SEACAR Southeast Meeting Summary and Outcomes April 11–12, 2017 Fern Forest Nature Center

Prepared For

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Acronyms and Abbreviations

AP	Aquatic Preserve
BGA	Blue-green Algae
CERP	Comprehensive Everglades Restoration Plan
Chl a	Chlorophyll a
CRCP	Coral Reef Conservation Program
CREMP	Coral Reef Evaluation and Monitoring Project
DERM	Department of Environmental Resources Management
DO	Dissolved Oxygen
DRM	Disturbance Response Monitoring
EEL	Environmentally Endangered Lands
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FCO	Florida Coastal Office
FKNMS	Florida Keys National Marine Sanctuary
FKWW	Florida Keys Water Watch
FIU	Florida International University
FNAI	Florida Natural Areas Inventory
FRRP	Florida Reef Resilience Program
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
HAB	Harmful Algal Bloom
IFAS	Institute of Food and Agricultural Sciences
NCRMP	National Coral Reef Monitoring Program
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NSEFSC	NOAA - Southeast Fisheries Science Center
PFLCC	Peninsular Florida Landscape Conservation Cooperative
RIOS	Resource Investment Optimization System
SAV	Submerged Aquatic Vegetation
SEACAR	Statewide Ecosystem Assessment of Coastal and Aquatic Resources
SIMM	Seagrass Integrated Mapping and Monitoring Program
SFRL	Sport Fish Restoration Program
SWAP	State Wildlife Action Plan
TNC	The Nature Conservancy
TSS	Total Suspended Solids
UF	University of Florida
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WQ	Water Quality
WQPP	Water Quality Protection Program

1 SEACAR Facilitation Overview

SEACAR (Statewide Ecosystem Assessment of Coastal Aquatic Resources) meetings were facilitated by Normandeau Associates, Inc. during the months of March and April 2017. The SEACAR Southeast Region meetings were held on 11 and 12 April 2017 at the Fern Forest Nature Center, 201 Lyons Rd. South, Coconut Creek, FL 33063. On 11 April, the meeting times were 9:10 a.m. to 4:30 p.m. On 12 April, the meeting times were 9:10 a.m. to 12:30 p.m. A list of meeting participants for both days is provided in Appendix A.

At the start of both days, the project lead, Cheryl Parrott Clark, provided an overview of the SEACAR pilot study to give the project background. This was followed by presentations by regional Florida Coastal Office (FCO) staff describing resources at each FCO-managed area in the region. Finally, Mrs. Clark provided a description of the indicator selection process.

1.1 SEACAR Meeting Goals

1. Resource Assessment Teams will establish ecological indicators, using current knowledge, for habitats in the Florida Coastal Office's managed areas (including AP, NERRs, FKNMS, CRCP)
2. Resource Assessment Teams will work cooperatively to provide consensus on indicators and product format
3. An analysis of the statuses and trends of coastal resources will be conducted at a locally relevant scale, to support state and local programs, planning and decision making
4. Relevant statuses and trends will be communicated to local and state decision makers and provide the best available science
5. Data will be integrated into a Decision Support Tool that promotes resource management

1.2 SEACAR Indicator Selection Criteria

1. Show statewide and site specific trends over time
2. Allow comparisons between sites and across the state
3. Illustrate habitat change over time driven by biotic and abiotic factors which define community structure
4. Allow data/results to directly inform and/or be utilized in local and state natural resource management decisions, submerged land planning and/or restoration
5. Allow for site and/or regional specific environments and conditions (while being comparable statewide)

1.3 SE Region Potential Habitats and Indicators

The following list of potential indicators was compiled based on indicators identified by the Resource Assessment Data Teams from all regions statewide prior to the in-person SEACAR meetings.

Table 1-1. Habitats and Potential Indicators Determined in Previous Webinars

Submerged Aquatic Vegetation	Water Column	Coral/Coral Reef	Coastal Wetlands
• Acreage • % Cover • Species Composition • Shoot Count • Algae *(Macro, Epiphytes, HAB, etc.)* • *Dissolved Oxygen* • *Temperature* • *Salinity* • Clarity	• Nekton • Algae *(Macro, Epiphytes, HAB, etc.)* • *Dissolved Oxygen* • *Temperature* • *Salinity* • *pH* • Clarity • Nutrients • Plankton • Fecal coliform	• % Live Tissue • Health • *Dissolved Oxygen* • *Temperature* • *Salinity* • *pH* • Clarity	• Acreage • Biomass • % Cover • Species Composition • Clarity • Nutrients

- % Cover/Live Tissue: Measured in the field using quadrat sampling methods
- Acreage: Calculated remotely through aerial imagery
- Algae: BGA, Chl a, Macro Algae, HAB, Epiphytes, etc
- Ambient Water Quality*: Dissolved Oxygen, Temperature, Salinity, pH*
- Clarity: *(turbidity, color, TSS, sediment, Chl a, light attenuation, Secchi)*
- Species Composition: identity of organisms that make up a community within the defined habitat

2 Day 1 Meeting

The purpose of the Day 1 meeting was to collect Data Team recommendations for priority indicators to be considered for inclusion in the SE Region Habitat index.

