Summary Report for Suwannee Sound, Cedar Keys, and Waccasassa Bay

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In

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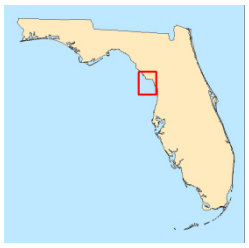

Contacts: Timothy Jones, Jonathan Brucker, and Jamie Letendre, Florida Department of Environmental Protection, Big Bend Seagrasses Aquatic Preserve (monitoring), and Paul Carlson, Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute (mapping)

General assessment: In 2001, 33,625 acres of seagrasses were mapped in Suwannee Sound, Cedar Keys, and Waccasassa Bay, and 72% of the seagrass beds occurred in Waccasassa Bay (24,184 acres). Suwannee Sound had 1,652 acres of seagrasses, located along the offshore reef west and south of the mouth of the Suwannee River. In the Cedar Keys region, 7,789 acres of seagrass were mapped. Of the total seagrass area, 72%, or 24,296 acres, were continuous beds. Seagrass cover in the Cedar Keys region appears to be stable, based on data from a monitoring program ongoing since 2006. Seagrass species composition appears to be stable, and turtlegrass (*Thalassia testudinum*) is the most common species. Seagrass stressors include nutrients, phytoplankton, and turbidity, which reduce water clarity. More recently, colored dissolved organic matter (CDOM), brought in by discharge of the southern outlet of the Suwannee River, has increased in Suwannee Sound waters. Localized, direct impacts from propeller scarring are evident, especially between North Key and Seahorse Key in the Cedar Keys. Less information is available for Suwannee Sound and Waccasassa Bay.

General Status of Seagrasses in Suwannee Sound, Cedar Keys, and Waccasassa Bay

Status and stressors	Status	Trend	Assessment, causes
Seagrass acreage	Yellow	Declining	River impacts in Suwannee Sound
Water clarity	Orange	Stable, often poor	Storm runoff, especially 2012 and 2013
Natural events	Yellow	Increasing frequency	Storm runoff, especially 2012 and 2013
Propeller scarring	Yellow	Localized	Cedar Keys area

Geographic extent: This region extends south from the mouth of the Suwannee River to just south of the mouth of the Waccasassa River. Seagrasses are limited to the offshore reef near the mouth of the Suwannee River but become much more common south and east of the Cedar Keys. The bottom visibility is often obscured by turbid waters, and this area is characterized by a mixture of hard bottom, reefs, sands, and seagrass beds.

