SEACAR Southwest Meeting Summary and Outcomes April 5–6, 2017
The Florida Fish & Wildlife Research Institute

Prepared For

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Acronyms and Abbreviations

AP	Aquatic Preserve
BB	Braun-Blanquet
BGA	Blue-green Algae
BMAP	Basin Management Action Plan
Chl a	Chlorophyll a
CMECS	Coastal and Marine Ecological Classification Standard
dbh	Diameter at Breast Height
DO	Dissolved Oxygen
EPC	Environmental Protection Commission
FCO	Florida Coastal Office
FDEP	Florida Department of Environmental Protection
FDOM	Fluorescent Dissolved Organic Matter
FGCU	Florida Gulf Coast University
FIO	Florida Institute of Oceanography
FL	Florida
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
GIS	Geographic Information Systems
HAB	Harmful Algal Bloom
LCC	Landscape Conservation Cooperative
LDI	Landscape Development Intensity
LiDAR	Light Detection and Ranging
MARES	Marine and Estuarine Goal Setting for South Florida
NEP	Net Ecosystem Production
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
OIMMP	Oyster Integrated Mapping and Monitoring Program
PAR	Photosynthetically Active Radiation
PFLCC	Peninsular Florida Landscape Conservation Cooperative
QSE	Quinine Sulfate Equivalent
RB	Rookery Bay
RESTORE	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States
SAV	Submerged Aquatic Vegetation
SCCF	Sanibel-Captiva Conservation Foundation
SCHEME	System for Classification of Habitats in Estuarine and Marine Environments
SEACAR	Statewide Ecosystem Assessment of Coastal and Aquatic Resources
SFWMD	South Florida Water Management District

SIMM	Seagrass Integrated Mapping and Monitoring Program
STORET	STORage and RETrieval
SW	Southwest
SWFWMD	Southwest Florida Water Management District
SWIM	Surface Water Improvement and Management
TB	Tampa Bay
TBEP	Tampa Bay Estuary Program
TBRPC	Tampa Bay Regional Planning Council
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
USF	University of South Florida
USGS	U.S. Geological Survey
WQ	Water Quality

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 Southwest Region meetings were held on 05 and 06 April 2017 at the Florida Fish & Wildlife Research Institute, 100 8th Ave SE, St. Petersburg, FL 33701. On 05 April, the meeting times were 9:10 a.m. to 4:30 p.m. On 06 April, the meeting times were 9:10 a.m. to 2:00 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 APs, NERRs, etc.)
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 SW 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

Oyster/Oyster Reef	Submerged Aquatic Vegetation	Water Column	Coastal Wetlands
• Density • Recruitment • Acreage • % Cover • % Live • Size Class • Ambient Water Quality • Species Composition • Algae	• Acreage • % Cover • Species Composition • Shoot Count • Algae • Ambient Water Quality • Clarity	• Nekton • Algae • Ambient Water Quality • Clarity • Nutrients • Plankton • Fecal coliform	• Acreage • Biomass • % Cover • Species Composition • Clarity • Nutrients

- % Cover: 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 SW 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 SW 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 2-1 through 2-5 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***
Acreage	Acreage
Distribution and Abundance	
% Cover	% Cover
% Cover (not BB)	
Ambient Water Quality	Ambient Water Quality (including salinity)
Salinity	
Species Composition	Species Composition
Shoot Count	Shoot Count (Density)
Clarity	Clarity
Nutrients	Nutrients
Epiphytic Algae	Epiphytic Algae
Algae	Macro Algae

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

Water Column ***Preliminary Indicators***	**Water Column** ***Revised Indicators***
Ambient Water Quality	Ambient Water Quality (salinity, DO)
Salinity	
DO	
Algae*	HAB
Clarity	Clarity (color, turbidity, Chl a)
Nekton	Nekton
Nutrients	Nutrients
Plankton	Plankton
Fecal coliform	Fecal coliform
Light, including phyto	Light, including phyto
Phytoplankton ab.	Phytoplankton (ab. and comp.)
Phytoplankton comp.	
Chl a	Chl a