The following goals were accomplished during the meeting:

1. Get collaborative agreement on regional indicators
2. Confirm the best measurement units for the indicators
3. Identify existing data sources for priority indicators
4. Confirm which indicators have already been analyzed
5. Assess data gaps

2.1 Day 1 Collaborative Agreement on Regional Indicators

The following process was followed to reach collaborative agreement on indicators for the SE Region:

1. Data Team members listed their top 5 indicators for each habitat index
2. Data Team members discussed the list resulting from the previous activity in order to clarify and condense the indicator list
3. Data Team members listed pros and cons of the refined indicators from the previous activity
4. Data Team members discussed pros and cons of the refined indicators so they would be able to make a more informed vote on their top indicators
5. Data Team members voted on their top 5 indicators

2.1.1 Data Team Initial List of Top Indicators for Each Habitat Index

Tables 2-2 through 2-6 list the indicators provided by the Data Team for each habitat index. The first column is a list of all indicators originally presented by the Data Team, and the second column is the revised list of indicators after discussion to clarify, condense, or add to the list.

Table 2-1. Data Team Initial List of Top Indicators for SAV

Submerged Aquatic Vegetation *Preliminary Indicators*	**Submerged Aquatic Vegetation** *Revised Indicators*
% Cover	% Cover
Acreage	Acreage
Algae	Algae (epiphytic, free-standing)
Algae (Epiphytes)	
Algae (Epiphytic, Free Standing)	
Ambient Water Quality	Ambient Water Quality
Clarity	Clarity
Density	Density/Shoot Count
Shoot Count	
Juvenile Green Sea Turtle (Health)	Juvenile Green Sea Turtle (turtle health)
Scarring	Scarring
Species Composition	Species Composition
Spotted Sea Trout	Spotted Sea Trout

Table 2-2. Data Team Initial List of Top Indicators for Water Column

Water Column *Preliminary Indicators*	**Water Column** *Revised Indicators*
Algae	Algae
Phytoplankton (abundance and composition)	
Ambient Water Quality	Ambient Water Quality
Clarity	Clarity
Nekton	Nekton
Species Composition	
Nutrients	Nutrients
Plankton	Plankton
Pollutants	Non-nutrient Pollutants
	HAB*

*HAB added as separate indicator from Algae

Table 2-3. Data Team Initial List of Top Indicators for Coral/Coral Reef

Coral/Coral Reef ***Preliminary Indicators***	**Coral/Coral Reef** ***Revised Indicators***
% Algae Cover	% Algae Cover (cyanobacteria/macro algae)
Algae Cyanobacteria/macro algae	
% Cover	% Cover
Coral Cover change	
% Diseased Coral Colonies	% Live Tissue
% Live Tissue	
Ambient Water Quality	Ambient Water Quality (DO, pH, salinity, temperature)
Temperature	
Change in fish assemblages (grouper and snapper complex)	Change in fish assemblages (grouper and snapper complex)
Clarity	Clarity
Community Composition	Community Composition (benthic, coral, sponge, algae, gorgonians)
Species Composition	Coral Species Composition
Grazer biomass & distribution	Grazer biomass & distribution
Health	Health (bleaching and disease)
Health (Disease, Bleaching, Mortality)	
Health (Disease, Fecundity, Positive Growth)	
Health (Disease Prevalence)	
	Recruitment*
Indicator Species	Targeted Species (ESA listed)
Sea Turtles	Sea Turtles

*Recruitment added in discussion of Health and Fecundity

Table 2-4. Data Team Initial List of Top Indicators for Coastal Wetlands

Coastal Wetlands ***Preliminary Indicators***	**Coastal Wetlands** ***Revised Indicators***
% Cover	% Cover
Acreage	Acreage
Ambient Water Quality	Ambient Water Quality
Biomass	Biomass (plants)
Biomass/Leaf Area Index	
Change in land cover	Change in Neighboring Land Use
Species Composition	Species Composition (plants and animals)
Nutrients	Nutrients

Table 2-5. Data Team Initial List of Top Indicators for Hardbottom

Hardbottom *Preliminary Indicators*	**Hardbottom** *Revised Indicators*
% Cover Algae	% Cover Algae
Sponge Density	Sponge Density
Sponge Species Composition	Sponge Species Composition

2.1.2 Data Team List of Indicator Pros and Cons for Each Habitat Index

To inform indicator prioritization, the Data Team provided pros and cons for the list of revised indicators.

