Using Remote Sensing to Detect Long-Term Coastal Plant Community Changes Due to Sea Level Rise, Everglades National Park

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Sea Level Rise

Globally, sea level has been rising and is predicted to both continue to rise and increase in rate of rise.

0.22 – 1.4 m by the end of the century.
South Florida today

South Florida ~future

+60 cm rise

H. Wanless
Coastal habitats disperse across the elevation gradient

- Red Mangrove
- Black Mangrove
- White Mangrove
- Halophyte Prairie
- Buttonwood/Halophyte
- Buttonwood/Glycophyte
- Tropical Hardwood Hammock

Mean Elevation Above Sea Level
Digital Elevation Model 2x2m
Have large scale plant community composition changes occurred along the ENP coast over the last 32 years?

If so, in what direction?
• 80 km²
• 2 x 2 m resolution.
• Dry season (Dec. 2011) and Wet season (April 2013).
• 8 Multi-spectral bands.
• Supervised classification.
Training Points and Photographic Database
Collected Training Points

17,166 training points

4,356 georeferenced photos
Classification

- Random forest algorithm.

- 8 Bands/image  = 16
- 1 Range/image  = 16
- 1 Mean/image   = 16
- 1 Std/image    = 16
- 1 NDVI/image   = 2
- 1 DEM/elevation= 1

Total  = 67
88% Overall model based accuracy
Design-based accuracy assessment

- Stratified random sample.
Aggregate map similarly to 1981 map.

Perform analysis of change.
Questions?