*Listed for Charlotte Harbor APs

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

Oyster/Oyster Reef ***Preliminary Indicators***	**Oyster/Oyster Reef** ***Revised Indicators***
Acreage	Acreage
Density	Density
% Cover	% Cover
% Live	% Live
Size Class	Size Class
Ambient Water Quality	Ambient Water Quality
Recruitment	Recruitment
Sediment contaminants, prevalence of diseases, reproductive condition	Health (sediment contaminants, prevalence of diseases, reproductive condition)
Clarity	Clarity

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
Benthic Invertebrate Community	Benthic Invertebrate Community
Biomass	Biomass
Nutrients	Nutrients
Size Frequency	Size Frequency
Species Composition	Species Composition

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

Unconsolidated Substrate ***Preliminary Indicators***	**Unconsolidated Substrate** ***Revised Indicators***
Abundance	Abundance
Sediment Bulk Properties	Sediment Bulk Properties
Species Composition	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 • Regular monitoring on acreage, cover, species on very regular basis in TB	**General Cons** •

Submerged Aquatic Vegetation	
• Extremely important indicator for TB	
% Cover Pros • Can be repeated frequently • Frequency of occurrence = strong metric **(**presence/absence over time)	**% Cover Cons** • Differing methods, dependent on sampling design
Acreage Pros • Widely used indicator • State-wide availability • Large areas covered • Need to include patchy, continuous, and propeller scars • Need as historical data present • Baseline to manage, quantifiable • Have recent updated info • Easy to compare over time • Region-wide dataset available over multiple years	**Acreage Cons** • Needs ground truthing • Should not be considered equivalent to habitat value • Edges of grassbeds are important to many species • Can't distinguish species and macro algae (aerial imagery)
Clarity Pros • Important determinant for seagrass growth • Required for SAV presence	**Clarity Cons** •
Species Composition Pros • Part of cover • WQ (salinity) affects species distribution • Shows species shift changes over time • Showing changes in ecosystem health that seagrass acreage totals might not reflect • Species and associated morphological differences may be correlated with population changes for associated species, as well as with other processes like sediment trapping	**Species Composition Cons** •
Macro Algae Pros •	**Macro Algae Cons** • (Algae) hard to quantify
Epiphytic Algae Pros • Probably more sensitive to changes that might affect SAV, overall	**Epiphytic Algae Cons** • (Algae) hard to quantify
Shoot Count (Density) Pros • Need for clarification of species of abundance • More responsive to long-term climate or water management changes (compared with **presence/absence)**	**Shoot Count (Density) Cons** • A lot of work • Labor intensive
Ambient Water Quality Pros •	**Ambient Water Quality Cons** •

Submerged Aquatic Vegetation	
Nutrients Pros •	**Nutrients Cons** •

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

Water Column	
General Pros • Robust data sets throughout region	**General Cons** • Availability
Ambient Water Quality (salinity, DO) Pros • Must have(?) used by others as indicator • Salinity – water storage and delivery affects quality and distribution of all coastal submerged areas.	**Ambient Water Quality (salinity, DO) Cons** • Data is often collected via grab and is done without respect to changes in seasons. • Consider collection frequency.
Chl a Pros • Indicator of HAB • N-loading events (dewatering long term changes • Used by NEP as an index	**Chl a Cons** •
Clarity (color, turbidity, Chl a) Pros • Lots of data to look at trends • Would be able to use for other purposes such as effect on seagrass habitat	**Clarity (color, turbidity, Chl a) Cons** •
Fecal coliform Pros •	**Fecal coliform Cons** • May be more localized • What does this tell us without looking at sources
HAB Pros •	**HAB Cons** • Limited data availability • May be limited dedicated monitoring networks
Light (attenuation, including phyto) Pros • Important for preserving high light habitats	**Light (attenuation, including phyto)** •
Nekton Pros •	**Nekton Cons** • Availability
Nutrients Pros • Dedicated long term networks • TMDL/BMAP implementation • Readily available dataset	**Nutrients Cons** •
Phytoplankton (ab. and comp.) Pros •	**Phytoplankton (ab. and comp.) Cons** •
Plankton Pros •	**Plankton Cons** •