Table 2-6. Data Team Pros and Cons for SAV

Submerged Aquatic Vegetation	
General Pros • % Cover captures changes over time in species composition	**General Cons** •
% Cover Pros • Captures important metrics for the habitat • Regional data available	**% Cover Cons** •
Acreage Pros • Easy to measure and track over broad spatial scales remotely	**Acreage Cons** • May not capture species composition, scarring, and % cover related changes
Algae (epiphytic, free-standing) Pros • Algae can be an indicator of not only poor conditions but also reflect a healthy habitat based on the composition and density	**Algae (epiphytic, free-standing) Cons** • Data gap for BBAP • Labor intensive
Ambient Water Quality Pros • DO/salinity/temp combo is important to overall health (e.g. FL Bay die off)	**Ambient Water Quality Cons** • Hard to make a decision from the data
Clarity Pros •	**Clarity Cons** •
Density/Shoot Count Pros • Captures important metrics for the habitat	**Density/Shoot Count Cons** • Labor intensive to collect
Juv. Green Sea Turtle (turtle health)Pros • Good system health indicator	**Juv. Green Sea Turtle (turtle health) Cons** • Data gap • Limited data in order to correlate as an indicator

Submerged Aquatic Vegetation	
Scarring Pros • Good for making management decisions • Regional data available • Captures important metrics for the habitat	**Scarring Cons** • Limited long-term data • Only one person has completed this study on the larger scale
Species Composition Pros • This is critical – often the most obvious change happening in this habitat (per long-term data)	**Species Composition Cons** •
Spotted Sea Trout Pros • Good multiple evidence line for how the system is doing	**Spotted Sea Trout Cons** • Data gap • Data deficient

Table 2-7. Data Team Pros and Cons for Water Column

Water Column	
Algae Pros •	**Algae Cons** •
Ambient Water Quality Pros •	**Ambient Water Quality Cons** •
Clarity Pros •	**Clarity Cons** •
Nekton Pros • Although it is important in terms of ecosystem-based management, I think it is outside of realm for this purpose.	**Nekton Cons** • Too general – there is already fisheries management data.
Nutrients Pros •	**Nutrients Cons** • Hard to make a decision • Hard to detect in coastal ecosystems. This may be better captured through a proxy, e.g., seagrass species composition (increase in nutrients = increase in faster growing species)
Plankton Pros •	**Plankton Cons** • Hard to make a decision
Non-nutrient Pollutants Pros •	**Non-nutrient Pollutants Cons** • Do we have data?
HAB Pros • Hot button issue. • A lot of visibility.	**HAB Cons** •

Table 2-8. Data Team Pros and Cons for Coral/Coral Reef

Coral/Coral Reef	
% Algae Cover (cyanobacteria/macro algae) Pros • Also shows shifts in species composition • Good data available • Proven to be very important to a number of aspects of coral biology, including recruitment	**% Algae Cover (cyanobacteria/macro algae) Cons** •
% Cover Pros • Can be defined as % live coral cover, so inclusive of live tissue indicator • Used in many monitoring efforts • Good available data	**% Cover Cons** •
% Live Tissue Pros •	**% Live Tissue Cons** •
Ambient Water Quality Pros •	**Ambient Water Quality Cons** •
Change in fish assemblages (grouper and snapper complex) Pros •	**Change in fish assemblages (grouper and snapper complex) Cons** • Lack of long-term data for northern portion of reef tract • Fish assemblages may not respond to coral health or the health of the dominant feature • This is very relevant to coral reefs, but is it outside the scope of this project? (Habitat vs associated organisms) • What is the "right" fish assemblage?
Clarity Pros •	**Clarity Cons** • Corals can adapt to lower light, and there have been studies that have shown corals in lower light can handle higher temperature better and not bleach as much as reefs in clearer water • Clarity may be difficult to capture due to pulse evens – multiple causes for reduce clarity
Community Composition (benthic, coral, sponge, algae, gorgonians) Pros •	**Community Composition (benthic, coral, sponge, algae, gorgonians) Cons** • Difficult to define positive vs. negative change relative to other indicators
Grazer biomass & distribution Pros •	**Grazer biomass & distribution Cons** • Difficult to quantify their cumulative effect

