Green engineering solutions for halting coastal habitat loss and restoring ecological function

Christine Angelini, University of Florida
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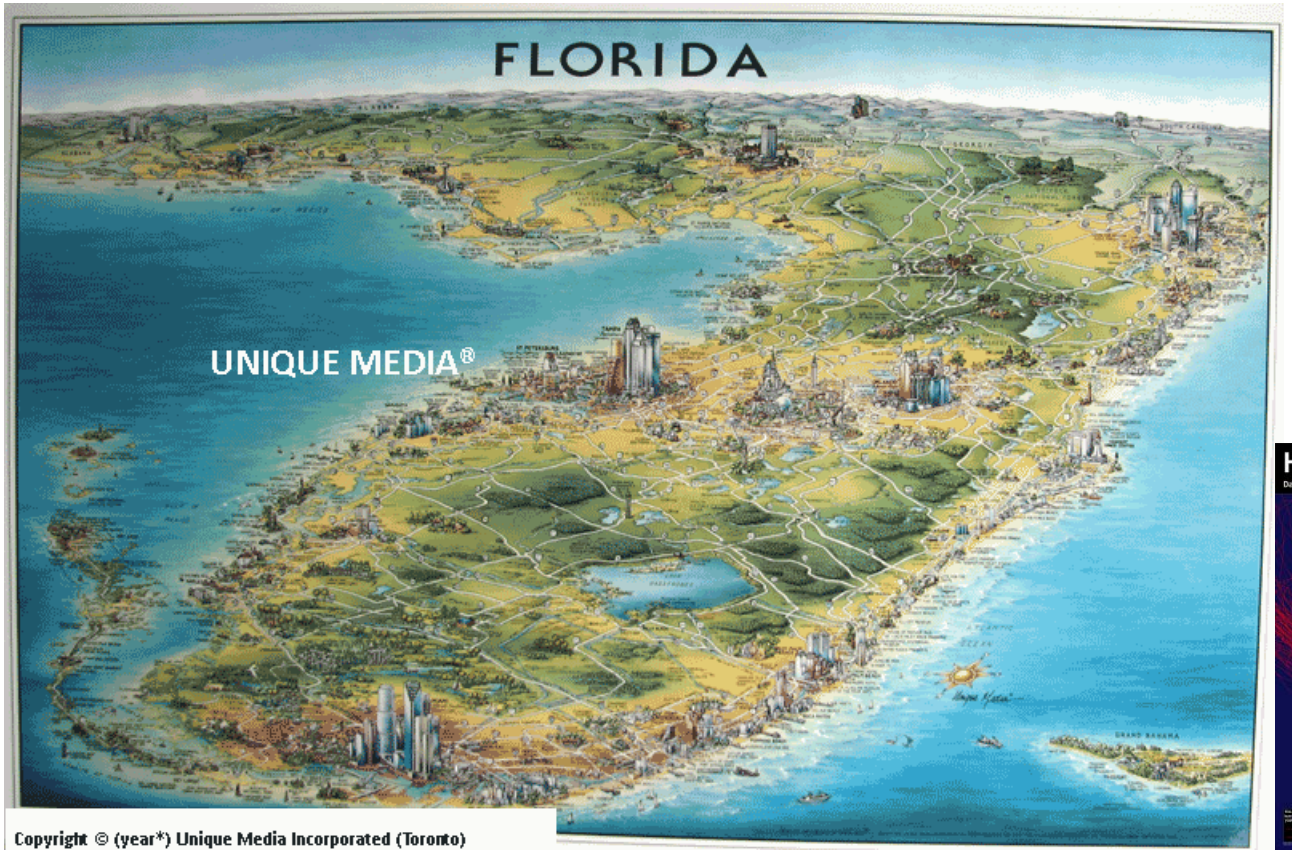
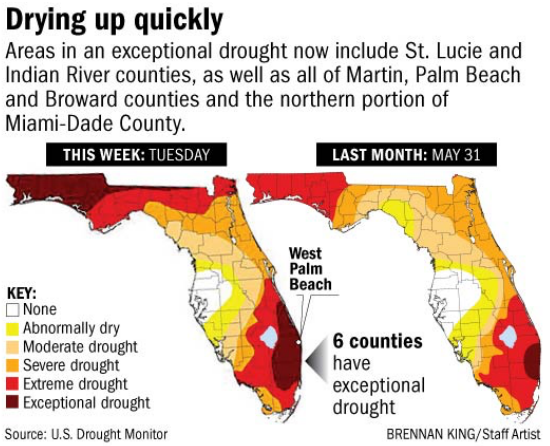
Florida, where the coast is key

