Interpretations for the Establishment and Restoration of Seagrasses

Mary E. Collins
L. Rex Ellis
Soil and Water Science Department
University of Florida

Investi***gators***

Soil and Water Science Department

University of Florida

Kelly Fischler
Wade Hurt
Christopher Chilton
Thomas Saunders
Todd Osborne
Luke Gommerman
Caitlin Hicks
And many more

What is seagrass?

- Evolved from terrestrial plants
- Have leaves, conducting tissue, flowers, seeds, roots, and photosynthesis.
- Roots holds the plant in place but also extract mineral and nutrients from the soil.

Value of Seagrass

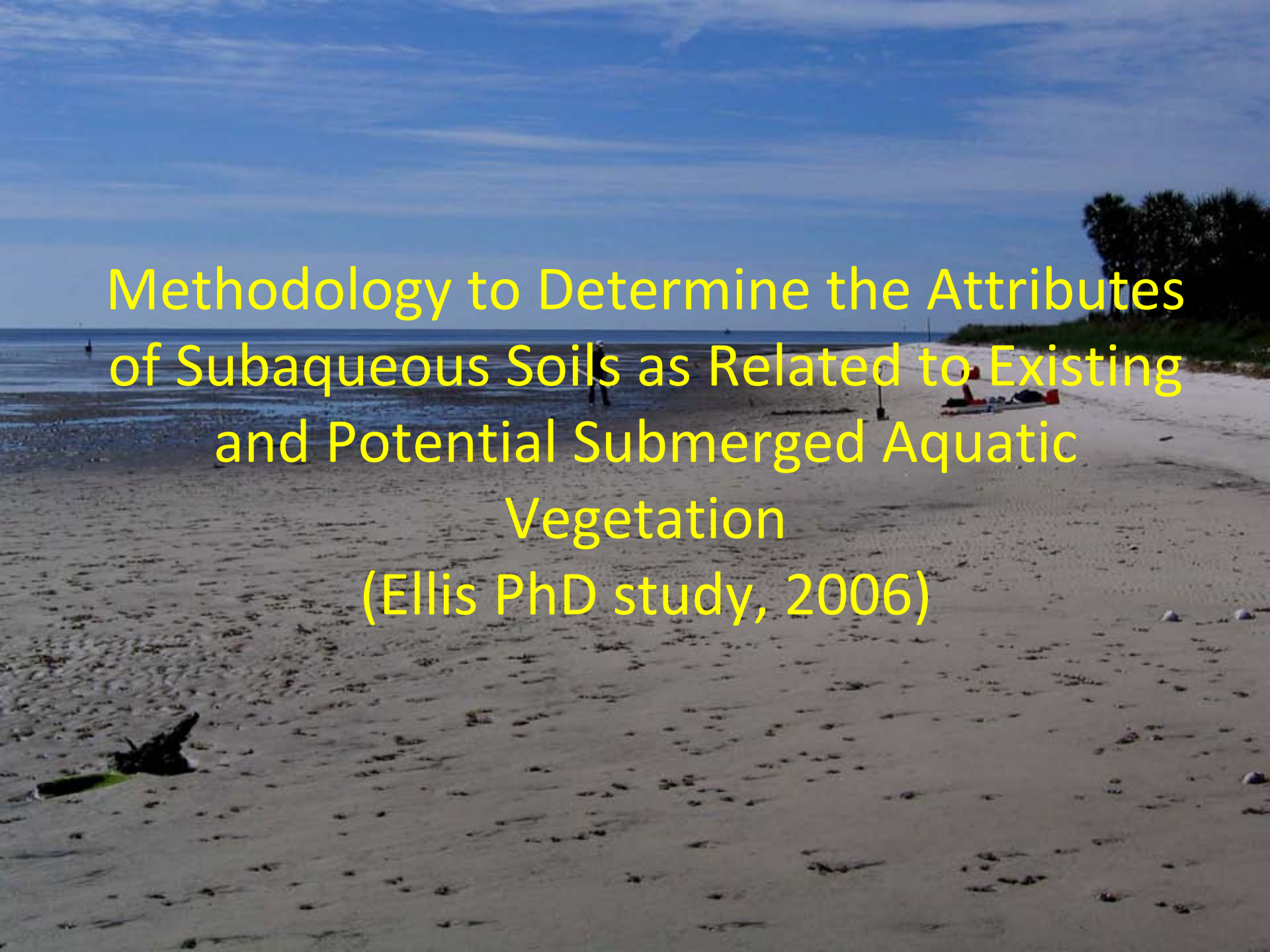
- 1 acre of seagrass can produce > 10 tons of leaves/yr
- Provides food, habitat, and nursery areas for adult and juvenile vertebrates and invertebrates
- 1acre may support 40,000 fish and 50M small invertebrates
- Very good environmental quality indicator
- Producer of as much as 5840 $g/C/m^2$

Value of Seagrass in Florida

- Approximately 2.7 M acres of seagrass supports commercial and recreational fisheries
- Commercial harvest of fish and shellfish is valued at >$124B
- 1 acre has an economic value of $20.5K
- Direct annual economic benefit of seagrass is ~$55.4B

Subtropical Seagrasses and Subaqueous Soils

- "Methodology to Determine the Attributes of Subaqueous Soils as Related to Existing and Potential Submerged Aquatic Vegetation“ (Ellis PhD study, 2006)
- "Biogeochemical Characteristics of Subaqueous Soils as Related to Aquatic Vegetation in Three Gulf Coast Rivers“ (Saunders PhD study, 2007)
- "Pre and Post Soil-Landscape Modeling of The SL 15 Mitigation Site “ (Fischler MS study, 2007)