Coral/Coral Reef	
Health (bleaching and disease) Pros • Long-term coral bleaching dataset • Disease is a growing threat to live coral tissue cover and overall health – direct indicator • Public attention	**Health (bleaching and disease) Cons** • Bleaching data from some long-term monitoring efforts (CREMP) doesn't take place during peak bleaching months
Targeted Species (ESA listed)Pros • As opposed to community composition, targeted species gives idea of what are the priority species	**Targeted Species (ESA listed)Cons** •
Sea Turtles Pros •	**Sea Turtles Cons** •
Coral Species Composition Pros • Composition and % Cover provide important data on species shifts • Good data available	**Coral Species Composition Cons** •
Recruitment Pros • Good measure of decline or increase	**Recruitment Cons** • Important but little data available

Table 2-9. Data Team Pros and Cons for Coastal Wetlands

Coastal Wetlands	
General Pros •	**General Cons** • Data gap for BBAP • Lack of management authority. • Does not apply to SE Region
% Cover Pros • % cover and changes in land use provide important data on changes over time.	**% Cover Cons** •
Acreage Pros •	**Acreage Cons** •
Biomass (plants) Pros • Good measure of value to greater coastal system.	**Biomass (plants) Cons** • Difficult to quantify on a large scale.
Change in Neighboring Land Use Pros • Important in context of ecosystem-based management. • Good measure of increase or decrease.	**Change in Neighboring Land Use Cons** •
Water Quality Pros • DO especially important for mangroves, especially in areas with restricted flow/flooding.	**Water Quality Cons** • Hard to make a decision from the data.
Species Composition (plants and animals) Pros • Captures the presence of exotic species	**Species Composition (plants and animals) Cons**

Coastal Wetlands	
	• Incorporates a lot of factors beyond management control. • May not be relevant to overall habitat quality.

Table 2-10. Data Team Pros and Cons for Hardbottom

Hardbottom	
General Pros •	**General Cons** • Lack of data for back country
% Cover Algae Pros • Need to define if "good" algae or bad	**% Cover Algae Cons** •
Sponge Density Pros • Good indicators of ecosystem disturbance/water quality – ex: algae blooms in FL Bay wiped out sponges	**Sponge Density Cons** • Might be some data gaps in long-term data collection
Sponge Species Composition Pros • Some species are more susceptible to disturbance/changes in water quality • A change in composition could indicate impending disturbance before it is fully realized	**Sponge Species Composition Cons** • Hard to make a management decision

2.1.3 Data Team List of Top 5 Indicators for Each Habitat Index

Following discussions of indicator pros and cons, members of the Data Team voted on their top five indicators for each habitat index. Data Team members only voted for habitat indices for which they were familiar. Only one vote was allowed per indicator. Indicators below are prioritized by the number of votes received, with only the top five indicators listed.

Submerged Aquatic Vegetation

1. Species Composition
2. % Cover
3. Ambient Water Quality
4. Algae (epiphytic, free-standing)
5. Acreage

Water Column

1. Nutrients
2. Algae
3. Clarity
4. Ambient Water Quality
5. HAB

Coral/Coral Reef

1. % Live Tissue

2. Community Composition (benthic, coral, sponge, algae, gorgonians)
3. % Algae Cover (cyanobacteria/macro algae)
4. Health (bleaching and disease)
5. % Cover

Coastal Wetlands

1. Species Composition (plants and animals)
2. Change in neighboring land use
3. Nutrients
4. Acreage
5. % Cover

Hardbottom

1. Sponge Species Composition
2. Sponge Density
3. % Cover Algae

2.2 Measurement Units and Analyses for Indicators

The Data Team assembled the following list of measurements for each of their top 5 indicators, as well as a list of locations where the data had been analyzed or summarized.

Table 2-11. Data Team Units of Measure and Analyses for SAV

Submerged Aquatic Vegetation				
Indicator	**Unit of Measure**	**Analyzed Y/N**	**Summarized Y/N**	**Comments**
Species Composition	• Species presence per area		Y (Jim Fourqurean – FIU)	
% Cover	• Percent per area	Y (Lignumvitae Key)	Y (SIMM)	Lake Worth Lagoon – Palm Beach County – outside managed area
Ambient Water Quality	• DO (% SAT) • pH • Temp. °C • Salinity (PPT, PSU)	Y (WQPP, DERM, CRCP, USGS - Ilsa Kuffner, CERP)	Y (USGS - Ilsa Kuffner, Pennekamp)	CREMP & SECREMP for temp collects

Submerged Aquatic Vegetation				
Algae (epiphytic, free-standing)	• Percent cover (free standing) • Available surface area/biomass/wet or dry weight (Epiphytic)	Y (free standing – Jim F. FIU, CERP, DERM)	Y (free standing – Jim F. FIU, CERP, DERM)	
Acreage	• Acres		Y (SIMM, Lignumvitae Key)	