Florida, a sentinel for global change





UF Coastal Ecosystem Dynamics

Systems Ecology

Andrew Altieri
Coral reef, coastal and benthic ecology

Christine Angelini
Coastal & conservation ecology, restoration engineering

David Kaplan
Watershed ecology, hydrology, climate change

Peter Sheng
Hurricane surge modeling, turbulence modeling, boundary layer dynamics

Geotech.Engineering

Mike McVay
Bridge and pile engineering, substrate & slope stability

Scott Wasman
Geomicrobiology, soil-structure interactions, soil improvement

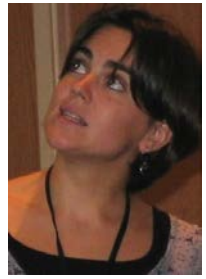
Computer Science & Informatics

Paul Gader
Remote sensing, image analysis, machine learning

Coastal Oceanography

Alex Sheremet
Wave physics, fluid dynamics, mud layer-wave interactions

Alberto Canestrelli
Coastal geomorphology, storm surge forecasting



Maitane Olabarrieta
Sediment transport, tidal inlet evolution, wave modeling

Arnoldo Valle-Levinson
Estuarine circulation, salt water intrusion, larval transport

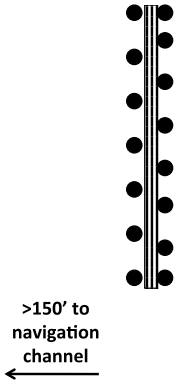
Boat stress in our estuaries

ICW:
3,000 mile
artery for
commerce

Loss of oyster reefs & salt marshes

Traditional living shoreline methods (e.g. oyster bags & grass plantings) will not work under these conditions

“Green Engineering”



of 3 breaks, one 1’ wide and a second 2’ wide, will be deployed)

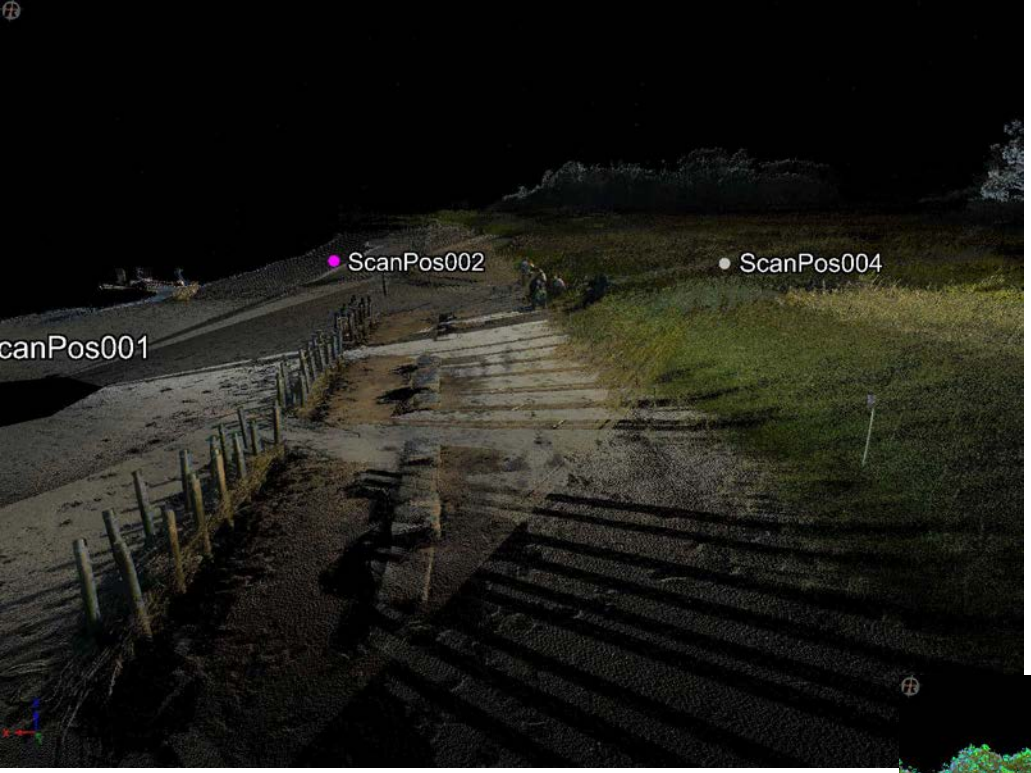
Experimental break walls and oyster restoration structures deployed at 6 high-energy sites within the GTM NERR, Ponte Vedra, FL

