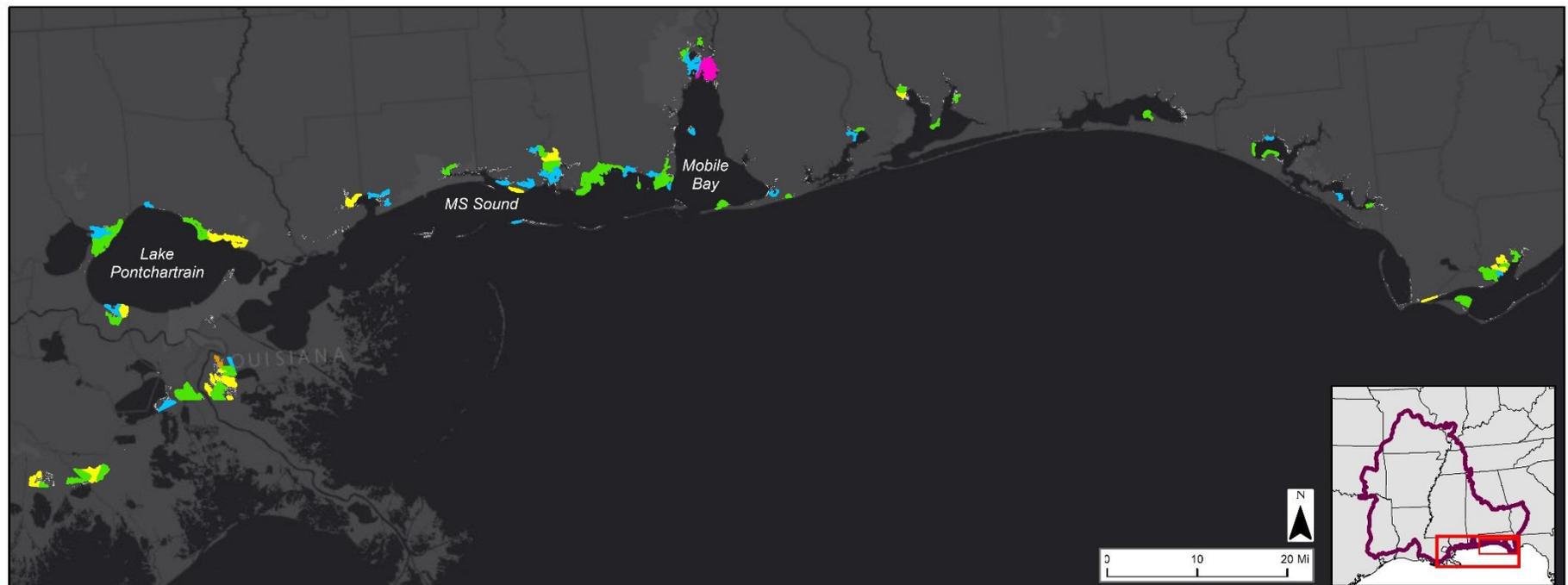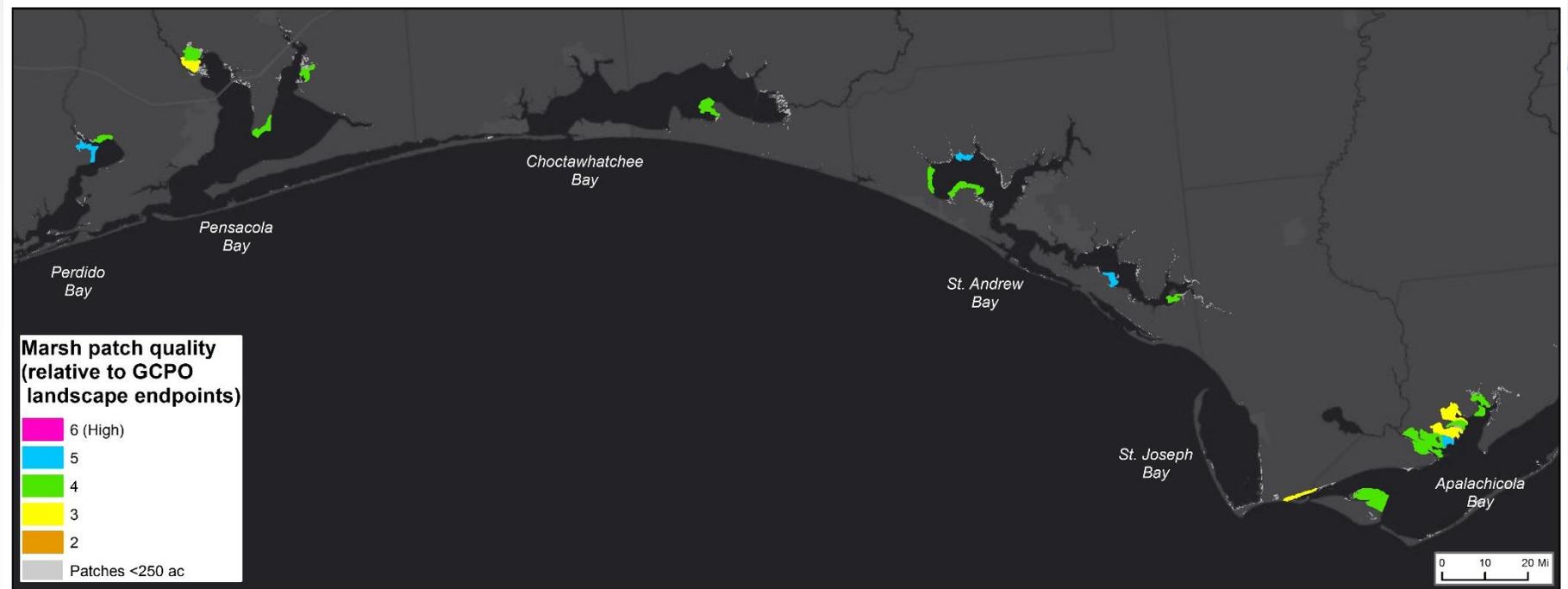
Geographic extent	Any condition		Meets 6 landscape endpoints		Meets ≥ 5 landscape endpoints		Meets ≥ 4 landscape endpoints		Meets ≥ 3 landscape endpoints	
	Acres	Acres protected	Acres	Acres protected	Acres	Acres protected	Acres	Acres protected	Acres	Acres protected
Alabama	33,280	10,602	5,075	2,006	10,956	4,515	21,261	7,611	21,261	7,611
Florida (GCPO only)	36,888	19,892	0	N/A	1,465	796	12,654	8,536	16,899	12,264
Louisiana (GCPO only)	89,083	21,850	0	N/A	9,246	2.73	49,863	12,157	65,790	17,819
Mississippi	43,002	29,377	0	N/A	6,984	5,589	20,944	13,228	27,343	19,570
GCPO Total	202,253	81,721	5,075	2,006	28,651	10,902	104,722	41,532	131,293	57,264

