

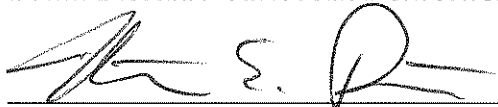
**ANNUAL ADMINISTRATIVE REPORT (FY 2010) AND
WORK PLAN (FY 2011) FOR INVENTORIES AND VITAL SIGNS
MONITORING**

FY 2010-FY 2011

South Florida / Caribbean Network

Includes: Biscayne National Park, Big Cypress National Preserve, Buck Island Reef National Monument, Dry Tortugas National Park, Everglades National Park, Salt River Bay National Historical Park and Ecological Preserve, and Virgin Islands National Park.

South Florida / Caribbean Network Approval Signatures



Matt Patterson, Network Coordinator, South Florida / Caribbean Network

11/18/2010

Date



Dan Kimball, Everglades/Dry Tortugas National Parks
Chair, Network Board of Directors

11-18-2010.

Date



Larry West, Inventory and Monitoring Branch Chief
Southeast Region

12-9-2010

Date

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Executive Summary

The South Florida/Caribbean Network (SFCN) includes seven national parks with significant natural resources in the southern tip of the state of Florida and the U.S. Virgin Islands of St. Croix and St. John: Big Cypress National Preserve (BICY), Biscayne National Park (BISC), Buck Island Reef National Monument (BUI), Dry Tortugas National Park, Everglades National Park, Salt River Bay National Historical Park and Ecological Preserve (SARI), and Virgin Islands National Park (VIIS). In FY 2010 the SFCN received \$2,018,156 in funding from the Inventory and Monitoring (I&M) program, the NPS Vegetation Mapping program, and the NPS Water Resources Division. In addition, SFCN received \$160,000 from the Army Corps of Engineers (ACOE) to assist with vegetation mapping of Everglades National Park. This funding enabled the SFCN to conduct monitoring on marine and community resources as the network continues operational monitoring for core vital signs. In FY10, biological inventories were conducted, including multiple vegetation and benthic habitat mapping efforts.

SFCN continued to implement its Vital Signs Monitoring Plan, focused on protocol development and monitoring. SFCN completed a new 10 year office space lease, and expansion to provide 3 new offices and 10 cubicles for post doctoral researchers and interns. SFCN assisted with Biscayne National Park's BioBlitz event, a 24 hour inventory of the biodiversity of the park co-hosted by National Geographic. The MS Canyon 252 Deepwater Horizon oil spill was unexpected, and required a significant effort from SFCN staff for field data collection, as well as data management. SFCN conducted marine benthic community Vital Sign monitoring in BISC, DRTO, VIIS, and BUI. Marine Fish Community monitoring was conducted in BISC, DRTO, VIIS, VICRNM, and BUI. SFCN hired a marine ecologist, a George Melendez Wright Climate Change intern, two REMI, as well as three SCA's in FY10. The vegetation Vital Signs postdoctoral researcher was hired to continue protocol development for several vegetation related vital signs. SFCN completed a vegetation map for Buck Island Reef National Monument (BUI), continued work on a vegetation maps for western BICY, EVER, BISC, SARI, DRTO and VIIS. Benthic habitat maps were drafted for DRTO and offshore BISC.

The FY10 budget was spent primarily on personnel, accounting for 55% (\$1,114,031), 16% (\$322,305) was spent on cooperative agreements, 15% (\$293,442) on contracts, 10% (\$207,805) on operations, 3% (\$55,252) on travel, and 1.25% (\$25,293) on Regional assessments.

The FY11 budget proposes spending \$2,073,138 with the following allocations: 62% (\$1,293,726) on personnel, 8% (\$169,507) on cooperative agreements, 11% (\$216,957) on contracts, 12% (\$252,051) on operations, and 4% (\$80,000) on travel, and 3% (\$60,897) on Regional assessments and internetwork lending.

Program Accomplishments Summary

Inventories

- Vegetation Maps:
 - SFCN completed a vegetation map product for Buck Island Reef National Monument (BUIS).
 - SFCN completed a draft vegetation map and report for Salt River Bay National Historical Park and Ecological Preserve (SARI) which is in review.
 - SFCN completed field work and completed a draft vegetation map and report for Dry Tortugas National Park (DRTO) which is in review.
 - SFCN collected an additional 136 field points to assess the accuracy of the existing Virgin Islands National Park (VIIS) vegetation map.
 - SFCN is collaborating with the Army Corps of Engineers who are mapping Everglades National Park (EVER) through the Comprehensive Everglades Restoration Plan RECOVER program. SFCN is assisting with field identification of training points and conducting a field accuracy assessment. SFCN has collected 291 accuracy assessment points to assist with assessing the Region 1 map when completed.
 - A classification analysis of the Everglades marsh plant communities by Dr. Ross and Jay Sah of Florida International University was completed and final report submitted. A geodatabase of the various vegetation projects in the Greater Everglades area was submitted and summarized.
- Benthic Habitat Maps:
 - SFCN has completed a draft revision of the benthic habitat map for DRTO. Revisions to the initial 2008 map product funded by SFCN and the Florida Fish and Wildlife Research Institute were made based upon side-scan sonar, LiDAR, imagery, and field data. A draft of the associated report is nearly complete. A bathymetry layer for the park is an additional product.
 - SFCN has almost completed a draft revision of the benthic habitat map for Biscayne National Park (BISC). Revisions to the initial 2008 map product funded by SFCN and the Florida Fish and Wildlife Research Institute were made based upon LiDAR, imagery and field data. A draft of the associated report is nearly complete.
- The small and medium mammal inventory for Big Cypress National Preserve (BICY) and Everglades National Park (EVER) is nearly complete. USGS/University of Florida submitted a draft report and databases for review. SFCN is working with the cooperators to resolve problems with the databases after which the cooperators will submit a final report.
- The bat inventory database has been cleaned up and the database and GIS files were posted to NRINFO.
- SFCN assisted in many aspects of the National Geographic BioBlitz in BISC. 324 of the 828 species tallied were new to the park lists, most of which were invertebrates (248), fungi (7), and non-vascular plants (44).
- The 2006 Datamining Project articles/reports have made searchable on the SFCN

Intranet. (http://science.nature.nps.gov/im/units/sfcn/veg_maps.cfm).

Vital Signs Monitoring

- Marine Benthic Communities:
 - SFCN conducted marine benthic community monitoring in BISC, DRT0, VIIS, and BUIS.
 - SFCN tracked the unusually warm water temperatures in the U.S. Virgin Islands and in response filmed additional video of U.S. Virgin Islands coral transects to document coral bleaching and provide additional data in case another coral dieoff occurs. Coral bleaching appears to have been less severe than in 2005.
 - Matt Patterson, SFCN Network Coordinator, participated on the Biological Review Team to evaluate the extinction potential of 82 species of coral. SFCN data were used.
- Marine Fish Communities:
 - SFCN conducted marine fish community monitoring in BISC, DRT0, VIIS/VICRNM, and BUIS in partnership with NOAA, University of Miami, Florida Fish and Wildlife Conservation Commission, and park staff.
- Colonial Nesting Birds:
 - In BISC monthly helicopter flights were conducted to complete a temporal picture of bird nesting in BISC. The techniques for monitoring nesting via photographs are being tested and fine-tuned for the protocol in development.
 - Monitoring flights were conducted in BICY to detect colonial nesting birds and determine whether it is a “good bird year” that triggers more intensive monitoring by Peter Frederick of the University of Florida (funded by CERP).
 - SFCN created preliminary drafts of Standard Operating Procedures for existing monitoring of colonial nesting birds at BUIS, EVER, and VIIS based upon interviews with park staff and existing documents for the purpose of clearly documenting the current protocols, monitoring and data and determining ways to collaborate on reporting results across the network.
- Forest Ecotones and Community Structure, Mangrove-Marsh Ecotone:
 - SFCN conducted a pilot study to test data collection and analysis methods for monitoring ecotonal movement at four mangrove/marsh sites and one pineland/hammock site in EVER.
 - Three maps created in the early 1980’s by Gunderson and Loope or by Olmsted et al. of Turner River, Flamingo and Joe Bay were digitized by SFCN interns and accompanying reports drafted. These maps will be compared with 1980’s imagery and recent imagery to help development of a vegetation ecotonal movement protocol.
 - Investigation of historical vegetation plots continues. In BICY three plots established near the Turner River area in Big Cypress National Preserve by Gunderson and Loope in the early 1980s were resampled. In BISC, 11 more of 32 long-term forest plots established by Bradley Bennet in 1995-1996 were relocated and eight were resampled. The Coot Bay (EVER) transect sampled in 2009 was analyzed by Kristie

Wendelberger showing little change to the vegetation communities other than hurricane damage. In DRTO transect data from Loggerhead Key were evaluated against the new DRTO map.

- Coastal Geomorphology: A soil elevation table (SET) monitoring site was established in BISC.
- Invasive/Exotic Plants:
 - SFCN completed a draft of the SFCN Early Detection Protocol for Invasive Exotic Plants which is currently being reviewed.
 - SFCN provided assistance to NPS-EPMT by post-processing digital aerial sketch-mapping results for spatial distribution of exotic invasive plants.
- Invasive / Exotic Animals
 - Booms and anodes for the SFCN electrofishing boat were designed, built and installed. SFCN entered into collaboration with Dr. Jennifer Rehage of Florida International University who is investigating how man-made canals function as habitat for both native and non-native fishes. The results of this 2 year study will assist design of the non-native fish in canals monitoring protocol.
 - SFCN found lionfish in 2010 during standard RVC (fish monitoring) surveys, coral monitoring, and opportunistic sightings: 3 lionfish were found in DRTO , 5 in BISC, and 1 in VIIS. Lionfish were also spotted by Jim Bohnsak in Florida Bay (EVER) and has been reported around St. Croix. Lindsay Jones, a Student Conservation Association Intern, created a lionfish pamphlet and gave a webinar on lionfish survey methodology.
- Periphyton: SFCN conducted a second round of pilot study sampling in Big Cypress National Preserve. A total of 65 periphyton mat samples were collected in 6 hydrological basins to assess inter- and intra- basin variability. Results from the 2008 sampling showed distinct differences in diatom assemblages in impacted vs. unimpacted sites and suggested sampling could be restricted to marsh communities.

Water Quality Monitoring

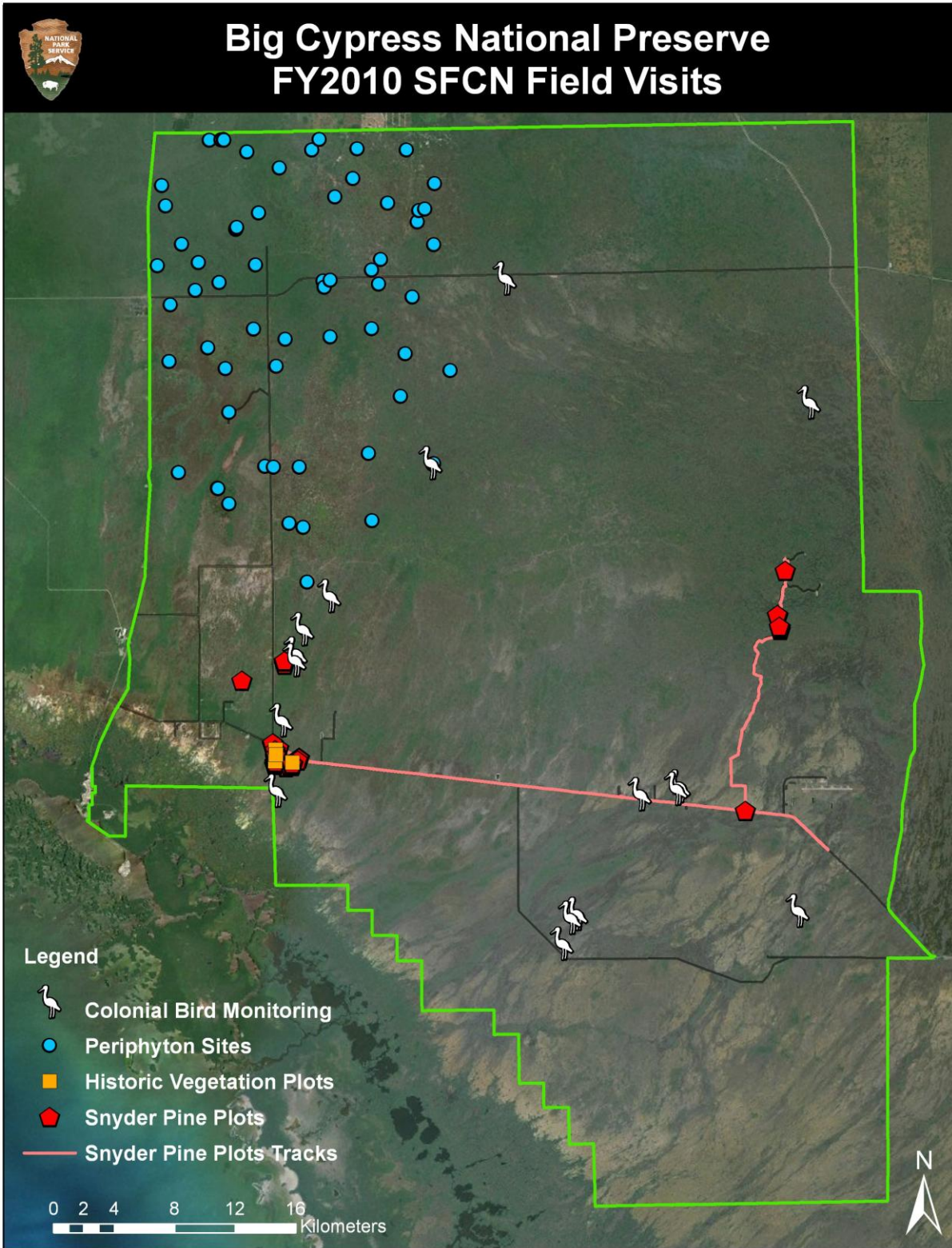
- Contaminants – MS Canyon 252 Baseline Oil Assessment: SFCN contributed 2,246 hours to a baseline assessment of South Florida parks in response to the MS Canyon Deepwater Horizon spill. SFCN assisted the many park staff involved with planning, protocol training, data collection, Semi-Permeable Membrane Device (SPMD) deployment and retrieval, coral tissue sample collection, data management, and communication.
- Contaminant-other:
 - SFCN completed a pilot project with Dr. Tim Bargar and David Alvarez of the U.S. Geological Survey to assess levels of Emerging Pollutants of Concern (EPOCs) in near shore waters of Biscayne Bay due to concerns generated by the Miami-Dade Water and Sewer Department's Wastewater Reuse Pilot Project. SFCN deployed and retrieved polar organic chemical integrative samples (POCIS) at 12 locations.
 - SFCN continues supporting Biscayne National Park staff with negotiations between

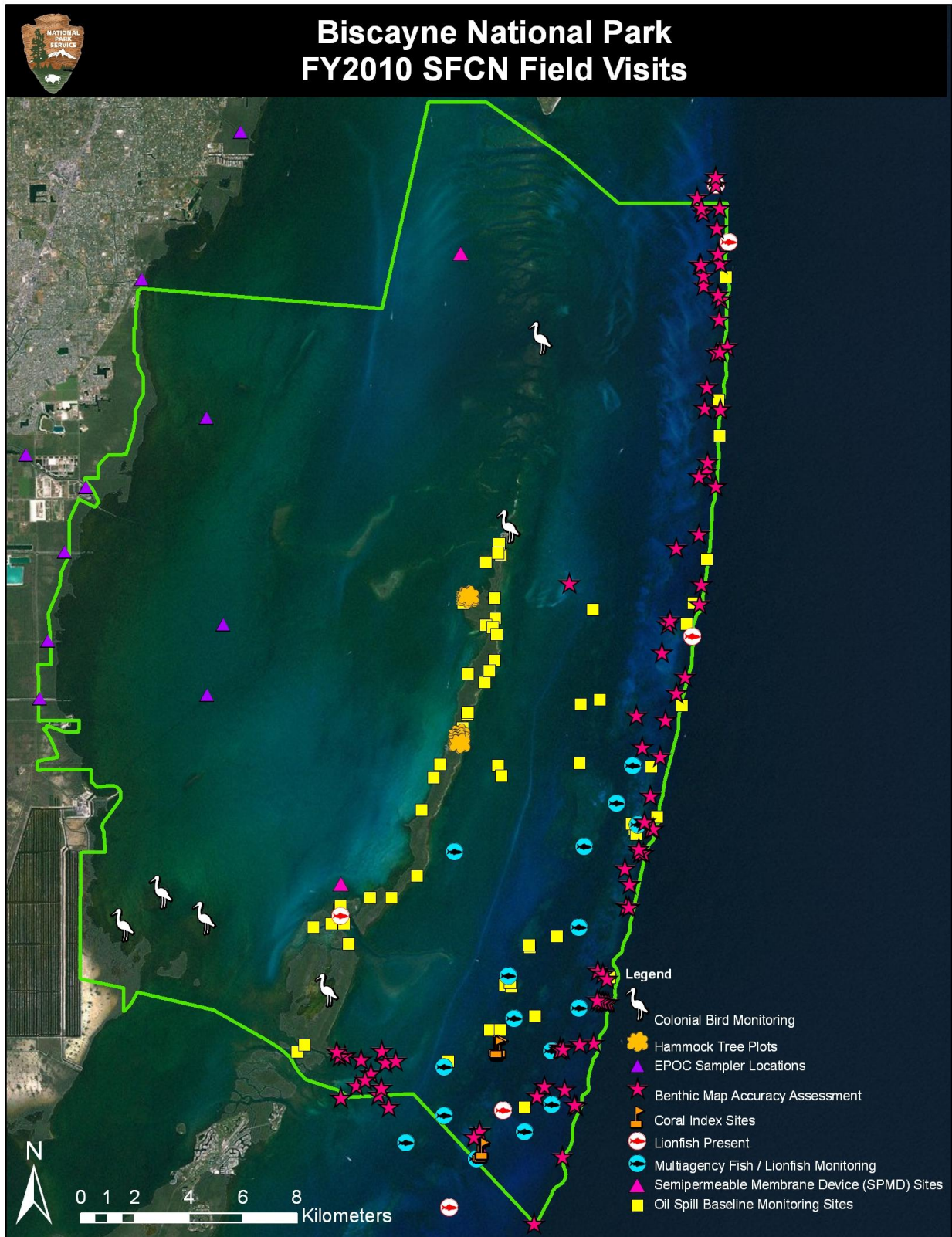
the park and Miami-Dade Water and Sewer Department's Wastewater Reuse Pilot Project.

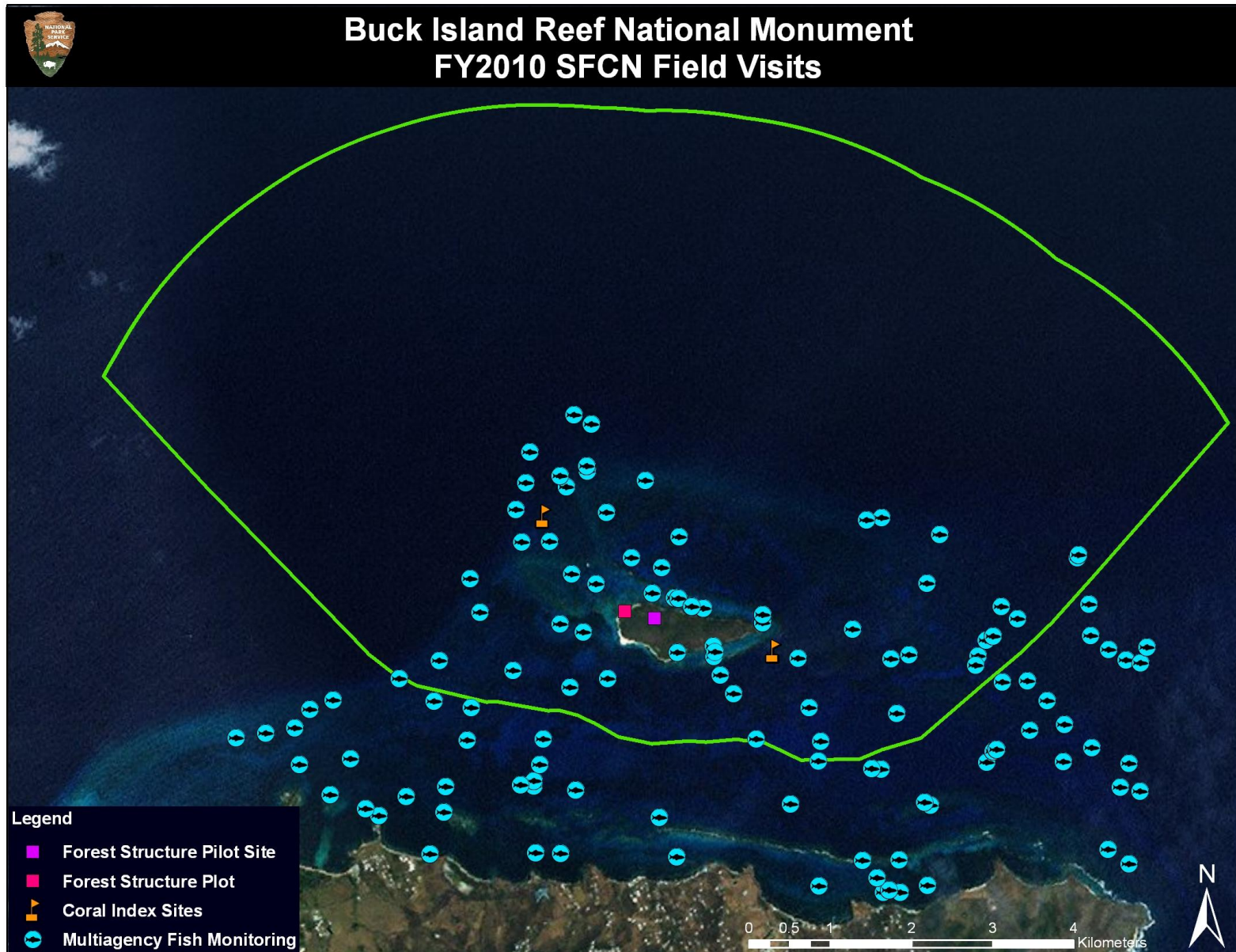
- **Marine Benthic Communities:** SFCN used reef water temperature data to track unusually warm reef temperatures (similar to 2005) at U.S. Virgin Islands reefs and alert the parks to the potential bleaching event. This also triggered SFCN to collect additional video data in case another coral bleaching/dieoff event occurred similar to 2005. The data showed the temperature lowering affects of rainfall, cloud cover, and mixing due to high winds from Hurricanes Earl and Otto which brought temperatures back within the historical data range.
- **Nutrient Dynamics and Water Chemistry:** The water quality post-doc position funded by SFCN to work on the Nutrient Dynamics and Water Chemistry vital signs via a cooperative agreement with Jim Fourqurean and Joe Boyer of Florida International University was advertised in late FY10 and interviews held in early FY11.
- **Surface Water Hydrology:** SARI and BUIS staff sent weather station and crest gage station data to SFCN. However the SARI station has been dismantled due to deterioration from weathering and is no longer in use and SFCN will explore using the offshore CREWS station data instead. SFCN developed basic reporting procedures and is finalizing QA/QC procedures which will complete the protocol.

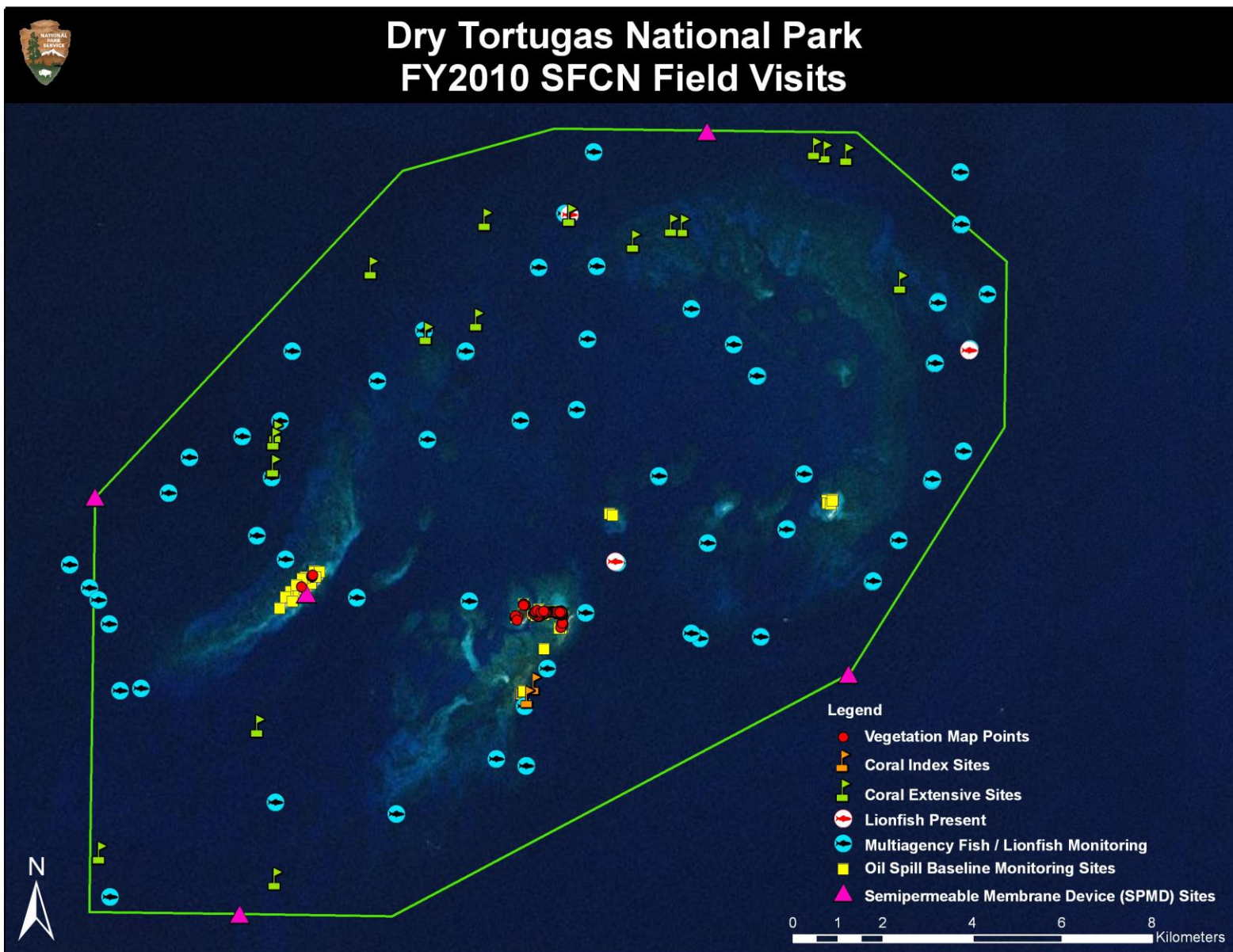
FY2010 SFCN Field Work Maps

As most of SFCN's vital sign protocols and reporting strategies with partners are still in development, we are providing maps showing work accomplished in the park this year by SFCN (or in the case of the reef fish monitoring and MS Canyon 252 Oil Spill monitoring, SFCN with partner agencies and park staff).





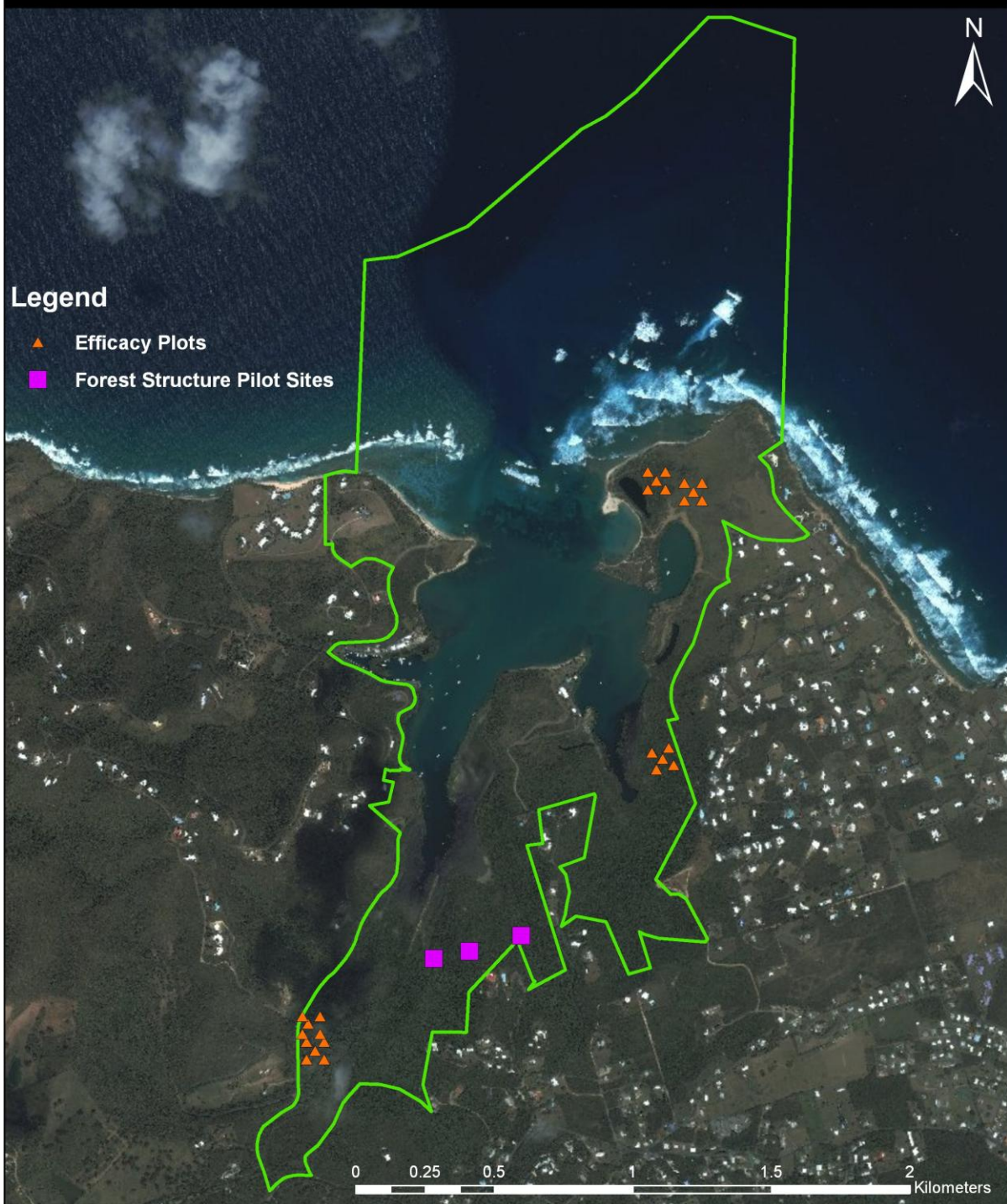


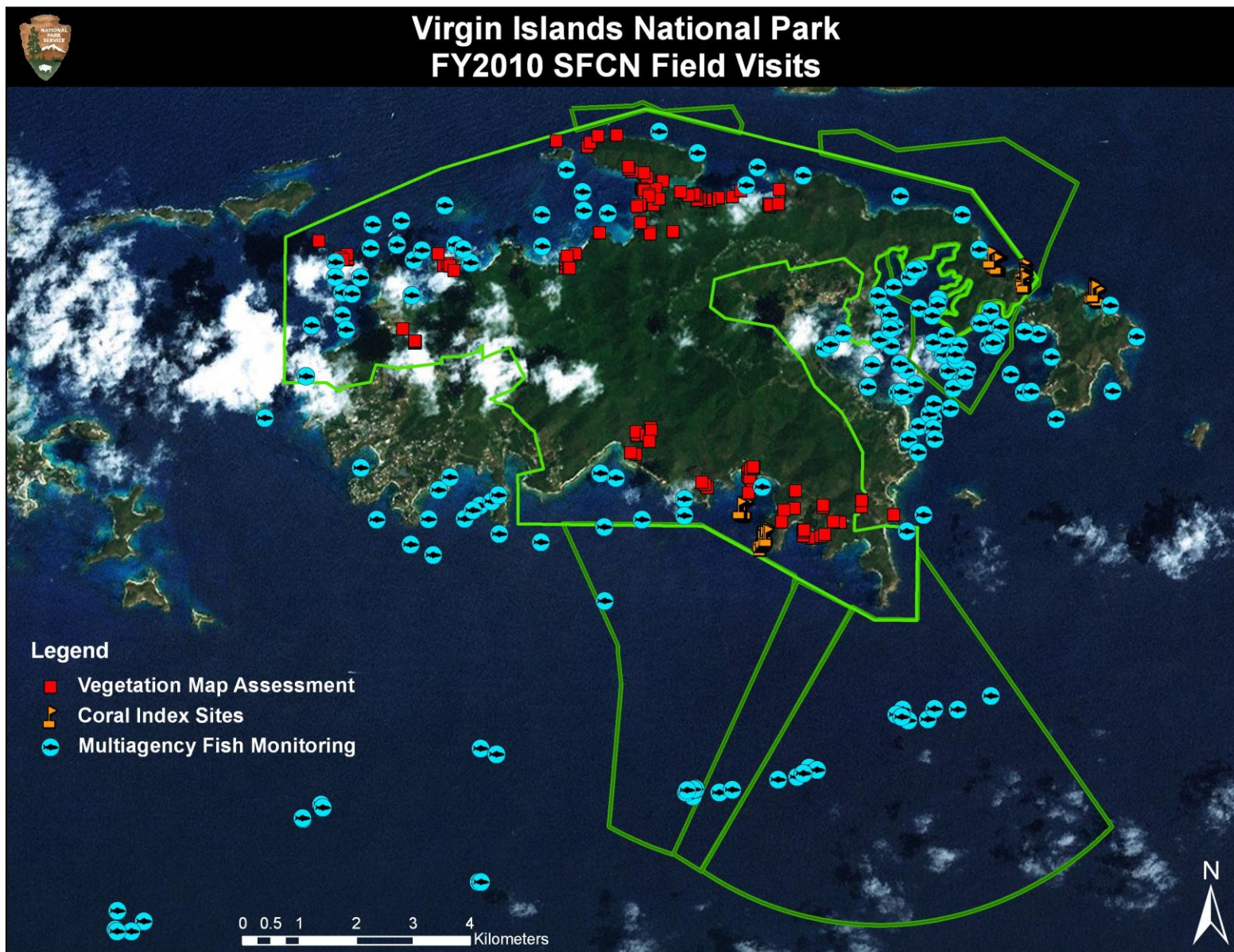






Salt River Bay National Historical Park & Ecological Preserve FY2010 SFCN Field Visits





I. Program Accomplishments

The accomplishments and scheduled activities are described separately under the three SFCN branches:

- I.A Marine Ecology Branch
- I.B Community Ecology Branch
- I.C Data Management, Analysis and Reporting Branch
- I.D Water Quality

Each section describes new staff, inventory activities and vital signs monitoring activities that relate to their branch. Water quality accomplishments and scheduled activities are described separately.