Table 2-12. Data Team Units of Measure and Analyses for Water Column

Water Column				
Indicator	**Unit of Measure**	**Analyzed Y/N**	**Summarized Y/N**	**Comments**
Nutrients	• Micromole per liter • Parts per billion	Y (WQPP)	Y (WQPP)	STORET raw data
Algae	• Chl a micrograms per liter • Cell count per volume	Y (Chl a – WQPP, CERP)	Y (Chl a – WQPP, CERP)	
Clarity	• Secchi depth (m) • Concentration of algae • Turbidity • Color • TSS • Light attenuation	Y (turbidity, light atten. TSS – WQPP, DERM)	Y (turbidity, light atten. TSS – WQPP, DERM)	
Ambient Water Quality	• DO (% SAT) • pH • Temp. °C • Salinity (PPT, PSU)	Y (WQPP, DERM, CRCP, USGS - Ilsa Kuffner –temperature data only, CERP)	Y (USGS - Ilsa Kuffner, Pennekamp)	CREMP & SECREMP for temperature collects
HAB	• Cell count • Presence of toxins	Y (FWC HAB program)	Y (FWC HAB program)	Units of measure depends on species; NOAA citizen science program

Water Column				
Nutrients	• Micromole per liter • Parts per billion	Y (WQPP)	Y (WQPP)	STORET raw data

Table 2-13. Data Team Units of Measure and Analyses for Coral/Coral Reef

Coral/Coral Reef				
Indicator	**Unit of Measure**	**Analyzed Y/N**	**Summarized Y/N**	**Comments**
% Live Tissue	• Percent per colony • Old mortality vs recent mortality	Y (TNC in progress)	Y (TNC-FRRP DRM, CREMP, SECREMP-FWRI)	Unit may vary by dataset, mortality analyzed
Community Composition (benthic, coral, sponge, algae, gorgonians)	• Percent cover - gorgonians and coral • Density – gorgonians and coral	Y (CREMP, SECREMP, Margaret Miller – NOAA SE Fisheries, NCRMP)	Y (Pennekamp, CREMP, SECREMP, NCRMP)	County/municipality reports available through DEP
% Algae Cover (cyanobacteria/macro algae)	• Percent - scale depends on project goals	Y (CREMP, SECREMP)	Y (CREMP, SECREMP, NCRMP)	
Health (bleaching and disease)	• Prevalence (% of population)	Y (CREMP, SECREMP)	Y (CREMP, SECREMP, FRRP)	CREMP: monitor each region once per year, miss peak bleaching except lower Keys; FRRP only during peak bleaching
% Cover	• Percent per area	Y (CREMP, SECREMP, NCRMP, FRRP)		

Table 2-14. Data Team Units of Measure and Analyses for Coastal Wetlands

Coastal Wetlands No Coastal Wetlands experts present – Contact Kathy Gooden and Mike Ross (FIU)				
Indicator	**Unit of Measure**	**Analyzed Y/N**	**Summarized Y/N**	**Comments**
Species Composition (plants and animals)	• Presence of species per defined area		Y (Audubon bird data)	LIDAR work – FWC, created GIS layers; Monroe County might have LIDAR; Mapping – NOS Biogeography Branch, NCDDC; FWC exotics; DERM
Change in Neighboring Land Use	• Change in area for each land use type		Y (GIS from GeoPlan UF?, some counties, FWRI GIS)	
Nutrients	• Micromole per liter • Parts per billion	Y (WQPP)	Y (WQPP)	STORET raw data
Acreage	• Acres			USGS - National Wetlands Inventory; LIDAR;
% Cover	• Percent			SFWMD?, Shoreline Resilience Working Group – GIS, Beaches - DEP

Table 2-15. Data Team Units of Measure and Analyses for Hardbottom

Hardbottom				
Indicator	**Unit of Measure**	**Analyzed Y/N**	**Summarized Y/N**	**Comments**
Sponge Species Composition	• Prevalence? • Percent Cover?	N	Y (FWC, Mark Butler – Old Dominion U.	
Sponge Density	• Number per m^2	N	Y (FWC, Mark Butler – Old Dominion U.	

Hardbottom				
% Cover Algae	• Percent	N	Y (FWC, Mark Butler – Old Dominion U.	

2.3 Existing Data Sources for Priority Indicators

Mrs. Clark, SE Region staff, and others presented information about existing data sources for various habitats in the region to inform meeting participants. These presentations are available by contacting DEP. After these presentations, meeting attendees were asked to list additional data sources that had not been mentioned in the presentations or earlier in the meeting.