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Value Added: Targeting management
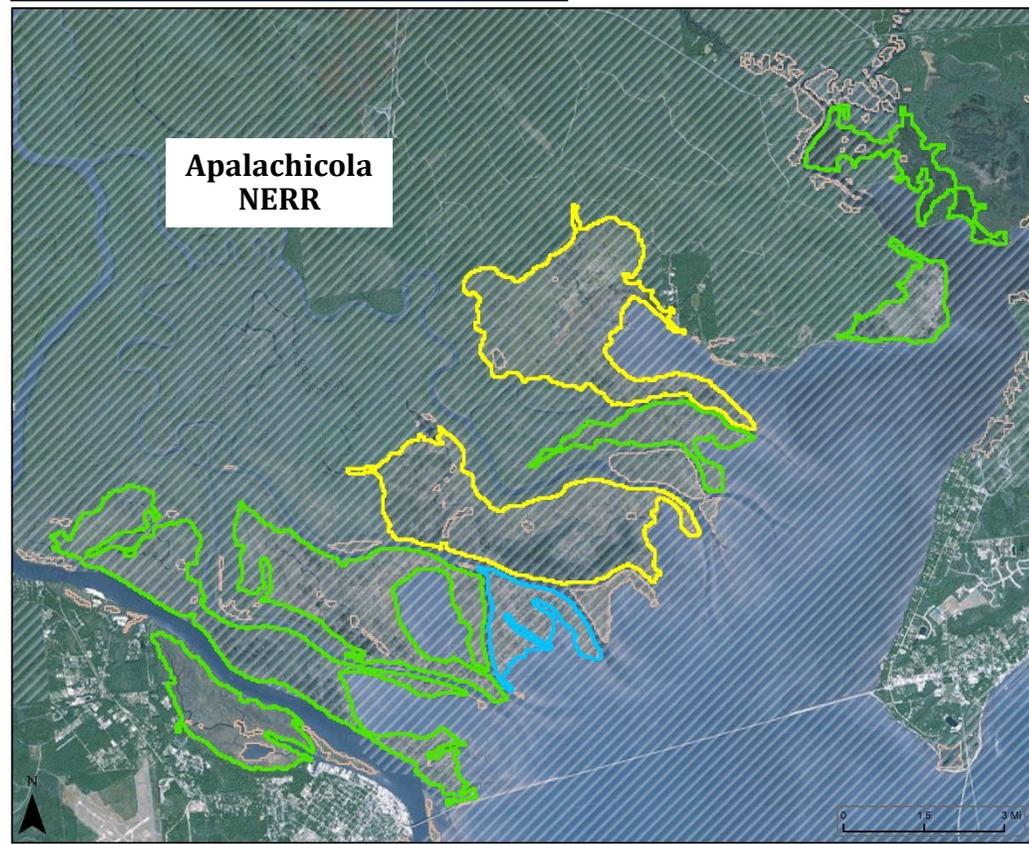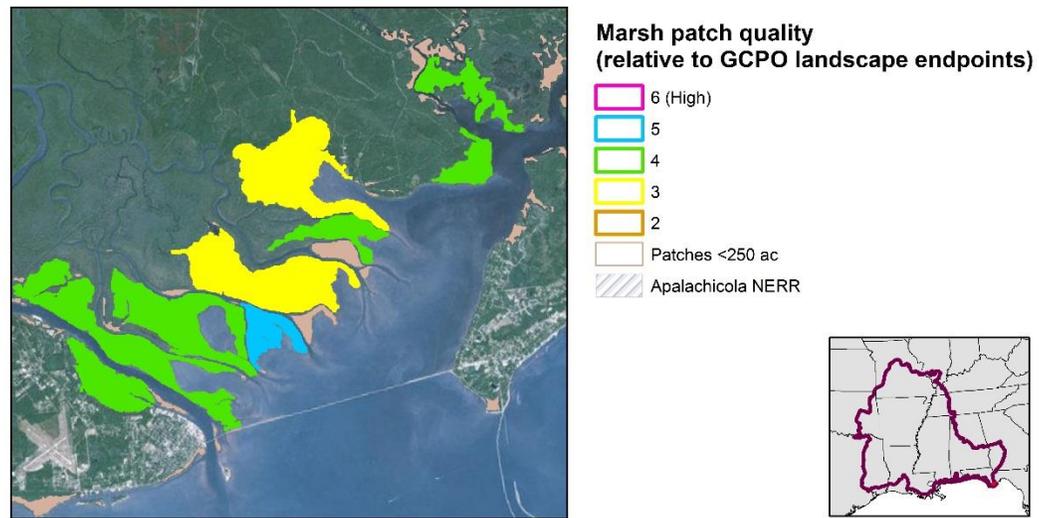
Value Added: Communicating with Partners