I.A Marine Ecology Branch

Overview

The Marine Ecology Branch made significant progress during FY10 on benthic habitat mapping and detailed marine resource monitoring of network parks and participated in the multiagency South Florida emergency environmental response to the MS Canyon 252 Deepwater Horizon oil spill in the Gulf of Mexico. In addition, Dr. Michael Feeley was hired to fill the Supervisory Marine Ecologist position and a candidate search is in progress to fill the SFCN/Univ. of Miami Marine Fisheries Science Postdoc position.

The 25' Boston Whaler, Acropora, stationed at Virgin Islands NP was shipped to the Brunswick Commercial Products Division for refurbishment in the spring of 2010. The 10-year old vessel is used for monitoring around St. John and twice a year makes the 40 mile open ocean crossing to BUIS for monitoring in that park. Included in the refurbishment was a replacement of the electrical system, replacement of the fuel tank and fuel lines, upgrade of the design of the bilge drainage and bilge pump, and cabin window replacement. This project was undertaken to prolong the working life of the vessel, and ensure the safety of NPS staff while working on the boat. The project took about 3 months and involved SFCN employees in Miami and the islands, as well as cooperation with the BISC maintenance division (lending a trailer during FL repairs), VIIS RM staff, and USGS staff (for coordinating boat use while Acropora was gone). Cost of refurbishment was less than 10% the cost of a new boat.

Marine ecology personnel were trained in EPA hazmat and coral disease sampling methodology developed by the Coral Disease Health Consortium in response to the possibility of extensive damage to South Florida marine habitats after the MS Canyon 252 Deepwater Horizon oil spill disaster that occurred on April 20, 2010. Coral tissue and water quality samples were collected within DRTO for baseline oil impact assessment.

A final DRTO benthic map will be published in FY11 and results will be submitted by Rob Waara in partial fulfillment of a Master of Science degree from the University of Miami's Department of Marine Policy. All "Unknown" areas within DRTO were identified and detailed bathymetry and habitat with higher potential for fish and benthic biodiversity layers were created. Additionally, a completed revision of the hard bottom habitats in BISC was finalized in

June of FY10. SFCN plans to also publish the mapping report for the BISC benthic map in FY11.

The Marine Ecology Branch also successfully completed annual coral monitoring at all current index sites in South Florida and Caribbean parks. Index sites are specifically selected reefs, each with 20 randomly placed transects. There are 2 index sites in DRTO (Bird Key Reef and Bird Key North), 2 index sites in BISC (Amanda's Reef and Ball Buoy Reef), 5 index sites in VIIS (Tektite Reef, Haulover Reef, Yawzi Reef, Mennebeck Reef, and Newfound Reef), and 2 index sites in BUIS (South Fore Reef and Western Spur and Groove). In addition, the Marine Ecology group surveyed 18 extensive coral monitoring sites each with 4 transects throughout DRTO. During work on this project in May and June, reef water temperature was downloaded from all sites. The Marine Ecology Branch also assisted SFCN partners with annual reef fish monitoring in DRTO, VIIS, VICRNM, BUIS and BISC.

Inventories

Dry Tortugas National Park Benthic Habitat Map

Project Overview: SFCN, in partnership with the Florida Fish and Wildlife Research Institute, contracted with Avineon, Inc. to provide a full benthic habitat map for all of the submerged areas of DRTO. An initial marine benthic habitat map was completed in 2008 by the contractor Avineon, Inc. SFCN conducted an accuracy assessment of the 2008 map and found the overall acceptable classification accuracy to be 83.2% with a lower 90% confidence interval of 79.8%. The accuracy of the hard-bottom and soft-bottom habitats were also analyzed separately resulting in the hard-bottom habitats having an accuracy of 75.2% with a lower 90% confidence level of 69.1%, while the soft-bottom habitat had a much higher accuracy of 89.4% with a lower 90% confidence level of 85.2%. Thus the accuracy of the hard-bottom habitat had room for improvement. Upon the acquisition of new higher resolution side scan sonar data and 2054 field data points from multiple sources, SFCN revised the 2008 Avineon benthic map by utilizing these new data sets to improve the mapping product.

Project Status: The final 2010 Dry Tortugas benthic habitat map is expected to be completed by the end of the calendar year. This map was developed with the following parameters. The coordinate system used was the UTM, NAD 83, zone 17N with a minimum mapping unit (MMU) for all feature class polygons of 0.5 hectares. However, where possible patch reefs and the soft and hard bottom interfaces were mapped to greater detail. The following data sets were used: 2009 side scan sonar/bathymetry with a 2-dimensional, 30 cm resolution backscatter image and corresponding bathymetric layer with raw a bathymetry resolution around 5-6 cm per data point collected by the College of Marine Science of the University of South Florida; 2004 LIDAR (1m spatial resolution); 2006 IKONOS satellite imagery blue band (4m spatial resolution), 2006 IKONOS satellite imagery RGB (4m spatial resolution) and 2007 National Agriculture Imagery Program (NAIP) (1m spatial resolution). Field data points and ground used the System for Classification of Habitats in Estuarine and Marine Environments (SCHEME).

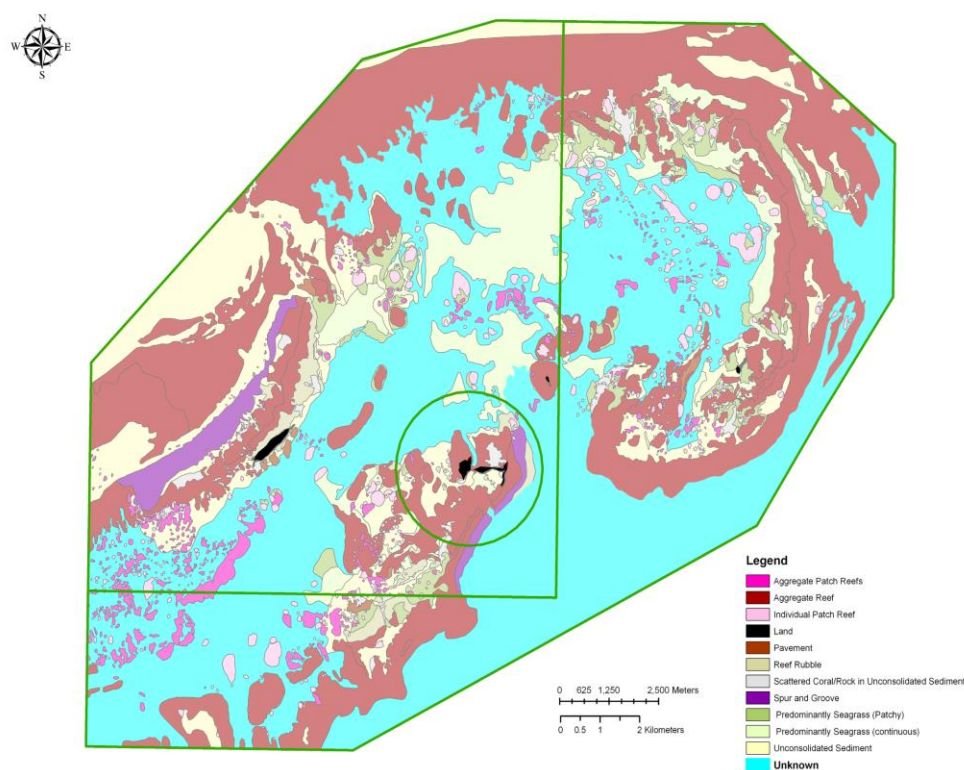
Table 1. Polygon changes between 2010 and 2008 benthic maps

2010 Map Class	Number Polygons	Total Area (ha)	Polygon Difference (2010 - 2008 maps)	Area difference in hectares (2010-2008 map)
Aggregate Patch Reefs	404	633	-6	33.9
Individual Patch Reef	736	525.6	72	-41.6
Linear Reef (Aggregate Reef)	--	--	59	-1950.2
Reef Terrace (high profile)	83	1871.6	--	--
Remnant (low profile)	75	4263.6	--	--
Land	5	46.9	0	0
Pavement	16	207.5	8	148.3
Reef Rubble	14	128.1	1	-117.7
Patchy Coral/or Rock in Unconsolidated Sediment	43	1011.5	17	817
Spur and Groove	--	--	3	197.7
High Relief Spur and Groove	4	155.6	--	--
Low Relief Spur and Groove	2	417.7	--	--
Unconsolidated Sediment	153	13244.5	-91	10500
Continuous SRV	106	2267.7	-3	194
Discontinuous SRV	68	1455.4	14	736.5
Unknown	--	--	-5	-10443.8
Totals	1709	26228.7		

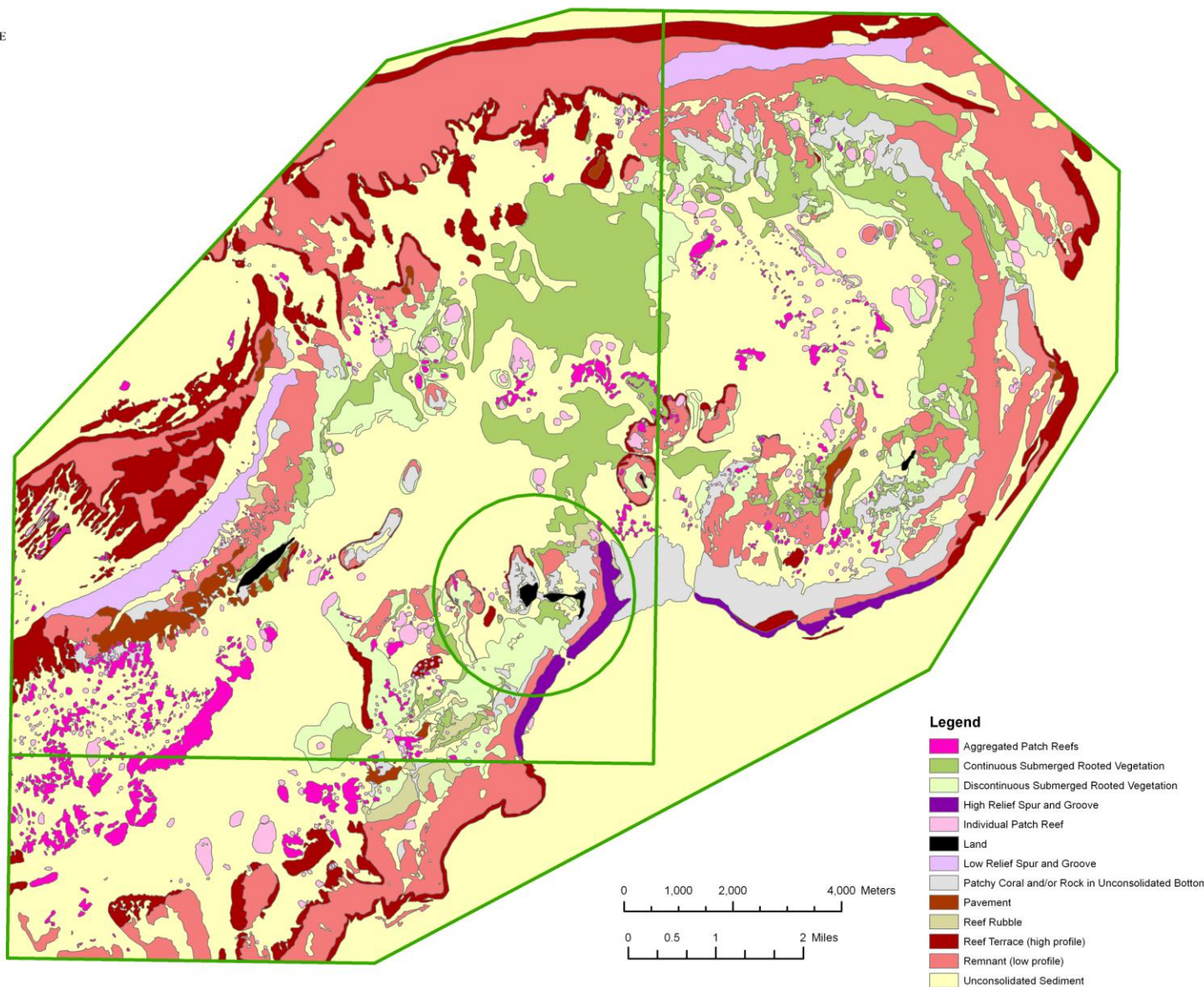
Field data included the 2008 SFCN accuracy assessment points (AA), four years of reef fish visual census (RVC) benthic data, 2008 rapid habitat assessment data (RHA) and SFCN extensive monitoring sites with corresponding photos for most of the field data points.

The final 2010 benthic habitat map has a total of 13 mapping classes and 1709 polygons with a total area of 26,229 hectares (see Table 1). With the improved mapping product all “Unknown” areas (10,444 hectares) in the 2008 map were identified, the line work for the hard-bottom areas was fine tuned and a mapping layer was developed showing those areas which have a higher potential for fish and benthic biodiversity. In addition, a final bathymetry layer for the park was developed by merging the existing LiDAR and newly acquired side scan sonar/bathymetry data.

2008 Benthic Habitat Map with Unknown Areas.



The 2008 benthic habitat map had 5 large polygons (light blue) which contained 31% of the park (over 40 sq. miles) that were labeled as Unknown. Based upon field data and the new 2009 side scan sonar/bathymetry data, these 5 unknown polygons were able to be classified as Unconsolidated Sediment adding 10,444 classified hectares and producing a complete habitat map for the Dry Tortugas National Park.



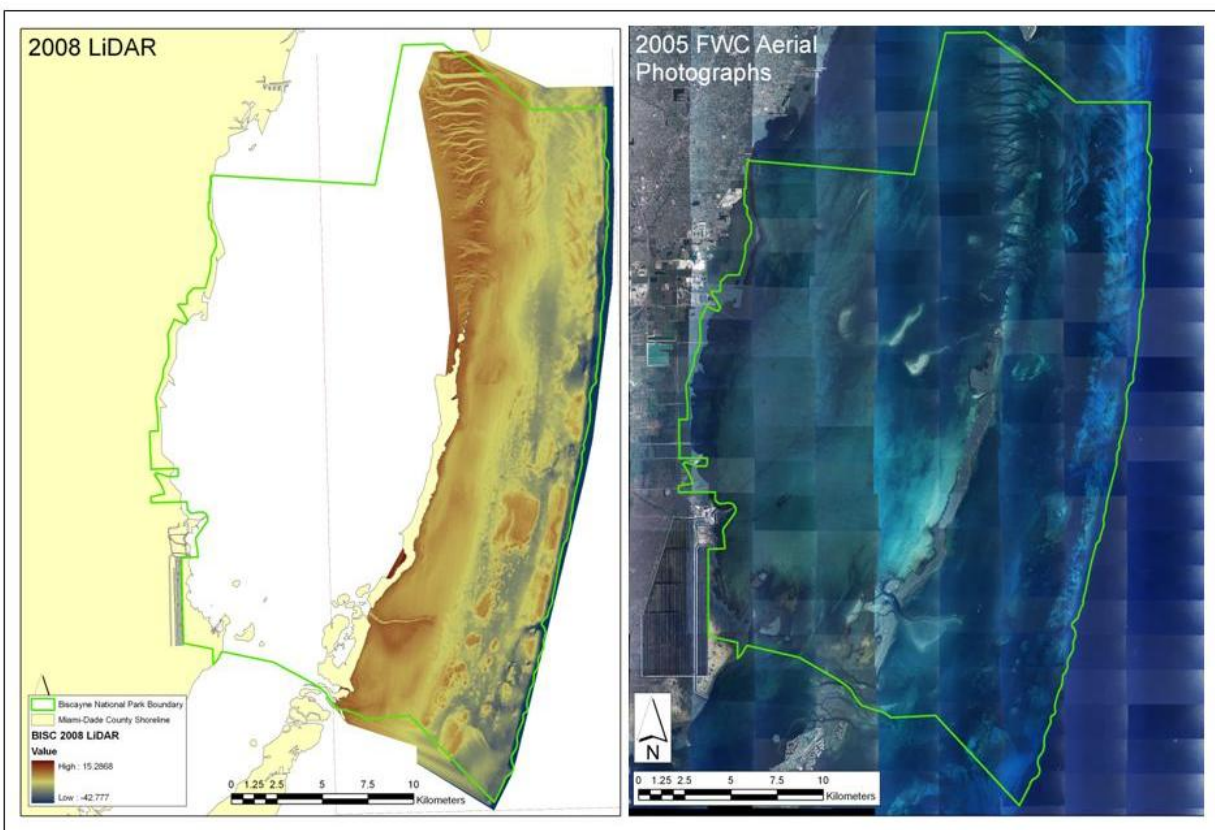
2010 Benthic Habitat Map of Dry Tortugas National Park.

Biscayne National Park Benthic Habitat Map

Project Overview: SFCN in partnership with the Florida Fish and Wildlife Research Institute contracted Avineon, Inc. to conduct photointerpretation of aerial photography (1 ft resolution) collected in 2005 for the seaward portion of Biscayne National Park. The first draft of the benthic habitat map was delivered in October 2008 followed by a 288 point accuracy assessment by SFCN staff.

Project Status: SFCN staff completed the accuracy assessment of the Avineon draft in March of 2009 for the offshore portion of Biscayne National Park. SFCN staff visited 288 randomly selected accuracy assessment sites as well as 17 non-random sites selected by Avineon. Habitats were evaluated *in-situ* using underwater video camera surveys, snorkeler surveys, and SCUBA surveys. The map possessed an 80.7% acceptable accuracy when classifying habitats into broad categories and with 33.2% of points with a 100% match. The calculated accuracy of the map was 75.5% at the lower 90% confidence interval.

LiDAR data were collected for the same region in December of 2008 with a first draft delivered at the end of January 2009. The final deliverable has 3 m horizontal resolution and 10 cm vertical (depth) resolution.

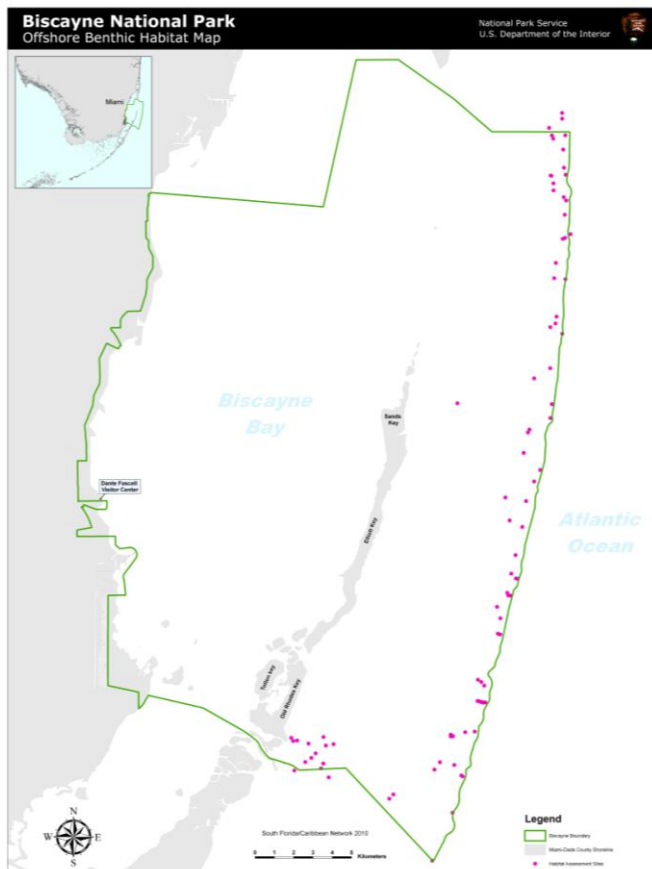


The primary datasets used for revising the BISC benthic map. Left: 2008 LiDAR and Right: 30cm Aerial photos.

Thus, in the beginning of FY10, the SFCN began revisions to the BISC benthic map. The LiDAR data and the 30cm aerial photography served as the primary data sources used to make

revisions to Avineon's draft of the BISC benthic map. Secondary datasets used for revisions included site-specific habitat data collected during following monitoring efforts in BISC: Rapid Habitat Assessments, Reef Visual Censuses, and Accuracy Assessment sites. Additionally, SFCN staff visited 83 non-random sites to conduct habitat classifications in order to better characterize common signatures in the LiDAR and aerial imagery.

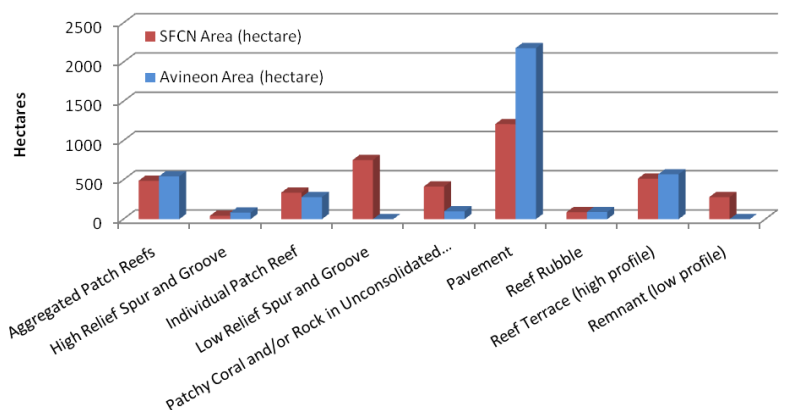
The previous classification scheme was NOAA's Coral Reef Conservation Program's (CRCP) Classification Scheme for Mapping the Shallow-water Coral Ecosystems of Southern Florida



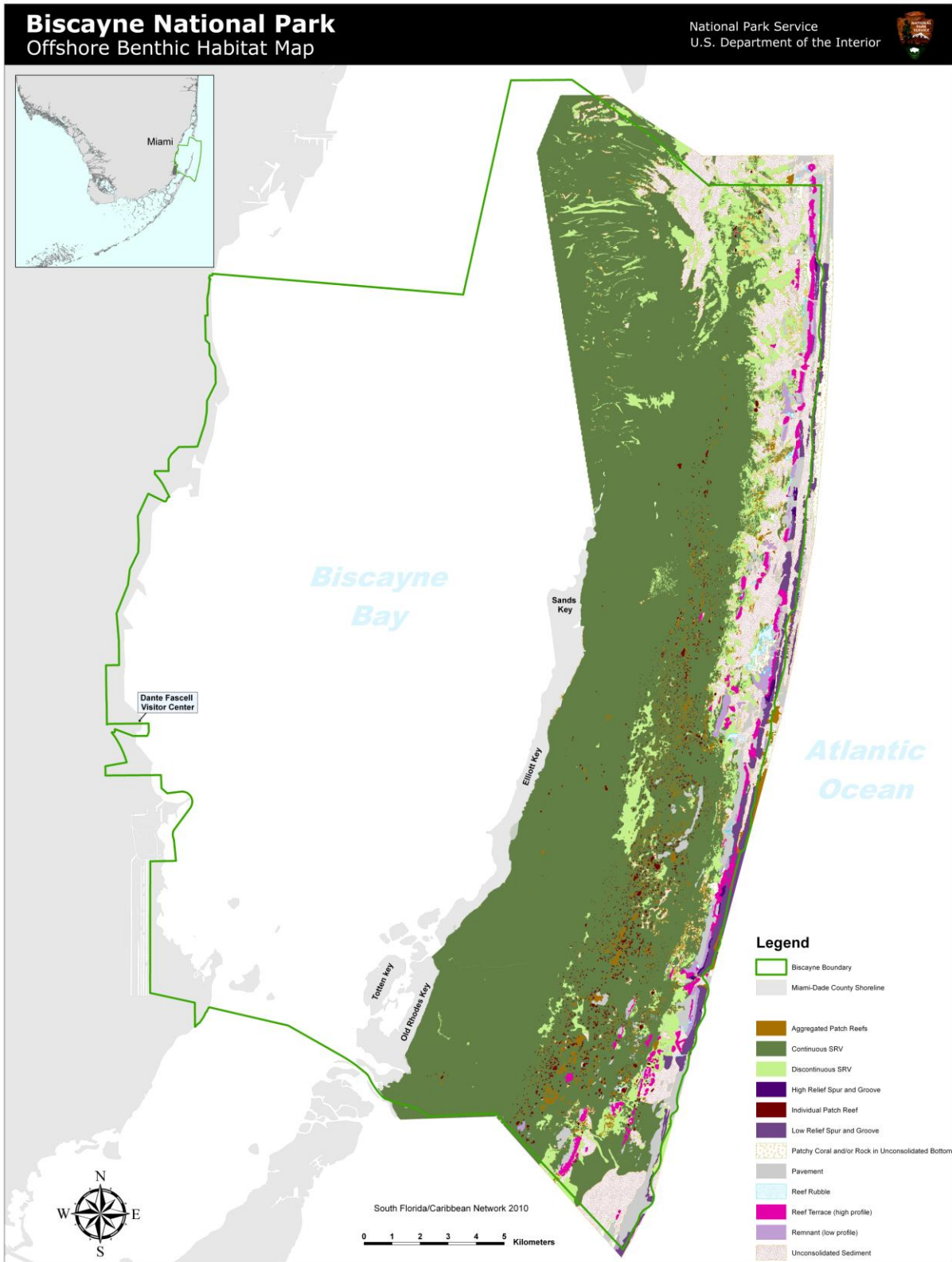
Map of BISC displaying the 83 non-random habitat classification sites SFCN visited in FY10.

Version 3.2. A new habitat classification scheme was adopted in FY10. SFCN migrated to Madley et al. 2002 "A System for Classification of Habitats in Estuarine and Marine Environments (SCHEME) for Florida" as it was directly cross-walkable to the NOAA classification but also provided sub-habitat categories that were desirable in the BISC and DRT0 benthic maps.

SFCN completed the revision of the hard bottom habitats in June of FY10. 1267 modifications were made to the Avineon draft. Changes in total area for each habitat class can be viewed in the chart below. Dramatic increases in the low relief spur and groove and remnant (low profile) classes seem exaggerated because these habitat classes did not exist in the old classification scheme. Soft bottom revisions are currently taking place with 350 out of 2715 polygons remaining. SFCN plans to publish the mapping report for the BISC benthic map in FY11.



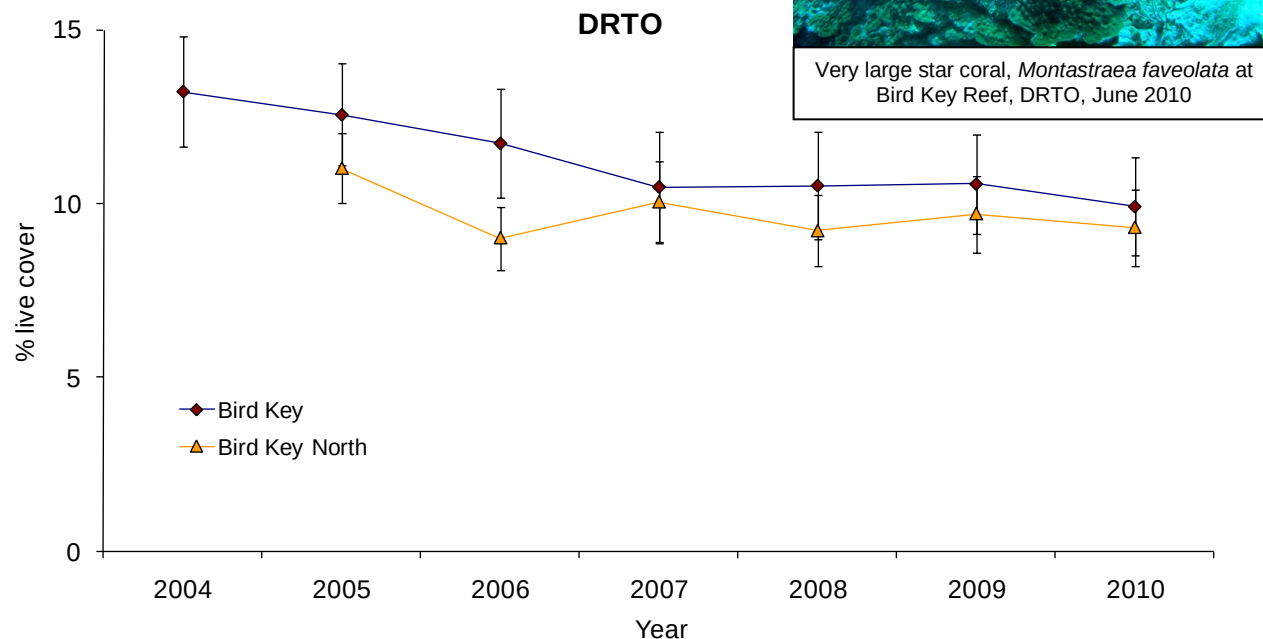
Revision results expressed as changes in total area of each habitat class.