Ada Bersoza
Environmental Engineering

Emily Astrom
Coastal Engineering

Emily Astrom
Civil & Coastal Engineering

Maintaining coastal habitats with natural materials

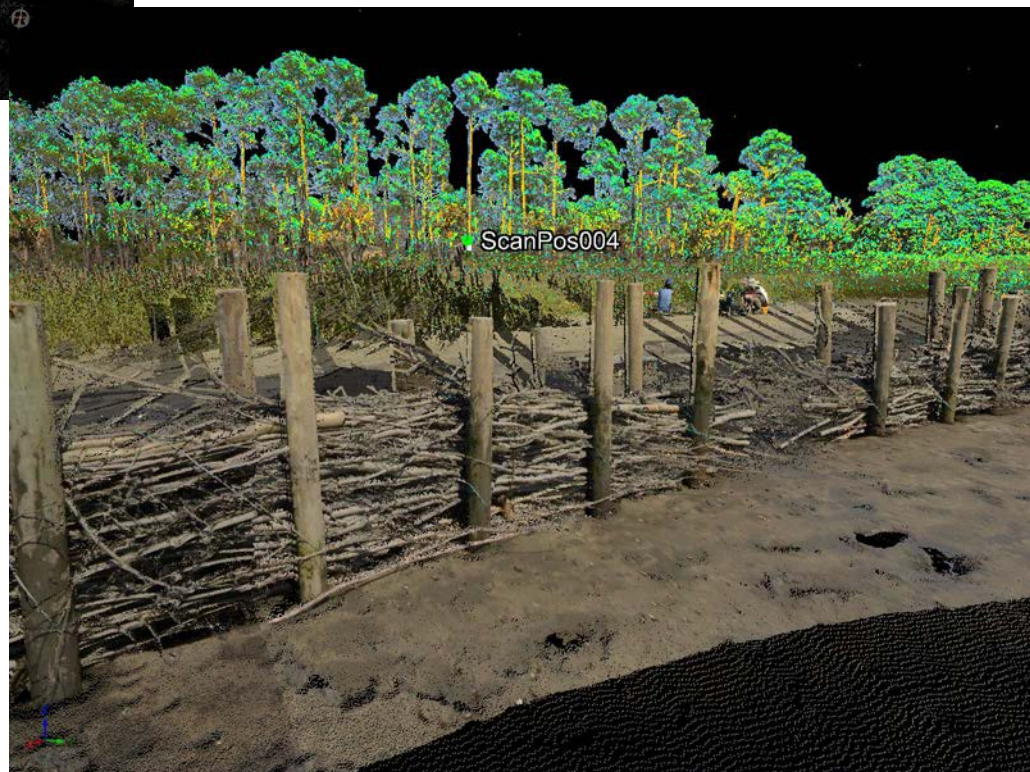


Seasonal monitoring variables:

- Wall stability, permeability and fouling
- Sediment accumulation/loss
- Oyster establishment and growth
- Marsh vegetation loss/gain
- Invertebrate community shifts
- Wave/wake dissipation
- Wave/wake profiles

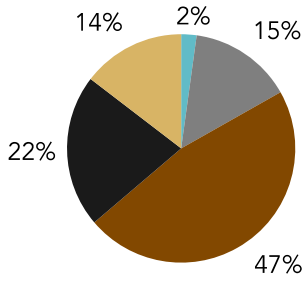
Upcoming educational materials:

- Written manual
  - Materials, costs, construction tips
- Training video
  - Gabion and break installation tips
- Interactive display on *The Edges of our Estuaries* at GTM NERR