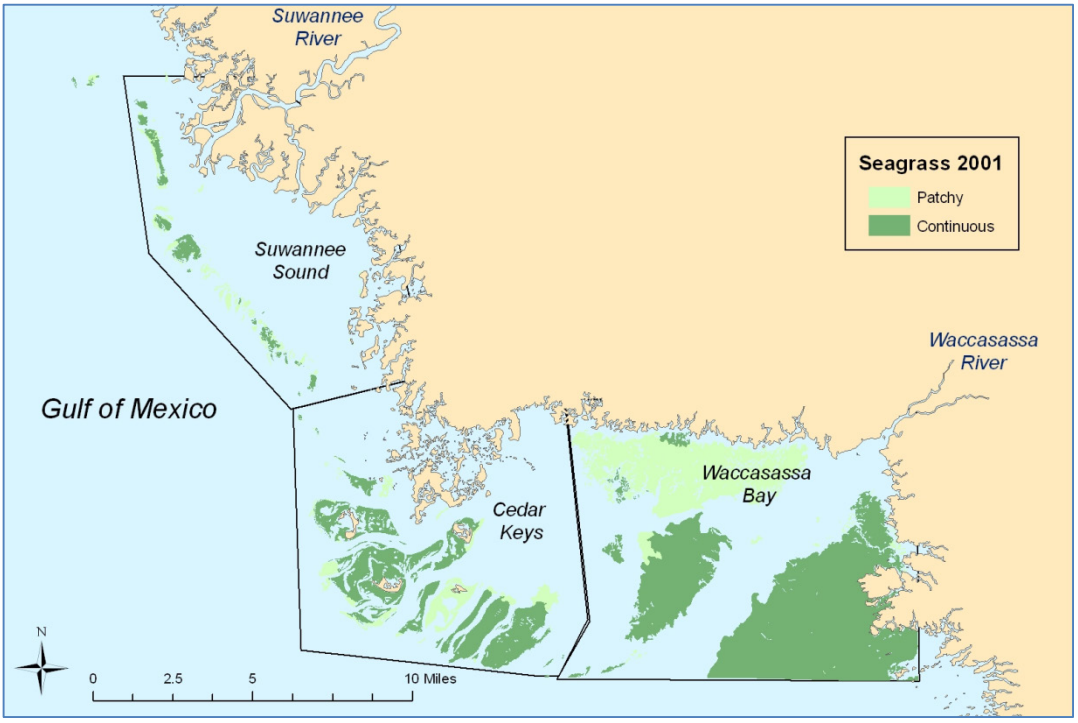

Figure 1 *Seagrass cover in Suwannee Sound, Cedar Keys, and Waccasassa Bay, 2001.*

Mapping and Monitoring Recommendations

- Establish a seagrass monitoring program in the Waccasassa Bay estuary and in Suwannee Sound.
- Acquire and map aerial or satellite imagery of seagrass beds in the Cedar Keys and Waccasassa Bay subregions, where poor optical properties of the water have prevented photo-interpretation of recently collected imagery.

Management and Restoration Recommendations

- Reduce nutrient levels in the Suwannee River. This will partly address the negative impacts of river discharge, but episodic high runoff associated with tropical storms, El Niño, and even excessive storminess will continue to affect seagrasses in this region.
- Design and build storm water storage capacity in the Suwannee watershed to lessen freshwater and CDOM inputs to coastal waters. This will have the added benefit of providing water for agriculture during dry periods.
- Survey and evaluate propeller scarring in the Cedar Keys region and develop a proactive program for reducing impacts. The current strategy includes distribution of and publicity about the boating and angling guide for the Nature Coast region (http://ocean.floridamarine.org/Boati

ng_Guides/nature_coast/index.html) to increase boaters' awareness of seagrass beds in the area. Florida Department of Environmental Protection (FDEP) staff have posted signs at public boat ramps advising boaters of penalties for propeller scarring of seagrass beds. Law enforcement will educate the public before issuing citations for scarring.

- Establish a framework for detecting the effects of climate change and ocean acidification on coastal marine resources in the region.

Summary assessment: Nutrients and poor water clarity in the highly colored and turbid discharge from the Suwannee River continue to affect surviving seagrass beds close to the mouth of the river. Seagrass beds are very limited in Suwannee Sound and mostly occur near the reef offshore and to the south of the river mouth. Seagrass maps created from imagery collected in 2001 showed that most of the seagrass beds in this region occurred in Waccasassa Bay (Figure 1). In recent years, turbidity and resulting light attenuation have made it impossible to map seagrasses near the Cedar Keys and in Waccasassa Bay, and these conditions might also be causing seagrass losses. Without recent mapping data or a monitoring program, the status of seagrasses in Suwannee Sound and Waccasassa Bay cannot be determined. Field monitoring from 2006 through 2014 near the Cedar Keys found that seagrass cover was stable. Turtlegrass dominated seagrass beds, while manateegrass (*Syringodium filiforme*) and shoalgrass (*Halodule wrightii)* occurred less frequently. Stargrass (*Halophila engelmannii*) was observed sporadically near Cedar Keys.