2010 Benthic Habitat Map of Biscayne National Park.

Vital Signs Monitoring

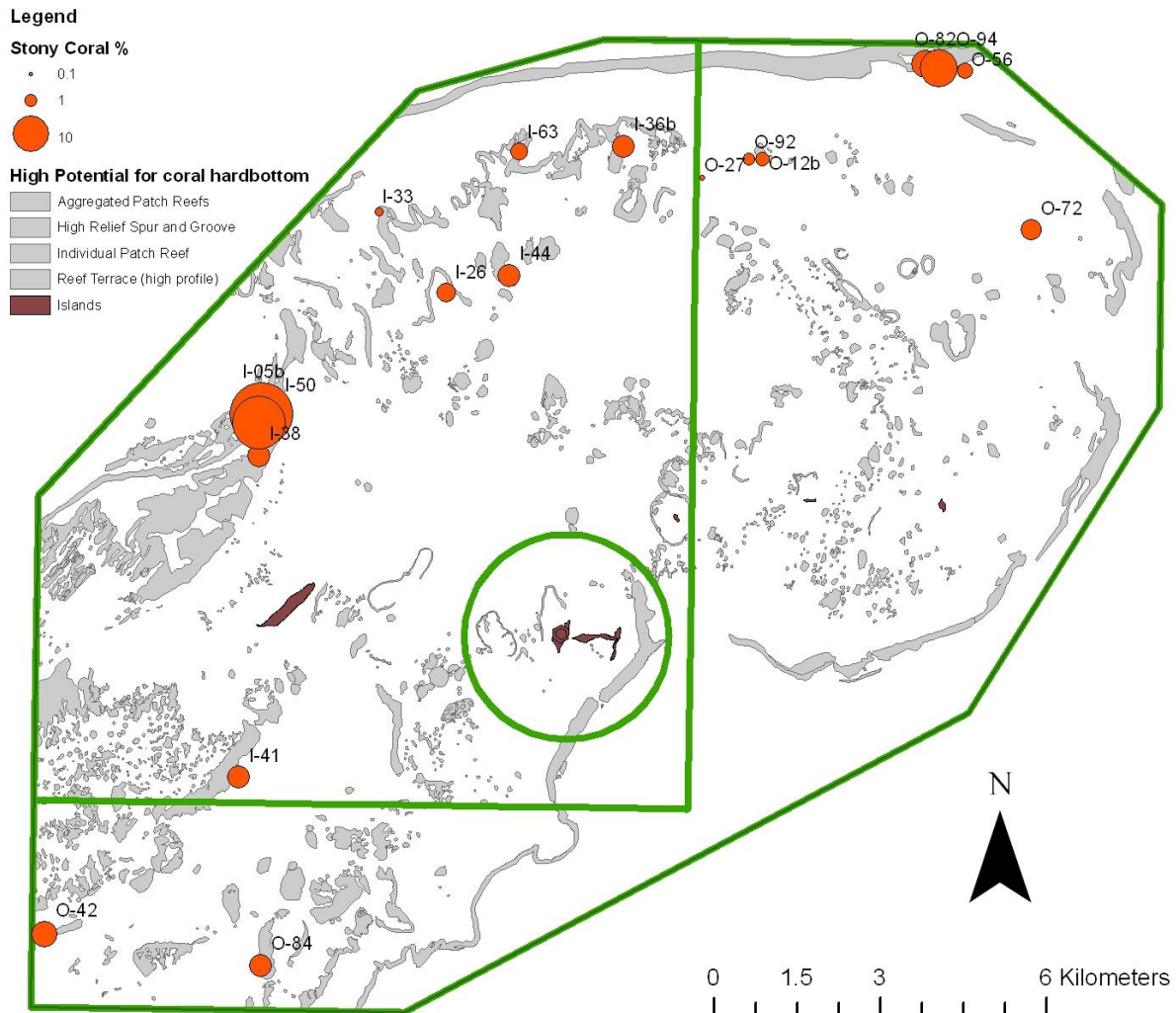
Marine Benthic Communities Vital Sign Dry Tortugas National Park (DRT0)



Trends in live stony coral cover at Bird Key and Bird Key North Reefs, DRT0

Accomplished in FY10: SFCN staff visited and monitored the 18 extensive sites for coral reef monitoring, installed in FY 08 (9 sites inside and 9 outside of the newly established Research Natural Area [RNA] (Table 2)). Data were collected using the Benthic Community protocol which includes the High Definition video for benthic component cover (analysis pending), *Diadema antillarum* abundance, coral disease presence/type and measurements, and reef-depth water temperature co-located at each sample site. SFCN staff concurrently conducted annual coral reef index site monitoring, (protocols and data collected as listed above) at the Bird Key and Bird Key North Reefs (analysis complete and included within this report). These index sites now include six and seven years of data.

Coral tissue samples were collected at Dry Tortugas by SFCN staff as part of the MS Canyon 252 Deepwater Horizon oil spill response. This is described in greater detail in the Water Quality Monitoring section “Contaminants – MS Canyon 252 Baseline Oil Assessment” on page 72.



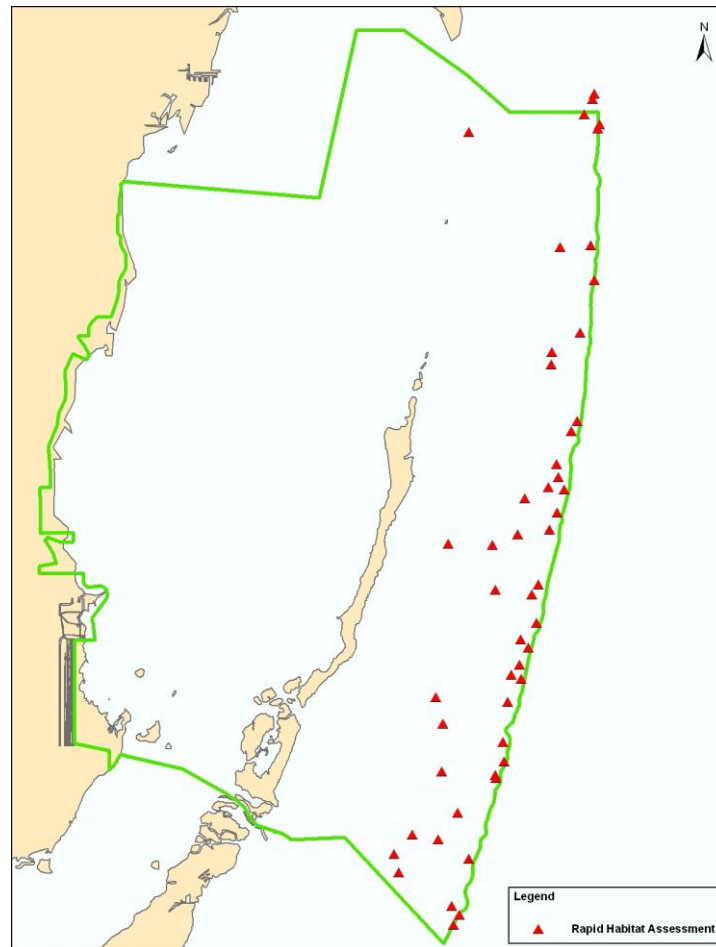
Average percent stony coral coverage from 2008 and 2009 Dry Tortugas extensive site surveys relative to benthos identified as high potential for coral habitat.

Continuation in FY11: SFCN staff will evaluate year 3 coral community data from the extensive sites. Specifically, we will examine levels of variation to determine if sufficient power exists to detect changes over time and differences between RNA and non-RNA areas of the park. Also, SFCN will evaluate including additional well-developed hard-bottom reef communities recently identified into existing sample domain, modifying sampling allocation as practical. SFCN staff will conduct annual sampling of both index and extensive sites throughout the park.

Table 2. Average percent cover from 2008 and 2009 for Dry Tortugas extensive sites by major category.

	SITE	% Stony Coral	% Gorgonians (soft coral)	% Sponge	% Coralline Algae	% Turf Algae	% Macro Algae	% Bare Substrate	In "High Potential" Zone?
Inside RNA	I-05b	30.9	2.6	2.2	1.7	17.1	43.7	1.2	Y
	I-50	22.0	2.7	1.6	2.3	16.0	41.4	13.8	Y
	I-38	3.9	3.4	1.7	3.7	22.9	52.4	11.5	Y
	I-44	3.9	6.4	4.6	2.5	19.6	49.8	11.0	Y
	I-36b	3.6	3.8	2.2	1.7	30.3	37.5	19.6	Y
	I-41	3.6	21.9	5.9	1.8	27.9	33.2	4.8	Y
	I-26	2.4	21.6	0.1	1.5	20.1	45.1	7.1	N
	I-63	2.3	8.2	3.2	3.2	19.9	52.7	8.7	Y
	I-33	0.4	5.2	2.3	0.6	12.9	59.1	18.7	Y
Outside RNA	O-94	10.7	3.7	1.2	1.8	25.8	40.3	12.9	Y
	O-82	5.9	0.6	1.3	3.3	21.8	48.3	17.2	Y
	O-42	4.9	4.1	6.0	1.4	20.0	52.4	9.3	Y
	O-84	3.9	5.8	4.8	1.4	23.6	45.1	14.6	Y
	O-72	3.3	3.7	0.1	1.2	29.1	47.8	14.1	N
	O-56	1.6	4.8	1.9	2.4	20.8	54.4	12.4	N
	O-12b	1.4	23.6	1.3	0.2	20.6	42.5	9.1	Y
	O-92	1.0	18.5	1.0	0.5	31.5	42.4	3.6	N
	O-27	0.2	14.1	0.4	1.2	19.1	42.9	21.5	N
Avg. Inside RNA Sites		8.1	8.4	2.6	2.1	20.7	46.1	10.7	8
Avg. Outside RNA sites		3.6	8.8	2.0	1.5	23.6	46.2	12.7	5
Avg. All sites		5.9	8.6	2.3	1.8	22.2	46.2	11.7	13

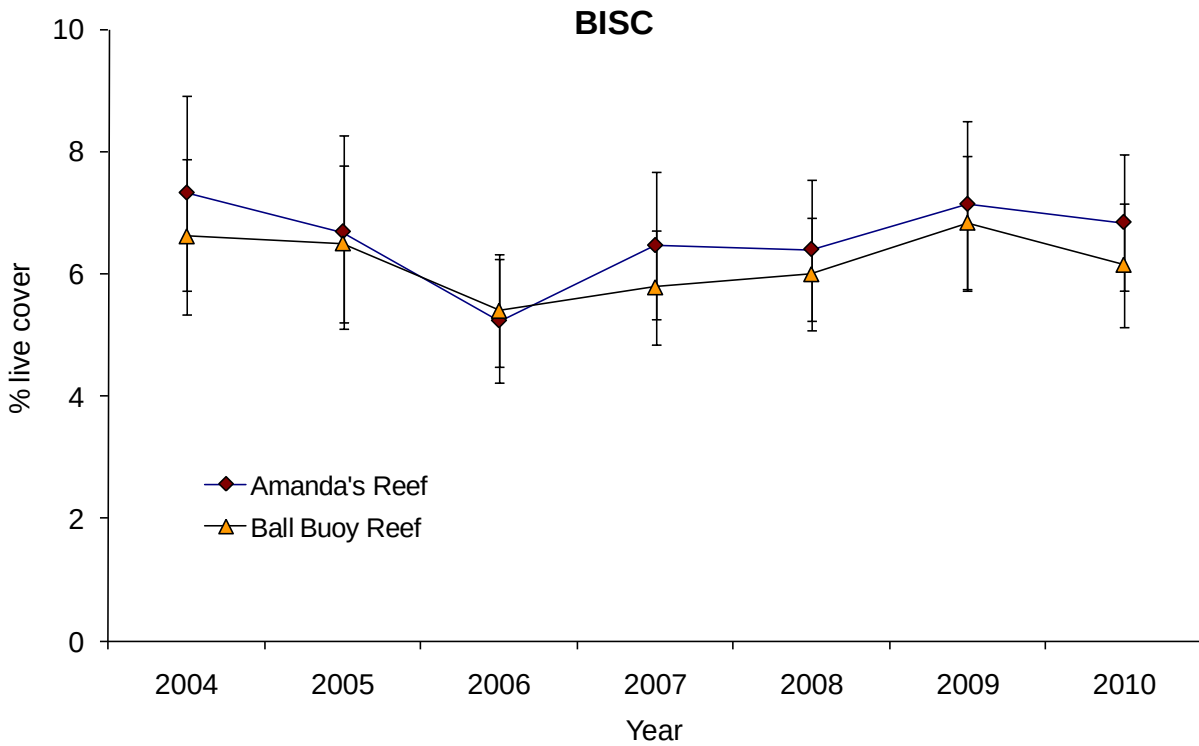
Biscayne National Park BISC



Rapid Habitat Assessment sites in Biscayne National Park

Accomplished in FY10: SFCN staff conducted annual coral reef community monitoring of index sites at Ball Buoy Reef and Amanda's Reef, both of which now include 7 years of data. Data were collected using the Benthic Community protocol which includes the HD video for benthic component cover, *Diadema antillarum* abundance, coral disease presence/type and measurements, and reef-depth water temperature co-located at each sample site.

Continuation in FY11: SFCN will expand upon our coral reef monitoring efforts in FY11. Exact sample sizes will depend on levels of variation in the evaluation RHA data along with multiple benthic data sources (e.g.: accuracy assessment data and data from fish habitat characterizations). SFCN staff will also conduct annual coral reef index site monitoring.



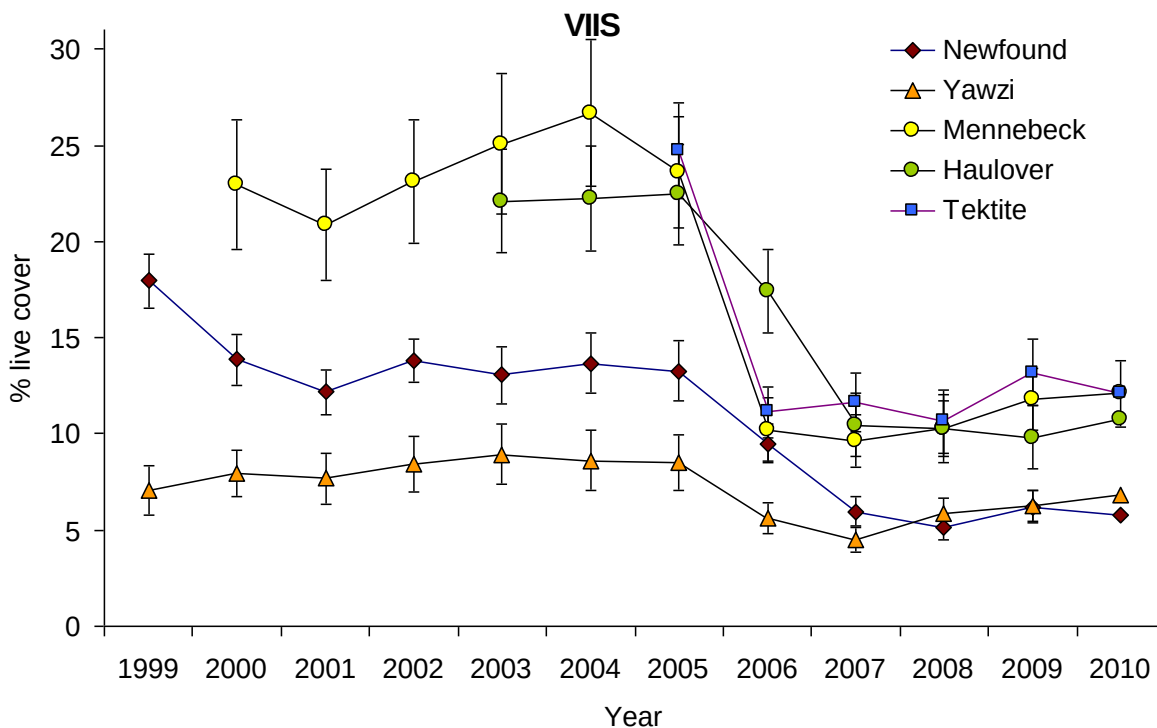
Trends in live stony coral cover at Ball Buoy Reef and Amanda's Reef, BISC



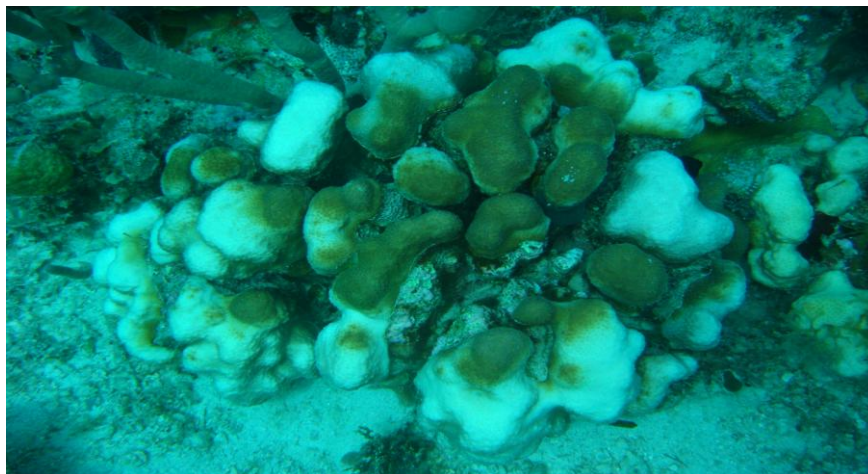
Caribbean Yellow Band Disease lesion on star coral colony, *Montastraea complex*, at W. Spur & Groove Reef, BUIS.

Virgin Islands National Park (VIIS)

Accomplished in FY10: SFCN staff conducted annual coral reef index site monitoring in VIIS (Tektite Reef, Haulover Reef, Yawzi Reef, Mennebeck Reef, and Newfound Reef). Data were collected using the Benthic Community protocol which includes the HD video for benthic component cover, *Diadema antillarum* abundance, coral disease presence/type and measurements, and reef-depth water temperature co-located at each sample site. The sites in VIIS have between 6-12 years of data.



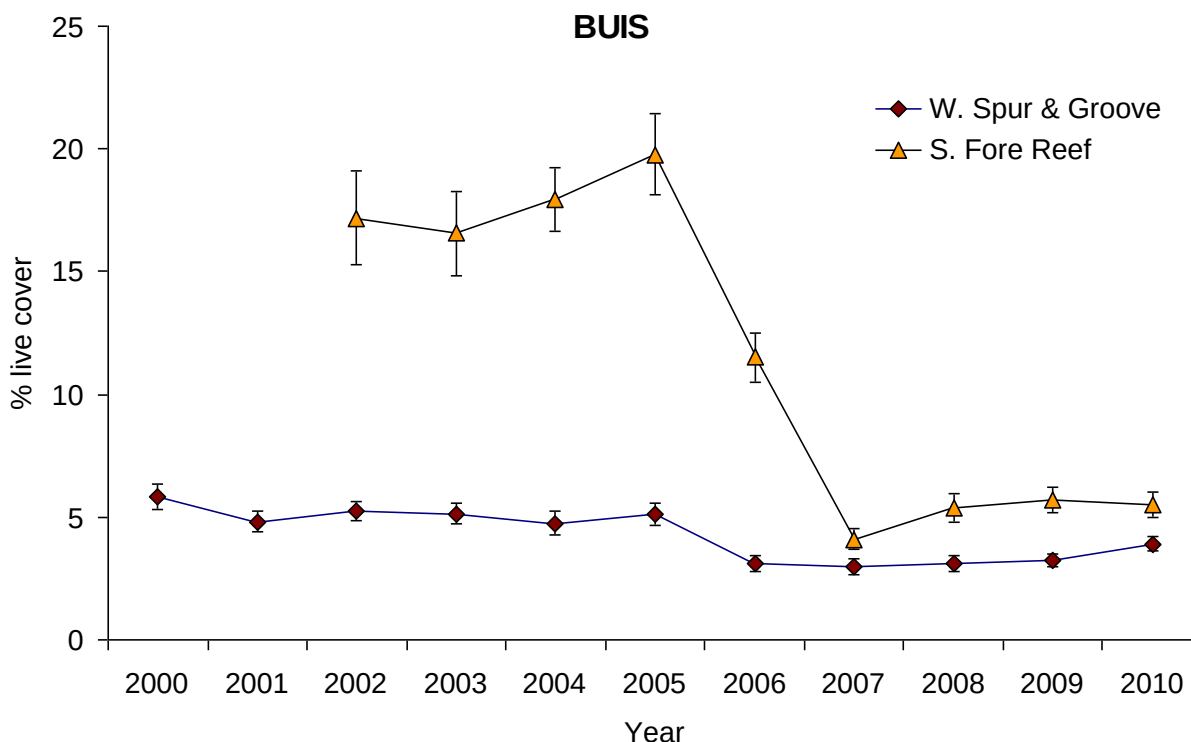
Trends in live stony coral cover at index sites throughout VIIS



Variety of bleaching conditions found within one coral colony of star coral, *Montastraea annularis*, found in Mennbeck Reef, VIIS.

Buck Island Reef National Monument (BUIIS)

Accomplished in FY10: SFCN staff conducted annual coral reef index site monitoring in BUIIS (South Fore Reef and Western Spur and Groove). Data were collected using the Benthic Community protocol which includes the HD video for benthic component cover, *Diadema antillarum* abundance, coral disease presence/type and measurements, and reef-depth water temperature co-located at each sample site. The BUIIS sites have 9 and 11 years of sampling data.



Trends in live stony coral cover at Western Spur and Groove and South Fore Reefs, BUIIS

Virgin Islands coral bleaching event: Reef-depth water temperatures in the Virgin Islands have been at or above normal since October 2009 (See the water temperature graphs and discussion in the "Water Quality Monitoring section Marine Benthic Communities – Coral Reef Water Temperature" (page 75). First signs of coral bleaching were observed in May 2010. Water temperatures in August and September were above the bleaching threshold for corals (~29.5°C), which triggered episodic benthic monitoring of index sites in the Virgin Islands. SFCN scientists were able to film, and evaluate disease conditions at all index sites during September and October 2010. Full analysis is pending; however sites where results are available are listed in Table 3. No outbreaks of coral disease had been observed at these sites as of these samplings. Episodic monitoring is planned to continue depending upon disease conditions observed.

Continuation in FY11: SFCN will conduct annual coral reef index site monitoring at sites in VIIS and BUIIS.

Table 3: Coral cover / bleaching monitoring status and results for US VI Parks in 2010 compared with 2005. Relative percent of bleaching levels means of the coral that was bleached, the percent that was

bleached to what level. Level 5 (BL5) is minimal discoloration. Level 1 (BL1) is completely white. In 2005 most of the bleaching in 2005 was level 1 and 2, whereas in 2010, most are Level 3, 4, and 5. So the 2010 bleaching event has not been as severe as the 2005 event.

2010 bleaching event has not been as severe as the 2005 event.															
		2005							2010						
		% coral cover (se)	% coral cover bleached (se)	bleaching level, relative percent					% coral cover (se)	% coral cover bleached (se)	bleaching level, relative percent				
Park	Site			BL1	BL2	BL3	BL4	BL5			BL1	BL2	BL3	BL4	BL5
VIIS	YZ	8.5 (1.4)	71.2 (5.2)	not analyzed for bleaching level					6.8 (0.9)	61.9 (5.1)	1.3	11.1	30.9	34.4	22.4
VIIS	TK	24.7 (2.5)	90.9 (1.9)	51.7	28.9	7.7	1.6	0.0	12.1 (1.7)	62.1 (4.5)	6.3	21.1	26.8	26.3	19.5
VIIS	MB	23.6 (2.9)	93.7 (1.4)	54.3	34.0	7.4	1.4	0.0	12.1 (1.8)	54.8 (4.6)	5.3	29.7	30.2	20.7	14.1
VIIS	HA	21.0 (2.6)	97.0 (1.4)	43.4	49.4	5.3	1.9	0.0	11.5 (1.9)	68.0 (4.2)	8.8	28.5	32.7	23.2	6.7
VIIS	NF	11.7 (1.3)	94.5 (1.6)	44.5	41.1	8.8	4.8	0.0	analysis pending						
BUIS	WSG	not sampled during bleaching event							3.9 (0.3)	15.1 (4.6)	3.7	12.1	25.5	25.6	33.0
BUIS	SFR	15.7 (1.4)	95.7 (0.8)	58.1	32.1	6.6	2.0	0.0	analysis pending						

Data Management, Reporting, and Protocol development

Accomplished in FY10: A comprehensive reporting strategy was outlined but will largely be fleshed out and implemented in FY11.

The coral database was modified to provide reporting for extensive sites. The coral disease database was modified to include a transect species list.

The coral colony counts per transect SOP was modified and written. Rugosity measures were added to the coral species counts per transect SOP. A SOP for the 10% QA/QC check was developed.

Continuation in FY11: A comprehensive reporting strategy for coral monitoring index sites and extensive sites will be drafted and implemented. Additional automated reporting will be added into the coral database and automated reporting will be developed for coral disease and *Diadema* to support these reports. Annual data summaries and resource briefs will be created and delivered to the parks. A multi-park comprehensive analysis report will at least be started and hopefully completed.

To assist QA/QC the video analyst will be added to the coral database to ensure analyst/videographer discrepancies can be identified. Reporting of single transects will be added.

The Coral Reef Monitoring Protocol will be updated and revised as follows: Sections on analysis, reporting and extensive sites monitoring will be added to the *Coral Reef Monitoring Protocol*. The coral disease SOP will be updated to reflect changes made after testing the SOP in DRTO and SOPs on Coral Colony Counts and Species Counts will be added. A description of the transition to High Definition video from existing digital video in the field will be added.

A comparison will be made among species counts from the field method, video method, and from the original video dotting and a decision made on which procedure to use and the SOP finalized.

Sampling design for the extensive sites in DRTO and BISC will be revisited as initial video transect data results for the extensive sites in DRTO had lower coral cover estimates than the Rapid Habitat Assessment results indicated. As a result the Rapid Habitat Assessment Protocol

has been revised for use in BISC by doubling the number of sampling points and crews must completely lay out tapes and tie them off before data collection can proceed to reduce possibility of bias.

Marine Benthic Communities – Seagrass and Conch

Initiated in FY10: SFCN obtained copies of seagrass protocols and conch protocols currently in use in the Florida Keys National Marine Sanctuary, Florida Bay, and the U.S. Virgin Islands and will conduct pilot work to test protocols and determine the level of effort involved in order to provide information to evaluate feasibilities of different sampling designs within park priorities and SFCN workload. However the protocol/SOPs will be drafted in FY 2011.

Two seagrass protocols are currently being studied by SFCN for acceptance/modification. One protocol currently in use in the Florida Keys National Marine Sanctuary (FKNMS) uses the Braun-Blanquet method to perform seagrass surveys. Variations of this method are being used to collect seagrass data in Biscayne National Park (BISC), Everglades National Park (EVER), and Dry Tortugas National Park (DRTO). Using this method would enable direct comparison of data between SFCN parks in Florida as well as with the FKNMS, thus complementing existing monitoring efforts already established in these areas. Another protocol developed by Virgin Islands National Park (VIIS) and Jacksonville University, and historically implemented in St. John, U.S. Virgin Islands (USVI), uses a short shoot count survey method. The method most effective for use in the USVI parks shall be determined in consultation with the VIIS, Buck Island Reef National Monument (BUIS) and Salt River Bay National Historical Park and Ecological Preserve (SARI) resource management teams.

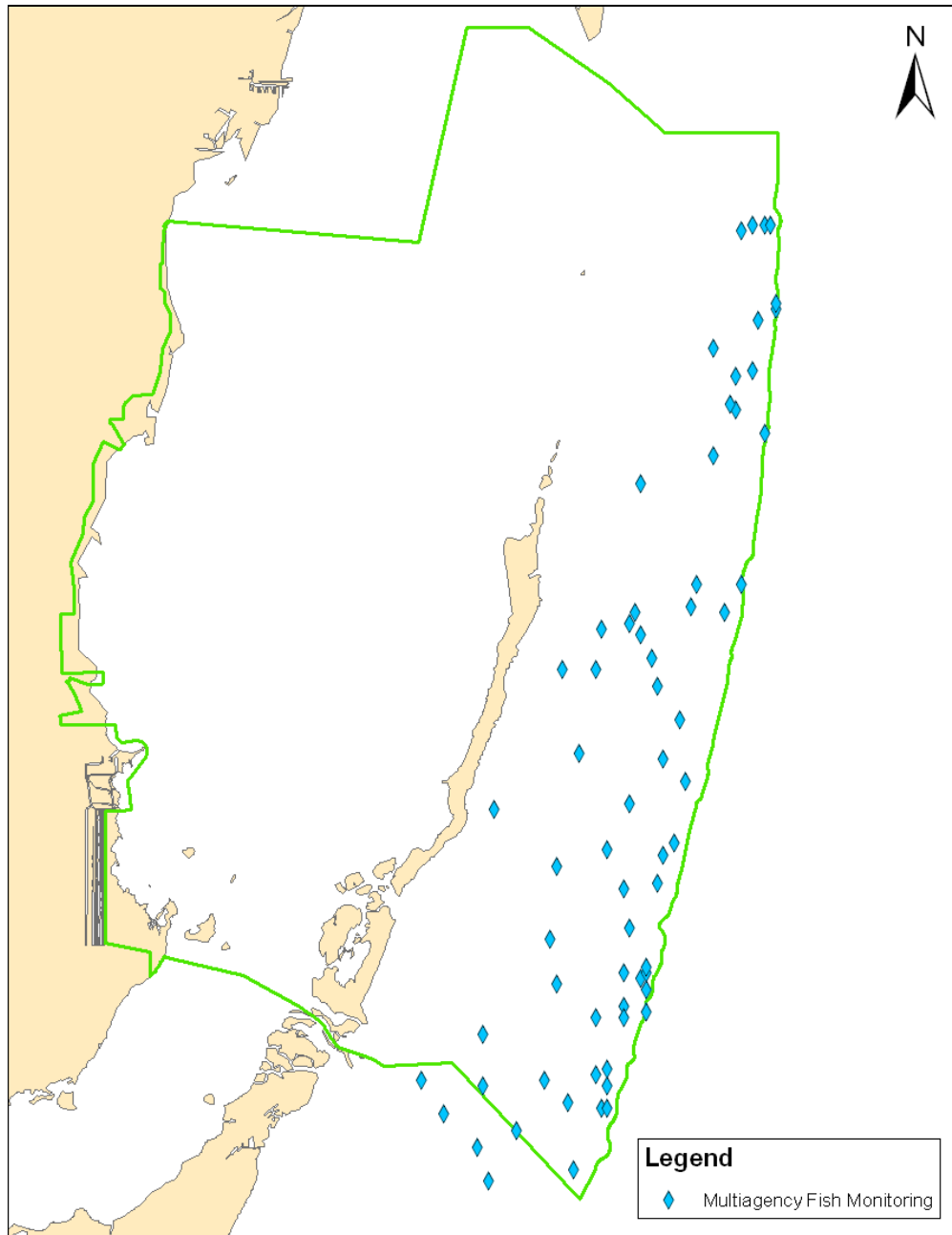
In an effort to increase effectiveness and efficiency of the vital sign program within SFCN, the network shall evaluate the feasibility of performing queen conch (*Strombus gigas*) surveys in conjunction with the seagrass method. This species is listed under the vital sign “Marine Exploited Invertebrates”, thus incorporating this survey as a standard operating procedure (SOP) in the seagrass protocol can provide a significant added-value benefit to the vital sign program. The additional effort is relatively minimal while no significant added resources may be necessary. The results of such data not only may fulfill the needs of the vital sign for this species, but the information will also enrich the seagrass data collected. SFCN shall attempt to prepare a seagrass protocol for submission in FY 2011 and implementation by 2012.