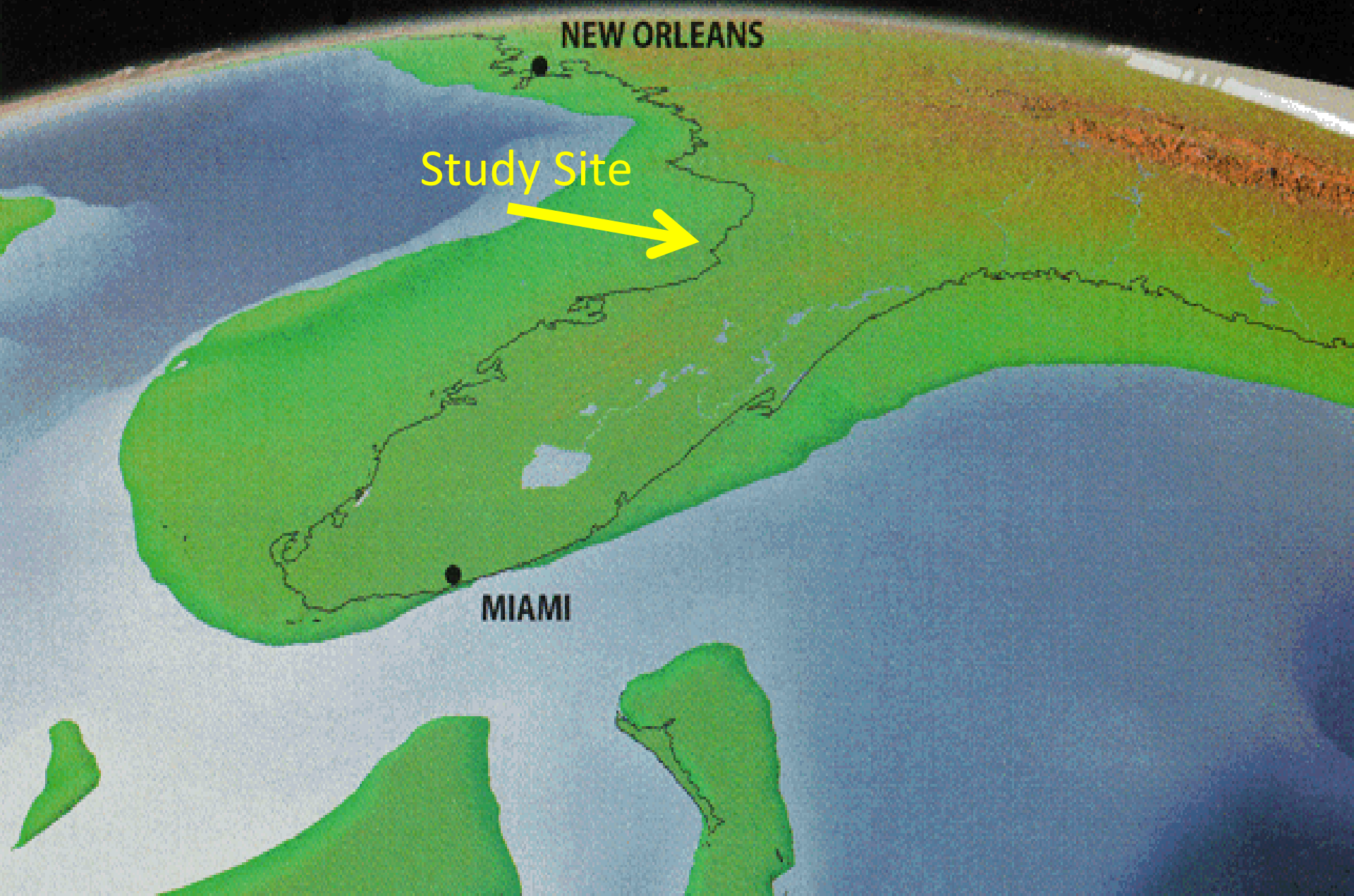


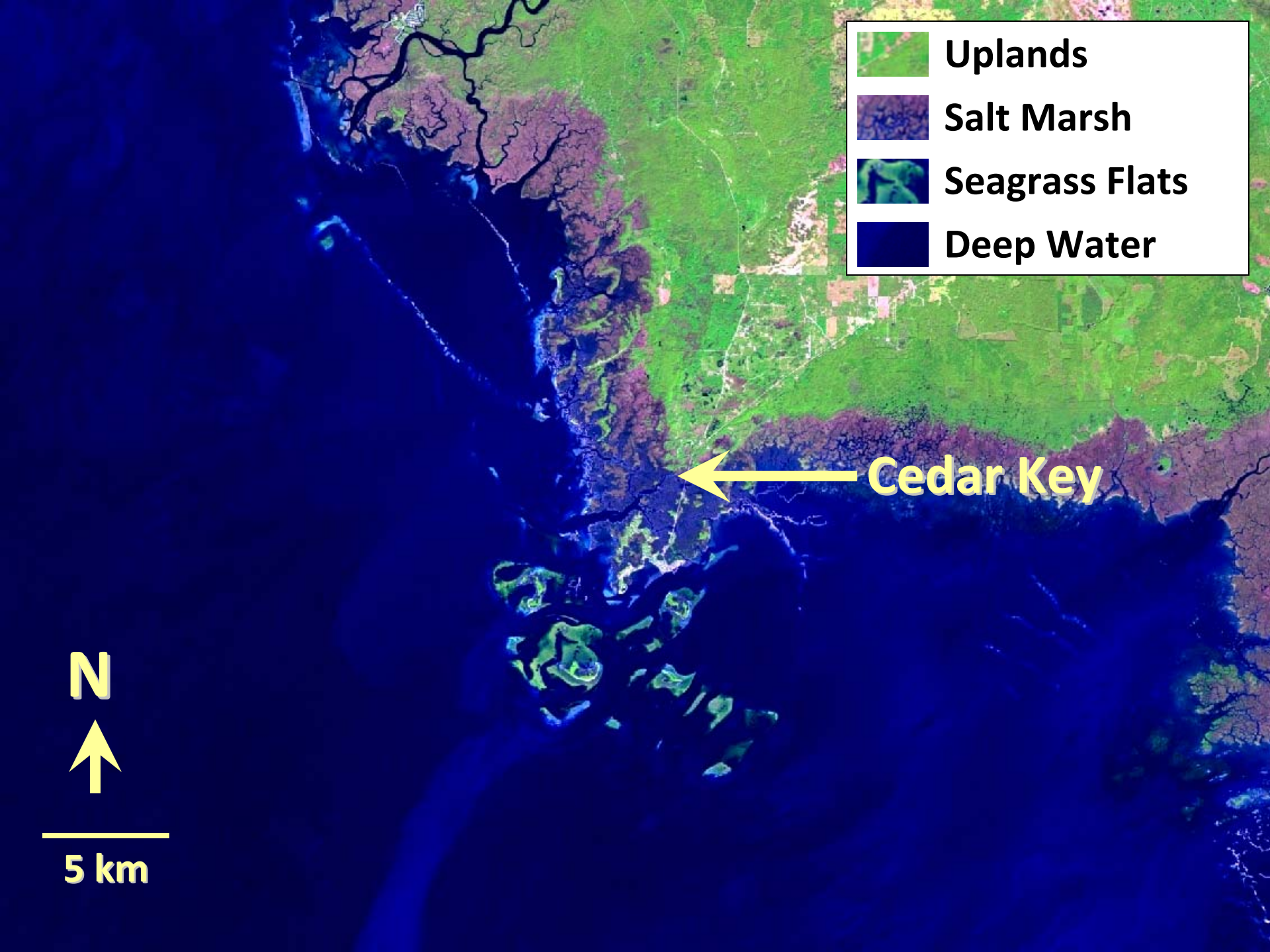
Methodology to Determine the Attributes of Subaqueous Soils as Related to Existing and Potential Submerged Aquatic Vegetation

(Ellis PhD study, 2006)