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

Oyster/Oyster Reef	
General Pros • Rookery Bay NERR has continuous long term water quality data	**General Cons** • Rookery Bay NERR does not have consistent long term data collection program on oyster reefs. Spotty data through partnerships may be available (will need work to find). • Availability
Density Pros • Indicator of health	**Density Cons** • Density highly variable • Spotty data • Big need for data
% Live Pros •	**% Live Cons** •
Recruitment Pros •	**Recruitment Cons** •
Acreage Pros • Important for comprehensive maps • Simple data • Acreage collected biannually by SWFWMD • Some historical data • Statewide availability; large area covered • Measurable and baseline • Can get historical data from old imagery • Restoration goal	**Acreage Cons** • Not enough data available • Current mapping efforts not exact (need multiple mapping efforts – oblique imagery vs aerial imagery and ground truthing) • Would be difficult to look at trends; need thorough updated mapping • Does not indicate current (or maybe not recent) health • Limited database (currently) • Not enough data
% Cover Pros • Indicates live • % High = high density • % Low = loose shell, not a reef	**% Cover Cons** • Localized data only • Does not extend throughout APs to see trends • May have different methods
Size Class Pros • Insight to long term trend of site • Allows for accurate number or recruitment and/or survival • Captures density recruitment and disturbance frequency	**Size Class Cons** •
Ambient Water Quality Pros •	**Ambient Water Quality Cons** •
Health Pros •	**Health Cons** •

Oyster/Oyster Reef	
Clarity Pros • Effectiveness of reef • (“Turbidity” would be better word)	**Clarity Cons** • Live reef will only clear water in immediate locale

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

Coastal Wetlands	
Acreage Pros • SWIM program • TBEP habitat master plan update • FNAI data • Multiple	**Acreage Cons** •
Species Composition Pros • Indicator of changes	**Species Composition Cons** •
% Cover Pros •	**% Cover Cons** • TB with spotty datasets for on-the-ground work (underway)
Biomass Pros •	**Biomass Cons** • Assumes no stochastic events • One hurricane may change the system – Natural event • Different reasons for different amounts of biomass – not sure what question would be answered
Benthic Invertebrate Community Pros •	**Benthic Invertebrate Community Cons** •
Nutrients Pros •	**Nutrients Cons** •
Size Frequency Pros •	**Size Frequency Cons** •

Table 2-10. Data Team Pros and Cons for Unconsolidated Substrate

Unconsolidated Substrate	
General Pro • Lots of data available in TB; created and refined a benthic habitat model	**General Con** • Difficult and costly to set up program to monitor benthic invertebrates
Species Composition Pros • Data should be available from many monitoring programs • This habitat should be present in all APs	**Species Composition Cons** • Data availability
Abundance Pros • The species in unconsolidated sediments are sensitive to changes. That is why they are commonly used as monitoring indicators	**Abundance Cons** • Data availability

Unconsolidated Substrate	
Sediment Bulk Properties Pros • Sediment properties are easily analyzed and sampled	**Sediment Bulk Properties Cons** •

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. Acreage
2. Species Composition
3. Shoot Count (Density)
4. % Cover
5. Epiphytic Algae

Water Column

1. Chl a
2. Ambient Water Quality (salinity, DO)
3. Nutrients
4. Light, including phyto
5. Clarity (color, turbidity, Chl a)*
6. HAB*

*Tie

Oyster/Oyster Reef

1. Acreage
2. % Live
3. Size Class
4. Recruitment
5. Density

Coastal Wetlands

1. Acreage
2. Species Composition
3. % Cover
4. Size frequency
5. Benthic Invertebrate Community

Unconsolidated Substrate

1. Species Composition
2. Abundance
3. Sediment Bulk Properties

2.2 Measurement Units and Analyses for Indicators

The Data Team assembled the following list of measurement 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**
Acreage	• Acres	Y (all locations have been done in last decade; trends)	Y (all locations have been done in last decade; trends)	Continuous, patchy, none; need to capture propeller scars
Species Composition	• Percent composition species per area	Y (TB, CH, EB, RB)	Y (TB, CH, EB, RB)	Need to know if local or regional dataset
Shoot Count (Density)	• Number shoots per m^2	Y (CH)	Y (CH, EB, TB)	
% Cover	• Percent presence/absence (by species) • Braun-Blanquet	Y	Y	Percent cover shoots; taken into account how concentrated in m^2; BB is visual estimate of biomass; refer to literature for BB
Epiphytic Algae	• Ash-free dry weight per unit area (in lab) • Visual estimate (scale 1-4) (in field)	Y (visual estimate; CH) N (dry weight)	Y (visual estimate) N (dry weight)	Dry weight very rare; labor intensive Visual estimate very common