Seagrass Status and Potential Stressors in Suwannee Sound, Cedar Keys, and Waccasassa Bay			
Status indicator	**Status**	**Trend**	**Assessment, causes**
Seagrass cover	Yellow	Declining	River impacts in Suwannee Sound
Seagrass meadow texture	Green	Stable	Monitoring in Cedar Keys only
Seagrass species composition	Green	Stable	
Overall seagrass trends	Green	Fairly stable	Potential runoff impacts
Seagrass stressor	**Intensity**	**Impact**	**Explanation**
Water clarity	Orange	Reduced in 2012 and 2013	Excessive storm runoff
Nutrients	Yellow	Likely increasing	Suwannee River discharge
Phytoplankton	Orange	Moderate	Excessive storm runoff
Natural events	Yellow	Increasing frequency	Storm runoff, especially 2012 and 2013
Propeller scarring	Yellow	Localized	Cedar Keys area

Seagrass mapping assessment: Based on aerial photography obtained in 2001, most of the seagrasses in this region were found in continuous beds, with 72% of all seagrass acreage found in Waccasassa Bay (Figure 1, Table 1). Suwannee Sound had the smallest area of seagrass (1,652 acres), but more than half (905 acres) were continuous. Seagrasses in the Cedar Keys (7,789 acres) were also predominantly found in continuous beds (79%).

Table 1 Seagrass acreage in Suwannee Sound, Cedar Keys, and Waccasassa Bay in 2001.

Habitat type	Suwannee Sound	Cedar Keys	Waccasassa Bay	All regions
Patchy	747	1,643	6,939	9,329
Continuous	905	6,146	17,245	24,296
All seagrass	1,652	7,789	24,184	33,625

Monitoring assessment: Staff members of the FDEP Big Bend Seagrasses Aquatic Preserve have been monitoring seagrass beds at 25 sites in the Cedar Keys area (Figure 2) since 2006 using Braun-Blanquet assessment of 1-m² quadrats. Data suggest that the occurrence and species of seagrasses are stable (Figure 3). Turtlegrass is the most common seagrass species found at the Cedar Keys, while shoalgrass and manateegrass occur about half as frequently as turtlegrass (Figure 3). Stargrass has been observed only sporadically. The mean cover (Braun-Blanquet score) for all seagrasses remained fairly stable from 2006 through 2014 (Figure 4).

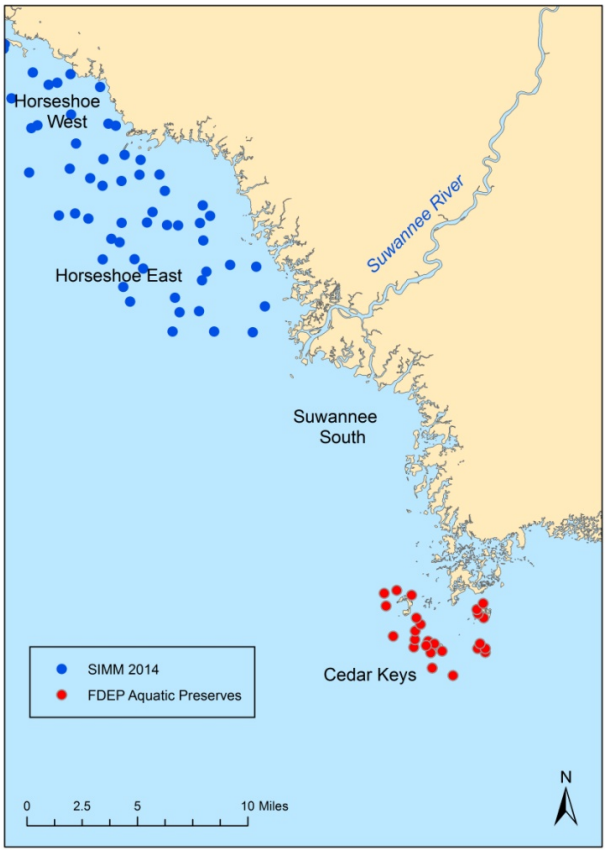

Figure 2 Location of sites in the Cedar Keys subregion monitored by the FDEP Big Bend Seagrasses Aquatic Preserve.