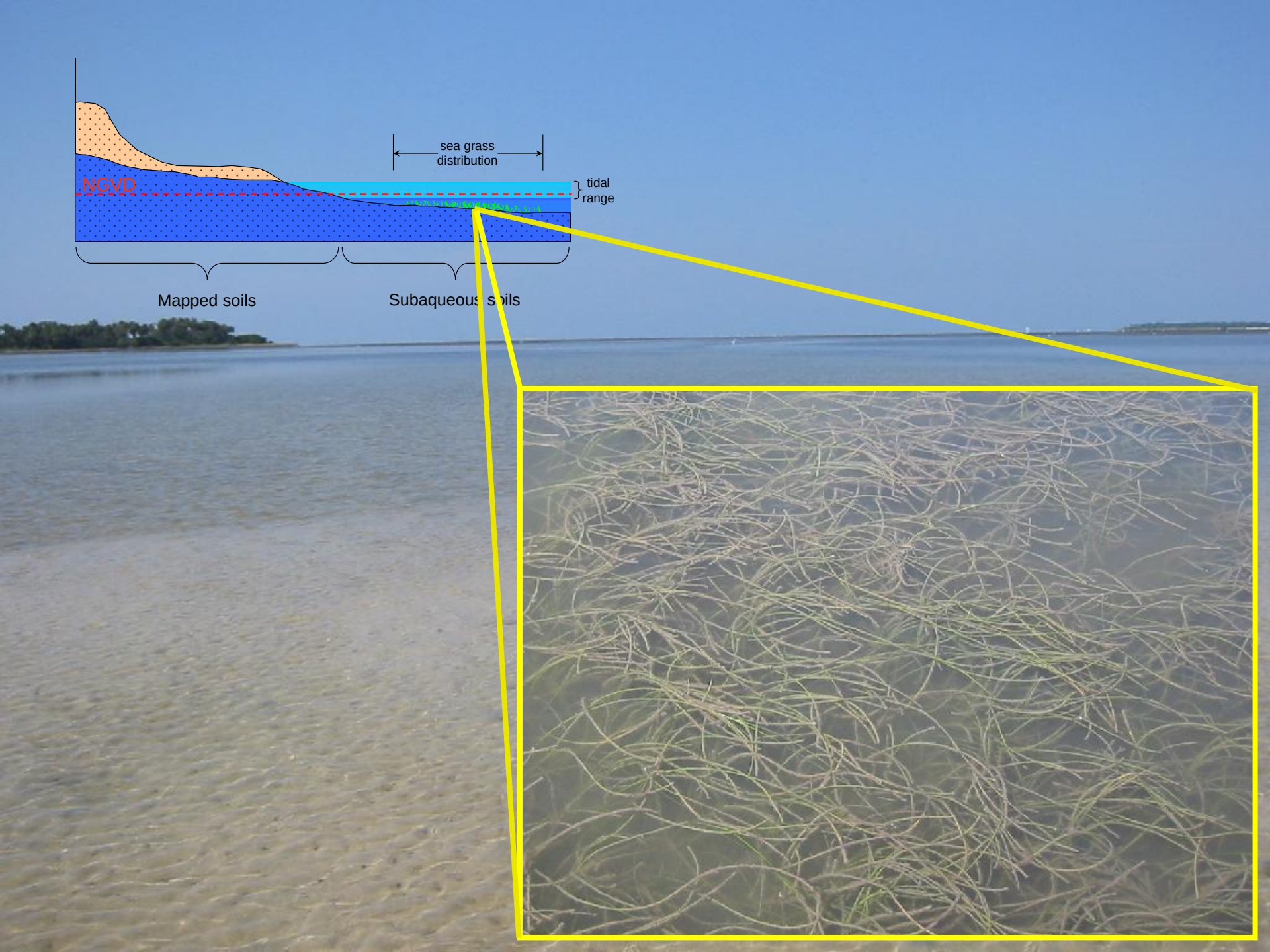
Interglacial Period

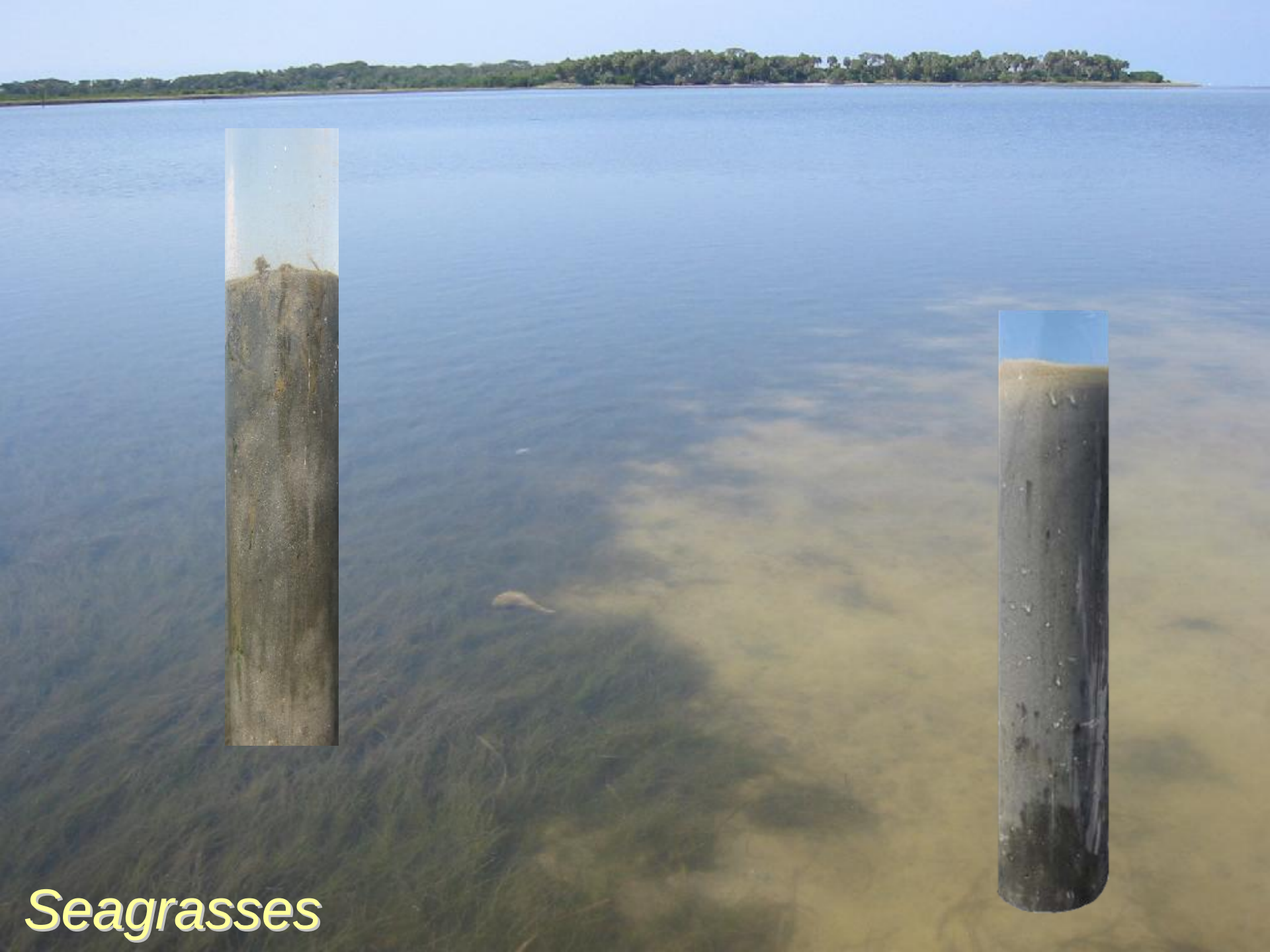
Glacial Period




Uplands
Salt Marsh
Seagrass Flats
