Physical & Program Options for Inland Migration of Louisiana's Coastal Wetlands

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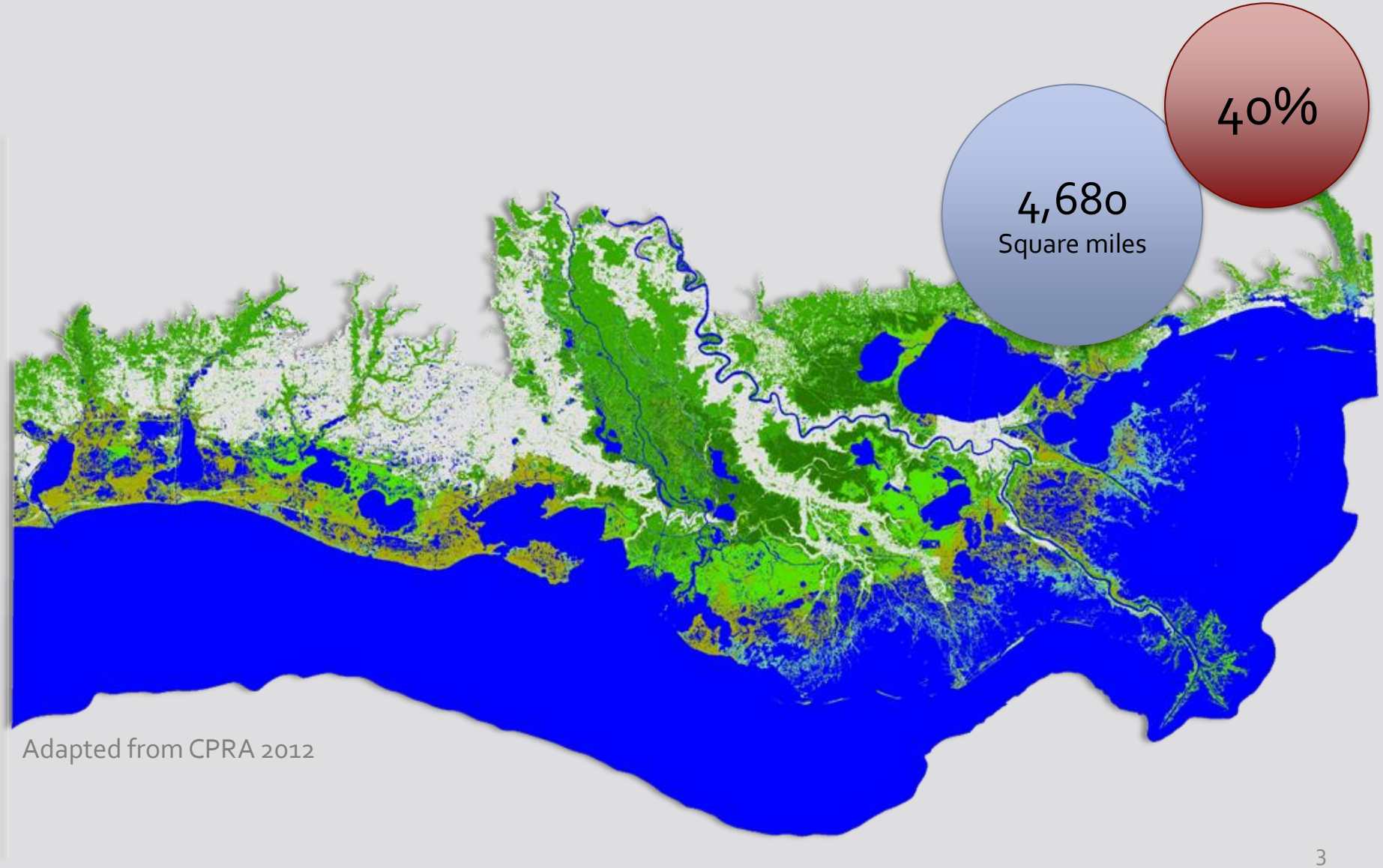
Client: Louisiana Coastal Protection & Restoration Authority (CPRA)

Goals of the Master's Project

- What areas in coastal Louisiana can serve as future wetland sites?
- What policy alternatives are available to facilitate the migration of wetlands?

1. Wetland loss in Louisiana
2. Geospatial modeling of sea level rise (SLR) & wetland migration
3. Policy analysis
4. Bringing it all together – applying policy tool to geospatial results