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**
Chl a	• Micrograms per liter	Y	Y	Separate out phaeophytin
Ambient Water Quality (salinity, DO)	• Standardized	Y	Y	
Nutrients	• Standardized • Mg per liter	Y	Y	
Light, including phyto	• PAR • K_d	Y (TB, CH, EB)	Y	

Water Column				
Clarity (color, turbidity, Chl a)	• NTU • Micrograms per liter • QSE (for color) (FDOM) • Secchi depth (m) with total depth (unitless)	Y (TB, CH, EB)	Y	
HAB	• Cells per liter	Y	Y	

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

Oyster/Oyster Reef				
Indicator	**Unit of Measure**	**Analyzed Y/N**	**Summarized Y/N**	**Comments**
Acreage	• Acres	N	Maybe (in some locations)	In progress
% Live	• Percentage	N	Maybe (patchy)	In many graduate thesis; OIMMP bring together info on statewide level; relatively new and can be measure m^2 or other
Size Class	• Density • Shell height/length (umbo to margin)	N	Y (some reports and publications – contact Eric M., Leslie)	
Recruitment	• Number spat per area	N	Y (reports and publications, thesis)	
Density	• Live oyster per m^2	N	Y (reports and publications, thesis)	

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

Coastal Wetlands				
Indicator	**Unit of Measure**	**Analyzed Y/N**	**Summarized Y/N**	**Comments**
Acreage	• Acres by habitat type	Y	Y	

Coastal Wetlands				
Species Composition	• Species richness (number of species) • Habitat classification code • Species dominance	Y (USGS, USFWS, FWC, NPS, other data with long-term trends)	Y	
% Cover	• Percent landscape cover • Canopy cover	N (too early; but USGS has done some analysis for specific habitat type; USACE)	N (too early)	Canopy cover – beginning to collect data USGS looked at historic habitats
Size frequency	• dbh • Tree height (m) • Seedling count per m^2	Y (RB)	Y (RB, TB)	Mainly mangroves
Benthic Invertebrate Community	• Individuals per unit area • Species richness	Y (only for individual wetlands; EB)	Y	

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

Unconsolidated Substrate				
Indicator	**Unit of Measure**	**Analyzed Y/N**	**Summarized Y/N**	**Comments**
Species Composition	• Species richness	Y (TB – Hillsborough County EPC)	Y (CH spatial – Jim Coulter, Mote, Schmid EB)	
Abundance	• Number per unit area	Y (TB – Hillsborough County EPC)	Y (CH spatial – Jim Coulter, Mote, Schmid EB)	

Unconsolidated Substrate				
Sediment Bulk Properties	• Percent silt, clay, sand • Grain size (freq. distribution; shape) • Porosity • Permeability • Percent organic	Y (TB – Hillsborough County EPC)	Y (CH spatial – Jim Coulter, Mote, Schmid EB)	Wet sieving for silt, clay

2.3 Existing Data Sources for Priority Indicators

Mrs. Clark, SW 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?
Mangrove	Community Composition, dbh, Seedling Density		Eric Milbrandt	2003-2007	Access database	Sanibel & Captiva	
Oyster	Density, Size Frequency (1x year)			2015-2017	Excel	San Carlos Bay	
Oyster	Settlement spat/m^2		Eric Milbrandt	Jan 2015-Apr 2017		San Carlos Bay monthly, Tarpon Bay	
Coastal Habitats and Oysters		FWC	Ryan.moyer@myfwc.com; kara.radabaugh@myfwc.com; steve.geiger@myfwc.com				
Water Column	Marine Mammals	Ron Mezich (FWC)	Ron Mezich (FWC)				
Beaches	Sea Turtles, Beach Area		FWC (sea turtles)				
Wetlands	Nesting Birds, Wading Birds		FWC – Ricardo Zambrano; Rookery Bay – Nancy Douglass				
Seagrass	Shoot Density (3x year); Species Composition – 10 sites mouth Caloosahatchee		Eric Milbrandt		Excel		
Coastal Wetlands	% Cover, Density, Species	TBEP	graulerson@tbep.org	2015-2016	Excel, Report	TBEP	Yes