Deep Water
Cedar Key
N
5 km

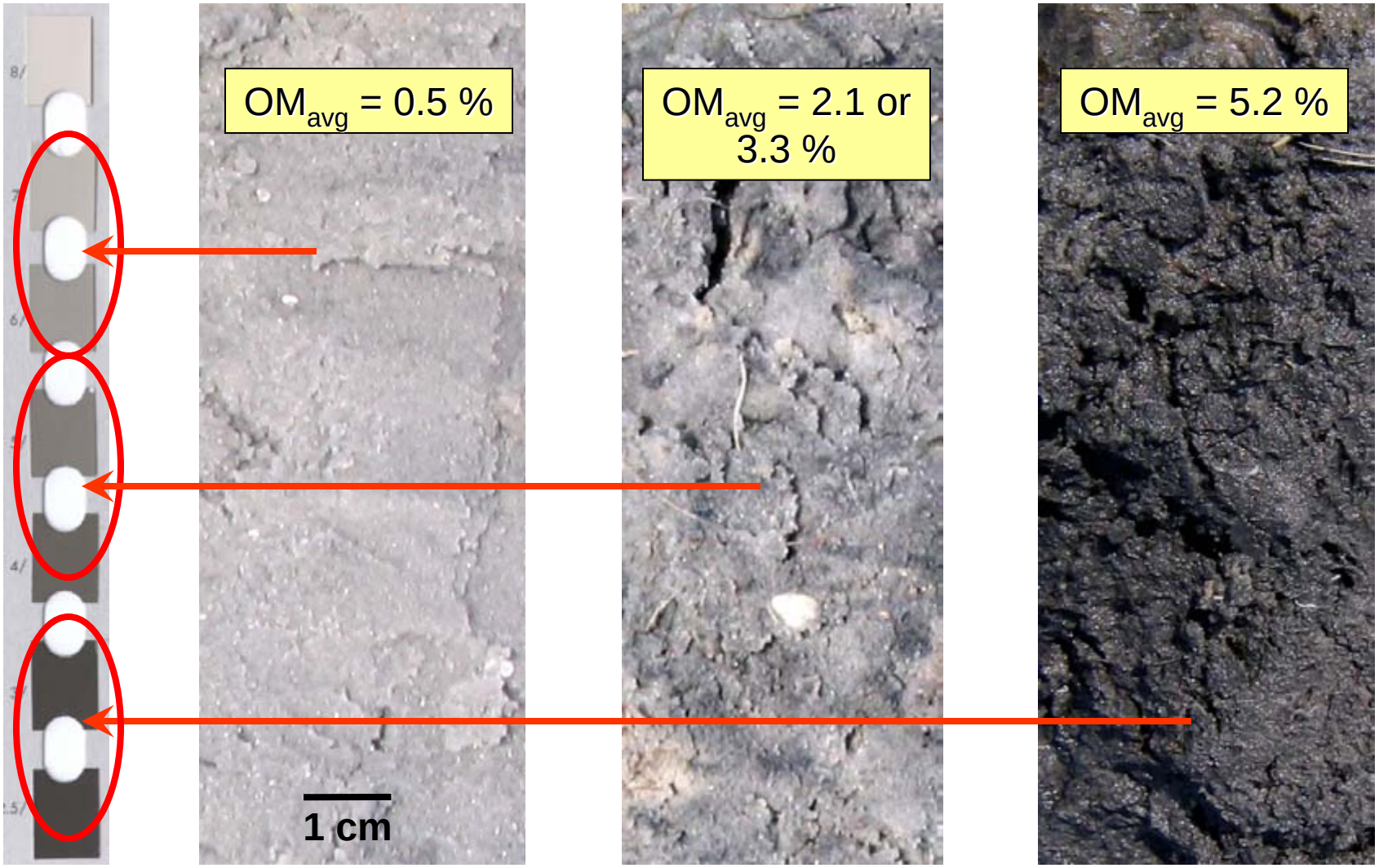
Determine the nature of subaqueous soil / seagrass relationships within the rooting zone.