Marine Fish Communities Vital Sign

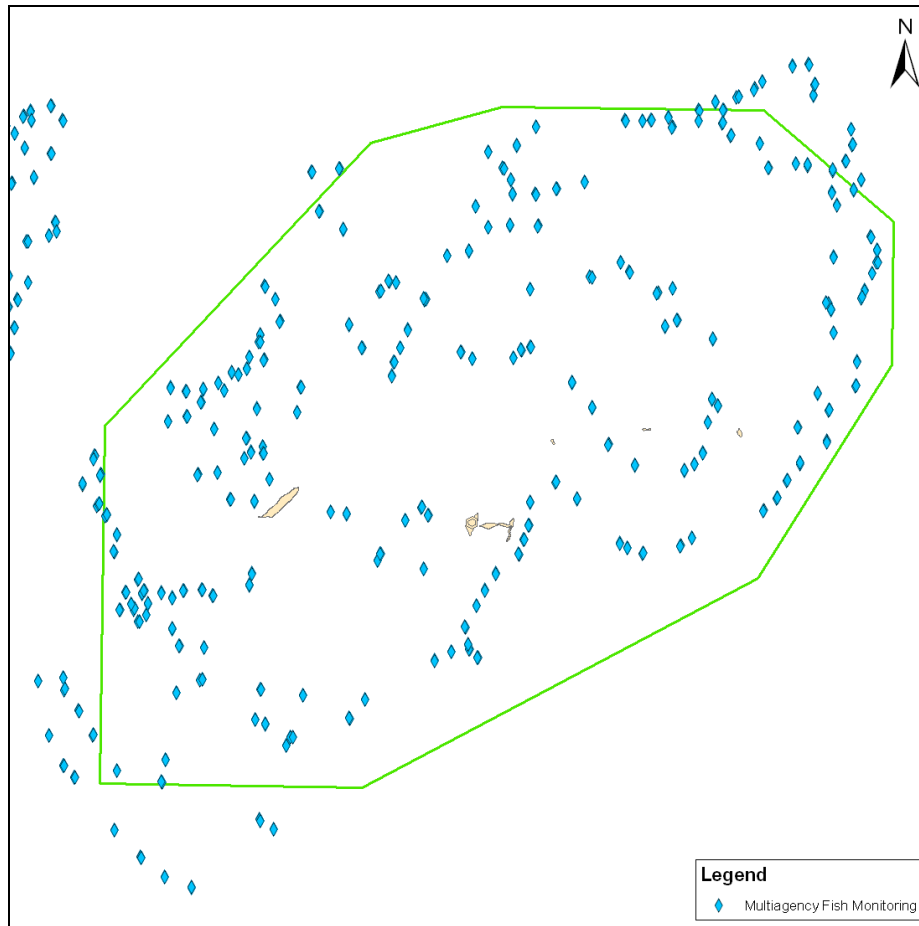
Accomplished in FY10: In March 2010, SFCN Marine Biologist Rob Waara, met with colleagues from NOAA, UM-RSMAS and FWRI on the reef fish visual census (RVC) monitoring program. Participants at the meeting agreed on logistics and sampling survey allocations for BISC, DRTO and the Florida Keys National Marine Sanctuary (FKNMS) for the 2010 season.

In June 2010, SFCN staff participated with staff from FWRI, NOAA, and UM-RSMAS on a 10 day reef fish monitoring cruise in DRTO. This cruise was part of a 20 day DRTO interagency regularly scheduled research mission. These cruises survey the Dry Tortugas every other year by stratified random sampling design and consist of two 10-day cruises to all three bank formations. Three SCFN staff members participated on the second leg of the mission.

After the completion of the 10-day cruise, SFCN staff in conjunction with BISC staff began reef fish surveys for BISC in September 2010.



Multiagency Fish Monitoring Sites in Biscayne National Park
Total Sites monitored: 66; Total sites monitored by SFCN: 54
(each site consists of 2 sub-sites)



Multiagency Fish Monitoring Sites in Dry Tortugas National Park
Total Sites monitored: 191 (each site consists of 2 sub-sites)

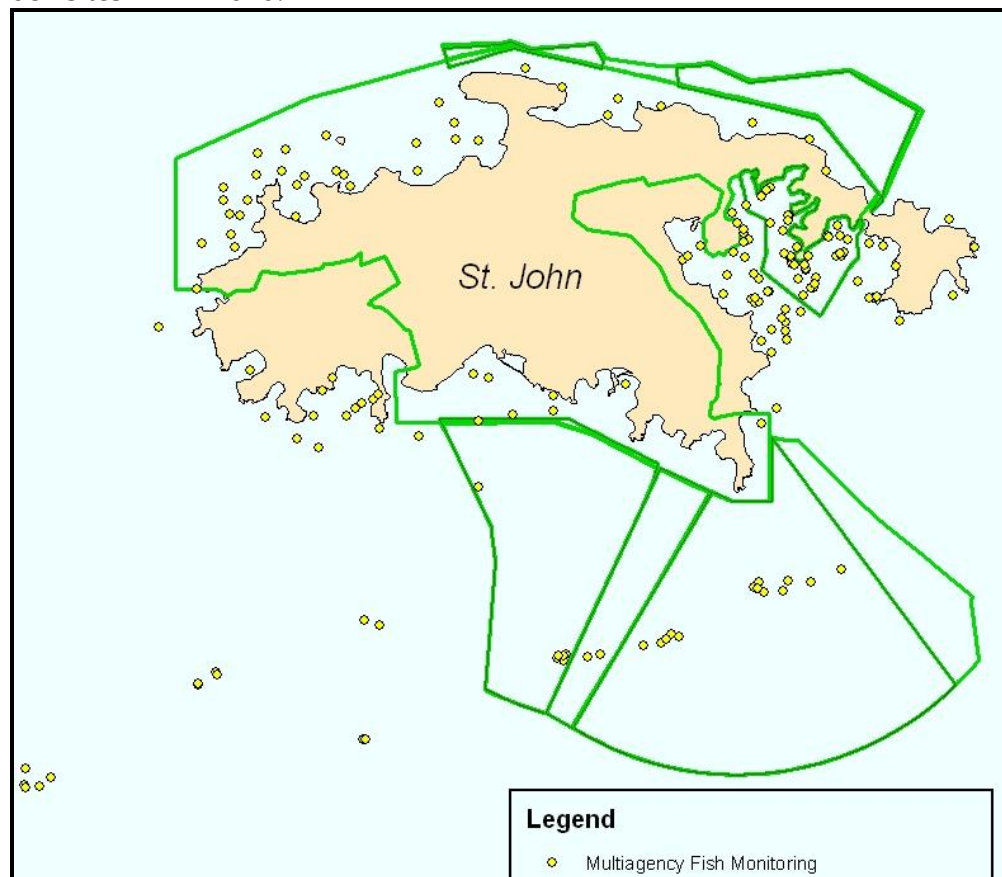


Diver performing an RVC assessment in DRTN.

In the U.S. Virgin Islands parks, the pilot study to co-locate surveys of fish assemblage along the benthic video transects at the index sites at VIIS and BUIS continued. Beginning in January 2010 and all sites sampled thereafter, transect selection changed from a fish survey on each 20x10 meter video transects, to surveying 12 of the 20 transects but expanding the transects to 25 meters.

SFCN scientists partnered with NOAA Biogeography and NPS resource managers at BUIS and VIIS during three two-week missions designed to inventory, characterize and monitor fish and fish-associated communities around St. John and Buck Island Reef National Monument. Missions in BUIS took place in October/November 2009 and sampled 122 locations. Sampling around St. John took place in July 2010 at 170 locations. At each sample location, the fish assemblage characterizations are co-located with estimates of benthic cover along a 25 meter transect.

In the U.S. Virgin Islands parks, the pilot study to co-locate surveys of fish assemblage along the benthic video transects at the index sites at VIIS and BUIS continued. Beginning in January 2009 and all Virgin Islands index sites sampled thereafter, transect selection changed from a fish survey on each 20x10 meter video transect, to surveying 12 of the 20 transects but expanding the transects to 25 meters. These co-located (fish and benthic) surveys were conducted for all Virgin Islands index sites in FY 2010.

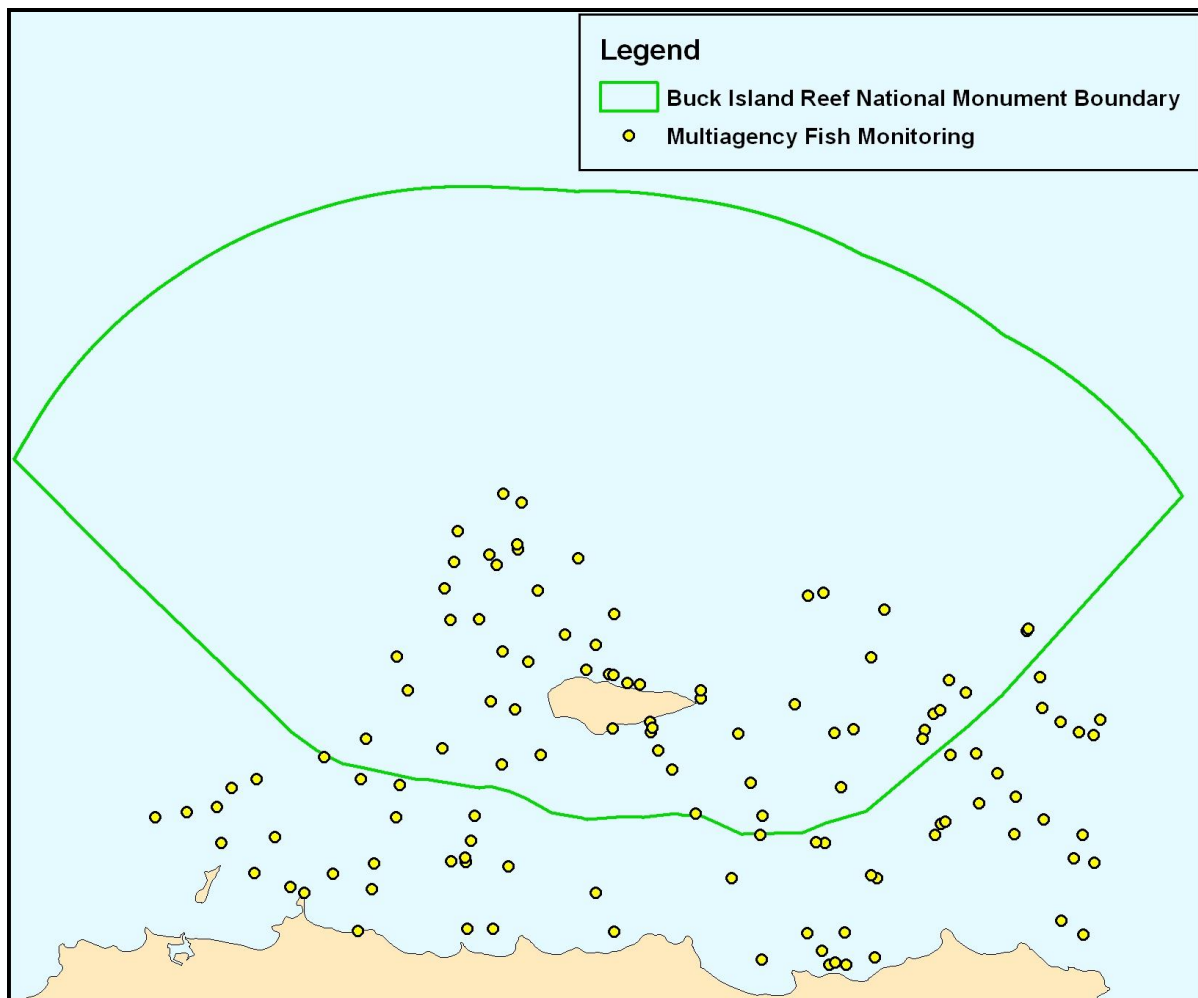


Multiagency Fish Monitoring Sites in Virgin Islands National Park and Coral Reef National Monument. Total sites monitored: 170

In VIIS, SFCN conducted annual monitoring of adult fish at four index sites (HA, MB, TK, NF) in partnership with USGS scientist, Alan Friedlander. This is the 22nd year of collaborative annual sampling with this project. Additionally, SFCN conducted annual survey of juvenile fish along 25x4m belt transects at the same four index sites at VIIS. Similar surveys had been conducted for juvenile fish annually from 1997-2005.

Marilyn Brandt left her post-doc through the University of Miami-RSMAS program in January 2010.

Continuation in FY11: Dr. Brandt has drafted a manuscript on the reef fish monitoring collaboration and submitted it for publication. The future Marine Fisheries Science Post-Doc Associate will continue to develop the cooperative protocol for monitoring reef fish communities in the U.S. Virgin Islands. In support of this effort, the Marine Post-Doc may participate in reef fish monitoring in St. John in 2011 in conjunction with the NOAA Biogeography team.



Multiagency Fish Monitoring Sites in Buck Island Reef National Monument
Total Sites monitored: 122

Adult and juvenile surveys will continue in FY11. In DRTO, reef fish communities will be sampled in conjunction with UM-RSMAS, NOAA and FWRI on a 10-day cruise in June 2011. This cruise is scheduled to provide additional data that will be submitted for a five-year assessment report on the establishment of the Research Natural Area (RNA) within DRTO due in the spring of 2012. SFCN staff will continue to collaborate with BISC and NOAA to conduct reef fish monitoring in BISC during 2011 in conjunction with FKNMS surveys. SFCN will continue co-locating fish surveys on benthic video transects at the index sites within VIIS and BUIS and will continue to partner with the NOAA Biogeography group during fish and benthic habitat characterization missions in BUIS and VIIS.

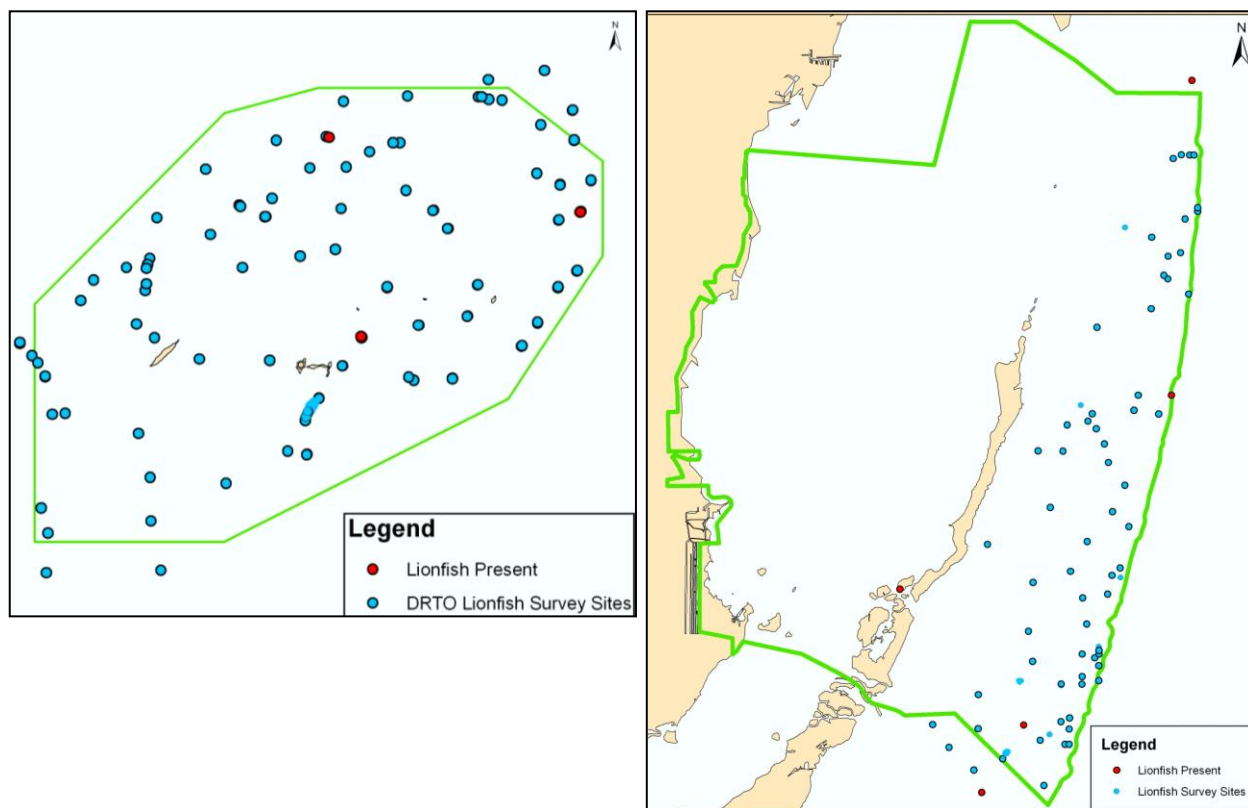
Other Projects

Searching for Lionfish project

Lionfish (*Pterois volitans/miles*), the first successful invasive marine reef fish species, are quickly overtaking the Western Atlantic. These venomous fish feed on anything and have been found to especially target juvenile grunts, snapper, and grouper. Lindsay Jones was hired on as a Student Conservation Association Intern to survey for lionfish in South Florida parks and to remove any fish that were discovered. Lionfish surveys accompanied Rapid Habitat Assessments (RHA), Reef fish Visual Censuses (RVC) and Coral Monitoring surveys in order to begin immediate monitoring in BISC, DRTO, VIIS/VICR and BUIS in FY09. A 40m by 10m belt transect was conducted by divers swimming with a dive light checking the reef and cryptic habitat. Zero lionfish were encountered in 2009, however, the number of lionfish sightings significantly increased at the start of the 2010 calendar year.

Reports came in rapidly from local sport divers and spear-fishers. In response, an educational pamphlet was made to provide information on the biology, negative ecological influences, and danger of lionfish to the public. Search and recovery trips were taken to sites where lionfish had been reported and we worked with local spear-fishers to analyze specimens that they had collected and try to combine collection efforts. Lindsay gave a webinar put on by the Water Resources Division of the NPS to describe our lionfish survey methodology. We also coordinated with the USDA's National Invasive Species Program to create lionfish footage for an invasive species documentary series.

The 2010 field season was shortened by weather and the oil spill response, so lionfish were only surveyed for during the standard RVC surveys, Coral Monitoring and opportunistically by staying alert for the invasive species while doing any underwater work. This year 198 sites in DRTO were surveyed with 3 lionfish found there and 112 sites in BISC have been surveyed with 5 lionfish found. In addition, 1 lionfish was reported during monitoring of 5 coral monitoring index sites and 170 fish monitoring sites in and around VIIS/VICR and 2 coral monitoring sites and 122 fish monitoring sites in and around BUIS.



Above: 2010 Lionfish Monitoring sites in Biscayne National Park and Dry Tortugas National Park.
Below: SFCN developed a lionfish brochure for Biscayne National Park to educate the public and encourage reporting of sightings.

- Lionfish (*Pterois volitans/miles*) are the least toxic member of the Scorpaenidae family and are native to Indo-Pacific waters.
- Lionfish were most likely introduced into the Atlantic via the aquarium trade, i.e. aquarists releasing their lionfish into the wild.
- Lionfish feed on juvenile snapper, grouper, grunts, other juvenile reef fish and invertebrates.
- Native reef predators have been shown to avoid eating lionfish in the lab and few have been caught with lionfish in their stomachs.
- Lionfish are voracious predators. One specimen was collected with about 20 fish in its stomach.
- Mature female lionfish can reproduce multiple times per season, releasing 2-egg sacs, each with tens of thousands of eggs each time.

Lionfish populations in the Bahamas and the Carolinas are almost 15 times those in their native range. These huge numbers, combined with their high feeding rates, enable lionfish to decimate native reef fish populations, which decreases prey available to native predators. With fewer juvenile fish to grow into adults, not only will fisheries decline, so will the entire reef ecosystem.

IF YOU SEE A LIONFISH CONTACT
Vanessa McDonough: 305-250-1144 ext 027
Vanessa_McDonough@nps.gov
or
NPS SFCN @ 305 252 0947
AND PASS THE FOLLOWING INFORMATION ON

- Date and time
- Location and depth - note GPS coordinates if you can!
- Number and size of lionfish
- Habitat it was on: patch reef, rubble, sand, artificial structure, etc.
- Behavior of fish: feeding, hiding, hovering, swimming, etc.

Take pictures!

Old contents above and below are eating.

If possible, avoid handling or contacting lionfish. If you have removed a lionfish from the water, do not release it back into the ocean. We would like the body for analysis. Call us to arrange a drop-off/pick-up. If a fish transfer is not possible - please contact us to share the requested data.

DEFEND YOUR OCEAN!

REPORT LIONFISH SIGHTINGS AND SAVE THE ECOSYSTEM!

LIONFISH FACTS
Brought to you by
Biscayne National Park
and the National Park Service's
South Florida/Caribbean Network

LIONFISH CAN BE IDENTIFIED BY THEIR

Lionfish are most active at dawn and dusk, when they emerge from the shelter of the reef to hunt. Juveniles tend to congregate in small groups while adults are more solitary in nature. Lionfish protect themselves with venomous spines located on their dorsal, pelvic, and anal fins. Though they tend to hide within structure during the day, the lionfish captured in Biscayne National Park have been found resting in relatively plain view.

FIRST AID FOR LIONFISH STINGS

Lionfish have 16 venomous spines on their bodies. Highlighted in red, to the left are the 13 dorsal fin spines, 2 pelvic fin spines, and 3 anal fin spines you should watch out for. A sting can cause extreme pain, swelling, numbness, nausea, and even paralysis.

IF YOU ARE STUNG BY A LIONFISH:

- Immerse the wound in hot water around 103°F. DO NOT burn yourself! This will deactivate the venom and relieve the pain. If you are at sea, your best source of hot water may be the outflow of seawater cooling your engine.
- Get medical attention as soon as possible. You may have spine fragments in your skin or a serious reaction to the venom.

HOW YOU CAN HELP

Biscayne National Park is asking you to report all lionfish sightings. With the information you provide we can quickly respond and remove the lionfish from the site. Many successful eradication missions have already been carried out based on reports from local divers and fishers.

Lionfish are bold predators, capable of learning. Once a lionfish has dodged a spear, they become wary of divers and therefore, much harder to capture. Biscayne National Park recommends leaving the capture of lionfish to trained staff (the best method is finning them into a net).

Whether you end up with a lionfish on your hook or spear, or as the highlight of your dive, any data you pass on to us will be invaluable to keeping Biscayne National Park and the Atlantic free from this volatile predator.

PLEASE KEEP THIS PAMPHLET ON THE WATER WITH YOU AND REFER TO THE BACK PANEL IF YOU MEET ANY LIONFISH.

I.B Community Ecology Branch

Overview

The Community Ecology Branch made considerable progress on the planned vital signs while still progressing on four vegetation mapping projects. Additionally, participated in the 2010 Biscayne National Park BioBlitz and the MS Canyon 252 Deepwater Horizon oil spill response. The Community Ecology Branch spent 2,496.5 person hours in the field during FY10. Due to the remote access issues related to field work in the South Florida Parks, the Community Ecology Branch successfully and safely had 61.5 hours of helicopter flight time (15.3 hrs colonial bird monitoring, 4 hrs periphyton sampling, and 42.2 hrs vegetation map related). We would like to thank BICY Resource Management (RM) for paying for 4 hrs flight time for periphyton sampling, EVER RM for 1.5 hrs flight time and EVER Fire for 1.5 hrs flight time both in support of Everglades Vegetation mapping.

The Community Ecology Branch staff has experienced some changes this year. We hired a postdoctoral researcher (Timothy Fotinos) and another full-time Resource Management Intern (ReMI, Tiara Thanawastien). In addition we were awarded funding for three internship programs: Chicago Botanical Garden's Conservation and land Management Intern (Carolyn "Lara" Ariori), Everglades Foundation internship (Tiara Thanawastien) and George Melendez Wright Climate Change Intern (Carolina Cabal). In addition, the Community Ecology Branch has been pursuing funding and staffing options for work on the Everglades Vegetation Map with the U.S. Army Corps of Engineers and the NPS National Vegetation Mapping Program. Additional collaboration occurred with the USGS for contaminant sampling in BISC, non-native fishes monitoring with Dr. Jen Rehage (FIU), and a South Florida oil and mangrove study conducted by the United States Forest Service with Dr. Joseph O'Brien. Raul Urgelles successfully completed his Master's of Science in Biology at Florida International University.

Currently, the small and medium mammals inventory project is in the final report writing phase summarizing and analyzing the information related to this massive project. There was extensive database cleanup associated with this project which has delayed the completion; this extension in time has not required additional direct funding from the SFCN; however, data management staff has spent a considerable amount of time and effort in this process.

There are currently four vegetation mapping projects in progress (DRTO, SARI, EVER/BICY, VIIS), two of which have complete drafts that are being reviewed (DRTO, SARI). In addition, there are two vegetation map projects generally completed but in final stages of having final reports sent to the National Vegetation Map office for WASO level review and acceptance (BISC, western BICY) and one map project completed this year (BUIS). The two vegetation mapping projects requiring extensive effort is EVER/BICY and VIIS. EVER/BICY is a six year project in collaboration with the U.S. Army Corp of Engineers (ACOE) as part of Everglades Restoration. We are receiving funds through an interagency agreement for helicopter flight time, photointerpreter training, and other additional field data collection efforts as mapping shifts from the South Florida Water Management District to the ACOE in Jacksonville, FL. Additionally, the National Vegetation Mapping program of the NPS has provided \$180K in funding to help support network mapping projects. This funding will support staff time which is directly related to project management and field work related to these efforts. The VIIS map assessment and

modification will be continued in FY11.

Initial progress towards the monitoring of vital sign indicators has begun. We are still working on the development of the monitoring protocol for colonial nesting birds (Great White Heron, Great Egret, Double-crested Cormorant) in BISC by continuing with monthly helicopter bird nest monitoring flights.

Significant progress on a number of the vegetation vital signs was accomplished. With the guidance from the new vegetation post-doc, we have begun working on sampling design and writing a draft of the vegetation monitoring protocol for the Forest Ecotones and Community Structure and Mangrove-Marsh Ecotones and Community Structure Vital Signs. Last year we established and populated a geodatabase with previous historical vegetation work. A number of historical vegetation sampling plots have been located or are in the process of being located (BISC, BICY, EVER, DRT0). Four Gunderson plots in BICY, the Olmsted and Loope Coot Bay transect in EVER, and eight hurricane recovery plots of BISC were relocated and resampled this year. We have digitized 1980 vegetation map of the area between Flamingo and Joe Bay in Everglades National Park (EVER) by Ingrid Olmstead, Lloyd Loope and Robert Russell, and a 1982 vegetation map of the Turner River Road area of Big Cypress National Preserve (BICY) by Lance Gunderson, Lloyd Loope and William Maynard.

We installed the first Soil Elevation Table site in BISC. Initial draft protocol and pilot year report for corridors of invasiveness was finished and has gone under internal review with our partner the Florida/Caribbean Exotic Plant Management Team (FLC-EPMT). The pilot work, equipment, or training for the exotic animals, freshwater fish and large macroinvertebrates, and periphyton vital signs also occurred. Finally, we worked in collaboration with the USGS Dr. Tim Bargar (Florida Integrated Science Center) and Dr. David Alvarez (Columbia Environmental Research Center) to assess levels of Emerging Pollutants of Concern (EPOCs) in near shore waters of Biscayne Bay and Biscayne National Park due to concerns generated by the Miami-Dade Water and Sewer Department's Wastewater Reuse Pilot Project (\$50K). This pilot work led to the successful acquisition of funds (3 year and \$300K USGS internal funds) through the National Park Service/USGS Water Quality Partnership to continue the EPOC project in BISC. The Community Ecology Branch has made three presentations of its work this year as well.

Inventories

Small Mammals Inventory

Project Overview: The University of Florida and U.S. Geological Survey have been collaborating on the small and medium sized mammal inventory for Everglades National Park and Big Cypress National Preserve. Field work is complete and a draft report was submitted in February and reviewed by SFCN and submitted again in April.

Project Status: Upon review of the database it was found that extensive database cleanup was required which has delayed completion of the project and will result in revision to numbers in the report. This has not required additional funding from the SFCN. However, SFCN data management staff have worked extensively with University of Florida project personnel to resolve issues with the data and develop updated numbers for the final report. A brief overview is provided in Table 4.

Some highlights include:

- 21 species in EVER and 22 species in BICY were detected. No new species were detected.
- Everglades mink and spotted skunk were not detected in EVER and only detected in low numbers in BICY despite extensive surveys. Southern flying squirrel and striped skunk were not detected in either park despite extensive surveys. Round-tailed muskrats were only detected in python stomach samples and owl pellets in EVER although lodges were found in BICY. These findings may be a cause of concern.
- Coyotes were found throughout both EVER and BICY rather than just along the northern boundaries as suggested previously.
- No one method successfully recorded all species. Rather it was the variety of survey methods (camera trap, live trap, roadkill, track surveys, owl pellets, python gut contents, opportunistic sightings) that successfully detected the range of species. The camera traps also successfully recorded Florida panther, black bear, deer, and pigs although this was not a primary focus of the project and is not included in the report (data are available).