Louisiana's Coastal Wetlands

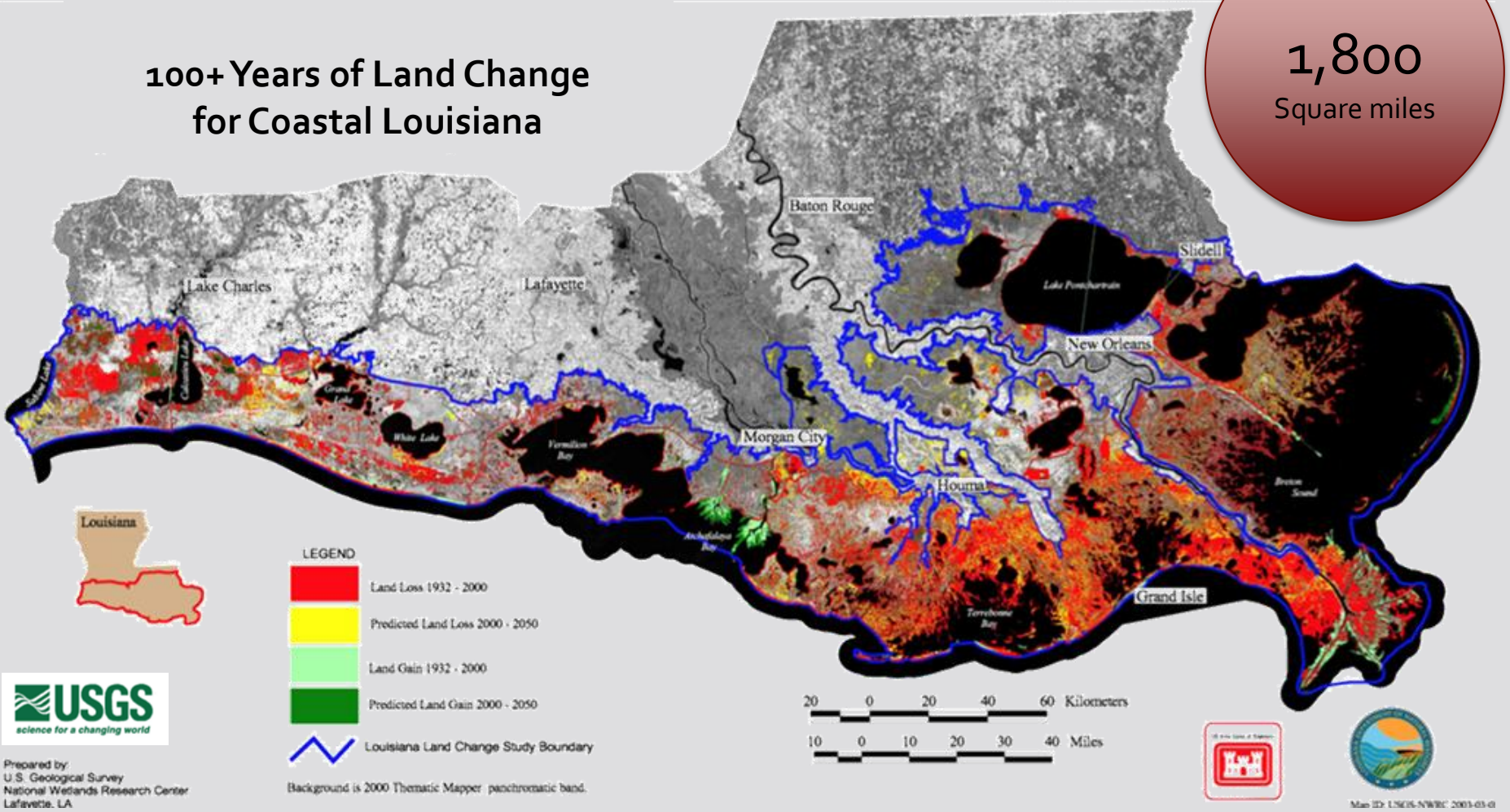


Adapted from CPRA 2012

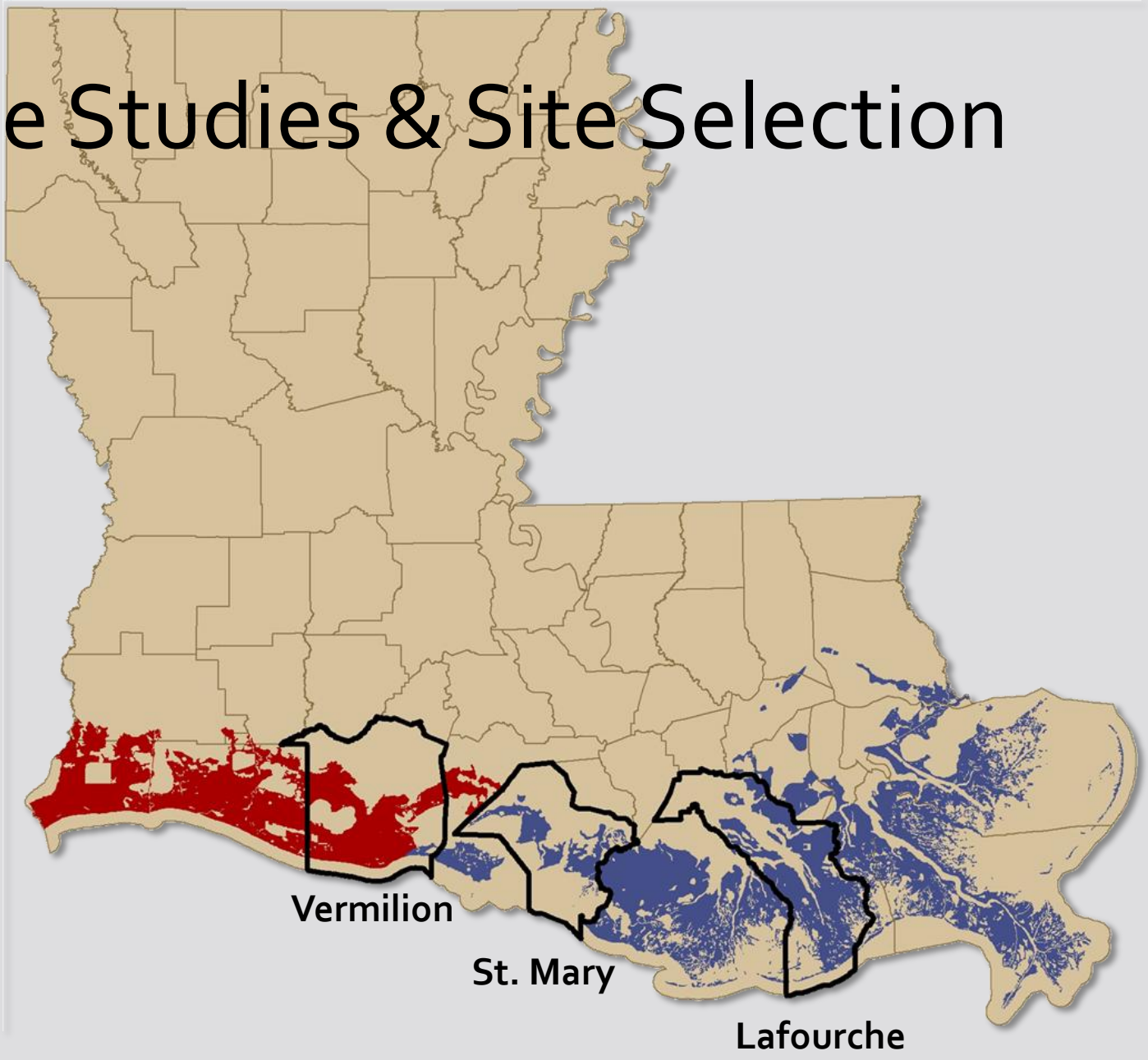
History of Wetland Loss

100+ Years of Land Change for Coastal Louisiana

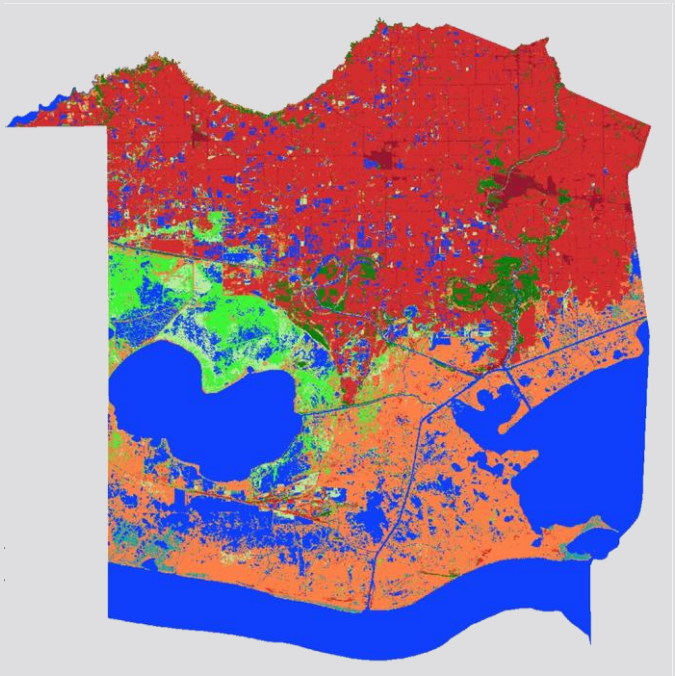
1,800