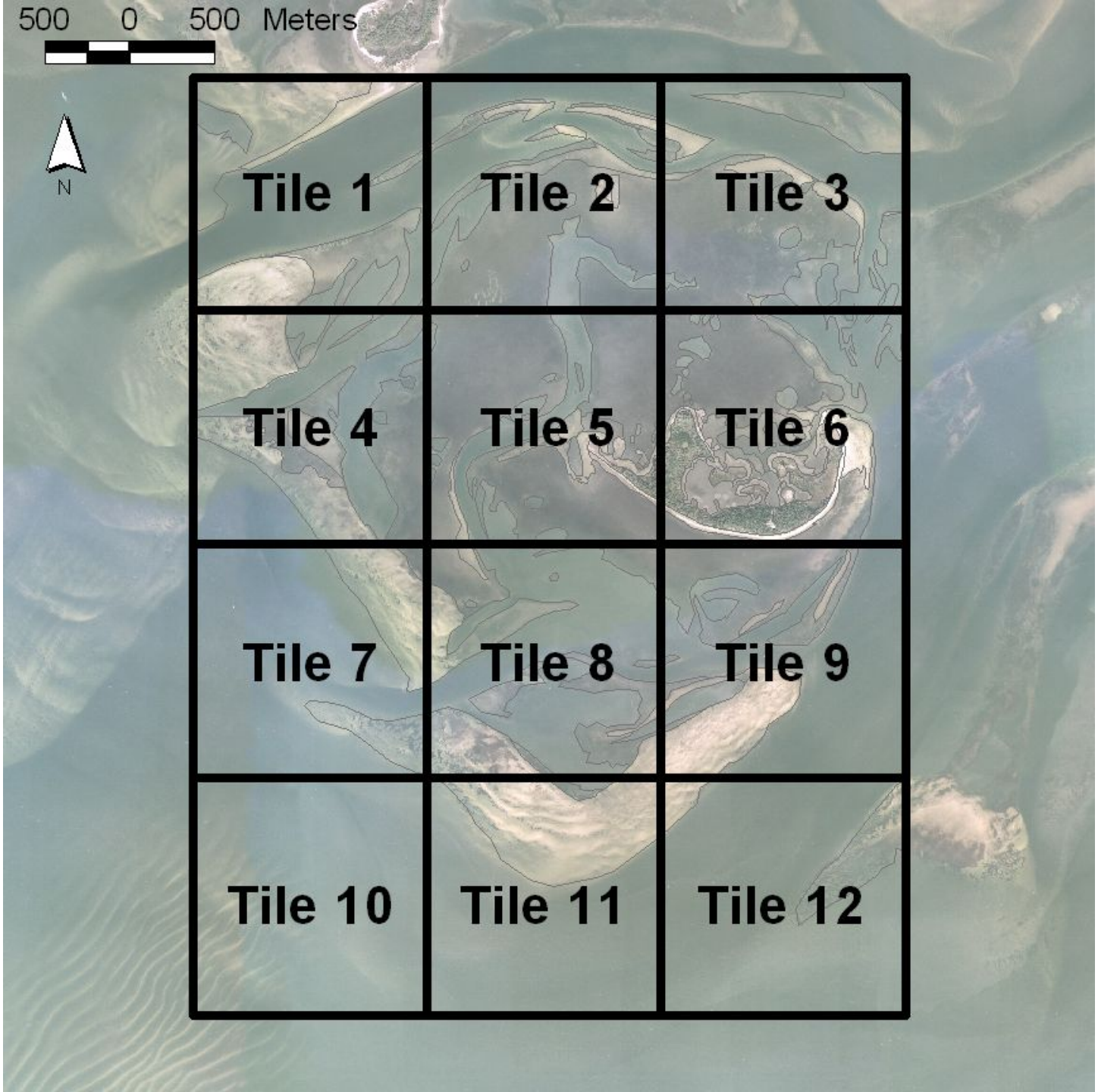

sea grass
distribution
NGVD
tidal
range
Mapped soils
Subaqueous soils



Seagrasses

Upper Pedons




500 0 500 Meters
N
Tile 1
Tile 2
Tile 3
