

Vital Sign: Coastal Geomorphology

[Shortened name: Coastal_Geomorphology]

Parks Where Vital Sign will be implemented:

BICY, BISC, BUIS, SARI, VIIS: Soil Elevation Tables (SETs)- SFCN implements monitoring

EVER: SETs – SFCN summarizes reports from existing program

EVER: Berms & Embankments – SFCN part of the Benthic communities extent and distribution indicator

Justification/Issues being addressed: Coastal Geomorphology ranked 27th among the 44 SFCN vital signs. Soil dynamics (the build up or loss of sediment) is a basic process that can have far reaching impacts on an ecosystem. This process is especially important in mangroves, mud-banks, and salt ponds. In the USVI, sediment filling of ephemeral guts and salt ponds from upland development is an important issue. In South Florida, hydrology, sea-level rise and storms have been found to affect mangrove and mud bank soil elevation. CERP/MOD Waters Everglades restoration of regional hydrology is expected to impact soil levels. At a larger scale in South Florida, berms, embankments, and mud banks in Florida Bay have substantial influence on water exchange and the general circulation patterns between the near shore estuaries and oceanic water bodies. Monitoring the position and spatial extent of these structures is critical to understand the connectivity of the water bodies for processes like: Pink Shrimp larval recruitment, export of dissolved organic matter, salinity, nutrient patterns, etc. Everglades restoration, water delivery, large storm events, and sea level rise could all affect these ecosystem structures. Long-term resource management will need to understand the change in position and spatial extent to properly understand changes within the system.

General Monitoring Questions to be addressed by the Vital Sign:

- What are the status and trends in soil dynamics (accretion, subsidence and erosion) in mangroves, mud-banks, and salt ponds, especially in relation to changes in hydrology (quality, quantity, timing and duration) sea-level, storms/hurricanes, and upland erosion?
- Where do berms, embankments and mud banks in Florida Bay change in location?

Measures:

Change in soil elevation in mangroves & salt ponds, location and spatial extent of mud banks, buttonwood embankment and berms

Basic Approach:

Soil Elevation Table (SETs) and mark horizon installation –

- SFCN will write a “Soil Elevation” protocol. In this protocol we will install soil elevation table in mangroves at a number of the parks (BICY, BISC, SARI, VIIS)

and in salt ponds at BUIS and VIIS. We will coordinate with existing EVER monitoring: the southwestern mangroves being conducted by Thomas J. Smith III USGS, Taylor River mangroves sites being conducted by the Fred Sklar of South Florida Water Management District (SFWMD) in conjunction with the Florida Coastal Everglades Long term Ecological Research sites (FCE -LTER) and mud banks of Florida Bay being conducted by Robert Halley (USGS).

Mapping of mud banks in Florida Bay

- If funding is available, SFCN will work to delineate mud banks, berms, buttonwood embankment in Florida Bay every 10 years from aerial photography (potential overlap with Mangrove-marsh transition mapping). This work will be handled by the SFCN internally in conjunction with “benthic communities extent and distribution” vital sign. Select ground truthing of aerial photography will be needed.

Principal Investigators/Key Contacts and NPS Lead:

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Development Schedule, Budget, and Expected Interim Products:

The Soil Elevation protocol is expected to take about of 15 days of SFCN staff time to measure SETs annually (measured bi-annually – twice a year) once the sites and equipment are established. SFCN staff will be responsible for this indicator (Community Ecologist, with assistance from Technicians). One time equipment cost of \$12,000.00 plus ongoing travel costs to USVI and DRTO for maintenance and monitoring at 6 month intervals. The protocol development for “Soil Elevation” should be completed by 2009 and begun 2010. Table indicates proposed SFCN workload upon full monitoring implementation.

Expected SFCN staff time requirements once program is fully implemented in 5 years:

SFCN Staff	Full Time Equivalent (FTE)
Coordinator	
Marine Ecologist	
Fisheries Biologist	
Marine Biologist Technician (So FL)	
Marine Biologist Technician (VI)	
Community Ecologist	0.02
Wildlife Technician (Wildlife)	0.08
Wildlife Technician (Vegetation)	0.08
Quantitative Ecologist	0.06
Data Manager	0.02
GIS/Data Tech	
Interns	
SFCN Total	0.26