Planning for the climbing tide: sea level rise at Everglades and Dry Tortugas National Parks

2011 Workshop on Sea level rise adaptation in the Florida Keys - Conserving Terrestrial and Intertidal Natural Areas and Native Species

David E. Hallac
Everglades and Dry Tortugas National Parks, South Florida Natural Resources Center, Homestead, FL
Sea Level Rise

IPCC projects 0.2 to 0.6 meters (7 to 23 inches) higher sea level by 2100.

Recent studies of ice sheet dynamics model a 0.8 to 2.0 meter (2.6 to 6.6 ft) rise (Pfeffer et al. 2008).

Walton 2007

Observed sea level at Key West and predicted continuing rise if the current trend doesn't change.
Sea level rise projections range from 3 inches to 28 inches by 2050.
Rare Plant Species

- 12 Endangered coastal plants (state listed)
- Institute for Regional Conservation lists 14 as extirpated or “critically imperiled”
- Easy to model with information on salinity- and flooding-tolerance

*Chromolaena frustrata* ENDEMIC to S. Florida
Amphibians

Species Richness
- High: 8
- Low: 0

Hydroperiod 1995
- High: 365
- Low: 1

Salinity 1995
- High: 32
- Low: 0

1995
• Ground nesting Sooty terns are susceptible to sea level rise
• Frigate bird nesting substrate may disappear
Seabird nesting is not likely to continue with rising sea level

(Colchero et al. 2010)
Climate Change Effects on Cultural Resources

- Dry Tortugas has nationally significant cultural resources, including Fort Jefferson, the Dry Tortugas (Loggerhead) Light Station, and dozens of documented submerged cultural resources.

- Once lost, cultural resources are lost forever. However, the information they represent can be preserved through documentation.
Fort Wall Stabilization
Where were we 5 years ago with factoring SLR into planning? Not here....

VE (EL 11) Zone (100 year risk)
Base Flood Elevation = 11 feet
Finished Floor = 16.1 feet

AE (EL 11) Zone (100 year risk)
Base Flood Elevation = 11 feet
Finished Floor = 12.2 feet

Freeboard (1.2')
Current Sea Level

Finished Floor
Base Flood Elevation (11')

Current Sea Level
Freeboard (1.8')

Freeboard in A-Zones is Sea Level Rise (assumed to be 14” in 50 years in South Florida); Freeboard in V-Zones is Sea Level Rise plus wave effect (Sea Level Rise is assumed to be 14” in 50 years in South Florida to which is added 55% for wave effect)

Typical Value

Height adjusted for Insurable Equivalence to 100 year return

Flood Insurance Rate Map (FIRM) 12087C0675K