Marsh patch quality
(relative to GCPO landscape endpoints)

- 6 (High)
- 5
- 4
- 3
- 2
- Patches <250 ac
- Tyndall AFB

Tyndall AFB

N

0   0.5   1 Mi

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Value Added: Targeting Investments

Scaling up conservation

Marsh patch quality
(relative to GCPO
landscape endpoints)

6 (High)
5
4
3
2
Patches <250 ac

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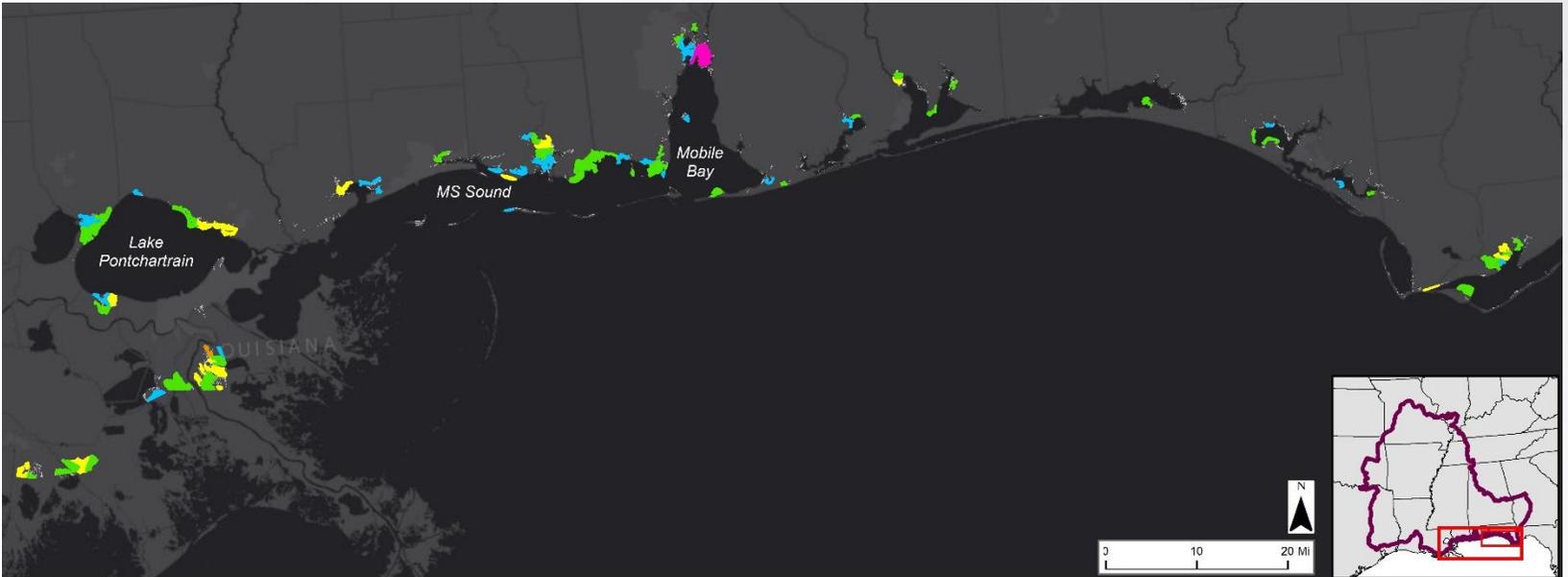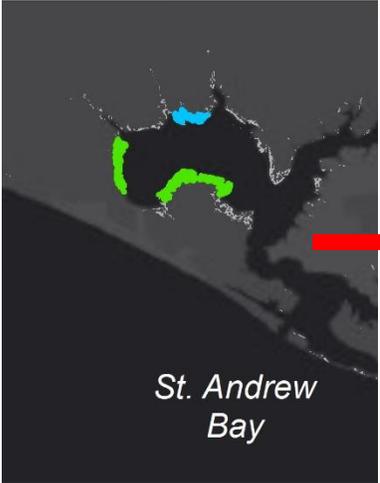
Thank You!

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GRI

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Tidal Marsh Loss
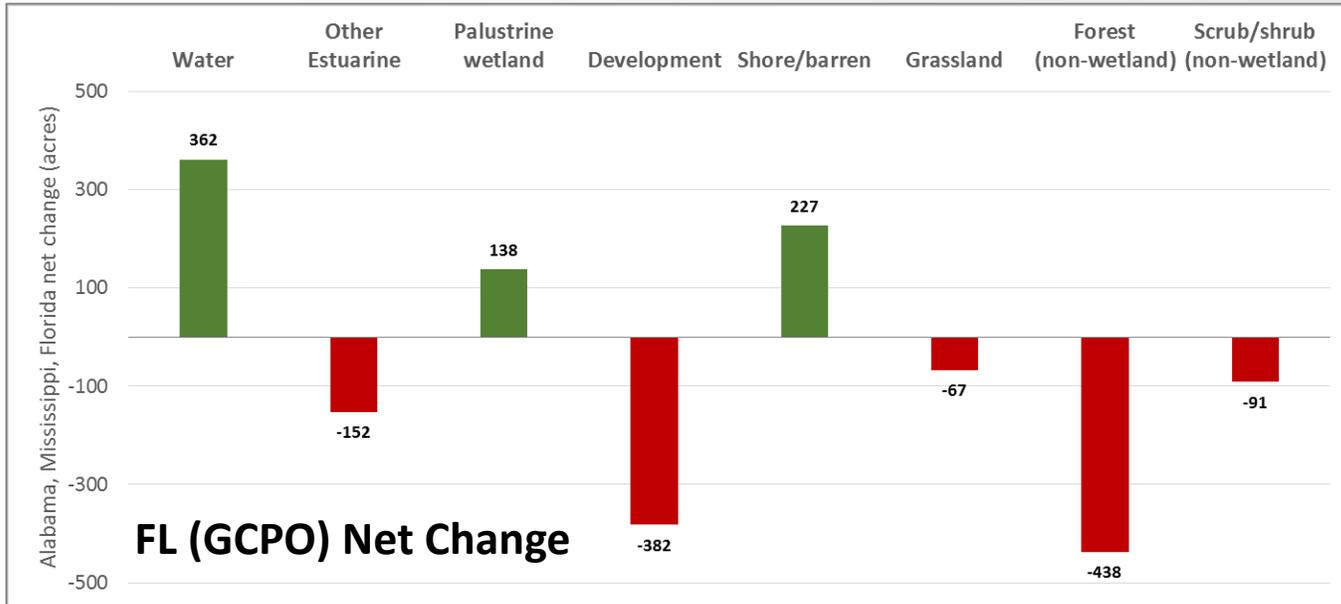
FL (GCPO) Net Change