Square miles



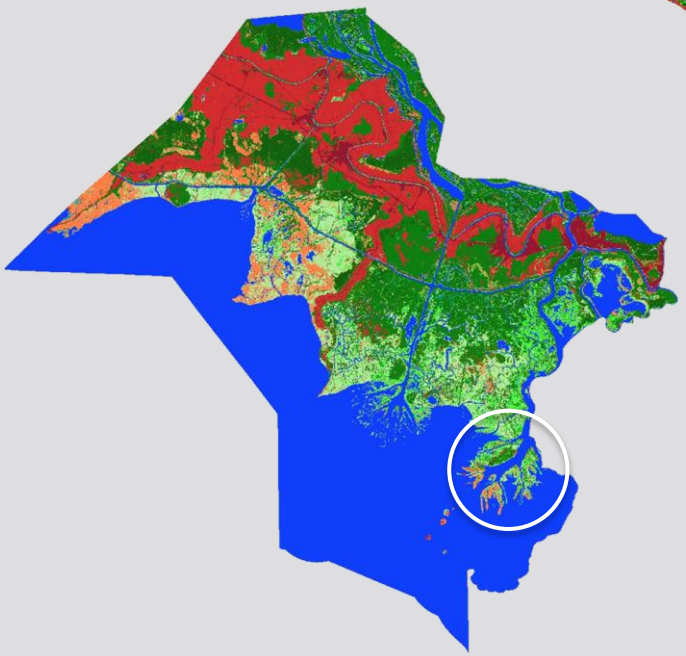
Case Studies & Site Selection



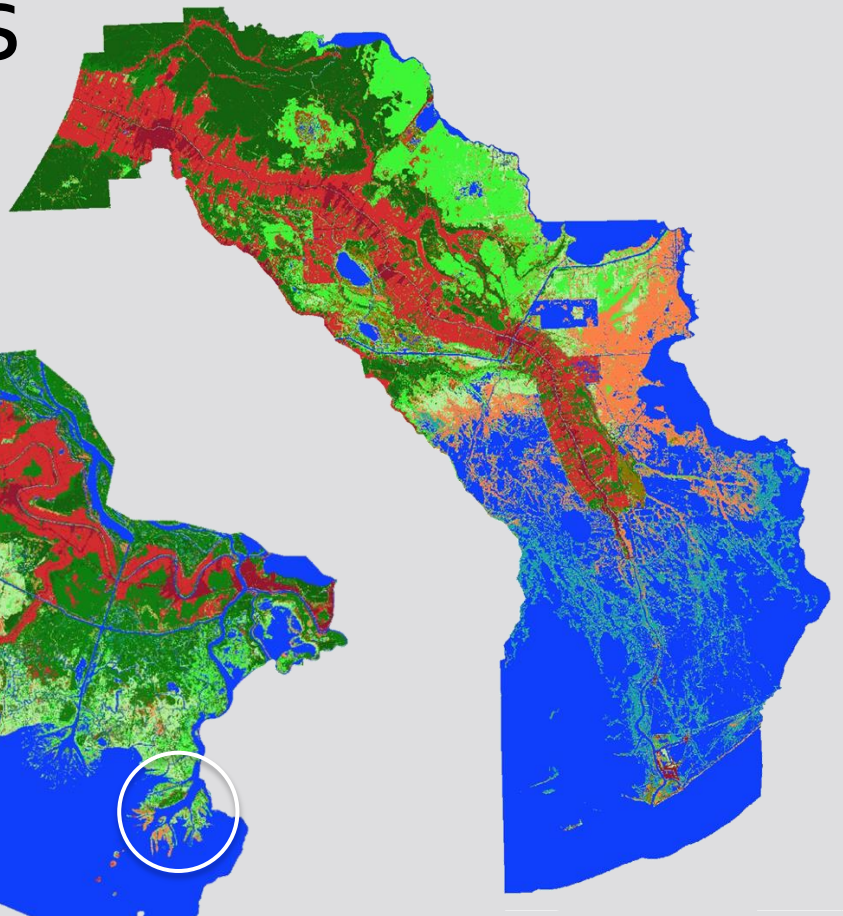
Parish Comparisons



Vermilion



St. Mary



Lafourche

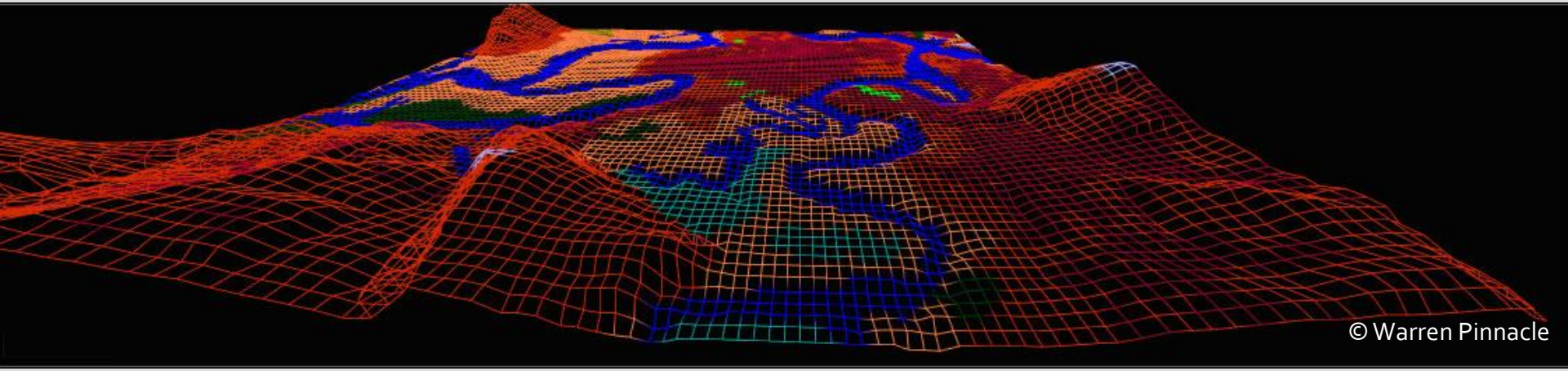
Sea Level Affecting Marshes Model (SLAMM)