Preliminary results: loss of organic soils

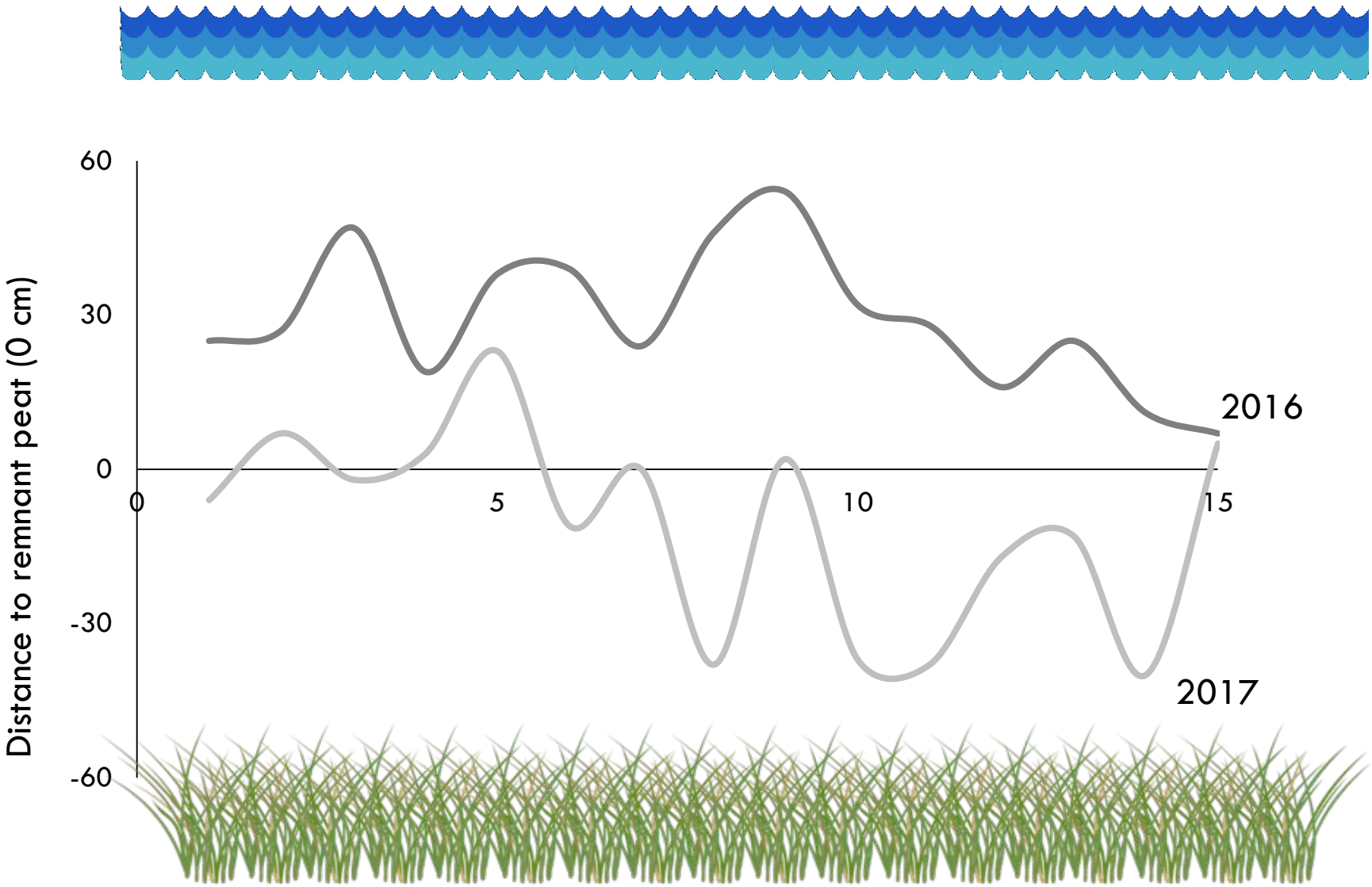
-1.5 m from shoreline



0 m from shoreline

1.5 m from shoreline

Oyster Shell hash Root mat Peat Sand

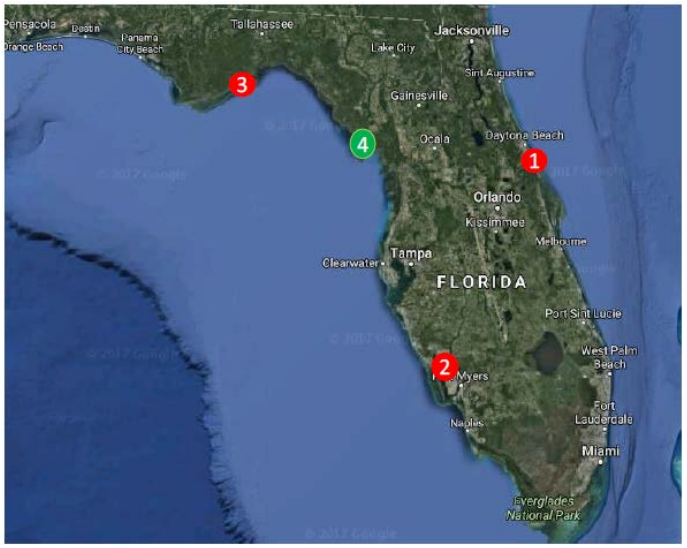


0-40cm of peat is being scoured from plant roots & locally lost over 9 months

Other restoration projects

Oysters in Cedar Key, FL

And around the state



FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

MDC
MARINE DISCOVERY CENTER
NEW SMYRNA BEACH, FLORIDA

The Nature Conservancy

Other restoration projects

Marsh cordgrass in Ponte Vedra

Questions?