C-CAP Change Product (1996-2010)

Estuarine emergent/scrub shrub wetland

- FL (GCPO) net loss = 404 ac
- GCPO Net loss = 15,116 ac

GCPO Net Change
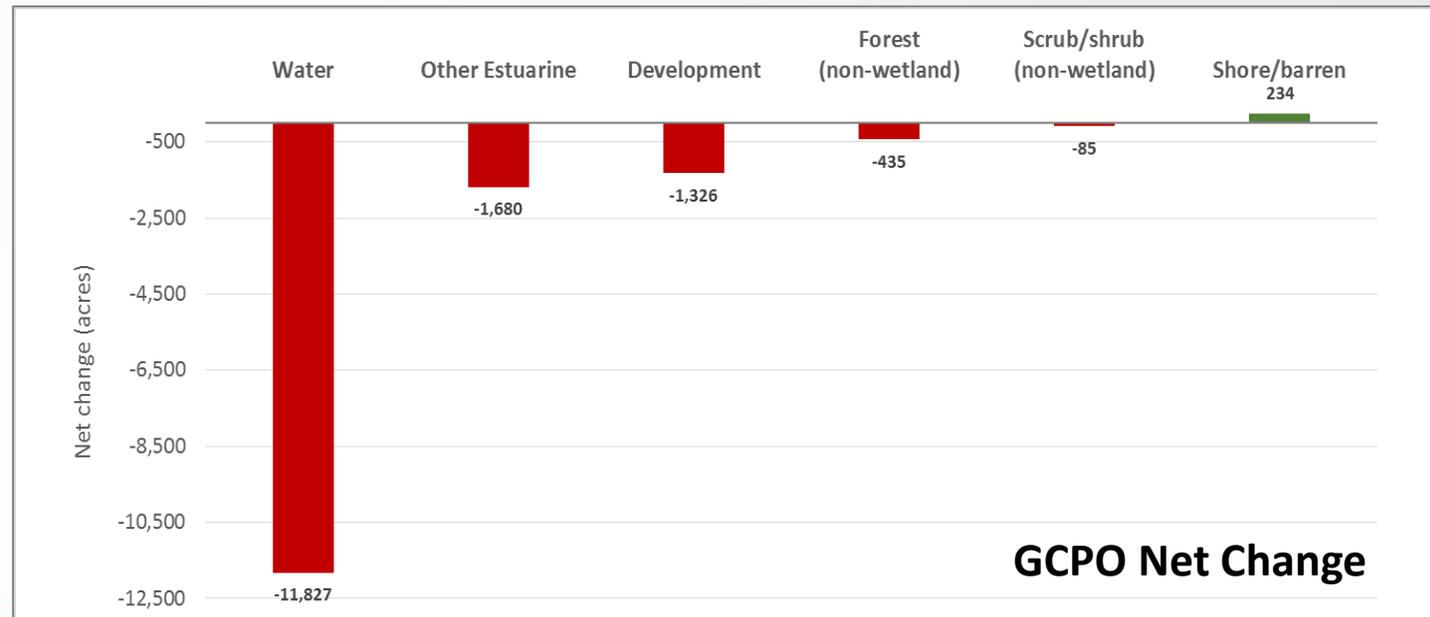
Tidal Marsh Species Endpoints

Desired Landscape Endpoints	River Otter	Mink	Black Bear	Penaid Shrimp	Clapper Rail	King Rail	Redhead	Scaup	Manatee	Speckled Trout	Oysters	Black Bass
Large blocks of unbroken marsh (>250 ac)	X	X										
Connectivity of habitat types	X	X	X									
Moderate amounts of edge				X	X							
Emergent Vegetative Cover >70%					X	X						
Limited Open Water (<20%)												
Submergent Aquatic Vegetation (15-30%)							X	X	X			
Natural salinity										X	X	
Composition – native vegetation												
Adequate freshwater flows			X									X