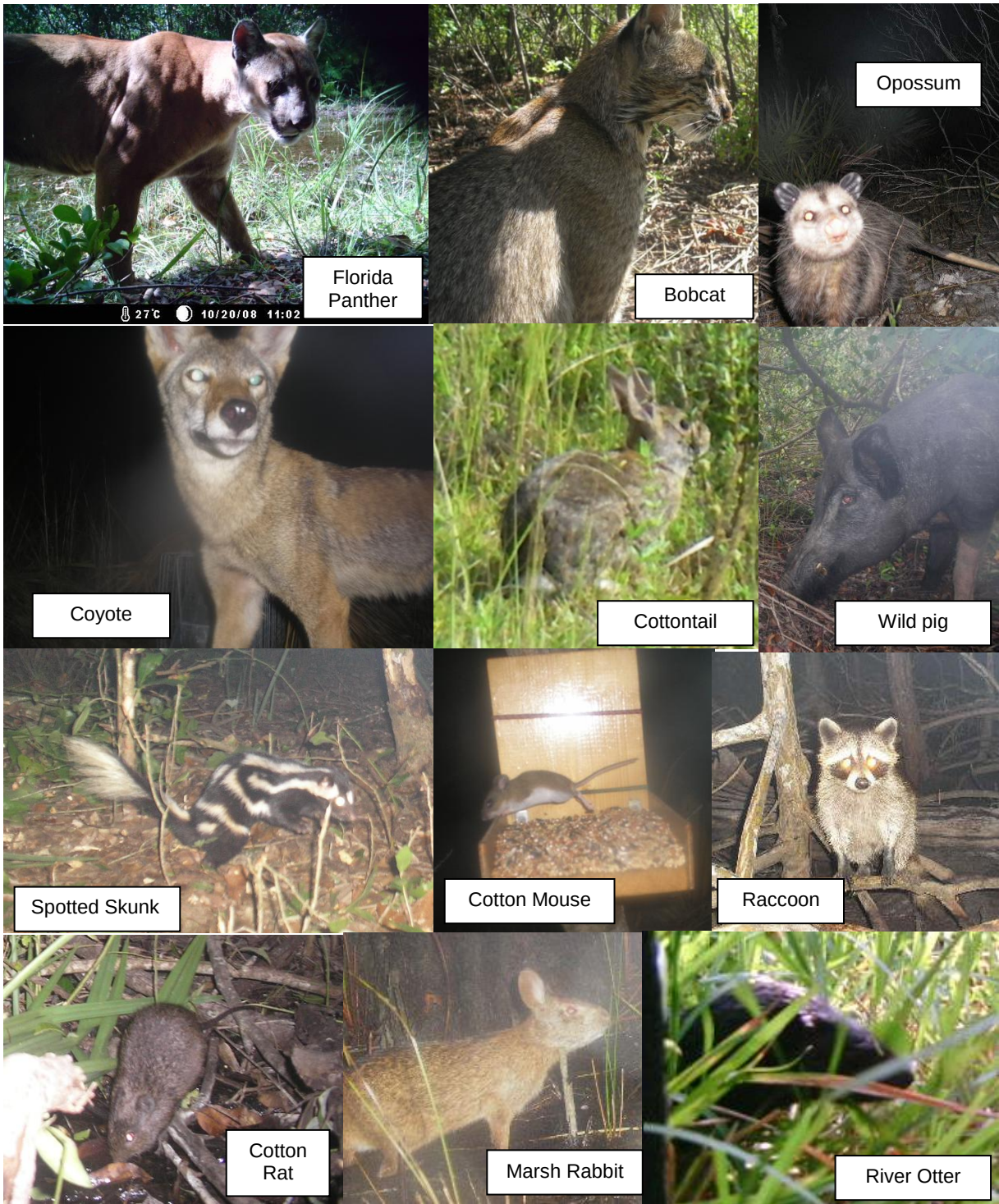


Table 4. Summary of small and medium mammal inventory detections in EVER and BICY.

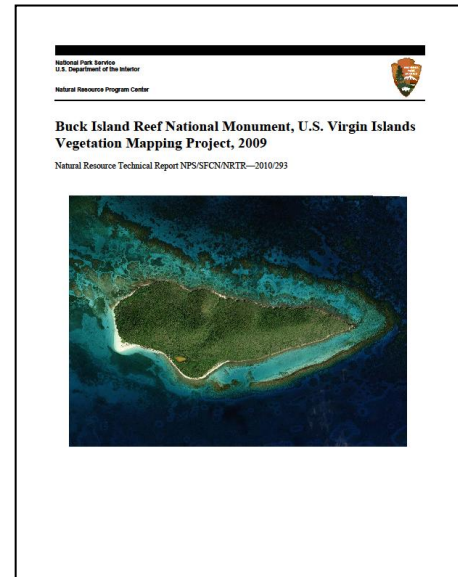
Common name	Everglades National Park				Big Cypress National Preserve			
	Camera trap	Live Trap	Other	Total	Camera Trap	Live Trap	Other	Total
Black rat (<i>Rattus rattus</i>)*	1306	28	24	1358	11		1	12
Virginia opossum (<i>Didelphis virginiana</i>)	100		32	132	842		89	931
Cotton mouse (<i>Peromyscus gossypinus</i>)	255	8	5	268	432	171		603
Cotton rat (<i>Sigmodon hispidus</i>)	239	112	178	529	89	118	11	218
Marsh rice rat (<i>Oryzomys palustris</i>)	281	42	77	400	12	95	2	109
Raccoon (<i>Procyon lotor</i>)	102		39	141	210		93	303
Bobcat (<i>Lynx rufus</i>)	2		26	28	121		30	151
Marsh rabbit (<i>Sylvilagus palustris</i>)	13		8	21	39		63	102
Gray squirrel (<i>Sciurus carolinensis</i>)	11		27	38	29		20	49
Armadillo (<i>Dasypus novemcinctus</i>)**			4	4	58		18	76
Coyote (<i>Canis latrans</i>)**	8		29	37	9		9	18
Round-tailed muskrat (<i>Neofiber alleni</i>)			23	23			29	29
Domestic dog (<i>Canis familiaris</i>)*	23		11	34	1		9	10
River otter (<i>Lutra canadensis</i>)			20	20	7		15	22
Fox squirrel (<i>Sciurus niger</i>)			6	6	13		13	26
Southern short-tailed shrew (<i>Blarina carolinensis</i>)			21	21	1	1	4	6
Domestic cat (<i>Felis domesticus</i>)*	4		5	9	2		9	11
Eastern cottontail (<i>Sylvilagus floridanus</i>)	7		4	11			7	7
Least shrew (<i>Cryptotis parva</i>)		1	12	13	--	--	--	--
Gray fox (<i>Urocyon cinereoargenteus</i>)			9	9			2	2
House mouse (<i>Mus musculus</i>)*			1	1	2	7		9
Spotted skunk (<i>Spilogale putorius</i>)	--	--	--	--	6		2	8
Mink (<i>Mustela vison</i>)	--	--	--	--			2	2
Long-tailed weasel (<i>Mustela frenata</i>)	--	--	--	--	--	--	--	--
Striped skunk (<i>Mephitis mephitis</i>)	--	--	--	--	--	--	--	--
Norway rat (<i>Rattus norvegicus</i>)*	--	--	--	--	--	--	--	--
Southern flying squirrel (<i>Glaucomys volans</i>)	--	--	--	--	--	--	--	--
Eastern mole (<i>Scalopus aquaticus</i>)	--	--	--	--	--	--	--	--
Red fox (<i>Vulpes vulpes</i>)	--	--	--	--	--	--	--	--

*=Exotic, **=New Range Extension

Buck Island Reef National Monument (BUIS) Vegetation Map

- Complete

Project Status: The map and report are complete and the final report was submitted to the National Vegetation Mapping Inventory Program and copies made available on the SFCN web page. Minor editorial corrections were made by Jonathan Moser late in the year and an updated version will shortly be sent.

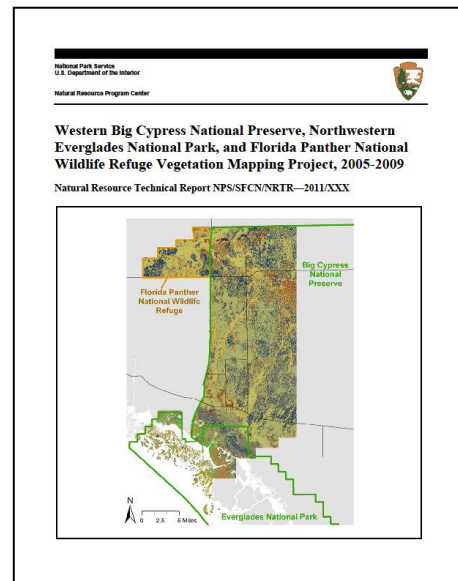


Draft Terrestrial Vegetation Map of western Big Cypress National Preserve (BICY) and northwestern Everglades National Park (EVER)

– Final Deliverable Accepted, Final Report in Development

Project Overview: SFCN contracted with Avineon, Inc. to map Florida Panther National Wildlife Refuge, 1/3 of BICY, and a small portion of EVER using the same approach as the CERP RECOVER mapping project using a 50m x 50m grid cell and the Vegetation Classification system for South Florida Natural Areas by Rutchey et al (2005). The project is broken into 4 sections. Accuracy assessment points were randomly chosen in each section and were classified by two botanists in a helicopter concurrently with the mapping process. Mapped cells were attributed based on dominant vegetation community.

Project Status: The contractor submitted the final map and accompanying technical report, all field training point data, and metadata in FY09. SFCN has approved these final deliverables and the contract is complete.

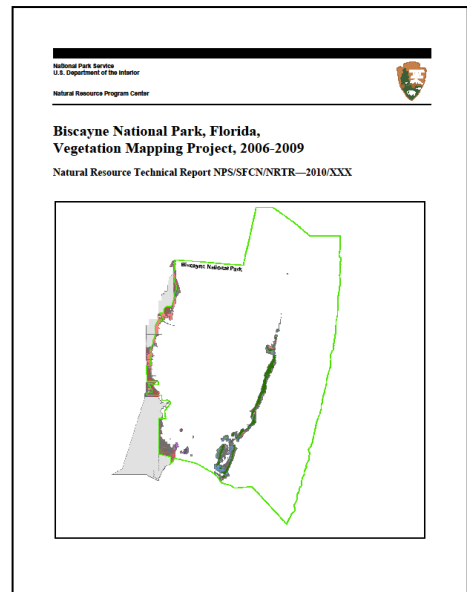


SFCN (Andrea Atkinson) is in the process of compiling a summary project report document which contains the contractor's report and SFCN's accuracy assessment report as appendices and putting all the project pieces in the format required by the National Vegetation Mapping Inventory Program. The final products will be submitted to the National Vegetation Mapping Inventory Program, as well as the parks and partners. The intent is for this map to merge seamlessly with the mapping project by the Army Corps of Engineers for Eastern Big Cypress National Preserve and Everglades National Park.

Draft Terrestrial Vegetation Map of Biscayne National Park (BISC)
– Final Map Deliverable Accepted, Final Report in Development

Project Overview: BISC includes 41 mangrove-dominated islands with extensive areas of tropical hardwood hammock, as well as a narrow strip of mangrove-dominated shoreline on the mainland. The vegetation map was created by Pablo L. Ruiz, Patricia A. Houle, and Michael S. Ross of Florida International University. Polygon creation depended primarily upon 2005 aerial imagery (30cm, 5-band), Normalized Difference Vegetation Index (NDVI), as well as 2002 LIDAR data (mainland only). The vegetation map features a six-tiered hierarchical vegetation classification system (Rutchey *et al*), with all polygons defined to at least the third tier.

Project Status: The map was submitted by the cooperator and the accuracy assessment completed in FY09. The map has been updated with the results of the accuracy assessment. SFCN (Andrea Atkinson) is in the process of compiling a summary project report document which contains the FIU report and SFCN's accuracy assessment report as appendices and putting all the project pieces in the format required by the National Vegetation Mapping Inventory Program. The final products will be submitted to the National Vegetation Mapping Inventory Program, as well as the park and its partners.

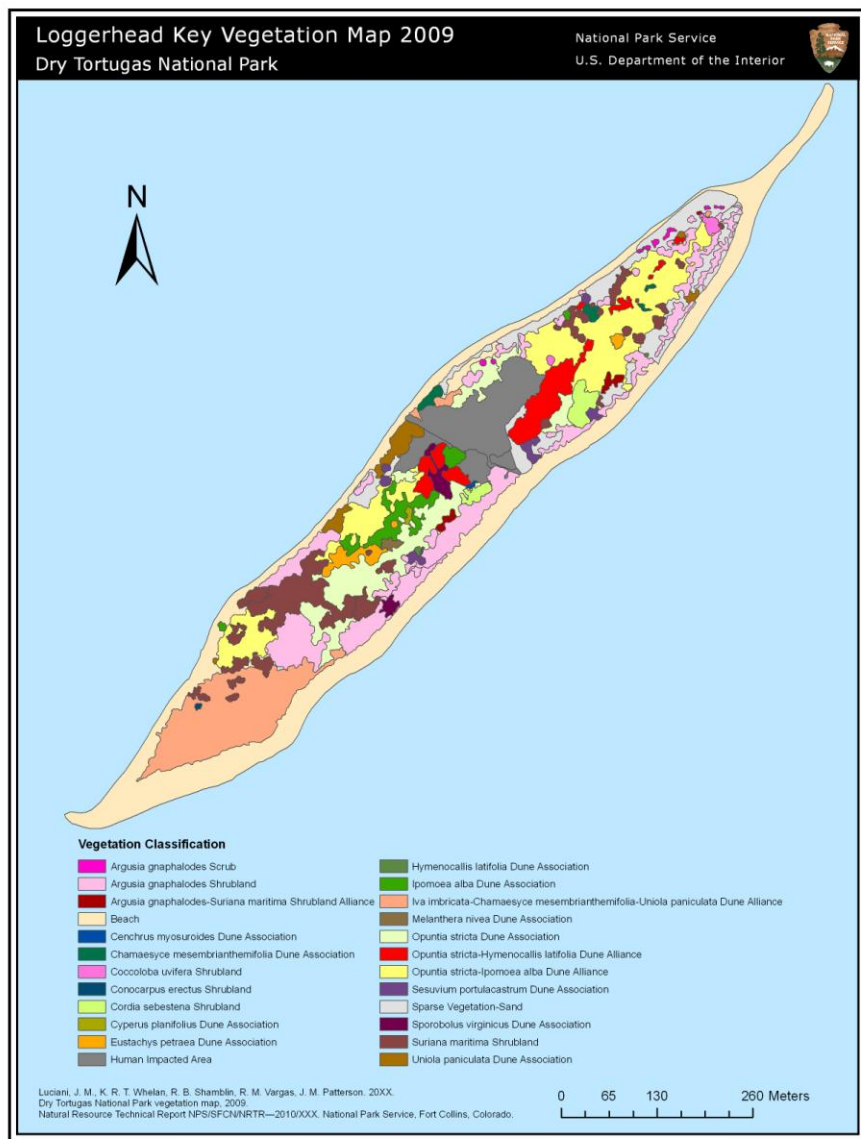


Dry Tortugas National Park (DRTO) Vegetation Map
- In Review

Project Overview: The National Park Service Vegetation Mapping Inventory Program funded the NPS South Florida/Caribbean Network to map the seven islands of Dry Tortugas National Park in 2009. SFCN established a cooperative agreement with Florida International University for the Resource Management Intern Program with one deliverable being the development of a vegetation map of Dry Tortugas National Park.

Project status: The field component of the project was completed in 2010 and the map and report are complete and are currently under external review by Tony Pernas (NPS Florida / Caribbean Exotic Plant Management Team Coordinator), Jimi Sadle (Everglades and Dry Tortugas Park Botanist), and Gary Davis (retired Ocean Science Chief for National Park Service). We will address their comments and will submit the final report to the National Vegetation Mapping Inventory Program in the upcoming months.

The Dry Tortugas vegetation map was made in UTM zone 17N, NAD 83 coordinates with a minimum mapping unit of 25m². Photo-interpretation of aerial imagery was not the method used to map the Dry Tortugas. Instead all seven islands were mapped using the Trimble GeoXT GPS device. The GPS device was used to delineate vegetation communities creating them into

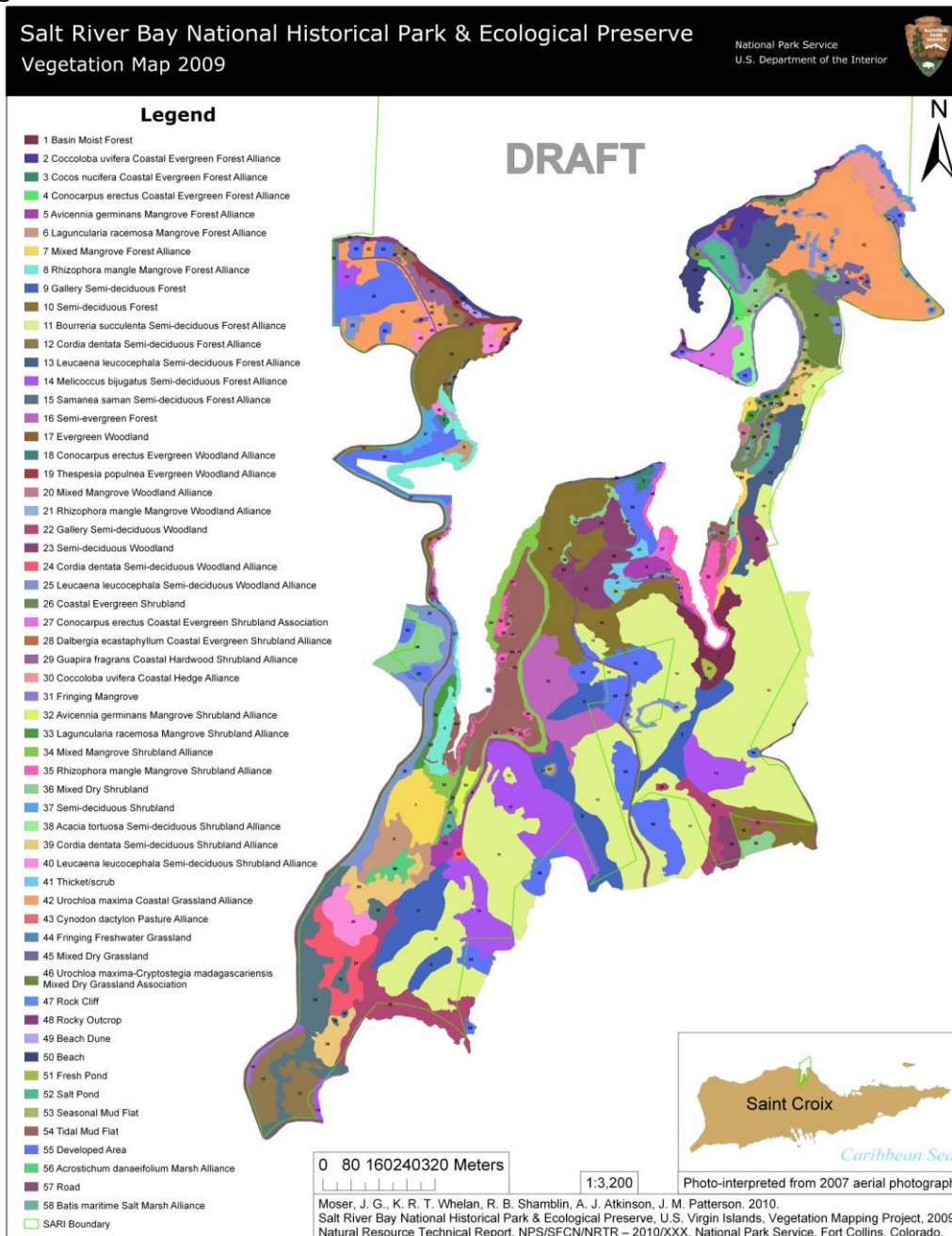


polygons. In-field polygon delineation produced a finely detailed vegetation map of Loggerhead Key, Garden Key, Bush Key, East Key, Long Key, Middle Key, and Hospital Key.

The final vegetation map has a total of 41 mapping classes and 296 polygons. Vegetation types were created in the field when unique vegetation communities were encountered. The vegetation types were developed into vegetation classes conforming to the Rutchey et al. (2006) South Florida Vegetation Classification System and those vegetation communities unique to the Dry Tortugas. The Dry Tortugas Vegetation Classification was generated as part of the project which included 3 Woodland classes, 8 Shrubland classes, 5 Scrub classes, 20 Dune classes, 3 Sparse Vegetation classes, and 2 Non-vegetative classes.

Also included are: detailed maps of close-up sections of Loggerhead Key, Bush Key, and Long Key, historical maps from reference literature, and the field data sheet.

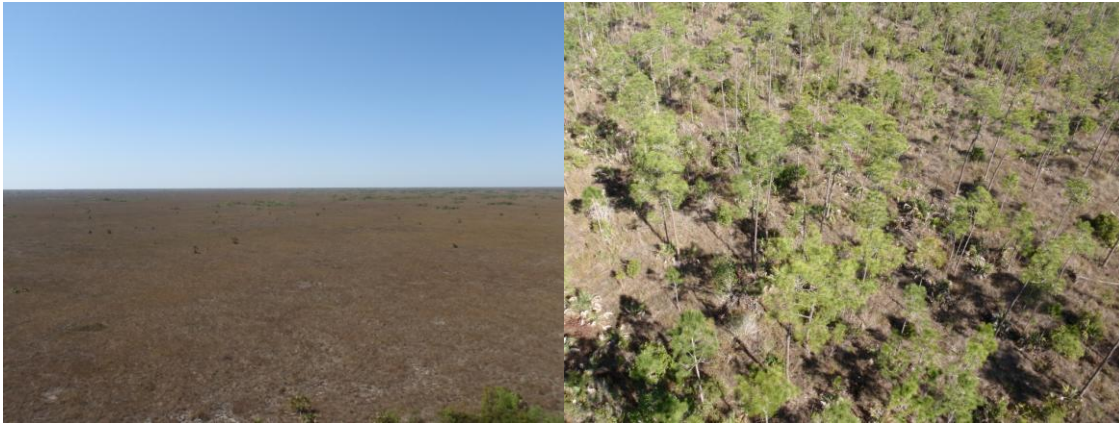
Salt River Bay National Historical Park & Ecological Preserve (SARI) Vegetation Map – In Progress



Project Overview: The National Park Service Vegetation Mapping Inventory Program funded the NPS South Florida/Caribbean Network to create a vegetation map of SARI. Three field trips collected data for 150 field points, the latest in July 2009. Based on photointerpretation and data collected from these trips, 244 polygons have been delineated with 58 vegetation map classes.

Project Status: The map has been submitted for external review and SFCN is awaiting the return of comments so that edits can be incorporated. Once these edits are complete and final, the project will be submitted to the National Vegetation Mapping Inventory Program.

Everglades National Park (EVER) Independent Accuracy Assessment of SFWMD process and USACE initial mapping.
- In Progress



Project Overview: The SFWMD is mapping the northernmost section of Region 1 within EVER, with the Army Corps of Engineers (ACOE) taking over mapping duties from SFWMD for the rest of Region 1, and most of EVER and 2/3 of BICY as part of the Comprehensive Everglades Restoration Plan (CERP) RECOVER mapping project using a 50m x 50m grid cell approach and the Vegetation Classification System for South Florida Natural Areas by Rutchey et al. (2005).

The SFCN is now receiving funds to help offset some of the cost associated with botanical training, assistance in field collection of training points and accuracy assessment data collection. Funding is from CERP RECOVER. The methodology followed is similar to that being used during the SFCN mapping of BICY/EVER and the two projects are designed to seamlessly merge when complete. The South Florida Water Management District completed mapping of the Water Conservation Areas north of Everglades National Park and began data collection for mapping of Region I Section 1 in Everglades National Park using newly acquired 2009 aerial imagery. The mapping is being taken over by ACOE and is not expected to be finished for several years.

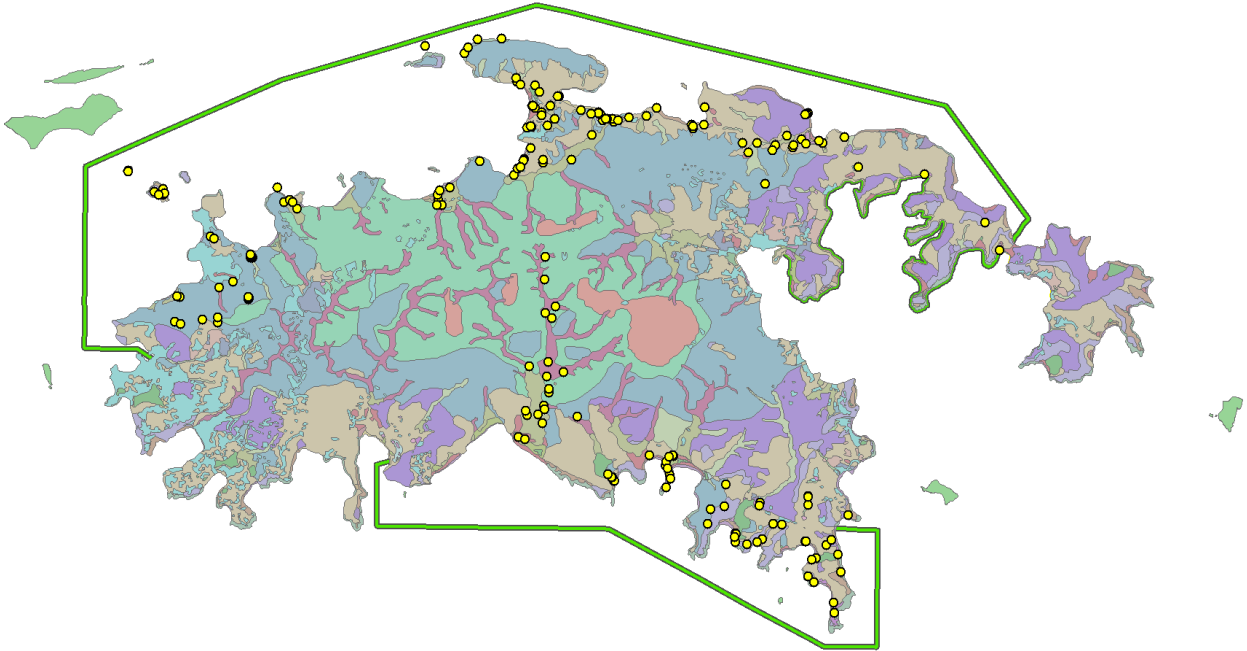
The EVER Vegetation Map project is divided into six regions each with 4 sections. The ACOE will assess the accuracy of each section as it is completed using 210 grid cells in which multiple in-house staff will use softcopy displays to see if they concur with the classification and only visit the field if there appears to be an error. Their level for acceptance is at least 90% (189/210) points accurately classified. At the end, the four sections are combined and the region is assessed with at least 210 field check assessment locations.

The SFWMD has almost completed Region 1 Section 1 and when this is completed, the SFCN will make a preliminary assessment. The field based accuracy assessment method was developed to assess SFCN's BICY/EVER map and will be used in EVER to determine if additional resources are needed to achieve an accurate map, ensure their approach isn't introducing systematic errors into the map, and to provide a direct comparison of the accuracy of the two mapping efforts before they are joined into a single seamless map at the end.

Project Status: SFCN collected field data to be able to independently assess the accuracy of the Region 1 Section 1 area mapped by the South Florida Water Management District (SFWMD) in Everglades National Park. This section has not been completed by SFWMD. In addition, the SFCN collected field data to assess the whole of Region I of the EVER Vegetation Map once mapping is completed. SFCN randomly selected 265 non-adjacent cells in Region 1 of the EVER vegetation mapping effort. An additional 30 non-adjacent cells were randomly selected in the Mustang Fire area; however, there were 4 cells in this area that were also sampled as part of the Region 1 accuracy assessment. In FY10, SFCN botanist Brooke Shamblin flew a total of 291 accuracy assessment cells in EVER during 8 helicopter visits.

Rutchev, K., T. Schall., R. Doren, A. Atkinson, M. Ross, K. Bradley, J. Snyder, J. Burch, T. Pernas, B. Witcher, and others. 2005. Vegetation classification system for South Florida natural areas. National Park Service, South Florida / Caribbean Network, open-file report 2006-1240, Miami, FL.

Virgin Islands National Park (VIIS) Vegetation Map Accuracy Assessment - In Progress



Project Overview: Virgin Islands National Park has a vegetation map produced by the Eastern Caribbean Center, Conservation Data Center at the University of Virgin Islands covering the shoreline to the highest peak, Bordeaux Mountain. The park staff that has used the map felt that the map is relatively accurate; however, there was not a formal accuracy assessment of the product at the time it was created. SFCN is assessing the accuracy of the map to determine whether it meets NPS Vegetation Mapping Inventory Program requirements.

Project Status: Tiara Thanawastien (Florida International University ReMI intern) is the project lead on the VIIS vegetation map assessment and modification project. In FY10, an additional 136 assessment locations were visited in the field. All of the field data for all 188 assessment locations have been entered into a Microsoft Access database and 100% quality assurance of the data has occurred. Pilot work in FY 2009 found that of 52 points visited, 37 were determined to be correct (71%). However some of the problems may be correctable using a LIDAR topography layer of the islands to better define slopes which are sharply associated with the distribution of and breakpoints between communities.

Continuation in FY11: Comparison for all 188 points will be completed. Based on these findings, park wide map modifications will take place using slope values (aspect) generated from ACOE 2009 LIDAR, orientation, and major geomorphic features. Conformation of species phenology and local common name is being reviewed by USVI botanists Eleanor Gibney and Rudy O'Reilly. The SFCN will visit a select number of assessment points from the updated map to determine whether the modifications are an improvement.

South Florida Data driven vegetation classification, Phase 1 project

-Final Report

Project Overview: The purpose of this project was to combine existing vegetation data sets from the region's researchers; run a classification analysis on one major category (in this case the freshwater graminoid and herbaceous wetlands); compare the results with the existing vegetation classification (Rutchev et al. 2005) to see how well it is supported; and make recommendations based upon the amount, types, and quality of existing data on how to proceed with analysis for and/or field work in the other major vegetation categories (i.e. pinelands, hardwood hammocks & tree islands, cypress forests, coastal wetlands).

Project Status: The final report and geodatabase have been received and this phase of the project is complete. Dr. Mike Ross and Dr. Jay Sah at Florida International University assembled the vegetation data provided to them by numerous researchers (35 datasets comprising 8,246 sites) into a geodatabase. This geodatabase itself coupled with the report is a very useful product. (Additional uses require permission of the participating researchers, but this is unlikely to be a problem). Brief descriptions of the data sets are provided. The classification analysis conducted on the graminoid and herbaceous wetlands portion of the system tied the vegetation classes to hydrology, salinity, and disturbance, thus helping link vegetation community change to sources of change which is important for CERP RECOVER. New vegetation classes were primarily added in the ruderal (disturbance) vegetation types and the exercise provided data support to many of the Rutchev et al. (2005) vegetation classes.