Inputs

- Landcover
- Elevation
- Slope
- Dikes/Levees

Parameters

- Subsidence
- Tide Range & Frequency of Inundation
- Erosion & Accretion Rates



SLAMM Scenarios

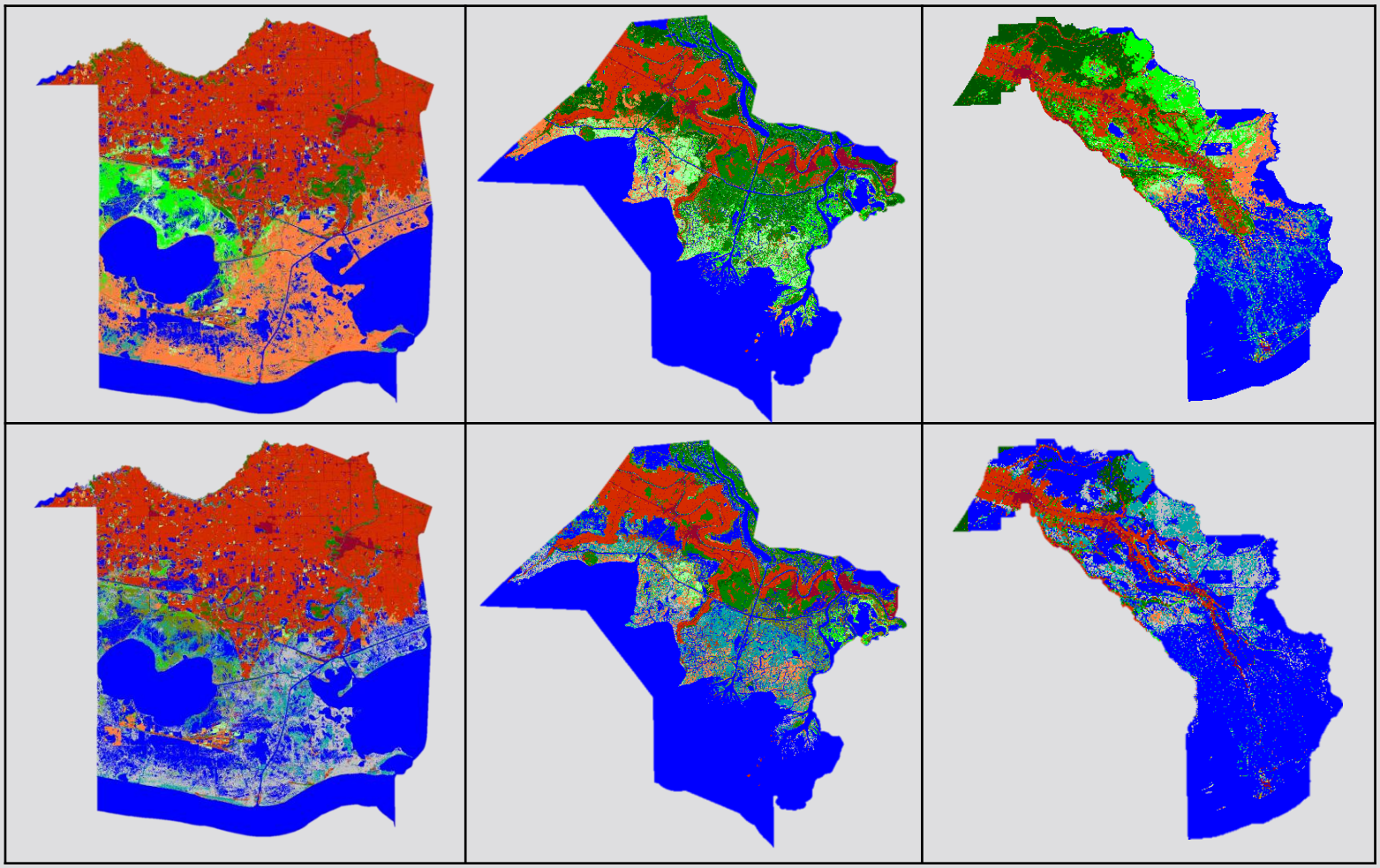
Inputs & Parameters

- Low Subsidence
- High Subsidence
- Dikes
- No Dikes

SLR by 2100

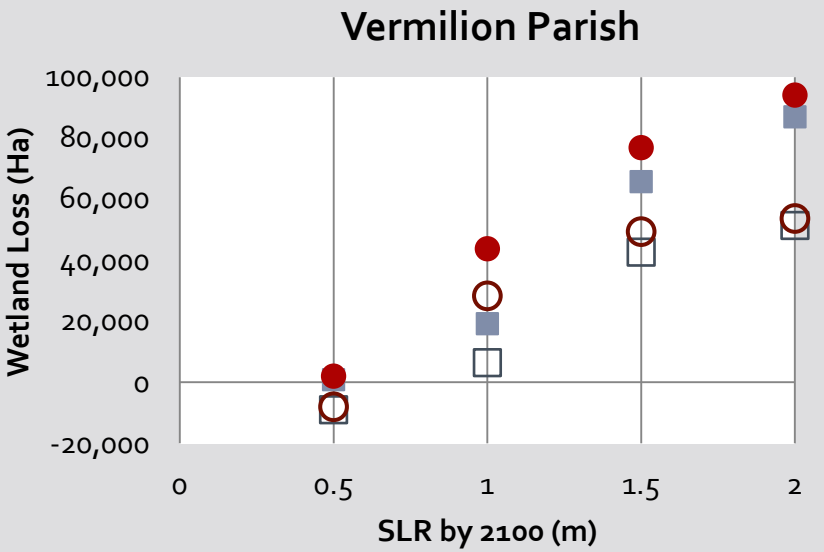
- 0.5 meters
- 1.0 meters
- 1.5 meters
- 2.0 meters

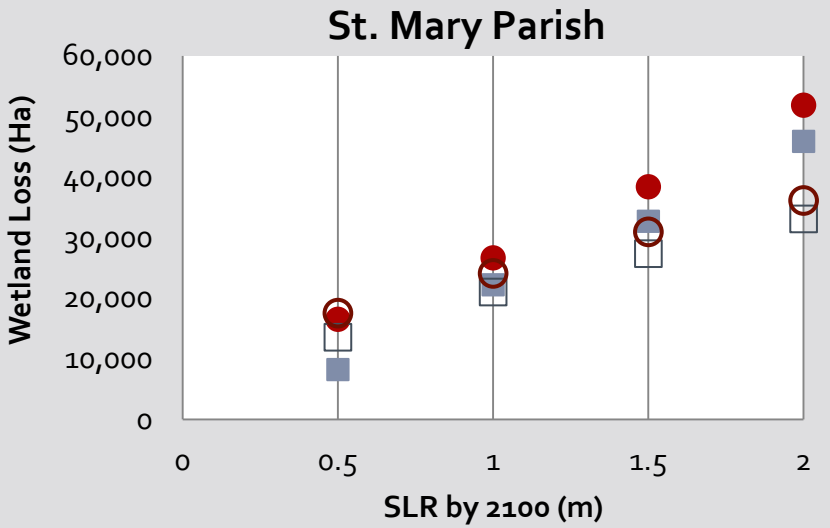
SLAMM Results

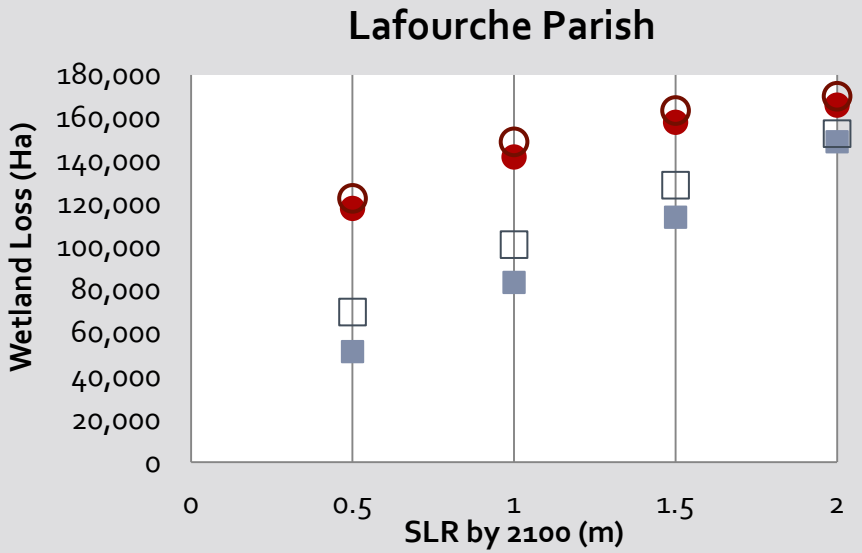


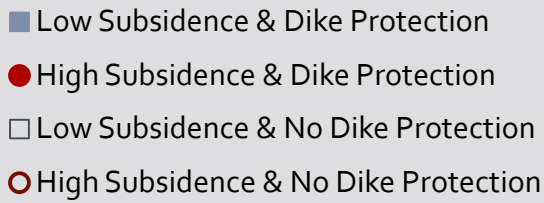
1.5 meter SLR by 2100, Dike Protection, Low Subsidence