Table 2-16. Additional Data Sources for Priority Indicators

Habitat	Indicator(s)	Data Owner	Contact	Years Data Available	Data Format	Location of Data	Is it Spatial?
Nearshore Hardbottom	Benthic assessments, sediment cover, sediment depth, acres (Palm Beach Co. – digitized)	Any municipality that puts sand on their beach – ex: Bathtub Beach, Sailfish, Palm Beach Co./town of Palm Beach, North/Central/South Boca Raton, etc.					Yes
Seagrass	% Cover, % Algae cover, species composition, algae species composition, epiphytes, temperature, salinity, water clarity, substrate type	Palm Beach County	Julie Bishop, Eric Anderson				Yes
SAV – associated with juv. fish seining – middle Keys nearshore waters	% Cover, species composition, shoot count (?) – basically Braun-Blanquet as well as ambient water quality (temp, salinity, DO, pH, conductivity)	FWC (Alejandro Acosta)	alejandro.acosta@myfwc.com	2006-Present	Access	FWC-SFRL	Yes
Hardbottom	Sponge species composition/density, algae % cover	FWC (Tom Matthews, Gabby Renchen), Mark Butler (Old Dominion University)	Tom.matthews@fwc.com; gabby.renchen@fwc.com	Not exactly sure – FWC 1980s-90s, maybe early 2000s; FWC also starting up monitoring again 2016-?; Mark Butler – 1990s-Present?	Access/Excel	FWC-SFRL, Old Dominion University (Virginia)	Yes

Habitat	Indicator(s)	Data Owner	Contact	Years Data Available	Data Format	Location of Data	Is it Spatial?
Coral	% Live tissue, community composition, health (bleaching/disease), % algae cover, % cover		Dr. David Gilliam: Gilliam@nova.edu	1996 (?)-Current	Access/Excel database	Nova Southeastern University	
Coral/Reef	Qualitative benthic p/a	? multi-agency	1978-Present		Reef visual census		
Coral (specific for Pennekamp)	Species composition, health	FPS	Janice Duquesnel	~20	Reports	FPS/Pennekamp/Hobe Sound Office	
Water Column *Fowey Rocks -> Dry Tortugas	Nutrients	FIU water quality monitoring program	Janice Duquesnel	>20	Unknown	FIU	Yes
Water Column (specific for Pennekamp)	Nutrients	Florida Park Service Pennekamp monitoring	Janice Duquesnel	~15	Unknown	FPS Park & District Office	Yes
Reef		Reef Env. Ed. Foundation			citizen science inverts & fish		
Gulf Council Coral Habitat areas of particular concern – out of range for SEACAR							
	Water Quality	FKWW (Florida Keys Water Watch)			citizen science water quality data; not currently regulatory level		

Additional information was provided after the meeting by Tom Jackson (NOAA NMFS; tom.jackson@noaa.gov) for) Extra Datasets and Invasives:

1. **Dennis Giardina** Dennis.Giardina@myfwc.com
   - FWC, FFWCC, Division of Habitat and Species Conservation, Everglades Region Biologist/Invasive Plant Management Section; ECISMA
2. **Jennifer Pousley** jpossley@faichildgarden.org
   - Fairchild Tropical Garden
3. **EELS – Environmentally Endangered Lands Program**
   - Miami-Dade County's Environmentally Endangered Lands (EEL) Program's focus is the protection and conservation of endangered lands. http://www.miamidade.gov/environment/endangered-lands.asp

2.4 Data Gaps

The following data gaps were identified during discussions following voting on top indicators.

- Coral recruitment
  - Need long-term data
  - Little data available
- Grazer biomass and distribution
- Epiphytic algae
- Green Sea Turtle
  - Limited data on how Green Sea Turtle health correlates with associated habitat
- Scarring data –
  - May not continue to be captured – done in Keys but limited on good aerials
  - Available regionally
- SAV fish composition data gap
- SAV algae (epiphytes) data gap for BBAP
- Plankton long-term datasets?
  - Missing from some areas
- Non-nutrient pollutants - long-term datasets?
- Sponge density and sponge species diversity
- Data gaps in long-term data collection

3 Day 2 Meeting

The purpose of the Day 2 meeting was to collect Partner Team recommendations for priority indicators to be considered for inclusion in the SE Region Habitat index.

The following goals were accomplished during the meeting:

1. Partner Team will review the Regional Habitat Index from Day 1.
2. Partner Team will come to a collaborative agreement on regional indicators.
3. Data Team will contribute to the Partner Team discussion.
4. Partner Team will assess gaps in management needs.
5. Partner Team will identify products that are most useful for management needs.

3.1 Partner Team Review of Data Team List of Top 5 Indicators

The top five indicators for each habitat index determined by the Data Team on Day 1 were presented to the Partner Team for review. The Partner Team made changes and additions to the indicator list, denoted below in italics.