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Tile 5
Tile 6
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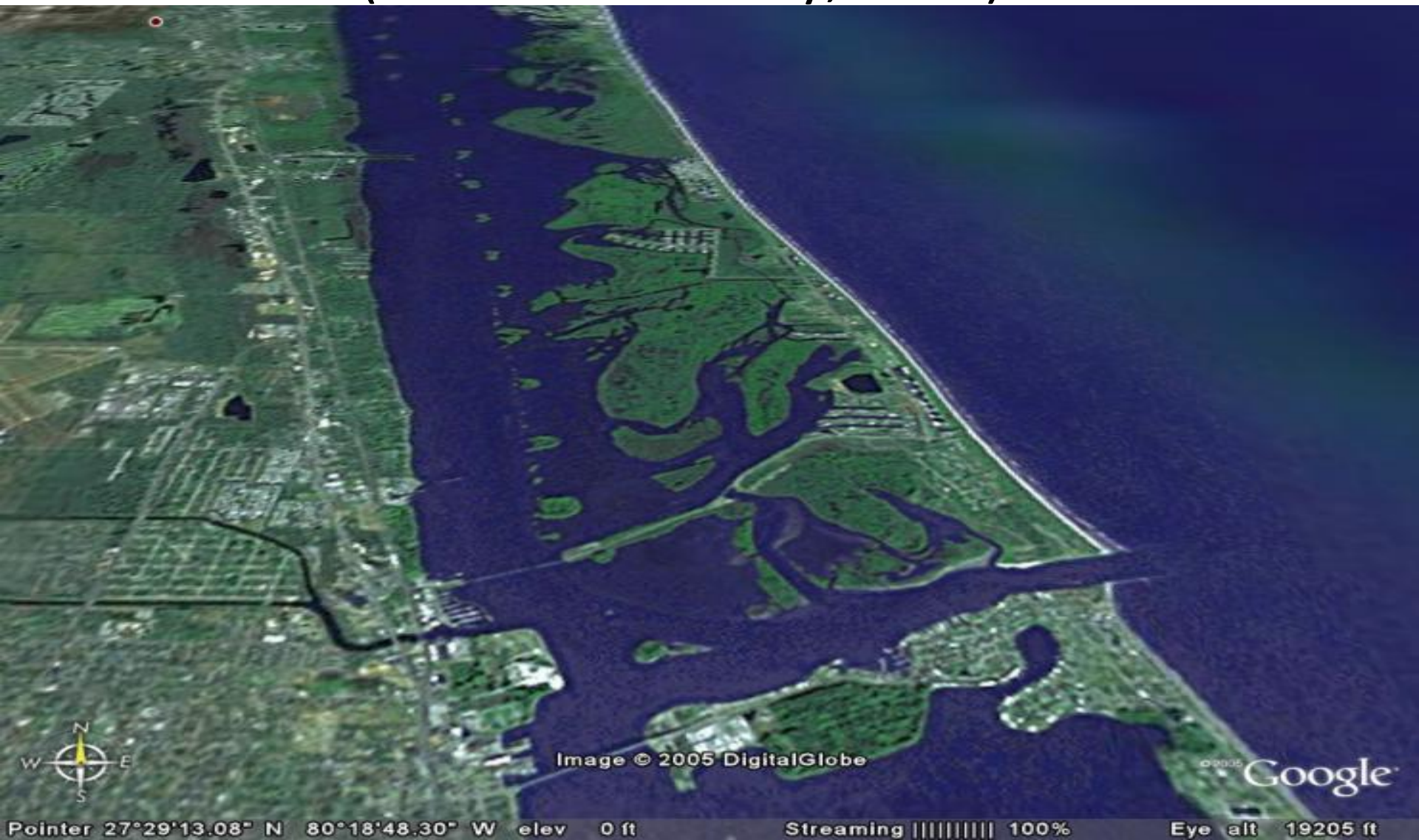
Tile 8
Tile 9
Tile 10
Tile 11
Tile 12