Model Sensitivity to Subsidence & Protection Conditions

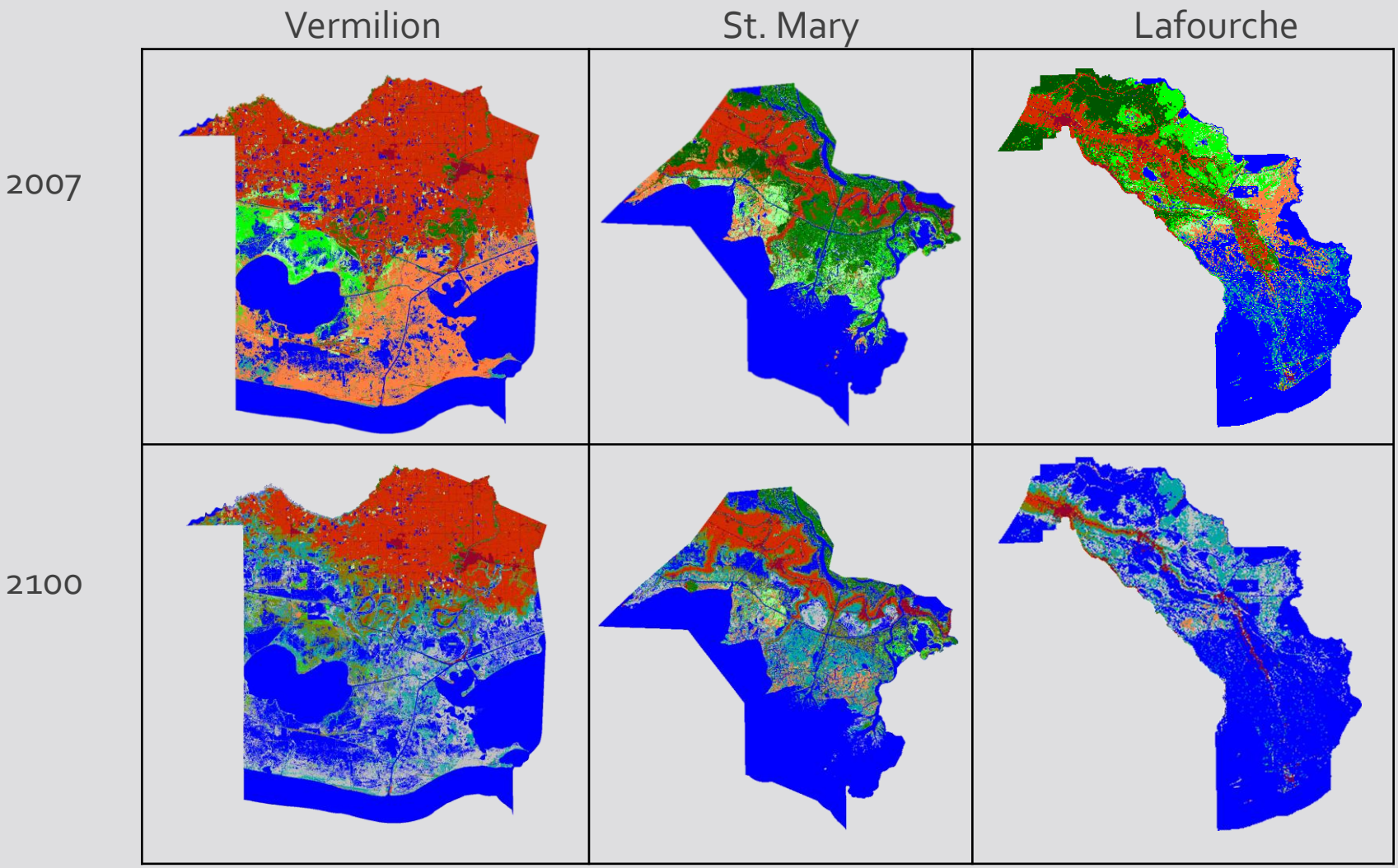






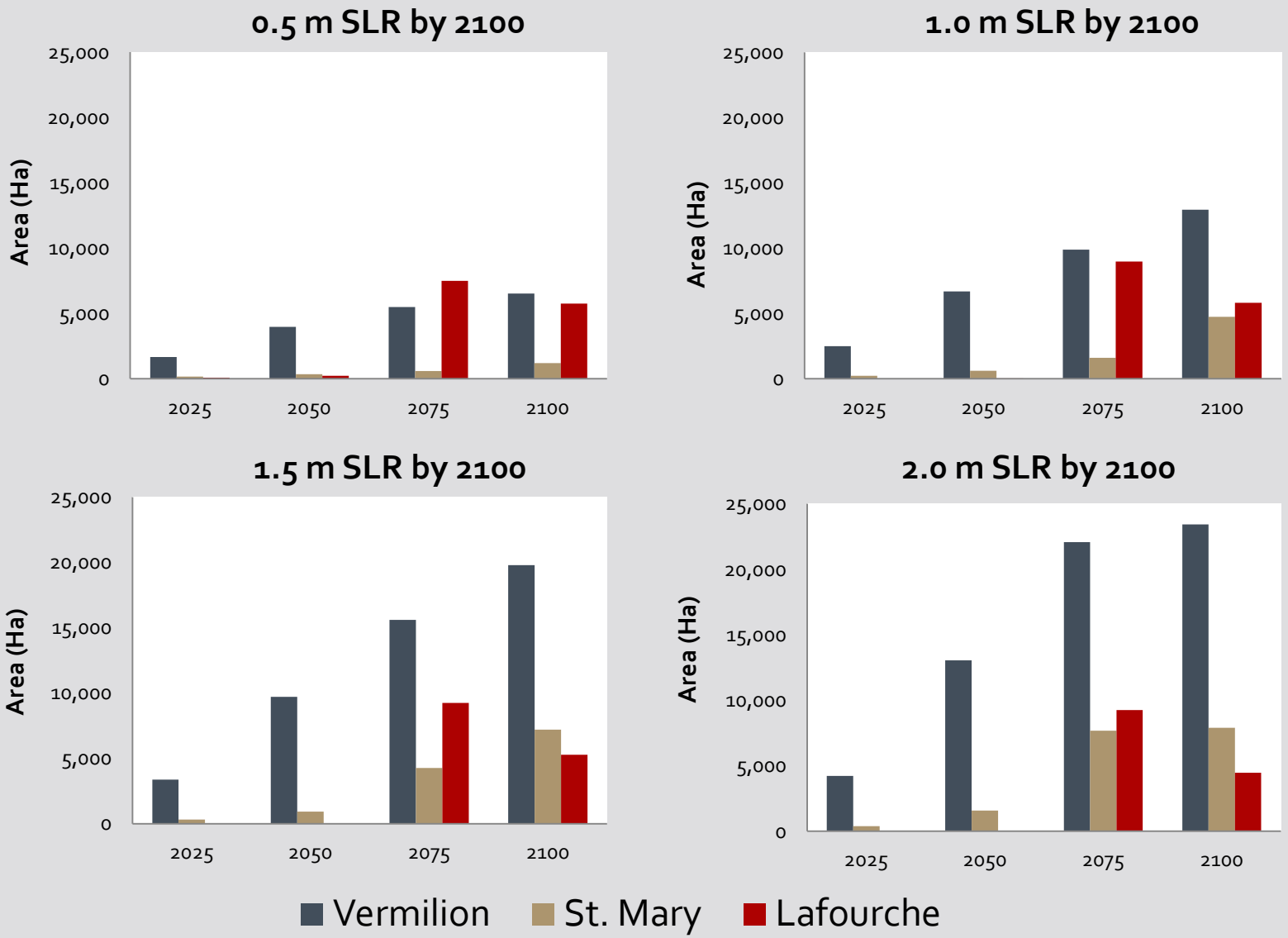


Upland Migration of Wetlands



1.5 meter SLR by 2100, No Dike Protection, Low Subsidence

Undeveloped Dry Land Converting to Wetlands

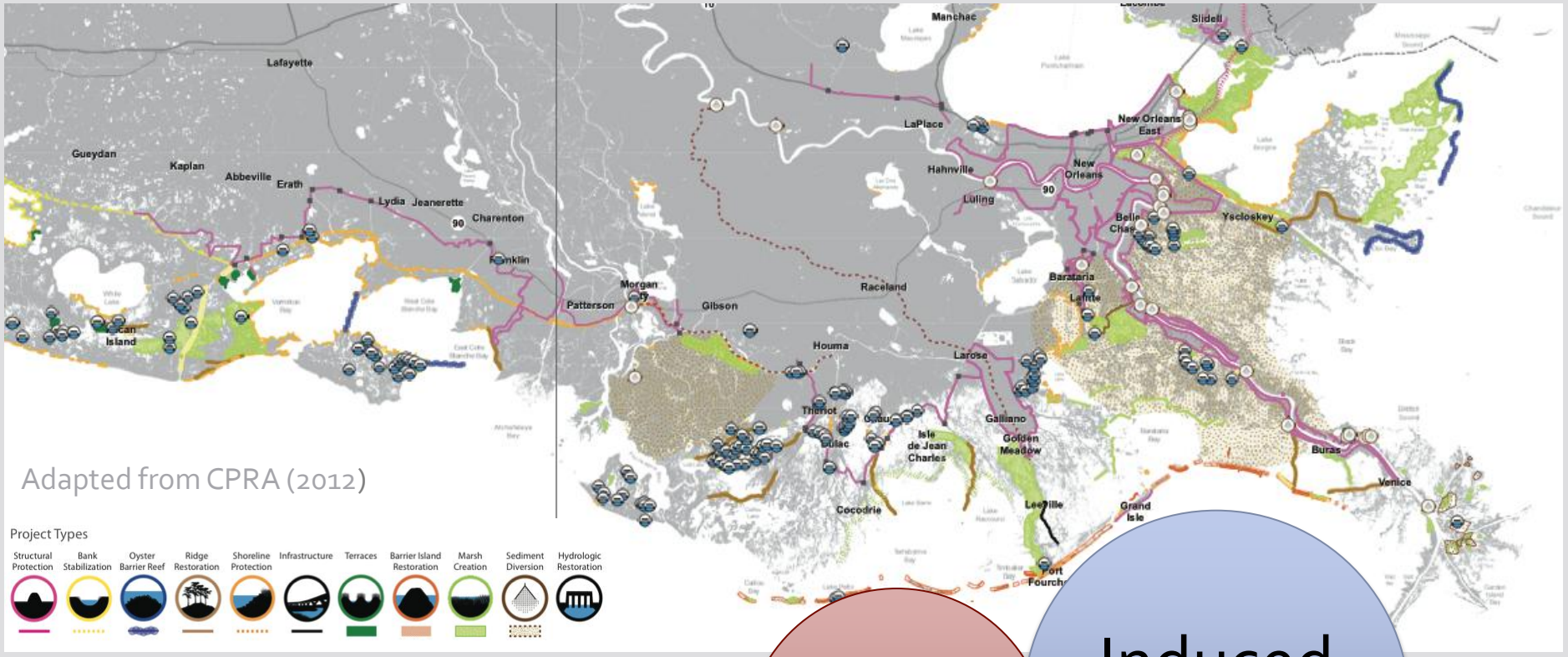