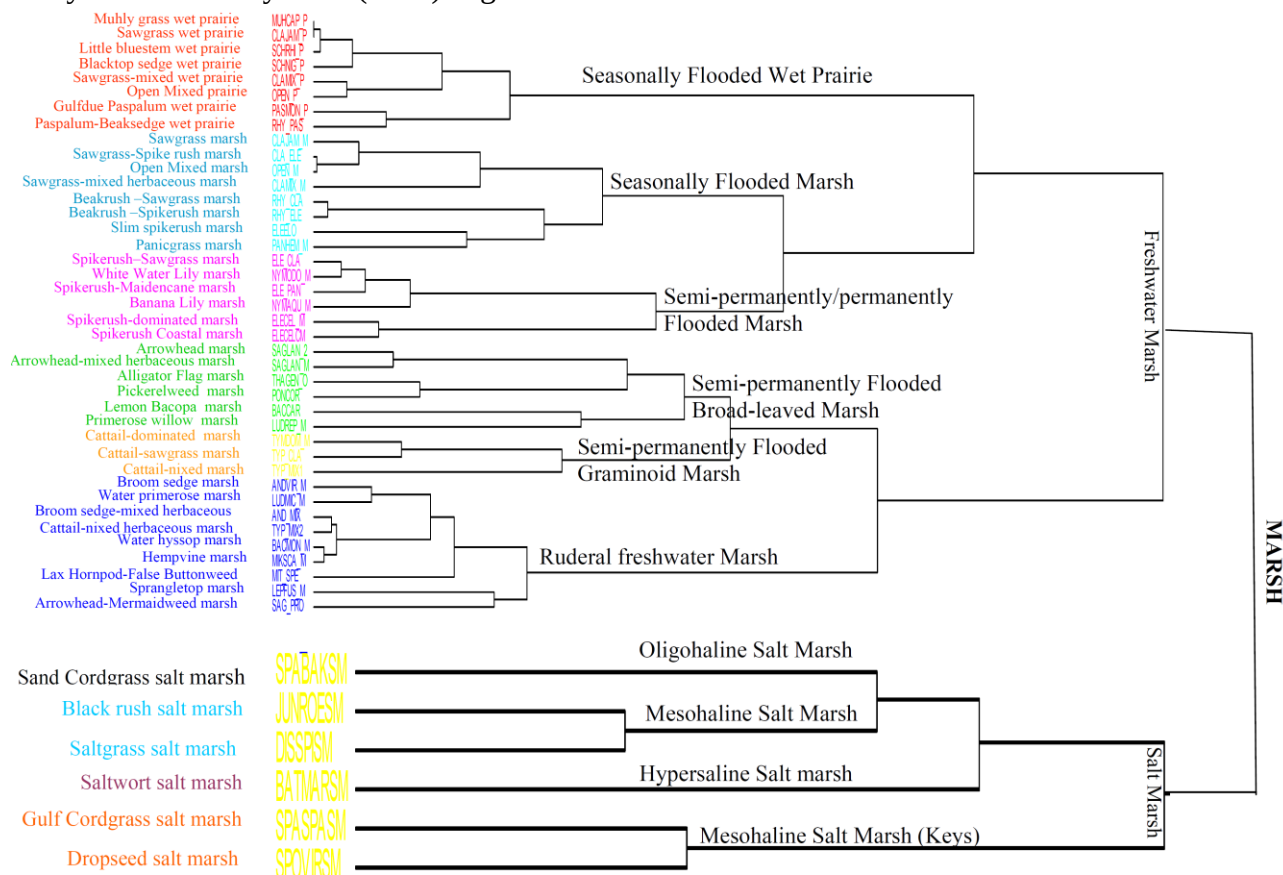
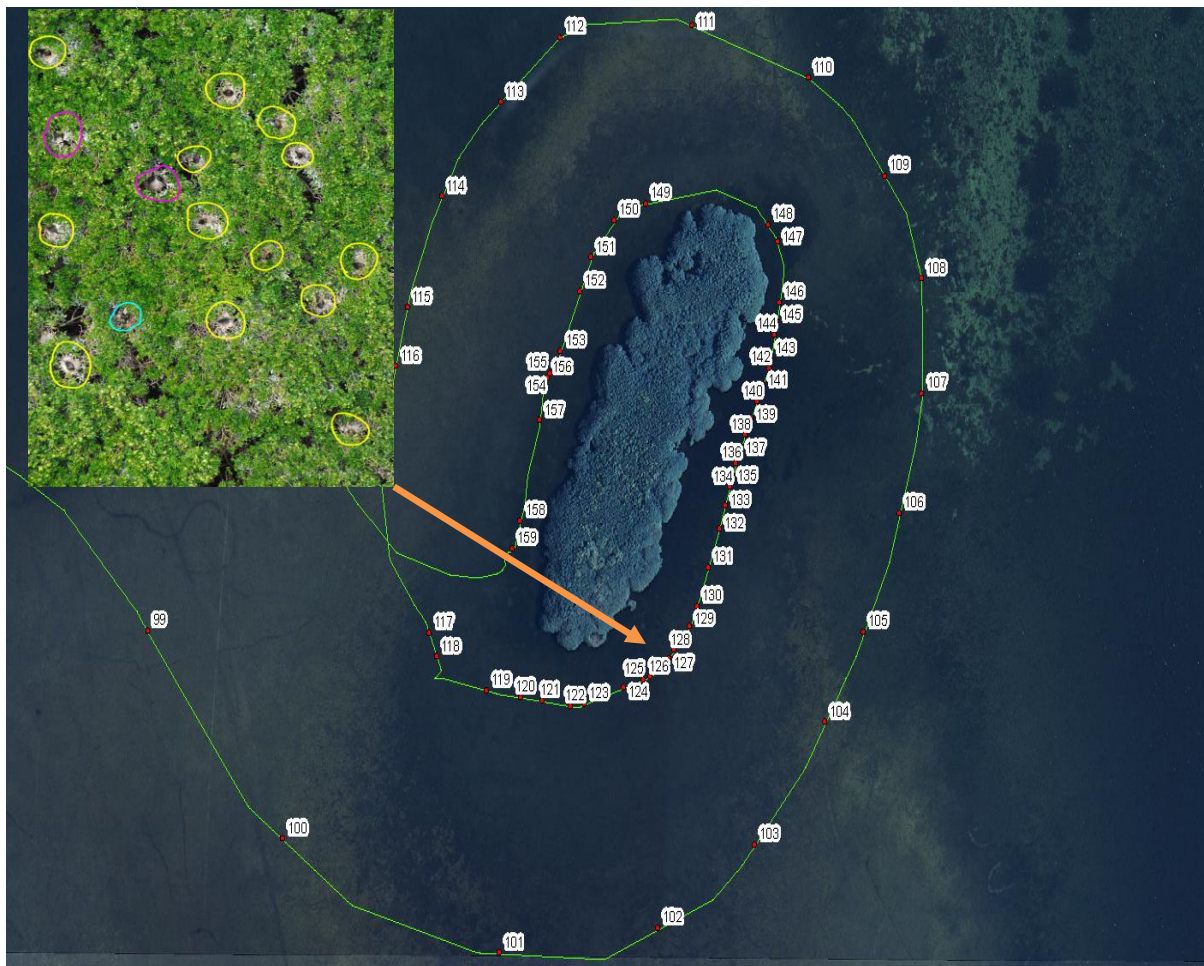


Figure from *Developing a data-driven classification of South Florida plant communities* by Sah et al. (2010) showing dendrogram from cluster analysis of the herbaceous sites.

Vital Signs Monitoring

Colonial Nesting Birds Vital Sign (BISC)

Accomplished in FY10: The SFCN is completing a second year of monitoring colonial nesting birds in Biscayne National Park (BISC). This year the monitoring has consisted of monthly systematic helicopter flights over BISC from January to December of 2010, in order to monitor nesting activity of colonial nesting species (e.g. Double-crested Cormorant), and if detected, colonial nesting wading birds (e.g. Great White Heron, Great Egret). A year round monthly flight schedule provided SFCN with a better and more complete picture of nesting trends of colonial birds in BISC. During the flights, photographs, GPS coordinates, and field notes are taken wherever nesting activity is detected. Photographs are then analyzed for number of active nests and number of species in each island. During the previous year's pilot project effort and with the continuation of flights during this year the SFCN has been able to 'fine tune' data gathering techniques that are to be included in the Colonial Bird Monitoring Protocol that continues to be developed along with the associated Standard Operating Procedures (SOPs).



Sample of flight path and geo-tagged pictures (#126 inserted) at Arsenicker Key during one of the colonial bird monitoring flights.

Additionally, an annual monitoring flight in BICY was conducted with the purpose of detecting colonial nesting bird activity. When the SFCN detects a “good bird year” it activates CERP funded monitoring by researcher Peter Frederick of University of Florida.

SFCN created preliminary drafts of Standard Operating Procedures for existing monitoring of colonial nesting birds at BUIS, EVER, and VIIS based upon interviews with park staff and existing documents for the purpose of clearly documenting the current protocols, monitoring and data and determining ways to collaborate on reporting results across the network.

Continuation in FY11: SFCN will continue monitoring nesting birds in BISC with monthly systematic helicopter flights. In addition, SFCN will continue to develop and finalize the BISC Colonial Bird Monitoring Protocol and associated SOPs. SFCN will also continue to attempt to gather and report the data from existing monitoring programs in the network’s parks.



Roseate Spoonbills (*Platalea ajaja*), adult with chick, detected nesting in BISC.

Forest Ecotones and Community Structure, Mangrove-marsh Ecotone, Wetland Ecotones and Community Structure Vital Signs

Vegetation Monitoring Protocol Development

Accomplished in FY10: SFCN worked to refine its vegetation monitoring goals and has thoroughly reviewed existing vegetation monitoring protocols from other networks. SFCN has begun working on sampling design and writing a draft of the vegetation monitoring protocol for the Forest Ecotones and Community Structure and Mangrove-Marsh Ecotones and Community Structure Vital Sign.

SFCN conducted a pilot study to test data collection and analysis methods for monitoring ecotonal movement at four mangrove/marsh sites and one pineland/hammock site in EVER. Four methods of delineating the ecotonal boundary were compared, 1) visual estimate using aerial imagery, 2) visual estimate on the ground, 3) species dominance curve, and 4) moving split window technique. The first two were based on expert opinion, are much less time intensive, and give a good estimate of the location of the ecotonal boundary in most cases. The second two methods are based on vegetation data collected from a 100m belt transect that requires a much greater time investment and improves little on the visual estimates in most cases.

Continuation in FY11: For 2011, SFCN will complete a draft vegetation monitoring protocol for the Forest Ecotones and Community Structure and Mangrove-Marsh Ecotones and Community Structure Vital Signs.

Historic Vegetation Monitoring: Big Cypress National Preserve (BICY) - Relocation and sampling of historic Gunderson and Loope (1982) vegetation plots

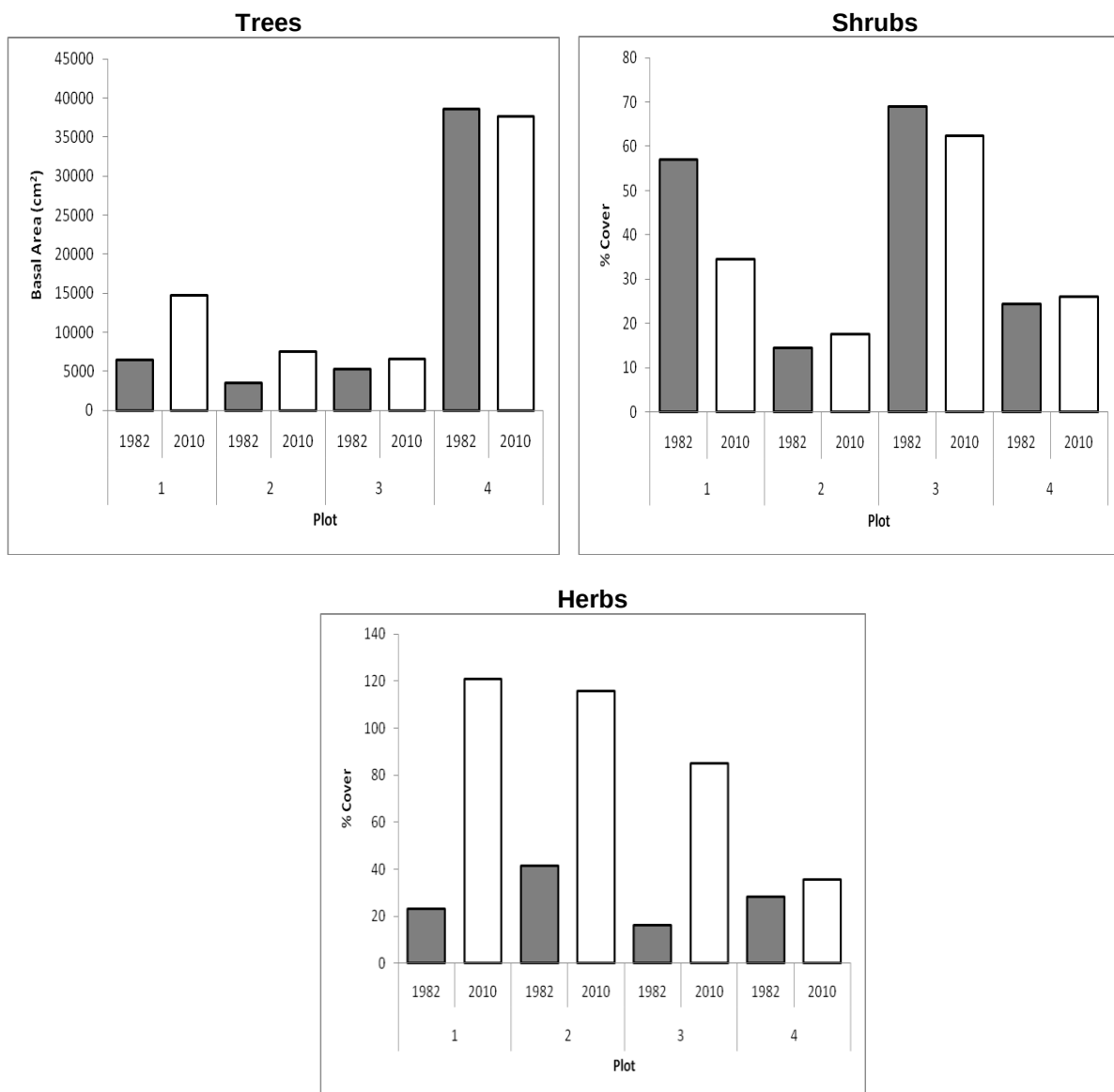


SFCN crew resampling 1982 pineland vegetation plots originally established by Gunderson and Loope.

Accomplished in FY10: Two pineland plots and one Cypress-mixed swamp plot, established near the Turner River area of BICY by Gunderson and Loope in the early 1980s, were resampled by Brooke Shamblin, Tim Fotinos, Tiara Thanawastien, and Jose Luciani in FY 2010 (See example results figure on next page). Total tree basal area and tree density increased at the two driest pineland sites. The moist pineland site and the Cypress-mixed swamp site experienced little change in these characteristics. Herbaceous plant cover increased dramatically at all pineland sites. Two pineland sites also experienced a significant increase in herbaceous species richness. There is a slight indication from the vegetation data that the sites sampled are becoming more mesic which is in agreement with the data from the nearest hydrologic station.

An informal report was written based on the data collected from resampling the historic Gunderson plots at Turner River, BICY. This report evaluated the insight that could be gained from resampling historic vegetation plots and assessed the value of adding a subset of historic plots, not currently being sampled by others, to the vegetation monitoring protocols as an independent group of sample sites. This report concluded that the set of vegetation plots established by Loope and Gunderson in BICY would be a valuable addition to the vegetation monitoring protocol because they extend our time period by 30 years and provide historic context to possible future changes.

Continuation in FY11: For 2011, SFCN will continue to attempt to relocate the remaining 14 vegetation plots in BICY that were established by Gunderson and Loope when time is available.



Change in tree basal area, shrub cover, and herb cover at Turner River vegetation plots in BICY. Results are from the 1982 sampling by Gunderson et al., and the resampling by SFCN in 2010.

Historic Vegetation Monitoring: Everglades National Park (EVER) – Sampling of historic Olmsted and Loope (1982) vegetation plots

Accomplished in FY10: The Coot Bay transect was relocated and re-sampled by ReMI intern Jose Luciani and University of North Carolina graduate student Kristie Wendelberger in 2009. The SFCN has received a preliminary analysis of the data from Ms. Wendelberger related to her Masters thesis work on the topic. In general, there has been relatively little change in the vegetation communities other than hurricane damage to the hammock species which increased the light environment.

Continuation in FY11: We will include this work with our other historical plot sampling program.

Historic Vegetation Monitoring: Biscayne National Park (BISC) – Relocation and resampling of permanent forest plots



Resampling of forest plot on Elliott Key in BISC. All eight tree plots on Elliott Key were resampled in FY10. Of 32 plots that were established in the mid-1990's, 29 have been found, with the remainder of the plots due to be relocated in 2011.

Accomplished in FY10: Eleven more of the 32 long-term forest plots were relocated in BISC. These plots were established by Bradley Bennett in 1995 and 1996 and sampled by Brooke Shamblin until 1998. The tree plots are 20m x 20m squares and include nested 5m x 5m sapling subplots and .5m x .5m seedling plots. There are eight tree plots each on four islands (Elliott

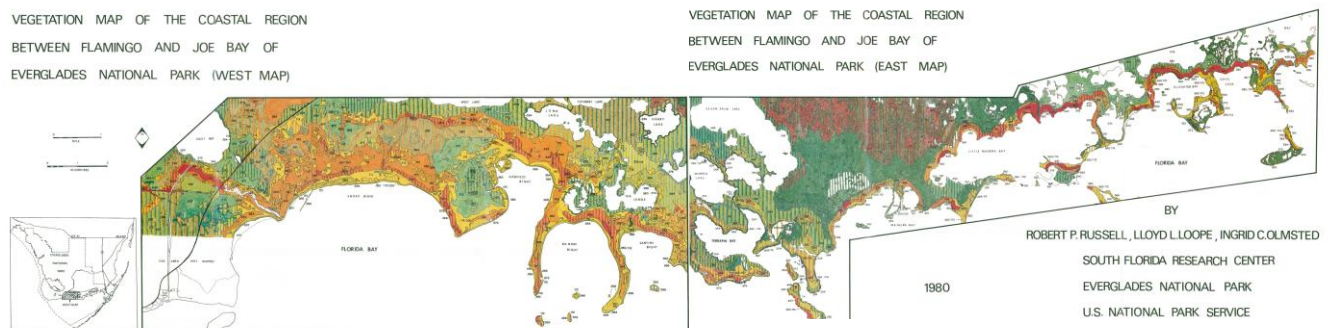
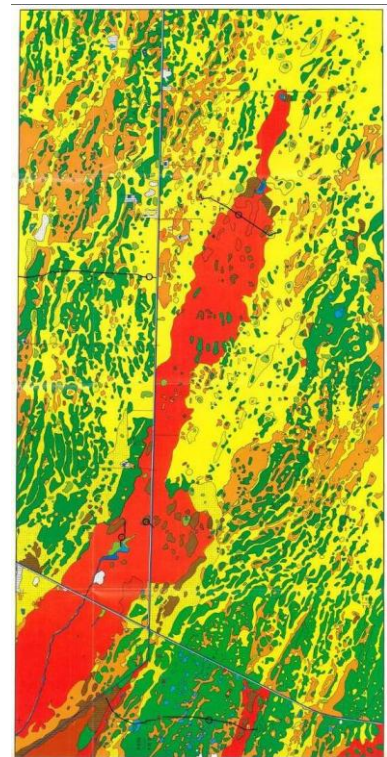
Key, Sands Key, Old Rhodes Key, Totten Key). The eight tree plots on Elliott Key were resampled in FY10. Analysis of six tree plots shows a decrease of 133 trees with the tree basal area remaining almost exactly the same since 1997. The trees exhibiting the highest density loss were the pioneer species *Eugenia foetida* (Spanish stopper), *Pithecellobium keyense* (Blackbead), and *Metopium toxiferum* (Poisonwood). This data suggests a maturing forest where the pioneer species are thinning out with other species becoming larger trees.

Continuation in FY11: For 2011, SFCN will relocate the remaining three hammock plots and continue re-sampling the plots when time is available.

Scanning and Georectification of Community level Vegetation Maps (circa 1980s)

Project Overview: The goal of this project was to digitize a historical paper vegetation map so that the South Florida/Caribbean Network Inventory and Monitoring office and others could use the map to study shifts in vegetation communities, which is an especially important task in a time of climate change. Advances in mapping allow digitized data layers to be related spatially so that multiple information layers can be used to understand, explore and manage natural resources. In this project, ESRI's ArcGIS 9.3 was used to digitize a 1980 vegetation map of the area between Flamingo and Joe Bay in Everglades National Park (EVER) by Ingrid Olmstead, Lloyd Loope and Robert Russell, and a 1982 vegetation map of the Turner River Road area of Big Cypress National Preserve (BICY) by Lance Gunderson, Lloyd Loope and William Maynard.

Project Status: In FY10, SFCN interns assisted with digitizing and attributing polygons within the Southern Everglades vegetation map originally created by Olmstead and Gunderson. Reports for Turner River, Flamingo and Joe Bay were created to explain the process that was used to georectify, digitize, attribute and do a topology check for each map. A total of 2,669 polygons were created for Turner River, and a total of 1,516 polygons were created for the Flamingo and Joe Bay area, both completed with a 10% accuracy check done by Rachel Vargas. This project was completed in FY10 and is currently in review.



Digitized polygons shapefiles have been created for the above three maps.

Dry Tortugas (DRTO) – Relocation of permanent vegetation transects

In the DRTO Vegetation Map, the SFCN compared the data from the five permanent vegetation transects on Loggerhead Key with the recently completed map to see if the transects represent the overall vegetation communities well. In general, and across all five transects the data are comparable (approximately 80 % similar) however, at the individual transect level this relationship is not as strong. Recommendation thus far is to continue to monitor the five transects and establish/reestablish a few transects to cover unsampled parts of Loggerhead Key.

Salt River Bay National Historical Park & Ecological Preserve (SARI) – Establishment of permanent exotic plant removal efficacy vegetation plots.

In 2009, the SFCN established five one acre treatment locations along with one vegetation plot (a circle with a 15m radius) at each location. Permanent tagged trees were measured and mapped. The goal was to understand treatment effects in a number of different vegetation types and to understand the long term recovery after exotic plant removal. After SFCN completed the 15m vegetation plots, EPMT followed up by treating the exotics within each of the acre plots in October 2009. A crew from St. Croix then did a retreatment in mid-December 2009 for new exotic plant sprouts and to report the overall condition of the treatment plots. In March 2010, the SFCN revisited the efficacy plots for a quick check to see how effective the treatments were. A number of trees were missed during treatments; additionally, there were a large number of *Leucaena leucocephala* seedlings sprouting now that the sites (4 and 5) have a high amount of light.

Coastal Geomorphology Vital Sign Soil Elevation Tables (SET)

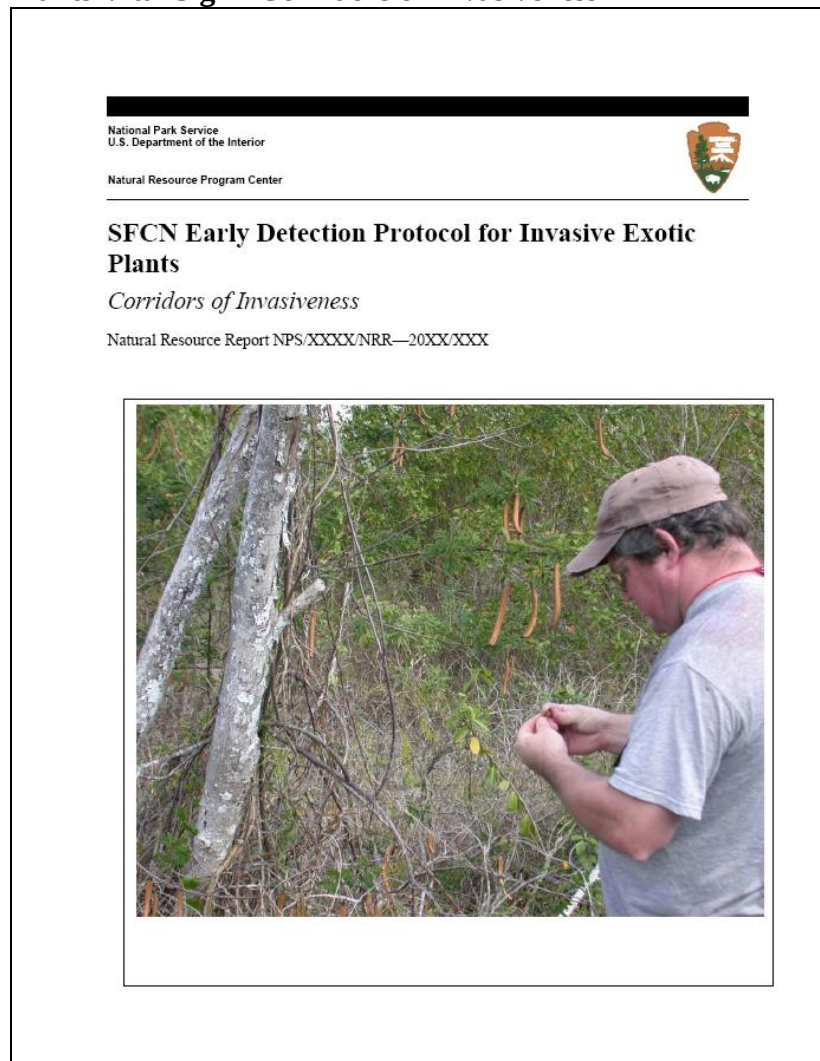


SFCN established a Soil Elevation Table monitoring site in BISC.

Accomplished in FY10: We established the first soil elevation monitoring site in BISC this year. After assessing the 21 potential sites in FY2009, this site was picked to minimize confounding effects. This site had low trash content, no berm present, low potential for discovery by public, ease of access, moderate sapling presence and enough distance from tidal creeks to minimize hydrologic impacts.

Continuation in FY11: We will finish adapting the SFCN SET protocols by adapting parts from the Louisiana Department of Natural Resources Coastal Restoration Division and the Southeast Coastal Inventory and Monitoring Network protocols. We will take initial measurements and establish stage monitoring equipment at the site.

Invasive/Exotic Plants Vital Sign - Corridors of Invasiveness



SFCN completed a draft of SFCN Early Detection Protocol for Invasive Exotic Plants. The protocol is currently being reviewed.

Accomplished in FY10: The Vital Sign for monitoring invasive-exotic plant species evaluates whether new invasive plants are establishing themselves in SFCN parks. With the completion of the pilot study for the Corridors of Invasiveness Vital Sign, the data were analyzed and the

protocol written in FY10. The protocol is currently out for review. Once comments are received, the changes will be made and the protocol implemented. The summary report for this Vital Sign was also completed and is out for review. A total of 115.43 miles were covered for the Corridors of Invasiveness pilot study. Within Everglades National Park 76.28 miles were surveyed, including Chekika Rd, Long Pine Key, Blue Shanty Canal and the Flamingo Area. In Big Cypress National Park 27.84 miles were sampled along Loop Road, and 11.31 miles in Biscayne National Park. A total of 46 exotic species were encountered during the pilot study. Of these 46 species, 15 were new to the parks. Everglades National Park (EVER) had the most new species at 8, followed by Big Cypress National Preserve (BICY) with 5, and Biscayne National Park (BISC) with 2 new exotic plant species. In EVER, the new species include *Washingtonia robusta*, *Bougainvillea spectabilis*, *Auracaria heterophylla*, *Mangifera indica*, *Stenotaphrum secundatum*, *Panicum repens*, *Senna pendula*, and *Emilia sonchifolia*. In BICY, the new species include *Stachytarpheta urticifolia*, *Ludwigia peruviana*, *Panicum repens*, *Lantana camara*, and *Sphagneticola trilobata*. In BISC, the new species include the trees *Ficus religiosa* and *Syzygium cumini*. In both cases these trees were small in stature and consisted of only one individual for each species.

Continuation in FY11: The SFCN will finalize the protocol derived from the pilot study, with the addition of SOPs from the Florida/Caribbean Exotic Plant Management Team (FLC-EPMT) for their part of the protocol and distribution of the website database brochures to the parks for circulation to permitted researchers. Standard Operating Procedures (SOPs) for annual retrieval of website reported data will be developed.

Invasive/Exotic Animals Vital Sign



SFCN community ecologist Kevin Whelan and “Sparky”, our 20-ft. aluminum hull electrofishing boat, are ready for their first test run in the L-31W canal.

Accomplished in FY10: Booms and anodes for the SFCN electrofishing boat were designed, built, and installed. Boom and anode designs were based on equipment presently used by various fisheries agencies. Materials were purchased and construction of unique components was done by two local welding businesses. Based on the recommendations of fisheries experts, SFCN electrofishing equipment was customized in order to effectively shock in deep-water canals.

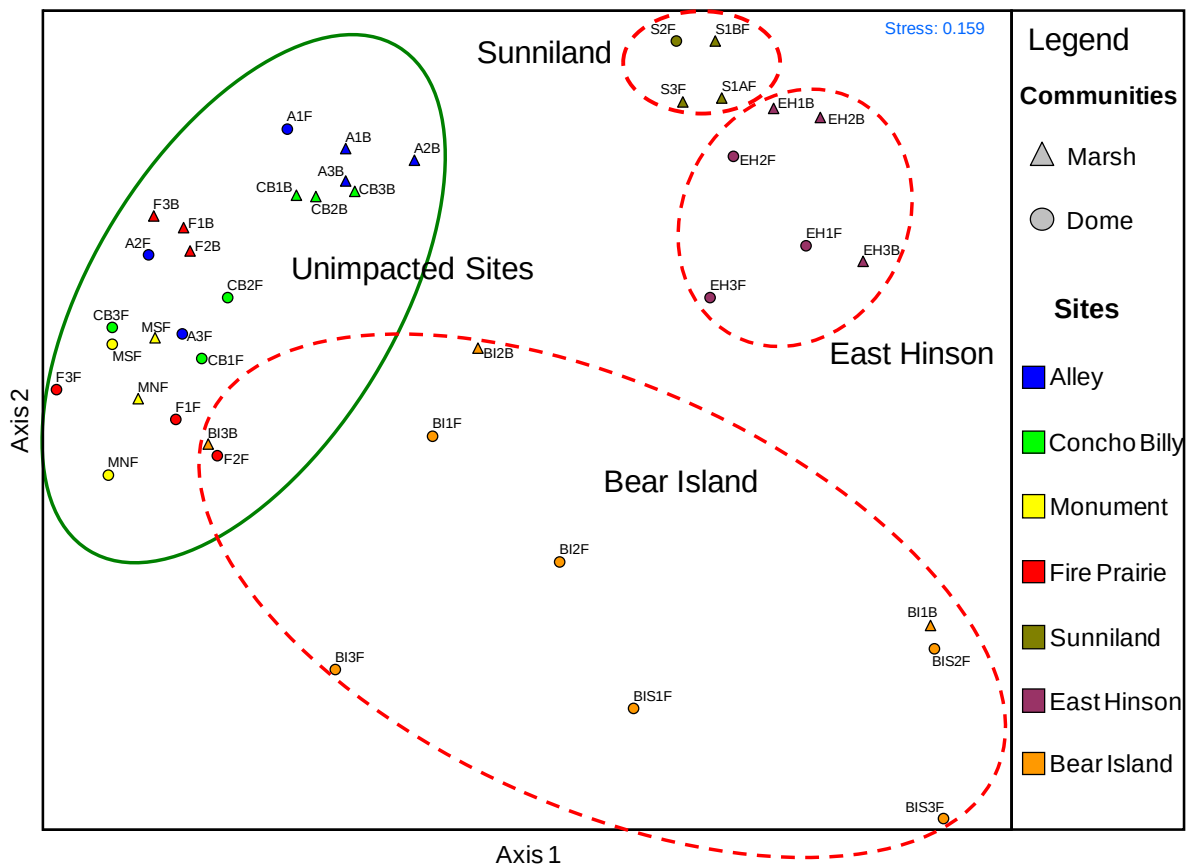
The SFCN entered into collaboration with Dr. Jennifer Rehage of Florida International University (FIU) regarding a Critical Ecosystem Studies Initiative (CESI) project which is investigating how man-made canals function as habitat for both native and non-native fishes. SFCN wildlife technician Raul Urgelles assisted Dave Gandy, a graduate student of Dr. Rehage, and other personnel from the Rehage lab in the electrofishing of the L31-W and L29 canals. Dave Gandy is currently exploring the interactions of non-native fishes with native fishes in south Florida canals and how these interactions are mediated by hydrology. The SFCN also has pledged collaboration from Everglades National Park (EVER) fisheries biologist Jeff Kline and fisheries technician Zach Fratto. The SFCN will design its Non-native Fish Monitoring Program in the canals adjacent to EVER based on the findings of Dave Gandy's work, which will take approximately two years to complete, and in consultation with EVER staff.