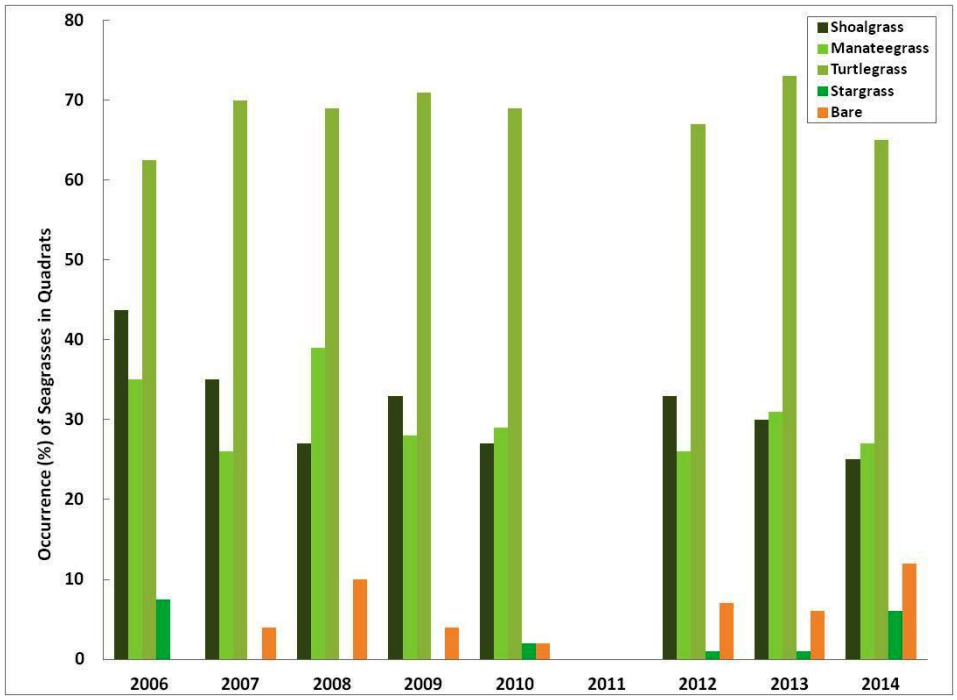

Figure 3 *Percentage occurrence of seagrass species in the Cedar Keys subregion, 2006–2014.*

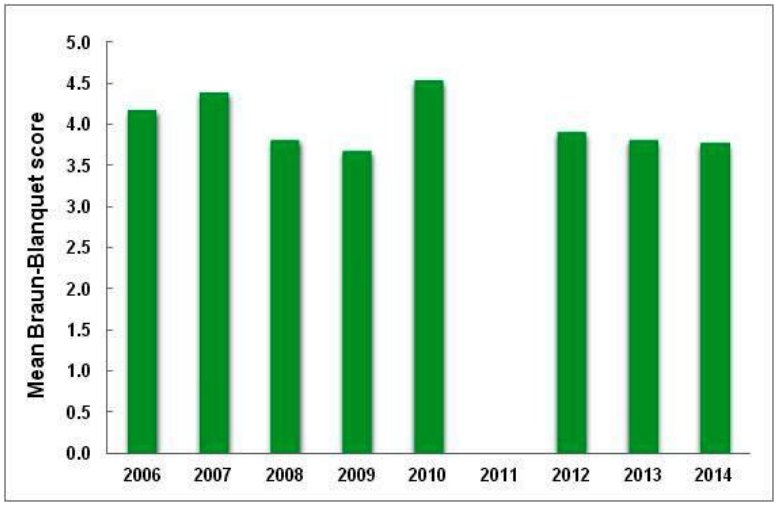

Figure 4 *Mean seagrass cover (using Braun-Blanquet scores) in the Cedar Keys subregion, 2006–2014.*

Mapping and Monitoring Recommendations

- Photograph and map the entire region very soon, and continue to map seagrasses every six years.
- Continue the monitoring program in the Cedar Keys subregion and expand it to include Suwannee Sound and Waccasassa Bay.