2.4 Data Gaps

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

- Mutations in mangroves
- Heavy metals? - data is out there but patchy
    - EB looking at copper; CH looking at mercury
- Toxic algae blooms
- Human activity (hardened shorelines, commercial/rec use, restoration areas, beach/marine nourishment)
    - Transition this into indicators? - # licenses, # visitors, catch data
    - Capturing trends
    - Anthropogenic drivers/Baseline data
    - Human response to natural occurrences
    - MARES - marine people
    - Socioeconomic observance system - property values, economics
- LDI Landscape Development Intensity
- Economic valuation by habitat

<u>Oyster/Oyster Reefs:</u>

- Not a lot of oyster mapping
- Spotty oyster data (live, density)
- Density - Live/Dead data is spotty but needed
- Acreage - SWFMD and SFWMD looking at reefs now, need info on under mangroves, on seawalls…
- Will need ground truthing
- Disease and parasites monitoring; FGCU has done some funded by SFWMD; localized need

<u>Submerged Aquatic Vegetation:</u>

- Water clarity is important but RB NERR does not have the data beyond turbidity
- Macro algae - drift vs attached
- Need to include patchy, continuous, and propeller scars (propeller scars are from aerial imagery)
- Species Composition - they want to capture propeller scars
- Spotted sea trout for seagrass - not sampled in some areas

<u>Coastal Wetlands:</u>

- Size frequency
- % Cover - listed as con: spotty datasets for on-the-ground work (underway)
- With sea level rise, need for more sediment elevation table stations
- Long-term funding is issue
- Frequency of mapping; depends to what habitat classification code resolution used
- LiDAR mapping
- Transition to open water habitats; die-off zones; habitats transitions to other habitats

Unconsolidated Substrate:

- Species composition - listed as con: data availability - will be site specific
- Abundance - listed as con: data availability - will be site specific

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 SW 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 no changes to the indicator list determined by the Data Team.

SAV	Water Column	Oyster/Oyster Reef	Coastal Wetlands	Unconsolidated Substrate
1. Acreage 2. Species Composition 3. Shoot Count (Density) 4. % Cover 5. Epiphytic Algae	1. Chl a 2. Ambient Water Quality (salinity, DO) 3. Nutrients 4. Light, including phyto 5. Clarity (color, turbidity, Chl a) 6. HAB	1. Acreage 2. % Live 3. Size Class 4. Recruitment 5. Density	1. Acreage 2. Species Composition 3. % Cover 4. Size frequency 5. Benthic Invertebrate Community	1. Species Composition 2. Abundance 3. Sediment Bulk Properties

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.

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

<table>
<tr><th colspan="2">Submerged Aquatic Vegetation</th></tr>
<tr><td>Acreage Pros
Changes in acreage is a quick and easy parameter to explain to the public and government managers who may be able to affect policy
Need to know trends for ecotourism and can correlate with water quality
Easy to measure – easy to compare long-term data
Will tell you presence and absence/distribution over large area
Trends over time</td><td>Acreage Cons</td></tr>
<tr><td>Species Composition Pros
Can tell you health and quality of seagrass beds and changes by estuary segment can signal changes in water quality or clarity
Important to look at trends over time to document species shift – can also be correlated with water quality</td><td>Species Composition Cons
Confirm that current SAV surveys separate out species levels (not all GIS files show species level), many times lumped. Usually designated as patchy, etc.
Clarification: it is not usually presented at GIS level and is a combination of aerial acreage and cover
SAV as habitat, not concerned with species</td></tr>
<tr><td>Shoot Count (Density) Pros
Accurate
Not subjective
Comparable across sites/region/state</td><td>Shoot Count (Density) Cons
Seasonality/variation -> difficult to translate data to management tool -> need long-term data?</td></tr>
<tr><td>% Cover Pros</td><td>% Cover Cons
Cover – too subjective
(% Cover/Epiphytic): Not sure epiphytic algae will mean much to non-science partners especially decision makers in political positions that aren’t biologists or scientists</td></tr>
</table>