SAV	Water Column	Coral/Coral Reef	Coastal Wetlands	Hardbottom
1. Species Composition 2. % Cover *by species* 3. Ambient Water Quality 4. Algae (epiphytic, free-standing) 5. Acreage • *Scarring* • *Community Species Composition* • *Density/Shoot Count* • *Clarity*	1. Nutrients 2. Algae 3. Clarity 4. Ambient Water Quality 5. HAB	1. % Live Tissue 2. Community Composition (benthic, coral, sponge, algae, gorgonians, *macroinvertebrates*) 3. % Algae Cover (cyanobacteria/macro algae) 4. Health (bleaching and disease) 5. % Cover • *Grazers and Reef-Dependent Predators*	1. Species Composition (plants and animals) 2. Change in Neighboring Land Use 3. Nutrients 4. Acreage 5. % Cover	1. Sponge Species Composition 2. Sponge Density 3. % Cover Algae • *Acreage*

**Italics denotes changes and additions made by Partner Team*

3.1.1 Partner Team List of Indicator Pros and Cons for Each Habitat Index

To inform indicator prioritization from a management perspective, the Partner Team provided pros and cons for the list of indicators prioritized by the Data Team on Day 1 and any newly added indicators.

Table 3-1. Partner Team Pros and Cons for SAV

Submerged Aquatic Vegetation	
Species Composition Pros • This is an easy measure and data are readily available. • There are proven correlations between species composition and amount of nutrients in the water. • Add other species • Add fish & (grazers), macroinvertebrates	**Species Composition Cons** •
% Cover by Species Pros • Critical	**% Cover Cons** •

Submerged Aquatic Vegetation	
Ambient Water Quality Pros • Does this include clarity • Add turbidity and clarity	**Ambient Water Quality Cons** •
Algae (epiphytic, free-standing) Pros • Good	**Algae (epiphytic, free-standing) Cons** • + phyto only? Not free-standing.
Acreage Pros • Critical	**Acreage Cons** •

Table 3-2. Partner Team Pros and Cons for Water Column

Water Column	
Nutrients Pros • Helps pinpoint issues in the direct operations of a city; exs. Fecal coliform -> clean out catch basins; Nutrients -> lower fertilizer use. • Helps visualize general trends in the environment. • Critical	**Nutrients Cons** •
Algae Pros • Good • Measured by Chl a?	**Algae Cons** •
Clarity Pros • Good	**Clarity Cons** •
Ambient Water Quality Pros •	**Ambient Water Quality Cons** •
HAB Pros •	**HAB Cons** •

Table 3-3. Partner Team Pros and Cons for Coral/Coral Reef

Coral/Coral Reef	
% Live Tissue Pros •	**% Live Tissue Cons** •
Community Composition (benthic, coral, sponge, algae, gorgonians, macroinvertebrates) Pros • Adding macroinvertebrates important to management – relates to potential economic values	**Community Composition (benthic, coral, sponge, algae, gorgonians, macroinvertebrates) Cons** •
% Algae Cover (cyanobacteria/macro algae) Pros • This is an important factor in assessing coral ecosystem "health"	**% Algae Cover (cyanobacteria/macro algae) Cons** • While data are available, it may not be collected at an appropriate temporal scale to capture pulse events

Coral/Coral Reef	
Health (bleaching and disease) Pros •	**Health (bleaching and disease)Cons** • This is important to know but difficult to influence from a management perspective
% Cover Pros •	**% Cover Cons** •
Grazers and Reef-Dependent Predators Pros • Adding macroinvertebrates and fish demonstrates wildlife utilization. – Important to habitat managers. • Important indicator – relates to algae cover and trophic structure status	**Grazers and Reef-Dependent Predators Cons** •

Table 3-4. Partner Team Pros and Cons for Coastal Wetlands

Coastal Wetlands	
Species Composition (plants and animals) Pros • Very important	**Species Composition (plants and animals) Cons** •
Change in Neighboring Land Use Pros •	**Change in Neighboring Land Use Cons** • This may explain change in other indicators
Nutrients Pros • This is good, but what about water quantity	**Nutrients Cons** •
Acreage Pros • Very important	**Acreage Cons** •
% Cover Pros • Very important if done by species – how different from acreage?	**% Cover Cons** •

Table 3-5. Partner Team Pros and Cons for Hardbottom

Hardbottom	
General Pros • Important and unique	**General Cons** •
Sponge Species Composition Pros • Very important to look at trends in health	**Sponge Species Composition Cons** •
Sponge Density Pros • Very important for looking at trends in health • Very important, especially considering recent die offs	**Sponge Density Cons** •

Hardbottom	
• Sponges are indicators of overall ecosystem health (they filter water, attract other key organisms, etc.)	
% Cover Algae Pros • Like it	**% Cover Algae Cons** •

3.1.2 Partner Team List of Top 3 Indicators for Each Habitat Index

Following discussions of indicator pros and cons, members of the Partner Team voted on their top three indicators for each habitat index. Partner Team members only voted for habitat indices for which they were familiar. Only one vote was allowed per indicator. Indicators below are prioritized by the number of votes received, with only the top three indicators listed.