Management and Restoration Recommendations

- Continue efforts to reduce propeller scarring of seagrass beds in the

Cedar Keys subregion. A high density of propeller scarring exists in the area around Seahorse Key. This area also has some of the highest concentrations of turtlegrass.

- Acquire imagery and map Suwannee Sound and Waccasassa Bay to allow trend analysis.
- Assess impacts of river runoff on seagrasses near the mouth of the Suwannee River.
- Continue the Total Maximum Daily Load (TMDL) program and best management practices in the Suwannee River watershed to reduce nutrient loading to coastal waters.
- Design and build storm water storage capacity in the Suwannee watershed to lessen freshwater and CDOM inputs to coastal waters. This will have the added benefit of providing water for agriculture during dry periods.
- Establish a framework for detecting the effects of climate change and ocean acidification on coastal marine resources in the region.

Mapping methods, data and imagery: Seagrass data were photo-interpreted from 2001 natural color aerial photography acquired at 1:24,000 scale and classified using the South Florida Water Management District's modifications to the Florida Land Use Cover and Forms Classification System (FLUCCS; Florida Department of Transportation, 1999). Features were stereoscopically interpreted from the aerotriangulated aerial photography, and vector data were compiled using analytical stereoplotters. Extensive field reconnaissance and seagrass bed monitoring were conducted to resolve classification and boundary problems encountered during photo-interpretation. The minimum mapping unit for classification was 0.5 acre.

Monitoring methods and data: Staff of the Big Bend Seagrasses Aquatic Preserve have been monitoring seagrass beds at 25 sites in the Cedar Keys area since 2006 using Braun-Blanquet assessment of 1-m² quadrats. Monitoring is done each summer, and all sites were in seagrass beds when monitoring began. Concurrently with the seagrass assessment, the presence and number of bay scallops and sea urchins in each quadrat are recorded, as well as assessment of epiphyte density on seagrass blades, and sediment type. Field–condition measurements (depth, water temperature, salinity, pH, dissolved oxygen concentration, turbidity) are recorded at each site as well. These data are available upon request. No monitoring program is in place for Waccasassa Bay or Suwannee Sound.

Pertinent Reports and Scientific Publications

FLORIDA DEPARTMENT OF TRANSPORTATION. 1999. Florida Land Use, Cover and Forms Classification System, A Handbook, Division of Surveying and Mapping, Geographic Mapping Section, Tallahassee, Florida. 92 p.

JACKSON, J. B., and D. J. NEMETH. 2007. A new method to describe seagrass habitat sampled during fisheries-independent monitoring. Estuaries and Coasts 30: 171–178.

MATTSON, R. A. 2000. Seagrass ecosystem characteristics and research and

management needs in the Florida Big Bend. Pp. 259–277 *in* S. A. Bortone, ed. Seagrasses: Monitoring, Ecology, Physiology, and Management. CRC Marine Science Series, Volume 16, CRC Press, Boca Raton, Florida. 318 p.

Technical Support Document: Derivation of Numeric Nutrient Criteria for Suwannee Sound, Waccasassa, and Withlacoochee Estuaries. 2013. Division of Environmental Assessment and Restoration, Florida Department of Environmental Protection, Tallahassee. 180 p.

TUCKEY, T. D., and M. DEHAVEN. 2006. Fish assemblages found in tidal-creek and seagrass habitats in the Suwannee River estuary. Fishery Bulletin 104: 102–117.

General References and Additional Information

Big Bend Seagrasses Aquatic Preserve: http://www.dep.state.fl.us/coastal/sites/bigbend/. Accessed April 2014.

Suwannee River: Resource Database for Gulf of Mexico Research: http://www.gulfbase.org/bay/view.php?bid=suwaneeriver. Accessed April 2014.

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