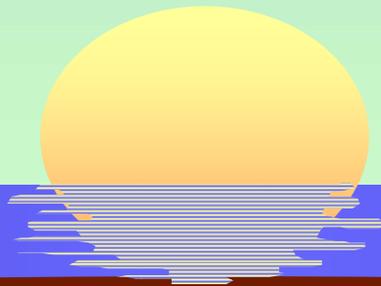


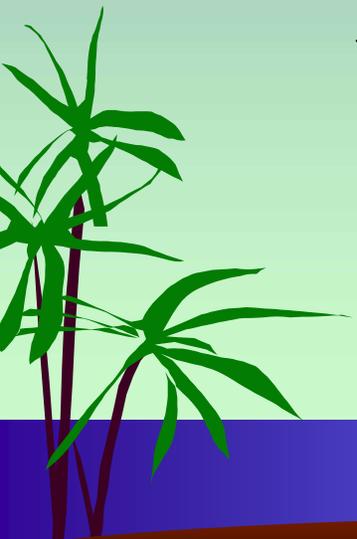
# Structural and Dynamic Habitat in the Suwannee Estuary

Ellen Raabe, Randy Edwards, and  
Carole McIvor



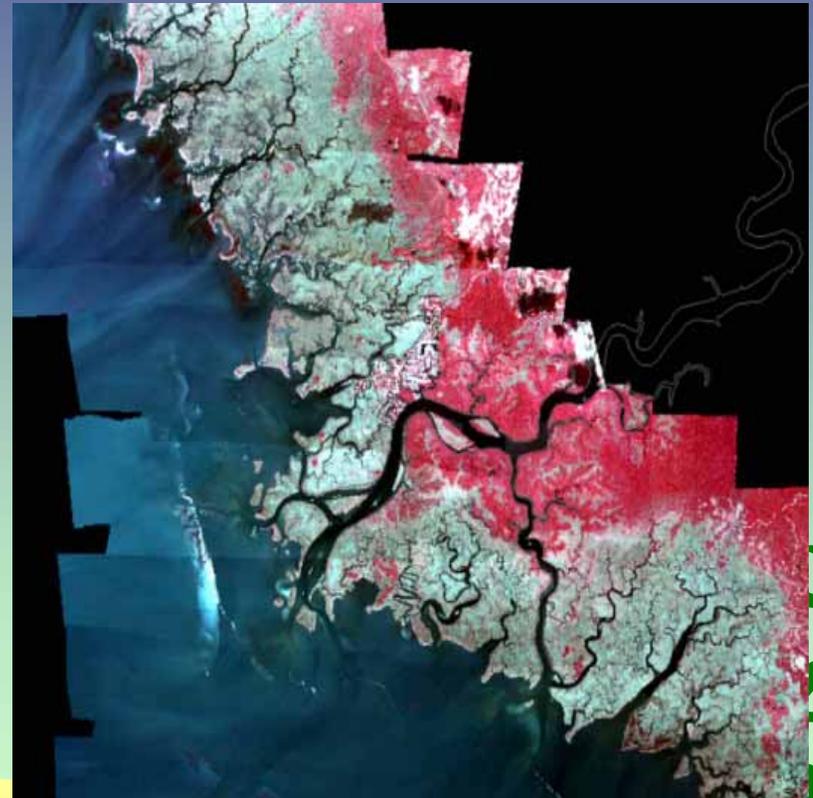
# Cooperative Effort

- ◆ **Cooperative data acquisition with FDEP**
- ◆ **FWS/USGS cooperative**
- ◆ **USGS Director's Venture Capital**
- ◆ **Integrated science**



# Why Suwannee Estuary?

- Confluence of fresh and tidal waters (MFL)
- Existing Research/FWS
- Unique Setting and Ecological value
- Recreation and Shellfish Industry
- Opportunity for Integrated Science

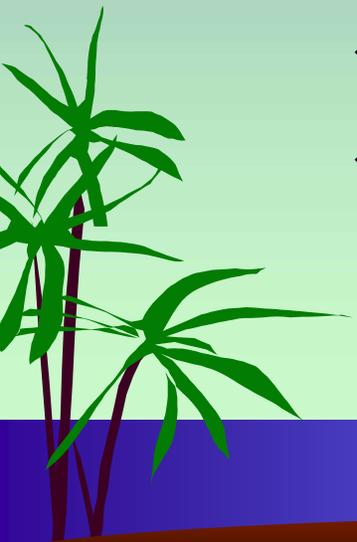


CASI imagery Suwannee Estuary Bands 9,7,5



# An application of remotely sensed imagery to integrated habitat mapping

- ◆ To map subtidal and intertidal habitat with hyperspectral imagery (CASI)
- ◆ To link structural and dynamic habitat
- ◆ To link habitat to fish ecology
- ◆ To develop resource management tool





Submerged flats



Flooded low marsh



Submerged limestone  
and high brackish marsh

H  
A  
B  
I  
T  
A  
T



Tidal creek in forest



# Habitat Map

- CASI imagery
- 4m, 12 bands
- Habitats
  - Submerged
  - Emergent
  - Uplands
- Bumblebee Creek
- Barnett Creek



# Estuarine Fish Ecology



- Similar species composition North and South
- Freshwater species in south tidal creeks
  - Seasonal and interannual variation?
  - Habitat use and preferences?
  - Dynamic habitat and benthic biota?



# Dynamic Habitat

- 0-25 ppt
- Tidal lag into creeks
  - 1.5 - 2 hours
- Net GW discharge
  - At low tide
  - Strongest signal in northern creek
- Need data:
  - Water flow/depth
  - WQ and salinity
  - Sediment load
  - Plankton
  - Benthic biota
  - Accessibility, duration, stability



# Flood zones

- Submerged
- Tidal creeks
- Shallow flats
- Low marsh
- Brackish marsh
- High marsh
- Low elevation freshwater habitats

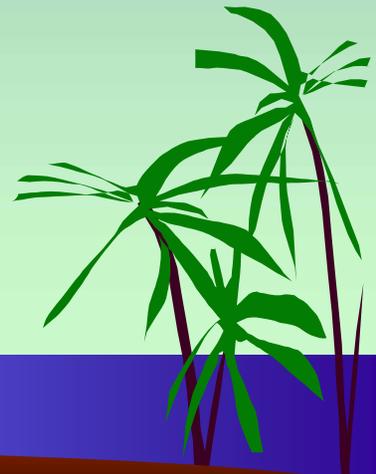
# Future

- Strengths of remotely sensed imagery
  - Low impact to habitat
  - Objective and large geographic coverage
  - Varied resolution and band selection
    - ◆ Topography, thermal, hyperspectral
  - Repeatability
    - ◆ quantitative change versus qualitative
    - ◆ habitat dynamics versus snapshot
  - Benthic Habitats: expand new field, new technique
    - ◆ to basin river bed, wetlands, uplands
    - ◆ to water source, quality and levels



# Landscape Level Links

- Bathymetry and topography - merge
- Tidal and sea level dynamics
- River discharge, groundwater and estuarine water quality
- Geology and sedimentary process
- from Ecosystem to Microhabitat
- Wetland biota with habitat
- Estuarine health and productivity



# Summary

- Detailed habitat and substrate features
- Management tool (FWS)
  - Road impact
  - Species habitat
  - Tide levels and flood
- Coordinate with hydrology, biota, & geomorphic process studies
- Need:
  - comprehensive mapping effort
  - hydrologic monitoring and models (GW)
  - spectral signatures of select features
  - identification of key issues



# Potential Collaborators

FWS

FDEP

FMRI

UF

USF

SRWMD

FGS

USDA