1.5 meter SLR by 2100, No Dike Protection, Low Subsidence

Modeling Results Summary

- Protection of dry land ≠ Wetland migration
- Allowing migration may not result in equal benefits across the study sites
- Management decisions must consider variability along the coast

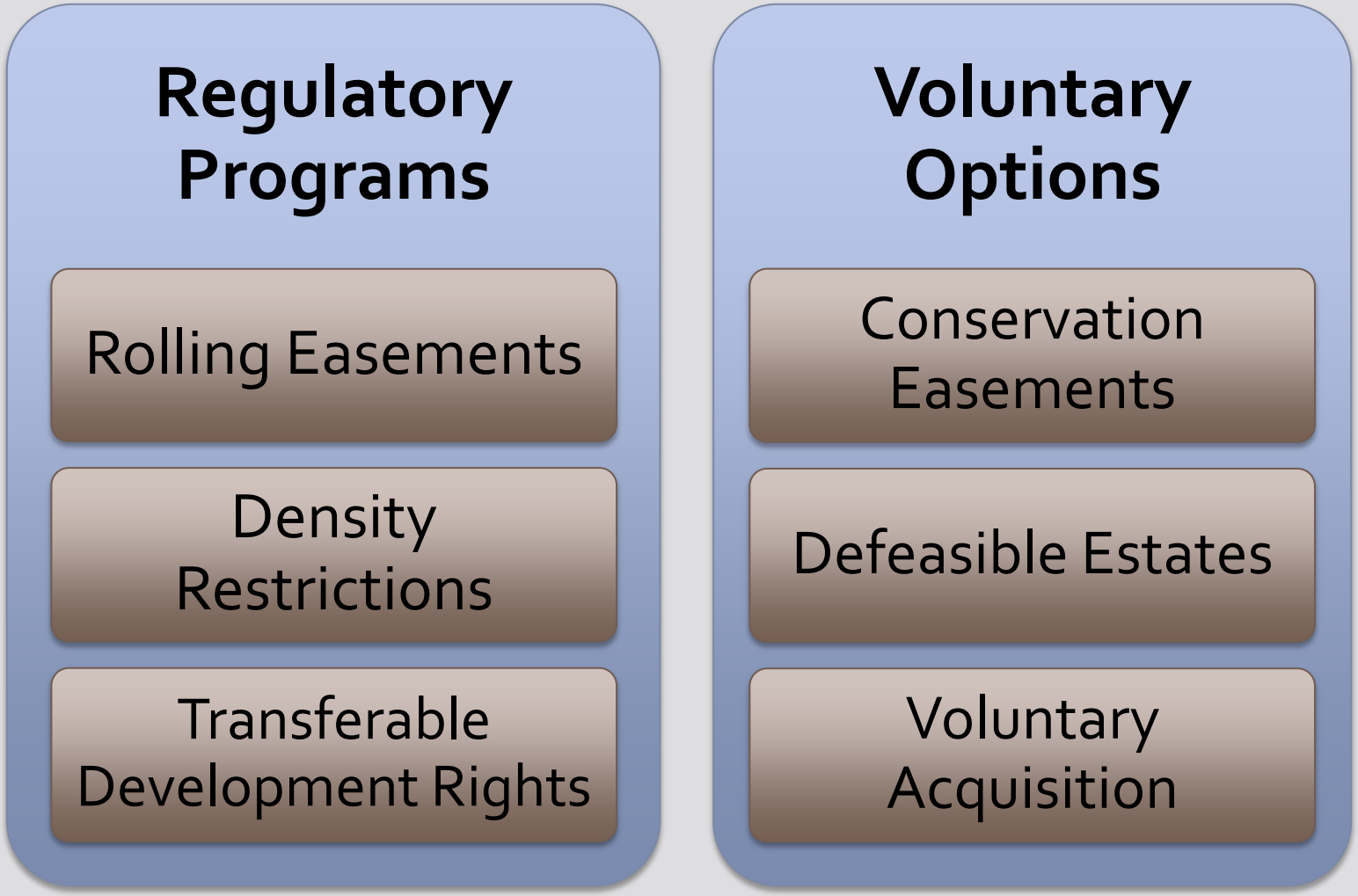
Coastal Protection and Restoration Authority (CPRA)