Example of one of the soil maps

MUID	Landscape Unit	Current USDA Classification
1	Erosional Unvegetated Flat / Near Channel Bar Complex	Sandy, siliceous, hyperthermic Typic Psammaquents
2	Deep Water	Non-soil
3	Edge of Channel Bar	Sandy, siliceous, hyperthermic Typic Psammaquents
4	Erosional Beach	Sandy, siliceous, hyperthermic Typic Fluvaquents
5	Erosional Unvegetated Flat	Sandy, siliceous, hyperthermic Fluvaquentic Endoaquolls
7	Near Bar Grassflat	Sandy, siliceous, hyperthermic, Typic Psammaquents
8	Drownded Flatwoods	Sandy, siliceous, hyperthermic Typic Endoaquolls
9	Near Shore Grassflat	Sandy, siliceous, hyperthermic Typic Psammaquents
10	Offshore Grassflat	Sandy, siliceous, hypterthermic Typic Endoaquolls
11	Oyster Bar	Sandy, siliceous, hypterthermic Typic Endoaquolls
12	Saltmarsh	Sandy or sandy-skelatal, siliceous, euic, hyperthermic Terric Sulfihemists
13	Saltmarsh Flat	Loamy, siliceous, hyperthermic Sulfic Hydraquents
14	Unvegetated Flat	Siliceous, hyperthermic, Typic Psammaquents
15	Uplands	Misc. Entisols and Spodosols

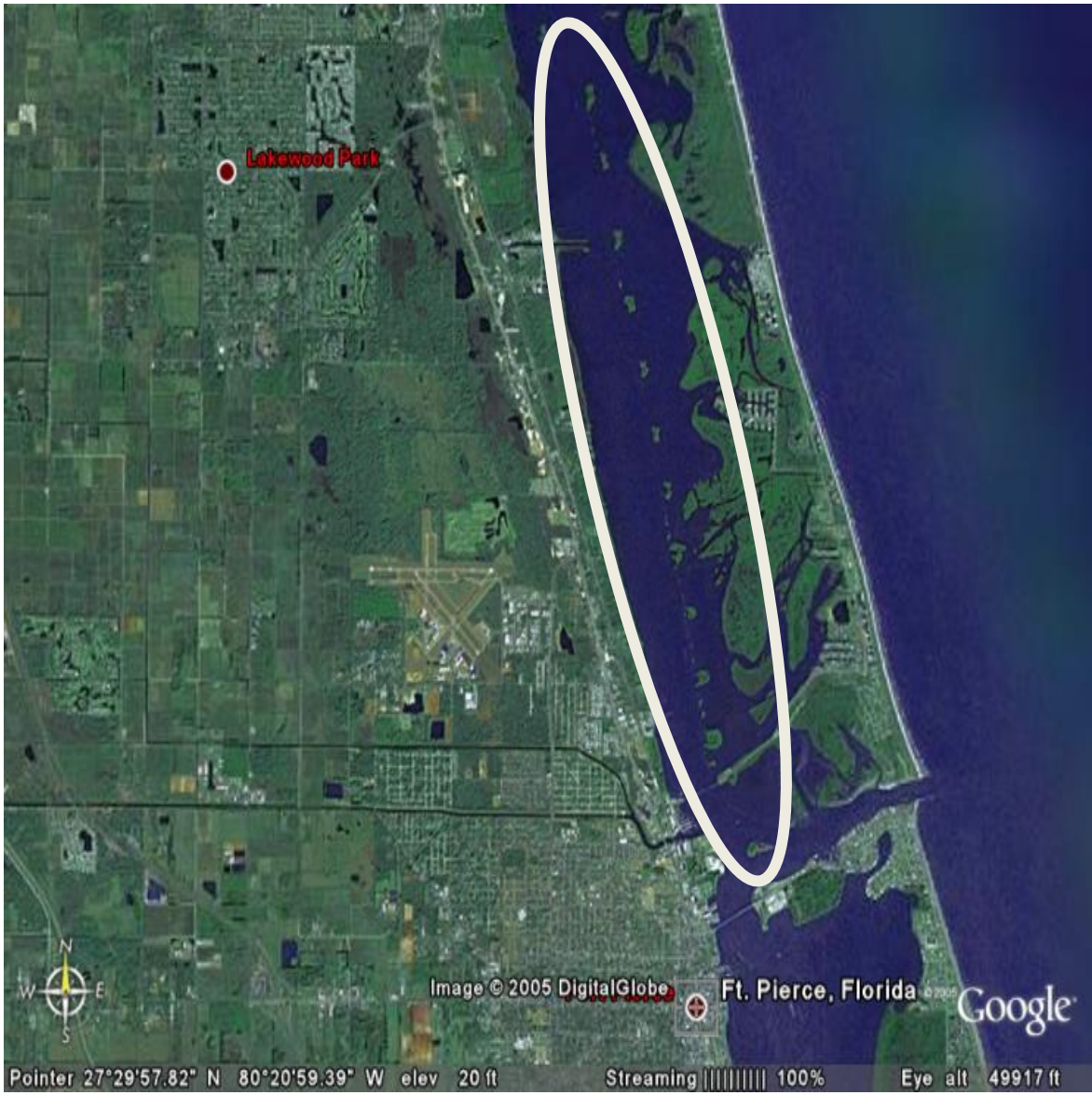
Pre and Post Soil-Landscape Modeling of the SL 15 Mitigation Site (Fischler MS study, 2007)