SFCN and FIU staff display an Orinoco Sailfin Catfish (*Pterygoplichthys multiradiatus*) caught during electrofishing in the L31-W canal in south Miami-Dade County.

Continuation in FY11: The SFCN will move forward in coordinating efforts with EVER and FIU personnel regarding fieldwork and calibration of electrofishing equipment. Raul Urgelles will continue to communicate regularly with all involved parties and update them on the status of the SFCN's progress toward this collaborative effort. Finally, the SFCN is helping to host a Non-Native Fish discussion symposium which will be held at the Southern Division of the American Fisheries Society Meeting this January. This discussion symposium is collaboration with Everglades National Park, U. S. Army Corps of Engineers Invasive Species Division, and Florida Fish and Wildlife Conservation Commission, U. S. Geological Survey and Florida International University.

Periphyton Vital Sign



Non-Metric Multi-Dimensional Scaling of diatom communities in periphyton mats from impacted sites (red dashed lines) and unimpacted sites (green solid line) sampled in Big Cypress National Preserve, December 2008.

Accomplished in FY10: In November 2009, the SFCN conducted its second sampling of periphyton in the Big Cypress National Preserve (BICY). The goal of the 2009 sampling was to provide a better understanding of a nutrient gradient, as depicted through diatom communities, across the hydrological basins in the northwest portion of the preserve. Sixty-five periphyton mat samples were collected from sites in six hydrological basins, three nutrient-impacted and three unimpacted, topographically defined by watershed boundaries and flow direction. Sites within the basins were accessed by helicopter and by all-terrain vehicles (ATVs). Samples were preserved and sent to Dr. R. Jan Stevenson at Michigan State University for diatom identification and community analyses.

The Stevenson lab had provided the SFCN with preliminary results of their analyses on the diatom communities found in the 2008 periphyton samples. These results showed distinct diatom assemblages in impacted and unimpacted sites within northwest BICY and recommended that examination of the diatom composition of marsh communities alone would provide sufficient information to determine if a site was in an impacted or unimpacted state. As a result, the number of periphyton collection sites was increased for the 2009 sampling in order to cover as much of each basin as possible. This increase in sample size would potentially indicate any

variability in the diatom community, from a spatial perspective, within each basin.

Continuation in FY11: The SFCN will again sample periphyton from the six hydrological basins delineated within northwest BICY and will continue to coordinate with BICY staff (hydrologist Robert Sobczak, hydrological technician Paul Murphy, and botanist James Burch) for logistical support during the collection. The goal of this year's sampling is to investigate temporal changes in periphyton communities at sites that have been repeatedly sampled. The Stevenson lab has processed the 2009 samples for diatom content and is in the process of writing an interpretive report.

Freshwater Fish and Large Macro-invertebrates Vital Sign

Accomplished in FY10: The SFCN did not conduct any sampling of freshwater fish and large macro-invertebrates due to time constraints. Monitoring for this vital sign initially called for a coordinated sampling effort of this and two other relevant vital signs: Periphyton and Aquatic Invertebrates in Wet Prairies and Marshes. All sampling would take place in the northwest portion of Big Cypress National Preserve (BICY).

Continuation in FY11: The SFCN will initiate a pilot study to sample fish and macro-invertebrates in the northwest portion of BICY. Sampling methodology for this vital sign will either be similar to that used to sample forested areas (BICY Audubon of Florida) or marshes (EVER FIU). The SFCN will determine if sampling sites for this vital sign will be located next to existing periphyton sampling sites or have its own sample frame.

Aquatic Invertebrates in Wet Prairies and Marshes Vital Sign

Accomplished in FY10: The project initially called for a coordinated sampling effort of this vital sign, along with the Periphyton and Freshwater Fish and Large Macro-Invertebrates vital signs, in the northwest portion of Big Cypress National Preserve (BICY). The SFCN did not conduct any field sampling of aquatic invertebrates in wet prairies and marshes; however, we did explore the use of a U. S. Fish and Wildlife Service (USFWS) protocol: Procedure for the Collection of Field Identifiable Freshwater Wetland Macroinvertebrates Using a Time-Limited Qualitative Dip-Net Method.

Continuation in FY11: The SFCN will initiate a pilot study using the above method and attempt to apply this in the field at a number of sites in BICY. Sampling for this vital sign may be done in conjunction with fish and macro-invertebrate sampling.

I.C Data Management, Analysis, and Reporting Branch

Overview

The Data Management, Analysis and Reporting Team worked this year to assist vegetation and benthic map production; GIS, data management, and analytical support to the various vital sign and water quality monitoring projects underway; provide IT support to SFCN; and provide information support to the parks. The team also helped with the field implementation of some of the vital signs with Brian Witcher providing assistance with reef fish monitoring and coral monitoring and Judd Patterson assisting with colonial nesting bird monitoring by Sonny Bass at DRTO. Kelly Bowman took a break from SFCN to help monitor sea turtle nesting at Buck Island through their SCA program. Presentations were given at the NPS Data Management Conference in April and ESRI International user conference in July. SFCN participated in the Marine and Estuarine Goal Setting for South Florida workshops to develop marine indicators and corresponding report cards. A new GIS/Data Management SCA intern was also hired.

The new Florida SFCN server was installed in 2010 together with a new automated tape backup system. A total of 6 new computers were purchased in FY10. Currently there are a total of 22 functioning workstations in the Florida SFCN office with computers purchased for 3 more. Updates to the USVI SFCN IT include the installation of a wireless antenna on the top of building RM 4. This antenna provides a secure internet connection between RM offices and St. Thomas. SFCN provided funds for the antenna and installation. A dual-tape backup system was transported down to St. John and is currently being configured.

Two major external efforts that the team was involved with include 1) providing data management support for the 2010 Biscayne National Park BioBlitz in cooperation with National Geographic, and 2) taking the initial lead on data management for the MS Canyon 252 Deepwater Horizon Oil Spill. This took some time away from vital sign reporting development and some projects are behind schedule. Staff also fulfilled more than 30 requests for spatial data, reports, and analysis assistance from national parks, universities, NGO's and state/federal agencies.

The team continues to work on completing reporting loop pathways and loading all products to the SFCN web page. The datamining project results were made available on the SFCN intranet. A vegetation mapping web page, a species lists web page and a marine fish communities web page were developed. A climate change fact sheet was created.

The team developed SOPs this year for using GeoSetter to geotag photographs, hyperlinking photos to ArcGIS maps, hyperlinking videos to ArcGIS maps, using ThumbsPlus for data entry, renaming photo files using ThumbsPlus user fields, and printing posters. In addition a project and report tracking database was developed.

Garmin is updating its Garmin BlueChart marine map series information with improved NPS boundaries and NPS regulations for Virgin Islands National Park as a result of conversations with and data provided by Jeff Miller and Judd Patterson. In the future, more detailed marine information will be added to other SFCN park units.

The sections below only addresses issues not covered in other branches above.

Inventories

Biscayne BioBlitz

Project status: Biscayne National Park joined with National Geographic to conduct a 24 hour “BioBlitz” to tally as many species as possible and to provide an opportunity for the public and school kids to work side-by-side with scientists in a major public outreach event. Total participation was estimated at over 2000 people including 170 scientists and experts from various disciplines and 1300 students and educators from elementary to university levels.

SFCN helped with various aspects of Biscayne BioBlitz 2010. Matt Patterson assisted with project planning and was the Science Branch Director for the Incident Command Team. SFCN also helped create maps and signs before the event. Nearly all SFCN staff were involved during the day of BioBlitz either at the data entry stations, leading snorkel boat surveys, leading plant and bird identification walks, helicopter colonial nesting bird surveys, and ferrying scientists around the park.



BioBlitz species photos taken by SFCN staff: Lined Seahorse (*Hippocampus erectus*), Black Witch Moth (*Ascalapha odorata*), Spotted Sea Hare (*Aplysia dactylomela*), Bald Eagle (*Haliaeetus leucocephalus*)

SFCN together with Peter Budde and Simon Kingston of the I&M WASO office took the lead of the Data Management Team creating the BioBlitz IT Plan, data sheets, database, tally sheets, and data entry station and photo management standard operating procedures (SOPs); setting up and running the data entry stations; providing near real-time updates throughout the event; and overseeing subsequent QA/QC. 167 data sheets have been processed to date and the results are summarized below. After Bioblitz, the data were vigorously QA/QC'd and returned to scientists for comments. Photos and data were provided to the National Geographic FieldScope program (<http://biscayne.fieldscope.us/>) as well as to the park.

9/30/2010 BioBlitz Species Count (Note: Some scientists with samples have yet to report their final results.). Photo of Judd Patterson and a scientist working together to label photos at the Elliott Key Data Entry Station.

Taxa Group	Total Species	New Species
Amphibian	4	
Bird	88	3
Coral	52	26
Fish	163	2
Fungus	7	7
Insect	39	37
Mammal	8	
Non-vascular Plant	44	44
Other Invertebrate	200	185
Reptile	9	
Vascular Plant	214	20
Grand Total	828	324



From an I & M program viewpoint, results support the following conclusions:

- 1) As less than 10% of the vertebrates and vascular plants were new species, the previous I & M inventories of vertebrates and vascular plants do appear to have accomplished their goal of identifying 90% of their taxa in the park. Most of the new species of vascular plants (9% new) were from the disturbed area around the visitor center and picnic area which was not the focus of the I & M inventory.
- 2) Although it cannot be considered a thorough survey, the BioBlitz added or greatly increased lists of species not covered under the I & M program inventories including: marine invertebrates, insects, lichens, macroalgae, and tardigrades.
- 3) Three scientists reported having a specimen that they were having difficulty identifying, so it's possible new species to science may result.
- 4) Good data management during this primarily public outreach event is necessary to make the resulting data useful for adding to NPSpecies inventories. The cost-benefit was primarily realized in taxa not previously surveyed during I & M inventories.
- 5) The event can greatly add to the number of species photos held by the park and network. However care must be taken to have a good form giving permission for future use handed out to the scientists.

In FY11 SFCN will provide guidance to an intern to follow up with scientists and write a final report. Then all "new" species will be sent to NPSpecies.

Inventory of bats – all network parks

Project status: Final cleanup of data files was completed. Final review of bat vocalization recordings was completed. Completed database and GIS files were posted to NRINFO (NRDataStore replacement). A brief summary of the results will be made available to the parks in FY11.

Datamining

Project status: Initial cleanup of the 2006 Datamining Project database occurred. Following the cleanup a ColdFusion application was developed to make these products available on the NPS Intranet in a searchable format. This has greatly increased access to articles and reports that previously only existed in a single paper copy. The Intranet website is

http://www1.nrintra.nps.gov/im/units/sfcn/doc_search.cfm

Downloadable Species Lists

Project status: Downloadable species lists were created for each park on the SFCN web page. (<http://science.nature.nps.gov/im/units/sfcn/inventories.cfm>). These will be refreshed as necessary as NPSpecies is updated.

Vegetation Mapping Web Page

A Vegetation Mapping web page with final vegetation mapping project data, reports, and maps to the Inventories section of the SFCN web page

(http://science.nature.nps.gov/im/units/sfcn/veg_maps.cfm).

Hyperlinking photos /video to field point locations in ArcMap

A hyperlinking tool was created that joins field photos to field point locations in ArcMap allowing users to click on a point and open up the associated field photos and/or video. This has been applied to benthic habitat mapping (BISC, DRTO) and to the vegetation map accuracy assessment (EVER, VIIS). We are also currently using this to link fish photos to monitoring locations.

Vital Signs Monitoring

Colonial nesting birds – DRTO, BISC

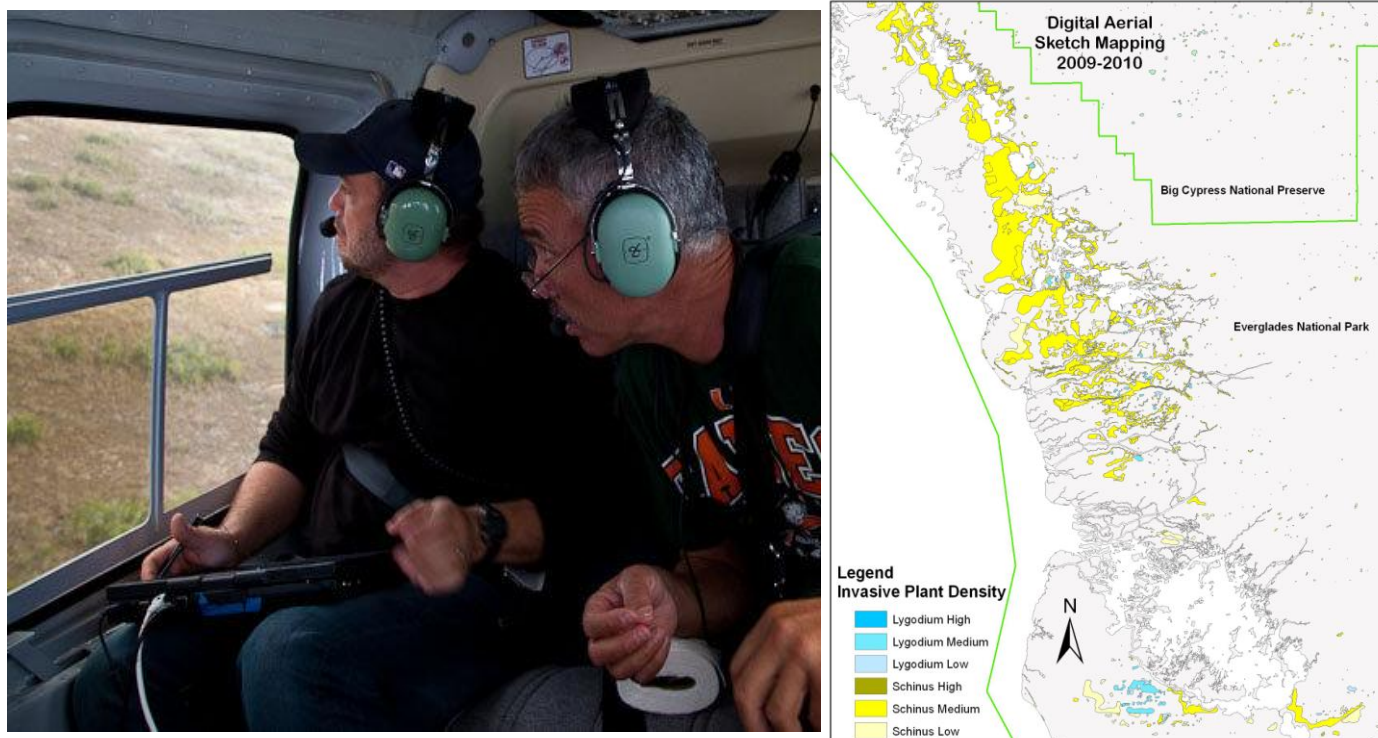
Accomplished in FY10: During the MS Canyon 252 baseline data collection effort at DRTO there were a few opportunities that allowed Judd Patterson to once again assist Sonny Bass of EVER with colonial bird monitoring.

Continuation in FY11: We expect to assist with database development for BISC monitoring and possibly database development, analysis assistance and reporting for the other parks. Judd will again assist the DRTO and BISC monitoring efforts if requested.



Female magnificent frigatebird landing on her nest

Invasive/Exotic Plants – Digital Aerial Sketch Mapping



Left: LeRoy Rodgers and Tony Pernas. Right: 2009-2010 cleaned-up digital aerial sketch mapping polygons

Accomplished in FY10: Judd Patterson provided Tony Pernas with aerial imagery and logistical support while preparing for his 2010 flights. Rachel Vargas provided post-processing and QA/QC for GIS files generated during the 2009-2010 Everglades Cisma Digital Aerial Sketchmapping by the NPS-EPMT program as well as cleaning up the database of some overlapping polygons. Final polygons and data were displayed at a GEER 2010 presentation by Tony Pernas. Results are available on the Everglades Cisma web site <http://www.evergladescisma.org/DASM/>.

Continuation in FY11: The Data Management, Analysis and Reporting Branch will work with Tony Pernas of the NPS-EPMT program to develop a protocol/SOP for the Digital Aerial Sketch Mapping that Tony currently conducts. EPMT staff will be taking a lead role and we will be providing assistance. SFCN will be providing assistance in post-processing of the digital sketch mapping with the SFCN-SCA contributing 2 weeks of time.

Land use change

Accomplished in FY10: SFCN worked with the WASO office on their national land use change effort, determining areas of analysis for the SFCN parks. Zoning information for counties and municipalities for the South Florida Area of Interest has been collected. Permit information was collected from Cutler Bay, FL for use in development of a mapping SOP to display permitted development occurring around the parks.

Continuation in FY11: SFCN will meet with local government entities in charge of permitting/zoning for each park and develop SOPs for obtaining relevant information as part of developing the protocol for the Land Use Change vital sign. This document will largely draw from the protocol developed by the Gulf Coast Network, as well as WASO. SFCN expects to complete the Land Use Change vital sign protocol in FY11.

Sea Turtles

Accomplished in FY10: SFCN responded to a request from BUIS to merge two versions of the database that were out of sync. A few other tweaks that improved data entry were also requested and implemented.

Continuation in FY11: We will work with BUIS staff to better document database fields (current vs. legacy), as well as convert existing location system to UTM coordinates. We also plan to add automated reporting to make it easier to get data back out of the database, including multi-year trends reports previously discussed with the BUIS resource manager. We will talk with VIIS, BISC, and EVER to see if they are interested in using the database. It has also been suggested that future sea turtle interns could enter data much more efficiently if they were given a tutorial on how the sea turtle database functions. This could be created as a series of screen captures or a video.



Hawksbill Sea Turtle

Marine Fish Communities- harvest data; Marine Exploited Invertebrates – harvest data; and Focal Fish Species

Initiation in FY11: SFCN will post links to BISC and EVER fish and lobster harvest data reports from their creel surveys. SFCN will create links to the state harvest data reporting and as necessary create additional summaries of the data.

Web page reporting for Vital Signs

Accomplished in FY10: A Marine Fish Communities web page was created and will serve as a template to begin working on web pages for other vital signs (http://science.nature.nps.gov/im/units/sfcn/vital_signs/marine_fish_communities/marine_fish.cfm). Vegetation Communities Extent and Distribution vital sign points to the Vegetation Mapping Inventory web page. Little progress was made on summarizing data or posting reports from other groups in FY10 as the bulk of our time was spent meeting the needs of the Marine and Community Ecology Branches as well as Biscayne BioBlitz 2010 and the MS252 Gulf Oil Spill.

Continuation in FY11: SFCN will work to get other vital sign web pages up and functioning and will seek additional guidance from the parks on the level of reporting effort the network will put towards reports/web pages to create for vital signs monitored by the parks and other organizations. SFCN will seek to get SFCN monitored web pages up and functioning this year.

In addition SFCN will generate web page links to existing monitoring program documents. In some cases this may simply involve creating links to the CERP RECOVER System Status Report which will shortly be released. Web pages currently being worked on include:

- Benthic Communities Extent and Distribution
- Marine Benthic Communities (Update)
- Surface Water Hydrology
- Invasive / Exotic plants (Update)
- Invasive / Exotic Animals
- Air Quality
- Visitor use
- Florida Panther
- Sea turtles

Big Cypress National Preserve Natural Resource Condition Assessment

Initiation in FY11: SFCN will hire a term GS-11/12 ecologist to work on the Big Cypress National Preserve Natural Resource Condition Assessment in early FY11. We anticipate this position will work for multiple years, producing the report for Big Cypress the first two years, and a report for Everglades National Park for the following two years.

I.D Water Quality Monitoring

Contaminants – MS Canyon 252 Baseline Oil Assessment

On April 20, 2010, the MS Canyon 252 oil spill began and on May 1, SFCN attended its first meeting on responding to the oil spill. The South Florida Parks of Dry Tortugas NP, Everglades NP, Biscayne NP, Big Cypress NP and De Soto NM initiated a South Florida multi-park Incident Command and determined to conduct a baseline assessment of natural and cultural resources in advance of any impacts of the oil spill to the parks based upon guidance in the NOAA Deepwater Horizon Sampling Guidance (4/28/2010 Draft). SFCN assisted with this effort by

- participating in initial baseline assessment planning,
- taking lead on initial protocol implementation, training and adaptation to local needs,
- leading on monitoring and reporting for DeSoto National Memorial (11 sites),
- participating in monitoring data collection for DRTO (55 sites), BISC (63 sites), and EVER(88 sites), and QA/QC of data for DRTO,
- collecting 18 coral tissue samples in DRTO for analysis by NOAA,
- placing and retrieving 36 SPMD's to collect water quality data in DRTO, EVER, and BISC for analysis by USGS,
- taking initial lead of data management for the first 5 weeks,
- adapting a GULN oil spill database and documentation to local needs,
- designing data sheets,
- providing randomly selected sample locations for DRTO, BISC, and EVER,
- tracking GPS points and track files and reporting them to the Alabama Incident Command office,
- providing GIS layers of the South Florida parks to the Alabama Incident Command,
- drafting initial data management plan and developing SOPs for data management and photo management,



Staff of multiple parks jointly collecting sediment samples at De Soto National Memorial as part of the MS Canyon 252 Oil Spill Baseline Assessment to ensure consistent protocol implementation across parks.

A screenshot of a web-based data entry form titled "Data Entry Form - New record". The form has a light green header and a white body. It includes fields for "Location" (with a dropdown menu), "Unit Code", "Start Date", and "Start Time". There is a section for "Observers" with a dropdown menu and buttons for "Add a person", "Delete record", "New record", and "Close". Below this is a tabbed interface with "Field Data", "Sediment Samples", and "Water Sample" tabs. The "Field Data" tab is active, showing a "Transsect Name" dropdown, a "What was used to mark this point?" dropdown, and a "Please specify" section. The "Please specify" section includes fields for "Tarball Present" (Yes/No), "Number", "Size", "Percent Cover", "Observable Distance (m)", "Dead Wildlife Present" (Yes/No), "Species", "Number", "Condition", "Observable Distance (m)", "Beach Conditions", "Oil Present" (Yes/No), "Oil Type", "Observable Distance (m)", "Other Comments", and "Birds or Mammals present". There are also sections for "Pictures" and "Subsite Location" with dropdown menus and buttons for "Add a person", "Delete record", "New record", and "Close".

SFCN adapted the GULN oil spill database and documentation to South Florida park needs

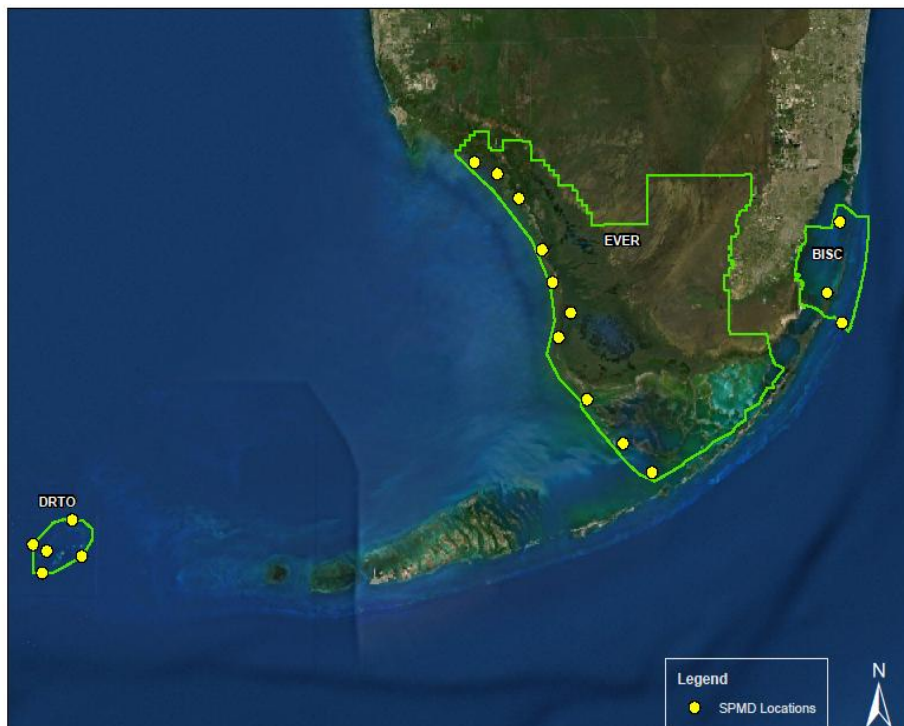
- recommending an institutional structure involving a Incident Command Data Manager, Park Monitoring Coordinators and Data Shepherds that was ultimately adopted and proved successful,
- assisting essential communication among Monitoring Coordinators and Data Shepherds at the various parks and to the Alabama Incident Command office,
- providing a report template to the monitoring coordinators using DESO as an example.

The exhausting joint inter-park effort resulted in the successful collection and management of the planned data, photos, water and sediment samples for all parks. The Incident Command Data Manager Alan Williams (Mid-Atlantic I & M Network Data Manager) successfully took charge in early June and helped ensure that all water and sediment samples were labeled appropriately and sent for analysis, that all data were QA/QC'd and reports generated by the monitoring coordinators for all the parks. Nearly every SFCN staff member and intern was involved during some point of the response resulting in at least 2246 hours of effort expended.

Collaborating with USGS to deploy Semi-Permeable Membrane Devices in 3 parks

As a response to the events related to the Deepwater Horizon explosion in the Gulf of Mexico, the SFCN again partnered with the USGS and Dr. Tim Bargar to increase water monitoring efforts in South Florida parks through the use of Semi-Permeable Membrane Devices (SPMD). SPMDs are used as bioaccumulators of lipophilic environmental contaminants. These devices provide a measure of bioavailable pollutants in the aquatic environment by mimicking the passive transport mechanism similar to that of fish gills or human lungs. During the months of May, June, and July SFCN's staff deployed and recovered 36 devices in two different rounds at 18 different locations encompassing three different National Parks; Everglades, Biscayne and Dry Tortugas. The samplers remained in the water for approximately 28 days each, and after

recovery they were sent to the USGS laboratories for analysis. The data collected optimally will provide baseline contamination data that could be correlated with historical assessment data for the locations where SPMDs were deployed in addition to providing a strong indication of causality if perturbations of the historical data are detected after exposure to oil.



SPMD locations for the sampling event related to the Deepwater Horizon oil spill in 2010.

Dry Tortugas Coral Tissue Sampling during MS Canyon 252 Baseline Oil Assessment

In collaboration with the Florida Fish and Wildlife Conservation Commission Florida Wildlife Research Institute's coral monitoring program (CREMP), NOAA and NPS, three sites were selected in DRTO for the sampling of corals for tissue analysis as part of the baseline oil assessment. At each site, five coral tissue/skeleton plugs were taken and put into a cryo-freezer for eventual shipment to analytical labs. Three water samples and three sediment samples were also taken at each site. Mustard Hill Coral, *Porites astreoides*, was sampled from a site in the NE section of DRTO, and a site near the fore reef crest of Bird Key Reef in the south of the park. Elkhorn Coral, *Acropora palmata*, was sampled from the palmata patch, south of Garden Key.

Continuation in FY11: Project is complete. No further action is assumed.

Contaminants-other

Accomplished in FY10: The SFCN completed a pilot project to assess levels of Emerging Pollutants of Concern (EPOCs) in near shore waters of Biscayne Bay and Biscayne National Park due to concerns generated by the Miami-Dade Water and Sewer Department's Wastewater Reuse Pilot Project. The SFCN worked in conjunction with the US Geological Survey Dr. Tim Bargar (Florida Integrated Science Center) and Dr. David Alvarez (Columbia Environmental Research Center) to complete the project. The project consisted of deploying polar organic chemical integrative samplers (POCIS) at 12 locations in Biscayne Bay. The POCIS are designed to sample water-soluble (polar or hydrophilic) organic chemicals from aqueous environments. Chemicals sampled can include complex mixtures of pesticides, prescription and nonprescription drugs, personal care and common consumer products, industrial and domestic use materials and degradation products of these compounds. The samplers remained submerged for approximately 30 days before they were recovered by SFCN staff. The SFCN provided field and equipment support and logistics to deploy and recover the samplers. Retrieval of the POCIS samplers was completed approximately 30 days after deployment (submersion) and returned to the USGS laboratories for analysis. Data are being processed and will be presented on the Florida Bay Conference by Dr. Bargar in October 2010.

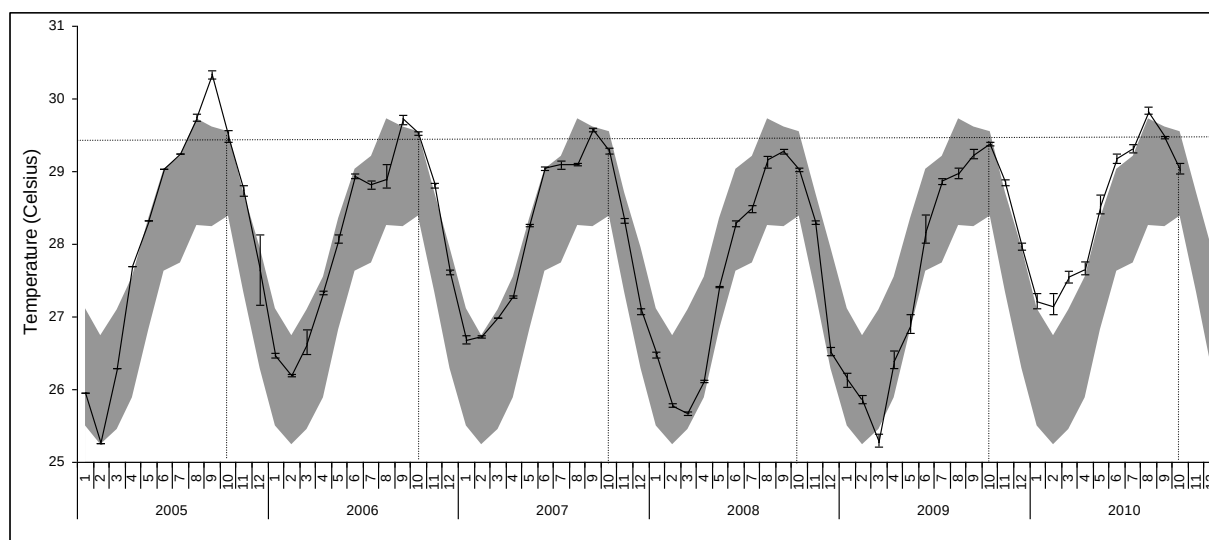


Continuation in FY11: After the successful completion of the pilot project in 2010 to assess levels of Emerging Pollutants of Concern (EPOC) in waters of Biscayne Bay, the SFCN secured funding through the National Park Service/USGS Water Quality Partnership to continue the EPOC project at Biscayne National Park and Biscayne Bay. The 3 year and \$300K project will be continued in conjunction with the USGS in order to establish baseline aquatic contamination

and endocrine status in resident fish populations of Biscayne National Park and in the adjacent coastal wetlands.