Submerged Aquatic Vegetation

1. Acreage
2. Scarring
3. % Cover by Species*
4. Clarity*

*Tie

Water Column

1. Nutrients
2. Ambient Water Quality
3. Clarity

Coral/Coral Reef

1. Community Composition (benthic, coral, sponge, algae, gorgonians, macroinvertebrates)
2. Grazers and Reef-Dependent Predators
3. % Cover

Coastal Wetlands

1. Species Composition (plants and animals)
2. Nutrients
3. Acreage

Hardbottom

1. Sponge Density
2. % Cover Algae
3. Sponge Species Composition*
4. Acreage*

*Tie

3.2 Product Formats

The following formats were suggested Partner Team as possibly suiting their management needs.

- ESRI StoryMaps
- Florida Reefs Marine Mapping Planning
- Mapping with land use… anything that brings together lots of datasets
- Features on an online platform
- Water quality data seasonally
    - Already summarized seasonally
    - NOT looking for annual average
- Resource Investment Optimization System (RIOS) Tool – used in Panhandle
- Fact sheets with:
    - Synthesized data that is easy for public to understand
    - Summary graphs
    - 1 page, both sides – able to grab attention
    - Regionally and state-wide, but mostly regionally is best to present for agencies, general public, education outreach

Appendix A. Meeting Participants

First Name	Last Name	Email	Organization	Area of Expertise	Managed Area	Attendance
Eric	Buck	eric.buck@dep.state.fl.us	FDEP	Natural resource management, seagrass, mangroves	AP Manager for Biscayne Bay AP, Biscayne Bay-Cape Florida to Monroe County Line AP	Day 1, Day 2
Francisco	Pagan	francisco.pagan@dep.state.fl.us	FDEP	Coral reefs	Environmental Manager for Coral Reef Conservation Program	Day 1, Day 2
Gabrielle	Renchen	gabby.renchen@myfwc.com	FWC	Spiny lobster, hardbottom, seagrass	Marathon County, Florida Keys	Day 1, Day 2
Janice	Duquesnel	janice.duquesnel@dep.state.fl.us	FDEP	Coral and seagrass	Keys resources	Day 1, Day 2
Jennifer	Stein	jennifer.stein@tnc.org	TNC	Marine science technician, benthic ecology, reef monitoring	Disturbance Response Monitoring/Florida Reef Resilience Program, restoration in Dry Tortugas-Martin County	Day 1, Day 2
Joanna	Walczak	joanna.walczak@dep.state.fl.us	FDEP	Coral	SE Regional Administrator	Day 1, Day 2
Karen	Bohnsack	karen.bohnsack@dep.state.fl.us	FDEP	Resource management, coral reefs	AP Manager for Coupon Bight AP, Lignumvitae Key AP, Florida Keys National Marine Sanctuary Liaison	Day 1, Day 2
Katy	Cummings	katy.cummings@myfwc.com	FWC	CREMP, FWRI	upper Keys to Dry Tortugas	Day 1, Day 2
Lisa	Krimsky	lkrimsky@ufl.edu	UF/IFAS	WQ	Florida Sea Grant, Brevard County to Florida Keys	Day 1
Matthew	Johnson	matthew.johnson@noaa.gov	NSEFSC	Coral reef fisheries, reef monitoring, SEFSC	NCRMP FL region and north Caribbean	Day 1, Day 2
Shelly	Krueger	shellykrueger@ufl.edu	UF/IFAS	WQ, sponges, hardbottom, fisheries federal waters	Florida Sea Grant agent Monroe county, Florida Keys National Marine Sanctuary Advisory Council	Day 1, Day 2
Dan	O'Malley	dan.omalley@myfwc.com	FWC	Marine habitat restoration, marine state action plan, oysters, coastal restoration	Wildlife Legacy South Region Marine Goal	Day 1
Steve	Traxler	steve_traxler@fws.gov	USFWS	Estuaries, estuarine fishes, sea turtles	PFLCC	Day 1
Stanley	Kolosovskiy	stanley.kolosovskiy@miamibeachfl.gov	City of Miami Beach	Environmentally specialist		Day 2

First Name	Last Name	Email	Organization	Area of Expertise	Managed Area	Attendance
Laura	Geselbracht	lgeselbracht@tnc.org	TNC	coastal resilience, oyster reefs, marine mammals, sea turtles	Senior Marine Scientist -Florida	Day 2
Erin	McDevitt	erin.mcdevitt@myfwc.com	FWC	marine estuarine habitat restoration and conservation	SE FL, Jupiter to Keys	Day 2