5-year Cycle

Induced Risk

Policy Alternatives



Policy Criteria

Primary

- Wetland Migration
- Flood Risk

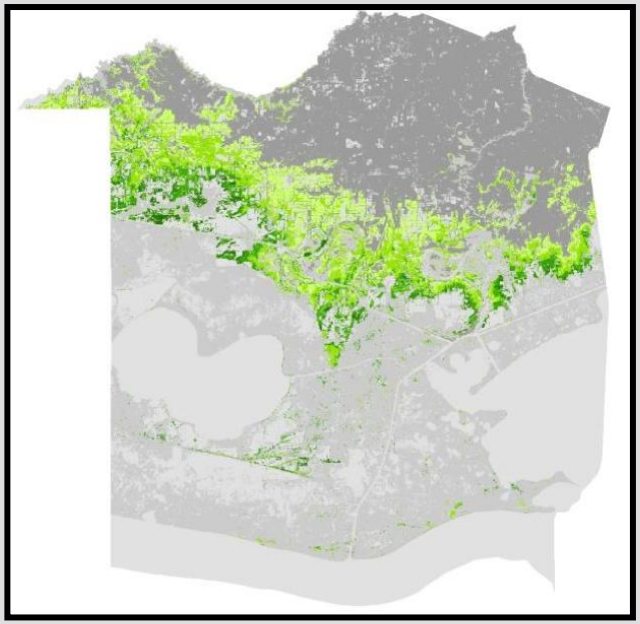
Practical

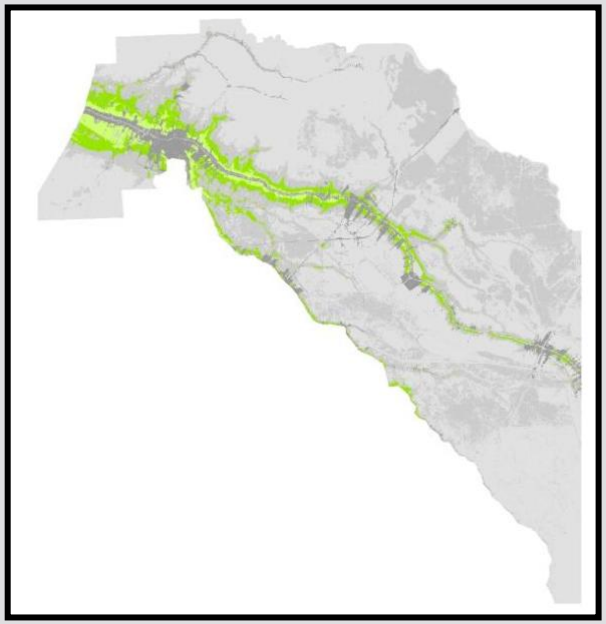
- Equity
- Adaptability
- Political Feasibility

Potential Wetland Migration

	Wetland Gain (sq. mi.)	Wetland Loss (sq. mi.)	% Loss Offset by Gain
Vermilion	76	165	46%
St. Mary	28	106	26%
Lafourche	20	497	4%

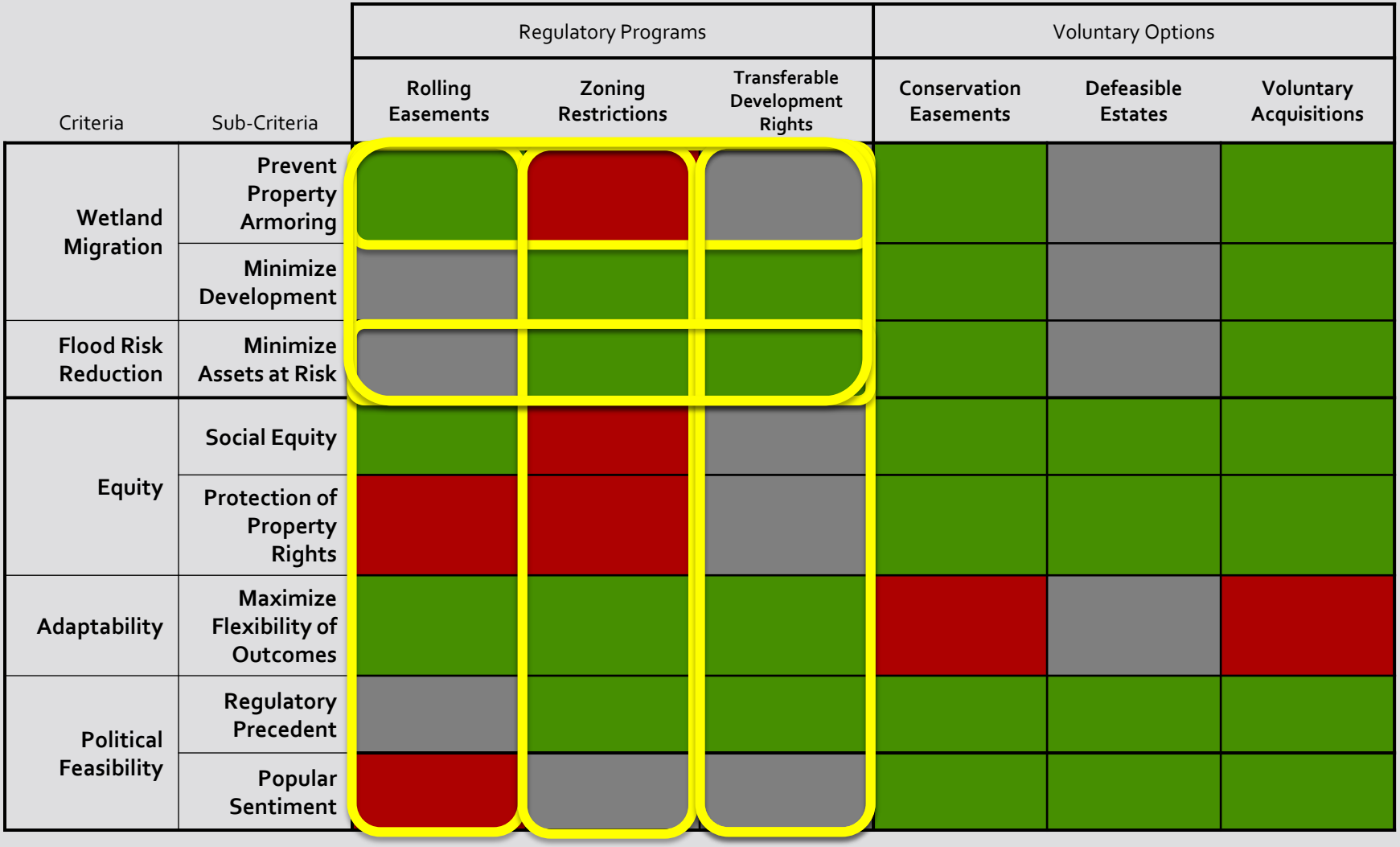
Vermilion Migration





Lafourche Migration

Using Matrix as Decision Support Tool



Expect the Unexpected

Public suggestions included in coastal restoration plan

BY AMY WOLD

0 COMMENTS

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+1 0

6

March 16, 2012

The state's draft plan on how coastal restoration and protection will proceed in the next 50 years is going through some changes based on

Changes include rethinking levees that have been proposed for Lake Charles in favor of other protection measures, as well as moving some

to voice your opinion.

Louisiana coast, authorities said.

The draft plan v
approval from t
Louisiana on M
approval later t
protection proj
50 years.

During the pub
coast, state coa
some of which
administrator c
Protection and

As an example,
Coastal Protect
and residents a
levees the plan

Adapted from CPRA (2012)

Advocate Photography

"They don't particularly want a levee system," he said.

restoration and protecting the shoreline along the Gulf of Mexico with rocks or other hard materials, he said.

