

## **Vital Sign: Mangrove-Marsh Ecotone**

[shortened name: Mangrove\_Ecotone]

### **Parks Where Vital Sign will be Implemented:**

BICY, BISC, BUIS, DRTO, EVER, SARI, VIIS– SFCN will evaluate existing monitoring and where possible build upon it or develop new sampling plan

**Justification/Issues being addressed:** Mangrove-Marsh Ecotone ranked 14<sup>th</sup> among the 44 SFCN vital signs. Mangroves provide important juvenile fish and invertebrate nursery areas, habitat for birds and rare plants, as well as providing important shoreline protection. Over 50% of the mangroves in the Virgin Islands have been lost since 1950. Ecotones are transition zones between habitats and are generally dynamic locations for flora and fauna. Due to the sharp transition between habitats, tracking the position of ecotones can indicate the long-term trajectory of habitats. Understanding the physical conditions which drive changes in the ecotone location is critical for proper resource management. Examples of ecotones include mangrove- tidal marsh ecotones, mangrove-marsh-cypress, and mangrove-freshwater marsh ecotones. Ecotones are expected to move, for example, in response to changes in water management, sea level rise, and fire management. Tracking the position of mangrove-marsh ecotones can indicate the long-term trajectory of a wetland ecosystem, while accounting for regional water management changes and sea-level rise. Ecotone positioning can be effectively monitored by aerial photography. At selected sentinel sites in South Florida, ecotone movement across the landscape has been an important indicator for water management (e.g., "White Zone" in southeast Everglades).

### **General Monitoring Questions to be Addressed by the Vital Sign:**

- Are ecotones shifting or changing in aerial size (widening or narrowing) due to physical conditions (e.g., sea level rise, hydrology, climate change, anthropogenic factors, fire, episodic meteorological and storm wave events, etc.)?
- What are the status and trends in plant community composition and structure?

### **Measures:**

Community composition and physical structure (e.g., canopy height, vegetative cover of each plant species, canopy cover in each stratum (canopy, herb layer, shrub layer, etc)), shifts in community boundaries, soil depth, litter depth

### **Basic Approach:**

SFCN will coordinate with existing programs where appropriate, such as mangrove monitoring by Tom Smith of FIU.

1) SFCN will evaluate ecotonal change using both aerial photography monitoring and field monitoring via belt transects or a series of plots set up along a longer transect. Table 1 shows the types of ecotones to be monitored and which methods will be used. Revisit time is likely to be once every 5 years or after major disturbance event (fire, frost, hurricane) and administered in a rotating panel.

Although porewater salinity was also identified as an additional indicator to monitor in this zone, this monitoring is deferred due to insufficient funds.

2) SFCN will evaluate long-term change within plant communities via field plots revisited approximately once every 5-10 years (see Table 2). Soil Elevation Tables will be co-located with a subset of plots.

Table 1. Plan for Ecotone Monitoring

A= monitored with aerial photography

F= monitored with field plots

	Pineland to Hammock	Coastal to Inland	Forest to Wet Prairie	Wet Prairie to marsh/slough
<b>BISC</b>		A,F	A	
<b>BICY</b>	A,F	A,F	A	
<b>EVER</b>	A,F	A,F	A	A,F
<b>DRTO</b>		A,F		
<b>SARI</b>		A,F		
<b>BUIS</b>		A,F		
<b>VIIS</b>		A,F		

Table 2. Plan for Long-term within-community monitoring plots

+ = SFCN monitoring

◆ = Existing monitoring program

	Pineland	Hardwood Hammock	Mangroves	Marshes	Island Moist Forest	Island Deciduous Forest	Island Scrub/Shrub
<b>BISC</b>		+,◆	+				
<b>BICY</b>	◆	+	+				
<b>EVER</b>	◆	+,◆	◆	◆			
<b>DRTO</b>			+				
<b>SARI</b>			+				
<b>BUIS</b>			+			+	+
<b>VIIS</b>			+		+,◆	+,◆	+

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**Development schedule, budget, and expected interim products:**

SFCN is working in cooperation with Jenny Richards of FIU to hire a post-doc to work on vegetation monitoring protocols. The “Mangrove-Marsh Ecotone & Mangrove Community” protocol development is expected to be completed by 2010.

Implementation is expected to take 0.33 FTE/year each for the community ecologist and two wildlife technicians across all habitat types including forest and marshes which are covered under other vital signs. For the evaluation of change via aerial photography, this is expected to take the GIS/Data technician approximately 2 months/year. Cost is estimated to be \$10,000/year to cover helicopter time plus stakes, etc. 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	0.3
Wildlife Technician (Wildlife)	0.4
Wildlife Technician (Vegetation)	0.4
Quantitative Ecologist	0.06
Data Manager	0.04
GIS/Data Tech	0.2
Interns	0.3
SFCN Total	1.7