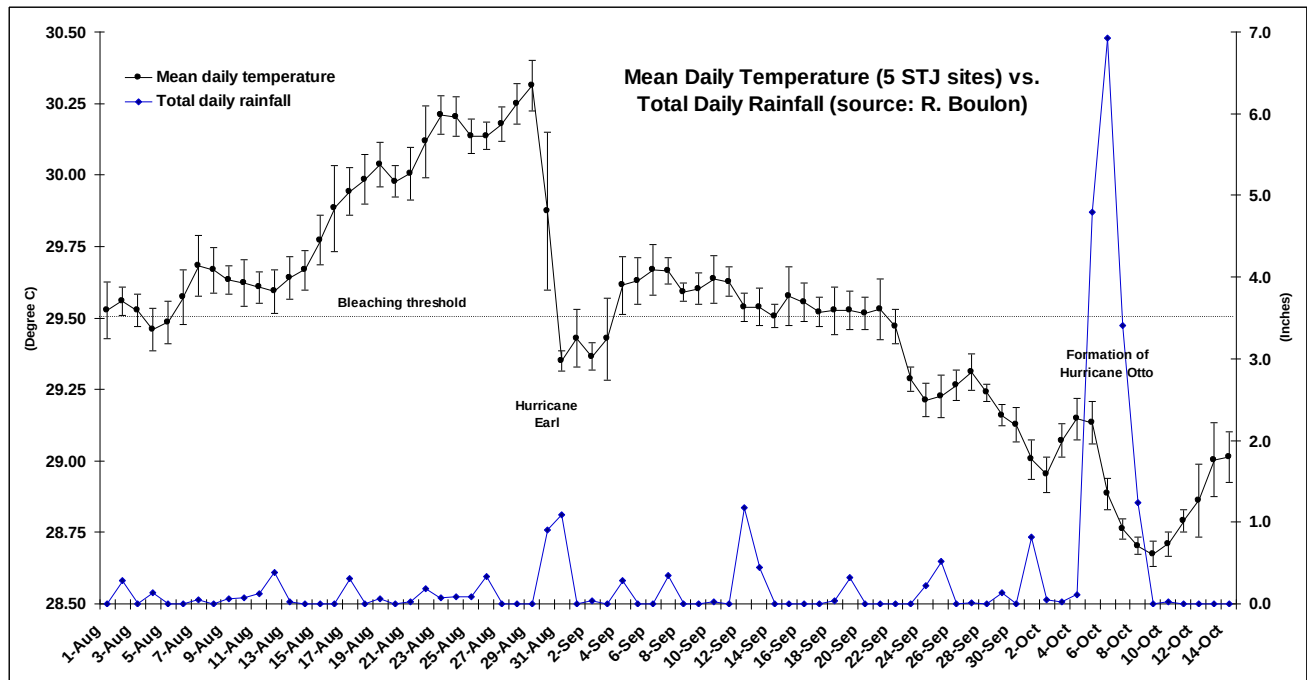
Marine Benthic Communities – Coral Reef Water Temperature

Accomplished in FY10: Reef temperature data were collected at all coral index sites and at coral extensive sites (DRTO only). Initially 2010 temperatures from January – August were higher than the baseline years of 1988-2004 raising concerns for another major bleaching event in the Virgin Islands. SFCN pulled the Yawzi and Tektite Hobo water temperature data after Hurricane Earl passed the U.S. Virgin Islands and they both show a similar pattern showing the abrupt decrease in temperatures after the passing of Hurricane Earl. Peaks prior to Earl were mid-30°C. Average of this plot from 8/18-8/29 was 30.1°C. The monthly average temperature for September dropped to 29.5°C, which is right at the "bleaching threshold". This was a decrease from the August monthly average which was 29.8 and is unusual as September is historically the warmest month for seawater. Thus it appears H. Earl did lower the water temperature and it stayed low for the rest of the month, although the storm caused substantial physical damage to the corals on the south shore.



St. John ocean temperatures at reef depth in 2005-2010 compared with 1988-2004 data. Line represents average, minimum, maximum of monthly average temperatures recorded at 4-5 reefs at St. John from 2005-Oct 2010 (HA, NF, TK YZ, MB). Grey shows range (minimum-maximum) of monthly average temperatures recorded at 3 reefs (HA, NF, YZ). Number of sites with data varied by month and year. Vertical line shows mean values for October 2005-2010. October mean temperature of 29.02 °C is lowest October mean temperature of the previous six years. Horizontal line is bleaching threshold (29.5°C).

Staff saw moderate bleaching, at depths ranging from 65 feet and shallower. There appeared to be more discoloration in water less than 30 feet. But very little "totally white" or totally bleached coral was seen. Early results from one analyzed site monitored in September showed 61.9% of the coral cover bleached, and most of that was only partially discolored. Less than 1% of the coral cover was completely white.



Abrupt change in water temperature readings at 5 St. John reef sites after the passage of Hurricanes Earl and Otto.

Continuation in FY11: Water temperature data will continue to be collected at all sites in FY11. Historical data will be QA/QC'd and added to DataForEver. Code to increase ease of data importation into the database will be added. The reporting strategy will be finalized and implemented and the protocol updated accordingly. SFCN plans to publish the long-term water temperature data record at VIIS. Analysis of DRTO water temperatures will be conducted to see if there are spatial/depth patterns across the park.

Nutrient Dynamics and Water Chemistry

Accomplished in FY10: The post-doc position funded by SFCN via a cooperative agreement with Jim Fourqurean and Joe Boyer of Florida International University was advertised in late FY10.

Continuation in FY11: Position interviews and hiring of the position are beginning in early FY11. The objectives of the agreement include:

- Identify and collect all available data pertaining to water quality and Vital Signs status for the marine and estuarine areas of the National Park Service lands in the SFCN. Data will be, to the extent possible, entered into a centralized relational database. The cooperator will work with SFCN staff, as well as staff from the member National Park Service units and academic and government scientists in the region to identify the available data.
- Document the SOPs used by the collectors of data.
- Develop SOPs for accessing and reporting nutrient and water chemistry data from cooperators.
- Produce a graphical and pictorial summary of the spatial and temporal extent of the available water quality and Vital Sign data. Develop initial data summaries of nutrient

and water chemistry data for reporting SFCN Vital Signs and to the extent possible put into context of status using, for example, state regulatory values or pristine site values. Once data collection tasks are accomplished, statistical models will be created in coordination with SFCN staff, relating to water quality and the state of Vital Signs to explore:

- How changes in water quality parameters (especially N, P, DO, salinity, turbidity) relate to changes in estuarine seagrass communities, phytoplankton, hardbottom communities, and associated biota?
- How changes in water quality parameters (especially N, P, DO, turbidity) relate to changes in marine seagrass, coral reef communities, and phytoplankton?
- How should the ecological and water quality data be reported to communicate effectively the linkages and when water quality is likely causing a problem in the ecological communities?

With EVER's permission, SFCN will work with WRD to migrate DataForEVER to Storet. For VIIS we will be working with the VIIS Data manager to finish their water quality monitoring database.

Estuarine Salinity patterns – BISC, EVER

Accomplished in FY10: No progress due to other SFCN time constraints.

Continuation in FY11: SFCN Data Management and Reporting Staff will further work with Sarah Bellmund to report this CERP indicator and NPS vital sign on the SFCN web as well as provide links to the CERP RECOVER System Status Report. SFCN will also contact Erik Stabenau for Florida Bay estuarine salinity patterns reports.

Surface water hydrology –BICY, EVER

Continuation in FY11: For BICY and EVER the SFCN will continue to maintain links to regional hydrology summaries by Bob Sobczak of BICY and EVER; additionally, SFCN will use the Everglades Depth Estimation Network (EDEN) pulling together hydropatterns at key long term hydrology stations (e.g. P205 station).

Surface water hydrology – Weather stations

Accomplished in FY10: SARI and BUIS staff sent monthly data collected from the three different weather stations to SFCN to be processed and saved as established by the Weather Station Protocol and associated SOPs. SFCN developed basic reporting procedures and associated database queries related to the weather station and crest gauge data in SARI and BUIS.

Continuation in FY11: SARI and BUIS park staff to continue sending to the SFCN the monthly data collected from the remaining weather stations. However, the weather station at SARI has been dismantled and no longer in use. SFCN will attempt to utilize NOAA's Integrated Coral Observing Network (ICON) monitoring station at SARI, which currently monitors many of the same parameters. SFCN will finalize QA/QC procedures, finalize the Weather Station Protocol and begin basic reporting procedures. SFCN will develop a SOP for transferring data to the DataForEver database, maintained by the Physical Resources Branch of Everglades National Park.

Surface water hydrology – SARI

Accomplished in FY10: SARI staff sent monthly data collected from the crest gauge to SFCN. The SFCN processed and saved as established by the Weather Station Protocol and associated SOPs. SFCN completed developing basic data reporting procedures in order to report on the crest gauge's collected data.

Continuation in FY10: SARI park staff to continue sending monthly data to SFCN. SFCN will begin basic reporting procedures and associated database queries.

Other water quality related monitoring

A number of other vital signs strongly relate to water quality but are covered under the vital signs monitoring section including periphyton, aquatic invertebrates, freshwater fish and large macro-invertebrates, seagrass, and coral.

SFCN continues supporting Biscayne National Park staff with negotiations between the park and Miami-Dade Water and Sewer Department's Wastewater Reuse Pilot Project

Dr. Kevin Whelan assisted Biscayne National Park during FY10 several times to address the requests for professional assistance evaluating the Miami-Dade Water and Sewer Department's proposal for the development of a Wastewater Reuse facility adjacent to the park's western boundary. NPS concerns include the ability for the pilot project to adequately demonstrate the treatment process having no negative impacts to the park ecosystems and adjacent lands. SFCN continues to assist in order to ensure any pilot project that goes forward would be able to produce scientifically defensible results to more fully understand the consequences of treated wastewater entering the park.

II. Public Interest Highlights

SFCN participates in the Fairchild Challenge Environmental Immersion Day

On March 23, 2010, SFCN hosted 10 high school students; giving them a taste of SFCN's marine monitoring work and helping them experience vegetation plot data collection and general data analysis. Fairchild Tropical Botanical Gardens, in partnership with Miami-Dade schools organized Environmental Immersion Day to educate high school students about their environment during a full day of shadowing natural resource professionals. The ten students were provided an experience on the water learning how the NPS monitors coral reefs and fish, how we monitor vegetation, and how we use GIS to evaluate changes in these resources. SFCN took the students to Elliott Key in Biscayne National Park, where the students established two vegetation monitoring transects in the tropical forests and gathered tree data, including composition and diameter at breast height (dbh) measurements. The students then performed simple analysis on the data collected, including average tree size and tree species counts. The students were then taken into the seagrass beds near Sands Key, also in Biscayne National Park, where SFCN demonstrated the process for counting fish and estimating seagrass percent cover data.

Biscayne National Park - National Geographic BioBlitz

Biscayne National Park and SFCN working with National Geographic hosted a 24 hour "BioBlitz" to tally as many species as possible and to provide an opportunity for the public and school kids to work side-by-side with scientists in a major public outreach event. Total participation was estimated at over 2000 people including 170 scientists and experts from various disciplines and 1300 students and educators from elementary to university levels.

Nearly all SFCN staff were involved during the day of BioBlitz either at the data entry stations, leading snorkel boat surveys, leading plant and bird identification walks, helicopter colonial nesting bird surveys, and ferrying scientists around the park.

SFCN with the I&M WASO office took the lead of the Data Management Team creating the BioBlitz IT Plan, data sheets, database, tally sheets, and data entry station and photo management standard operating procedures (SOPs); setting up and running the data entry stations; providing near real-time updates throughout the event; and overseeing subsequent QA/QC. Of the 828 species tallied, 324 were new to the park list.

Water Temperature & Coral Bleaching

U.S. Virgin Islands water temperatures never cooled from 2009 summer temperatures and began heating up during the spring and early summer 2010. These increased ocean temperatures exceeded the historical data range and triggered a coral bleaching event. Hurricane activity provided some reductions of water temperature. However with the ocean temperature exceeding the critical threshold for coral bleaching, SFCN commenced additional coral monitoring to document the level of bleaching, and are preparing for potential additional monitoring if the bleaching event continues.

MS252 Deepwater Horizon Oil Spill

On April 20, 2010, the MS Canyon 252 oil spill began and on May 1, SFCN attended its first meeting on responding to the oil spill. The South Florida Parks of Dry Tortugas NP, Everglades NP, Biscayne NP, Big Cypress NP and De Soto NM initiated a South Florida multi-park Incident Command and determined to conduct a baseline assessment of natural and cultural resources in advance of any impacts of the oil spill. SFCN assisted with this effort by participating in initial baseline assessment planning, taking lead on initial protocol implementation, training and adaptation to local needs, leading on monitoring and reporting for DeSoto National Memorial (11 sites), participating in monitoring data collection for DRTO (55 sites), BISC (63 sites), and EVER (88 sites), collecting 18 coral tissue samples in DRTO for analysis by NOAA, placing and retrieving 36 SPMD's to collect water quality data in DRTO, EVER, and BISC for analysis by USGS, taking initial lead of data management for the first 5 weeks, and providing an information conduit to incident command centers around the Gulf. Nearly every SFCN staff member and intern was involved during some point of the response resulting in at least 2246 hours of effort expended.

Roseate Spoonbills nesting in Biscayne National Park

During FY10-FY11 colonial nesting bird monitoring flights, SFCN staff detected two Roseate Spoonbill (*Platalea ajaja*) nests within Biscayne National Park, a significant find as Roseate Spoonbills are considered uncommon in the park. This is the first time in several decades that this state listed Species of Special Concern (FWC) has been detected nesting in the park according to park management.

Garmin updates park boundaries and regulations on Garmin devices

Jeff Miller opened conversations with Julie Keys, a cartography product manager with Garmin, and discussed the feasibility of improving NPS boundaries and regulations on Garmin devices. With help from Judd Patterson, boundaries for all SFCN park units were sent to Garmin. As a test, additional details including anchoring zones, mooring buoys, and park regulations were added to Virgin Islands National Park. All of these boundaries and regulations will be included on the Garmin BlueChart marine map series to be released in February 2011. In the future, more detailed marine information will be added to other SFCN park units.

Review of extinction potential for 82 species of coral

Matt Patterson, SFCN Network Coordinator, participated on the Biological Review Team (BRT) to evaluate the extinction potential of 82 species of coral. SFCN data were used to help document declines in *Montastraea annularis* complex species in the Caribbean. The BRT findings are currently being reviewed and will be forwarded to National Marine Fisheries Service in early 2011 for consideration for ESA listing.

III. Staffing

SFCN Staff, Associated Post-docs, and Interns

Matt Patterson, Network Coordinator
Andrea Atkinson, Quantitative Ecologist
Michael Feeley, Marine Ecologist
Kevin R. T. Whelan, Community Ecologist
Brian Witcher, Data Manager
William “Jeff” Miller, Fisheries Biologist
Judd Patterson, GIS/Data Management Specialist
Andy Davis, Marine Biological Technician
Andy Estep, Marine Biological Technician
Brooke Shamblin, Vegetation Technician
Raul Urgelles, Wildlife Technician
Rob Waara, Marine Biological Technician
Joaquin Alonso, Community Technician
Rachel Vargas, Data Management/Outreach Technician
Rick Jacobson, Administrative Assistant
Marilyn Brandt, Marine Postdoctoral Research Assistant
Tim Fotinos, Vegetation Postdoctoral Research Assistant
Jonathan Moser, Resource Management Intern
Jose Luciani, Resource Management Intern
Tiara Thanawastien, Resource Management Intern
Lindsay Jones, Student Conservation Association Intern
Kelly Bowman, Student Conservation Association Intern
Elizabeth Anzinger, Student Conservation Association Intern
Carolyn “Lara” Ariori, Conservation and Land Management Intern
Carolina Cabal, George Melendez Wright Climate Change Intern

Board of Directors

Pedro Ramos, Superintendent, Big Cypress National Preserve
Mark Lewis, Superintendent, Biscayne National Park
Joel Tutein, Superintendent, Buck Island Reef National Monument/ Salt River Bay National
Historical Park and Ecological Preserve/ Christiansted National Historic Site
Dan Kimball, Superintendent, Everglades National Park/ Dry Tortugas National Park
Mark Hardgrove, Superintendent, Virgin Islands National Park / Virgin Islands Coral Reef
National Monument
Matt Patterson, Network I&M Coordinator
Larry West, Regional I&M Coordinator

Science and Technical Committee

Ron Clark, Resource Management Chief, Big Cypress National Preserve
Elsa Alvear, Resource Management Chief, Biscayne National Park
Zandy Hillis-Star, Resource Management Chief, Buck Island Reef National Monument/ Salt
River Bay National Historical Park and Ecological Preserve
Robert Johnson, South Florida Natural Resource Center Director, Everglades National Park / Dry
Tortugas National Park

Dave Hallac, Biological Branch Chief, Everglades National Park / Dry Tortugas National Park
Rafe Boulon, Resource Management Chief, Virgin Islands National Park / Virgin Islands Coral
Reef National Monument
Carol Daniels, South Florida / Caribbean Cooperative Ecosystem Studies Unit Coordinator

Volunteers in the Park (V.I.P)

Five VIPs worked with the Community Ecology Branch, two VIPs worked with Marine Ecology and one VIP with the Data Management Branch for a total of 2,356 volunteer hours in FY10 (approximate value of the volunteer effort was \$42,502.24).

Carolyn “Lara” A. volunteered 880 hours of office and field work at the South Florida/Caribbean Network. She worked with the community ecology team as well as the Exotic Plant Management Team and Biscayne National Park as an intern from the Chicago Botanical Garden’s Conservation and Land Management Internship Program. She worked primarily on Periphyton, the Corridors of Invasiveness vital sign, georeferencing and digitizing historic vegetation maps, and EPOC sampling.

Tiara T. volunteered 480 hours of office and field work at the South Florida/Caribbean network. She was hired as an intern with the Everglades Foundation for a 12 week period to work on a collaborative project to develop very detailed vegetation maps initially created in the early 1980’s by Gunderson and Loope or by Olmsted et al. These maps will be used as the basis for long term vegetation monitoring in Everglades National Park and Big Cypress National Preserve.

Carolina C. has volunteered 640 hours of office and fieldwork at Everglades National Park and Biscayne National Park. She was funded through the NPS George Melendez Wright Climate Change Internship Program. She has assisted with the retrieval of SPMDs along the west coast, tested for accuracy of Trimble GPS units in closed canopy areas, helped gather vegetation data of mangrove-marsh and pineland-hammock ecotone transition zones, installed pressure transducers and wells in mangrove areas, and helped resample vegetation plots in Elliot Key.

Valerie M. (FIU Earth and Environment student) volunteered 16 hrs and Daniel C. (Miami Dade High School student) volunteered 8 hrs helping with Colonial Bird Nest counting.

Elizabeth W., a Geology student from Oberlin College volunteered 160 hours of office work assisting with both the BISC and DRTO Benthic Habitat Map. She indexed video and photos related to the accuracy assessment of both the BISC and DRTO benthic habitat maps. She then hyperlinked photos and/or video to the corresponding accuracy assessment point, 283 for the BISC and 300 for the DRTO.

Philip M. (FIU Graduate student Biological Sciences) has volunteered 10 hours of field support assisting with the Marine Fish Communities Vital Sign by boat support during BISC Reef Fish Visual Census.

Sarah M., a high school student, volunteered 160 hours in July-August 2010 conducting QA/QC of the species data and photos collected during the 2010 National Geographic BioBlitz in Biscayne National Park and compiling associated photos and data for the National Geographic Fieldscope project. Her work resulted in our office being able to clearly state which species recorded during BioBlitz had not previously been officially recorded in the park.

IV. Reports, Publications and Presentations

Published journal articles, open file reports, reports, resource briefs, presentations

Journal Articles

Alonso J., Heinen J. T. *In Press*. Miami Dade County's Environmentally Endangered Lands Program: Local Efforts for a Global Cause. *Natural Areas Journal*.

Brandt, M.E., B.I. Ruttenberg, R. Waara, J. Miller, B. Witcher, A.J. Estep and M. Patterson. *In review*. Dynamics and impact of an acute outbreak of coral disease in Dry Tortugas National Park, Florida, USA. Submitted to *Coral Reefs*.

Brandt M.E., N. Zurcher, A. Acosta, J.S. Ault, J.A. Bohnsack, M.W. Feeley, D.E. Harper, JH Hunt, G.T. Kellison, D.B. McClellan, M.E. Patterson, S.G. Smith. 2010. The opportunities and challenges in development of a multi-agency program to monitor and assess reef fish populations in the Florida Keys coral reef ecosystems. *Proceedings of the 62nd Gulf and Caribbean Fisheries Institute Meeting*, Cumana, Venezuela, 2-6 Nov 2009.

Eakin, C. M., J. A. Morgan, S. F. Heron, T. B. Smith, G. Liu, L. Alvarez-Filip, B. Baca, E. Bartels, C. Bastidas¹, C. Bouchon, M. Brandt, A. W. Bruckner, L. Bunkley-Williams, A. Cameron, B. D. Causey, M. Chiappone, T. R.L. Christensen, M. J. C. Crabbe, O. Day, E. de la Guardia, G. Díaz-Pulido, D. DiResta, D. L. Gil-Agudelo, D. S. Gilliam, R. N. Ginsburg, S. Gore, H. M. Guzmán, J. C. Hendee, E. A. Hernández-Delgado, E. Husain, C. F.G. Jeffrey, R. J. Jones, E. Jordán-Dahlgren, L. S. Kaufman, D. I. Kline, P. A. Kramer, J. C. Lang, D. Lirman, J. ., Carrie Manfrino, J. Maréchal, K. Marks, J. Mihaly, W. J. Miller, E. M. Mueller, Erinn M. Muller, C. A. Orozco Toro, H. A. Oxenford, D. Ponce-Taylor, N. Quinn, K. B. Ritchie, S. Rodríguez, A. Rodríguez Ramírez, S. Romano, J. F. Samhoury, J. A. Sánchez, G. P. Schmahl, B. V. Shank, W. J. Skirving, S. C.C. Steiner, E. Villamizar, S. M. Walsh, C. Walter, E. Weil, E. H. Williams, K. Woody Roberson, and Y. Yusuf. *In Press*. *Caribbean Corals in Crisis: Record Thermal Stress, Bleaching, and Mortality in 2005*. Public Library of Science.

Reports and related products

Alonso, J. *DRAFT*. Standard Operating Procedure: Buck Island Seasonal Bird Surveys for Brown Pelicans and Least Terns. 9pp.

Alonso, J. *DRAFT*. Standard Operating Procedure: Virgin Islands Brown Pelican Monitoring Program. 4pp.

Cabal, C. 2010. Standard Operating Procedure: Pressure Transducer Protocol. 25pp

Cabal, C., and T. Fotinos. 2010. Testing GPS unit accuracy and precision for use in forest ecotonal movement monitoring. 28pp.

Cabal, C., and T. Fotinos. 2010. Summary Report: Ecotonal movement pilot project. 40pp.

Fotinos, T. 2010. Summary Report: Revisiting Turner River (BICY) vegetation plots. 28pp.

Moser, J. G., K. R. T. Whelan, R. B. Shamblin, A. J. Atkinson, J. M. Patterson. 2010. Buck Island Reef National Monument, U.S. Virgin Islands, vegetation mapping project, 2009. Natural Resource Technical Report. NPS/SFCN/NRTR—2010/293. National Park Service, Fort Collins, Colorado.

Sah, J. P., M. S. Ross, S. Stoffella. 2010. Developing a data driven classification of South Florida plant communities. Southeast Environmental Research Center. Florida International University. Miami, FL. Submitted to National Park Service South Florida / Caribbean Network.

May, L.A., A.R. Avadanei, C.S. Rogers, J. Miller, and C.M. Woodley. Microbial Community Analysis of *Acropora palmata* Mucus Swabs, Water and Sediment Samples from Hawksnest Bay, St. John, U.S. Virgin Islands NOAA Technical Memorandum NOS NCCOS CCEHBR. 6 pp.

Moser, J. G., K. R. T. Whelan, R. B. Shamblin, A. J. Atkinson, J. M. Patterson. *DRAFT*. Salt River Bay National Historical Park & Ecological Preserve, U.S. Virgin Islands, Vegetation Mapping Project, 2009. Natural Resource Technical Report. NPS/SFCN/NRTR—2010/XXX. National Park Service, Fort Collins, Colorado.

Shamblin, R.B., K.R.T. Whelan, and C. O. Ariori. *DRAFT*. SFCN Early Detection Protocol for Invasive Exotic Plants, Corridors of Invasiveness. Natural Resource Report NPS/SFCN/NRR—20XX/XXX. National Park Service, Fort Collins, Colorado.

Shamblin, R. B., and K.R.T.Whelan. 2010. 2009 Pilot Year Summary Report of the Corridors of Invasiveness Monitoring in Big Cypress National Preserve, Biscayne National Park, and Everglades National Park. Natural Resource Technical Report NPS/SFCN/NRTR—20XX/XXX. National Park Service, Fort Collins, Colorado.

Urgelles, R. 2010. Dragonfly assemblage structure in relation to hydroperiod and vegetation gradients in freshwater wetlands of the Florida Everglades. Master's thesis. Florida International University, Miami, Florida, USA.

Whelan, R. T. K., C. Ariori, T. Thanawastien and J. M. Patterson. *DRAFT*. Digitization of 1981 Vegetation Map of the Coastal Region between Flamingo and Joe Bay of Everglades National Park (East Map). Natural Resource Report NPS/SFCN/NRR—2010/XXX. National Park Service, Fort Collins, Colorado.

Whelan, R. T. K., C. Ariori, T. Thanawastien and J. M. Patterson. *DRAFT*. Digitization of 1981 Vegetation Map of the Coastal Region between Flamingo and Joe Bay of Everglades National Park (West Map). Natural Resource Report NPS/SFCN/NRR—2010/XXX. National Park Service, Fort Collins, Colorado.

Whelan, R. T. K., C. Ariori, T. Thanawastien and J. M. Patterson. *DRAFT*. Digitization of 1982 Vegetation Map of Turner River Road Area of Big Cypress National Preserve. Natural Resource Report NPS/SFCN/NRR—2010/XXX. National Park Service, Fort Collins, Colorado.

Whelan, K.R.T. and R. B. Shamblin. 2010. MS Canyon 252 Baseline Oil Impact Assessment at De Soto National Memorial. Document prepared for National Park Service South Florida Incident Command Team by the National Park Service South Florida / Caribbean Network.

Presentations, Posters, and Resource Briefs

Brandt, M.E., N. Zurcher, A. Acosta, J.S. Ault, J.A. Bohnsack, M.W. Feeley, D.E. Harper, J.H. Hunt, G.T. Kellison, D.B. McClellan, M.E. Patterson, S.G. Smith. 2009. The opportunities and challenges in development of a multi-agency program to monitor and assess reef fish populations in the Florida Keys coral reef ecosystems. A presentation at the 2009 Gulf and Caribbean Fisheries Institute Meeting, Cumana, Venezuela, 2-6 Nov 2009.

Davis A. J. Miller, A. Atkinson, M. Patterson, R. Waara, C. Rogers, E. Muller. May 2010. Are the VI coral reefs of today lucky or resilient? Presentation during Virgin Islands Reef Resilience Workshop, St. Thomas VI.

Jones, L. 2010. Defend your ocean! Report lionfish sightings and save the ecosystem! Lionfish facts brochure.

Luciani, J.M. April 2010. Career Day presentation to 3rd Grade of E.W.F. Stirrup Elementary School on National Park in Miami area and animal species students might encounter.

Miller, J. Feb 2010. State of the VI Coral Reefs. Presentation to St. John Rotary Club. St. John USVI

Miller J. Weekly Nov 2009 - April 2010. Reef Life. Presentation at Maho Bay Ecocamp, St. John VI.

Miller, J., M. Patterson, A. Atkinson, A. Davis, A. Estep, L. Jones, J. Patterson, R. Waara, B. Witcher, C. Rogers, E. Muller. October 2009. Coral Reef Impacts due to Multiple Stressors. Presentation during SE Region Ocean and Coastal Park Workshop, Miami. Florida.

Miller, J., M. Patterson, A. Atkinson, A. Davis, A. Estep, L. Jones, J. Patterson, R. Waara, B. Witcher, C. Rogers, E. Muller. Feb 2010. Monitoring the Effects of Multiple Stressors on Coral Reefs within US National Parks. Presentation during Aquatic Professionals Meeting, Ft. Collins CO.

Patterson, Judd. Continuous Data Collection in Florida and the U.S. Virgin Islands, National Park Service Data Management Conference, Ft. Collins, Colorado. April 2010.

South Florida / Caribbean Network. 2010. Climate Change Resource Brief.
http://science.nature.nps.gov/im/units/sfcn/docs/SFCN_Climate_Change_Res_Brief.pdf

Urgelles, R. 2009. Dragonfly assemblage structure in relation to hydroperiod and vegetation gradients in freshwater wetlands of the Florida Everglades. Master's thesis defense. November 13, 2009. Miami, Florida, USA.

Witcher B. 2010. Spatial Photo Management of Coral Disease Data. ESRI International User Conference. San Diego, California. July 2010.

Whelan, Kevin R.T., and R.B. Shamblyn. 2010. Corridors of Invasiveness Plant Monitoring, NPS Early Detection Protocol for Invasive Exotic Plants. Greater Everglades Ecosystem Restoration Conference. Naples, Florida. July 2010

Whelan, Kevin R.T., and R.B. Shamblyn. 2010. Presentation to Dry Tortugas National Park Staff on current SFCN projects within their park including vegetation mapping of the islands within Dry Tortugas, an overview of dominant plant species, and fish and coral monitoring. Oct. 13, 2009.

V. Connect the Dots – Resource Condition Summary Tables

Abbreviated SFCN draft Connect the Dot Resource Condition Summary tables are can be downloaded from

<http://www1.nrintra.nps.gov/im/units/sfcn/connect.cfm>

Only data from coral reef monitoring and EPMT monitoring are included this year in the tables with placeholders for remaining vital signs.

Background

The “Connect the Dots” effort is a strategic, long-term framework (over a period of years to decades) for coordinating the efforts of the I&M networks, Natural Resource Condition Assessment Program, park planning (e.g., Foundation Statement, General Management Plan, Resource Stewardship Strategy), park-funded monitoring and research relevant to assessing natural resource condition, and other research and monitoring efforts. A Natural Resource Summary Table will eventually be developed for each park as part of the park’s Resource Stewardship Strategy document. The Natural Resource Summary Table framework demonstrates the connection of science to management through the planning process.

The 32 I&M networks were required to develop a first draft of a Vital Signs Supporting Table for each park, which will feed into the larger Natural Resource Summary Table. The draft excel spreadsheets listed on our Intranet site summarize the key measures of resource condition that the I&M network will routinely provide data for as part of our ‘Job 1’ duties of measuring the condition of selected park resources. If the park superintendent or Chief of Natural Resources thinks this Connect the Dots framework is a good idea and requests assistance from network staff to populate additional rows and columns of the Natural Resource Summary Table, network staff should contribute data and expertise to the extent that data and staff time are available to assist the park.