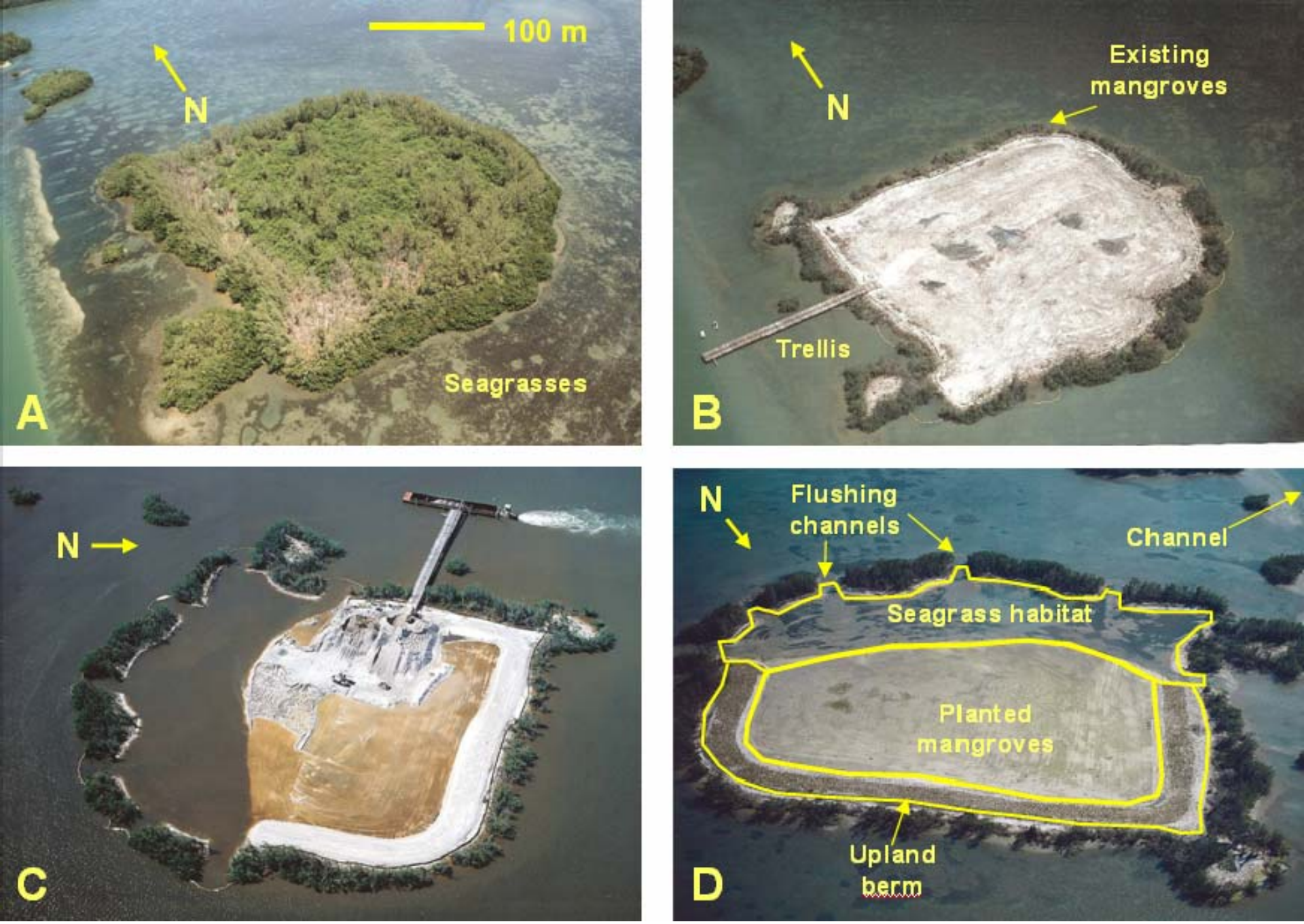
Objectives

- To quantify human activities that either destroy or creates an environment in which it is difficult to re-establish the fragile seagrass vegetation in subaqueous soils along the southeast Atlantic Coast.
- To quantify and describe the environmental factors which might act upon seagrasses in a mitigation site
- To conducted a seagrass transplant experiment in the natural and constructed habitat
- To created a habitat suitability model

Indian River Lagoon



SL 15
Image © 2005 DigitalGlobe
Google
Pointer 27°29'13.08" N 80°18'48.30" W elev 0 ft
Streaming 100%
Eye alt 19205 ft


100 m
N
Seagrasses
A
N
Existing mangroves
Trellis
B
N
C
N
Flushing channels
Channel
Seagrass habitat
Planted mangroves
Upland berm
D

Interpretations for Seagrass

- Nutrients/pollution
- Excessive sediments
- Stormwater runoff
- Dredging affecting the hydrodynamic properties
- Prop scarring

- Establish habitat populations
- Maintain habitat populations
- Subaqueous landscape requirements
- Light requirements
- Energy requirements

Thank You