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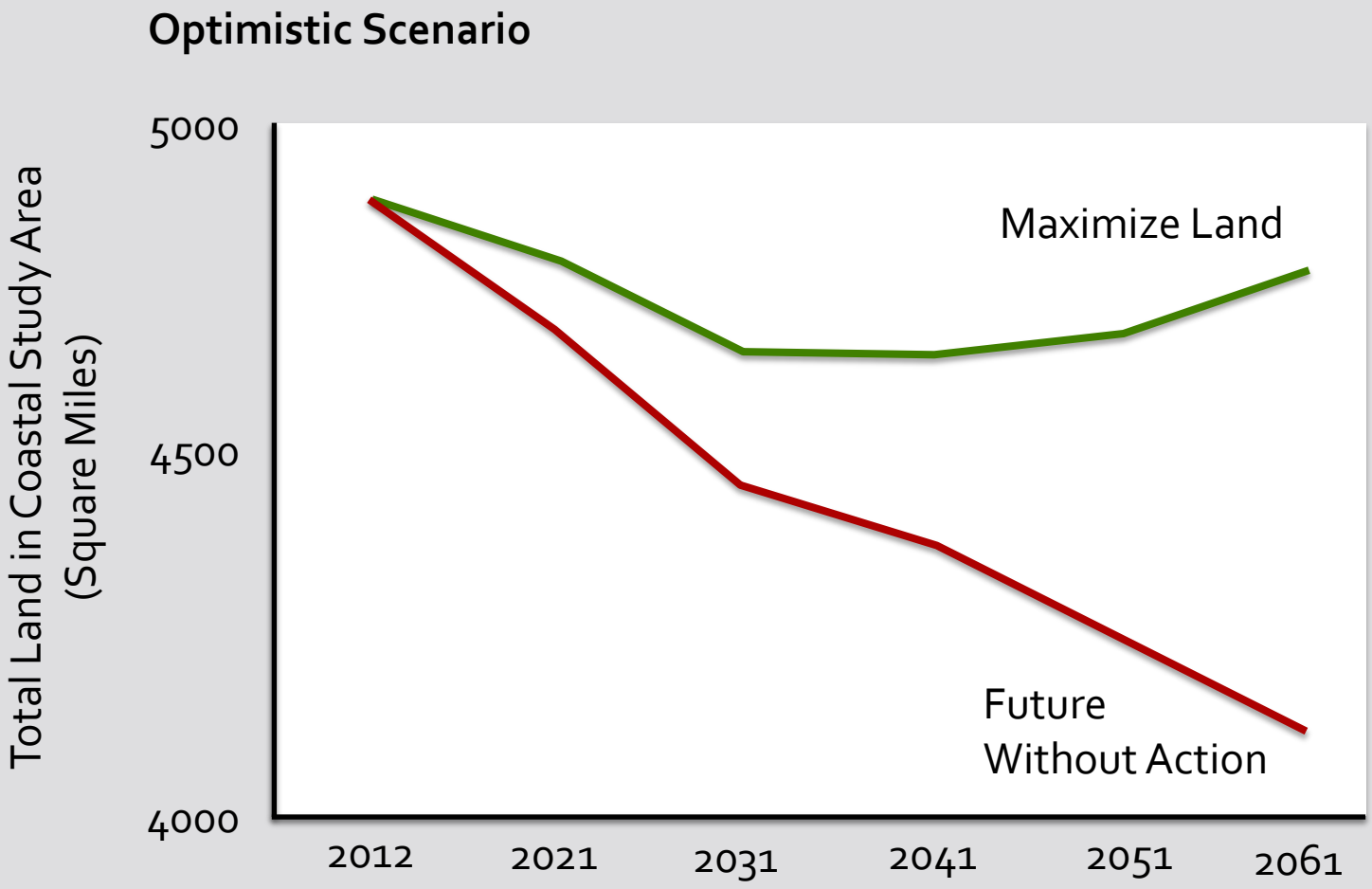
Conclusions

- Wetland migration can reduce, but not fully offset wetland loss by 2100
- Levee protection of undeveloped dry land is the greatest impediment to migration
- HOWEVER removing levees does not help facilitate wetland migration in every case
- A wetland migration policy can help mitigate wetland loss AND address "induced risk"
- Social, political, and environmental factors need to be considered at the finest grain possible

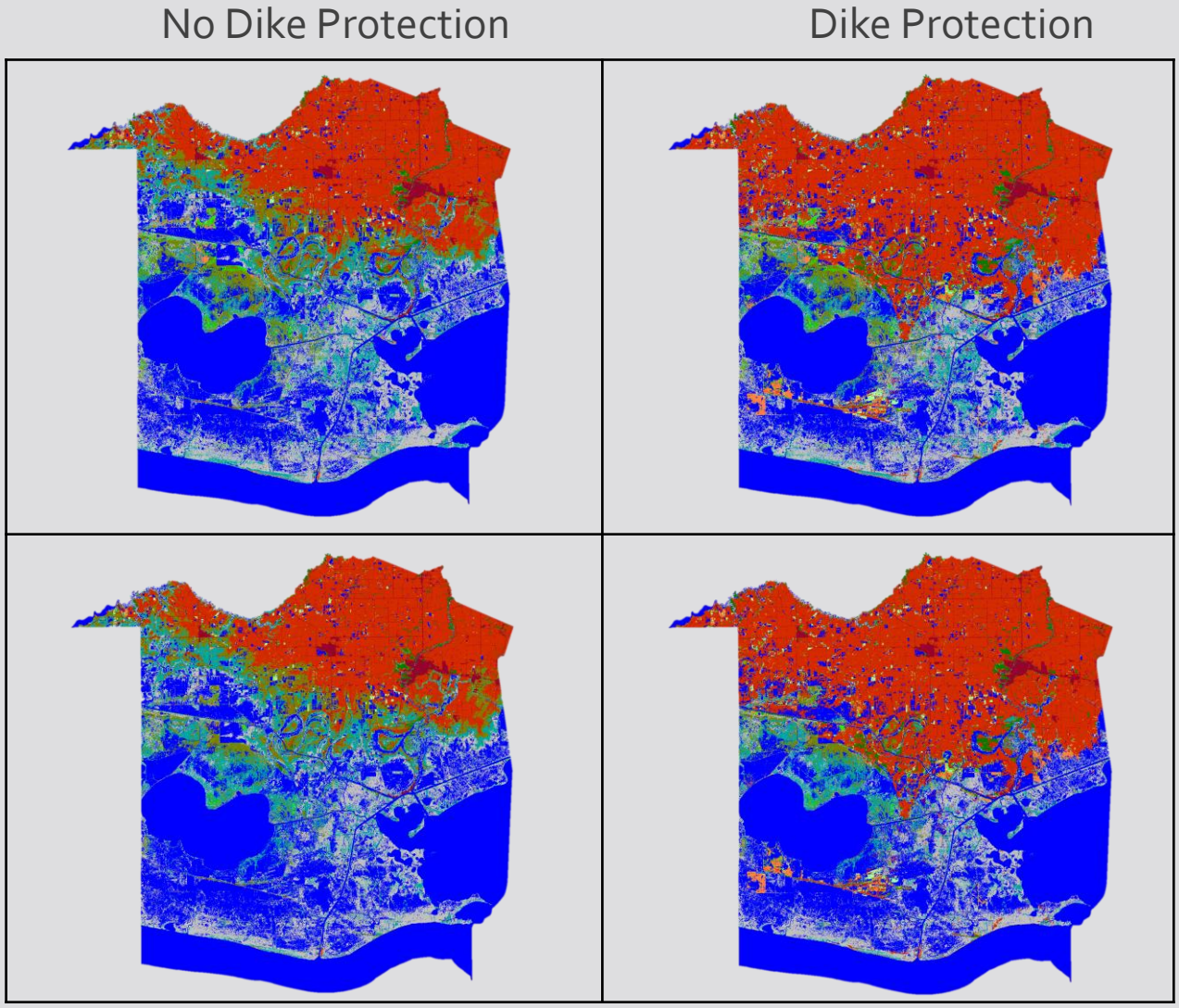
Thank you for your attention.
Questions?

Future of Wetland Loss



Adapted from CPRA 2012

Vermilion Parish in 2100



1.5 meter SLR by 2100, Low Subsidence

Project Types

Total:
$50
Billion

$12.9
Billion

Restoration

- Barrier Islands
- Sediment Diversions
- Hydrologic Restoration
- Marsh Creation

Structural Protection

- Levees
- Floodwalls

Nonstructural Protection

- Flood Proofing
- Elevating Structures
- Voluntary Acquisition
- Wetland Migration

Policy Approach

Prescriptive

vs.

Exploratory