<table>
<tr><th colspan="2">Submerged Aquatic Vegetation</th></tr>
<tr><td>Epiphytic Algae Pros
Response metric to WQ
Easy to capture</td><td>Epiphytic Algae Cons
Not measured/defined consistently throughout region
Comment: community databases can be easily standardized
(% Cover/Epiphytic): Not sure epiphytic algae will mean much to non-science partners especially decision makers in political positions that aren't biologists or scientists
Clarification: this is a good indicator but does need some work to make more appealing to non-biologists/scientists</td></tr>
</table>

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

<table>
<tr><th colspan="2">Water Column</th></tr>
<tr><td>General Pros
These parameters are important because they relate to the health of the system and can help explain why specific resources are being impacted</td><td>General Cons
Nutrients, color, Chl A; are these data readily available in most areas?</td></tr>
<tr><td>Chl a Pros</td><td>Chl a Cons
Water column indicators need translation for non-scientists. These types of measures like chlorophyll A are less likely to be understood by the lay person</td></tr>
<tr><td>Ambient Water Quality Pros
DO and Salinity required parameters for survival in the habitat
Large regional dataset
Readily available region wide
Easily accessible</td><td>Ambient Water Quality Cons
Accessible data may be collected for NPDES or related purposes and not be parameters wanted by coastal managers
Which H2O quality parameters are desired for manager trends?</td></tr>
<tr><td>Nutrients Pros
Available data
Should be of interest to decision maker
Can use levels to direct watershed management programs</td><td>Nutrients Cons</td></tr>
<tr><td>Light (attenuation, including phyto) Pros</td><td>Light (attenuation, including phyto) Cons
PAR not commonly collected throughout region</td></tr>
</table>

Water Column	
Clarity Pros •	**Clarity Cons** • Needs interpretation, e.g. decreased clarity could be due to current- induced resuspension of sand, i.e. may not be indicator of water quality
HAB Pros • Widely available data from FWC/Mote monitoring program	**HAB Cons** • May move in from offshore and may not be an estuarine/coastal indicator

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

Oyster/Oyster Reef	
General Pros •	**General Cons** • Not enough consistent info/data program wide • All oyster indicators: Significant data gap (look at FWRI data) – Needed information
Acreage Pros • Most doable of all oyster indicators • Easier to measure and communicate info to govt. officials and public • Large-scale; model appropriate • Easily monitored for intertidal (drone/aerial)	**Acreage Cons** • Low acreage of oyster beds may be normal for a region (acreage alone does not include comparison with historic extent), but acreage is still useful to know • Seems like in most regions are lucky to have presence/absence maps, and those that do know information is missing. – Most of this seems like a gap. • No measure of "health of system" • Resolution won't detect fine-scale short-term variability • Need side scan tools for subtidal • Not representative of historic distributions (loss of substrate)
% Live Pros • Simple measurement of health • Good for fine-scale/seasonal • Can link to variable factors (salinity, predator density, etc.)	**% Live Cons** • Subtidal oysters are more labor intensive to acquire the same indicators and may be under represented compared to intertidal oysters • Seems like in most regions are lucky to have presence/absence maps, and those that do know information is missing. – Most of this seems like a gap. • Need lots of man power to sample system strata effectively • Hard to sample in-situ for subtidal reefs

Oyster/Oyster Reef	
Size Class Pros • Could link to pulse-events (HABs, salinity crashes, pollution events)	**Size Class Cons** • Subtidal oysters are more labor intensive to acquire the same indicators and may be under represented compared to intertidal oysters • Demographics/age structure really not a critical monitoring factor • Survival on most reefs is highly variable naturally
Recruitment Pros • Monitoring focal spat settlement = source production and capacity of system to recover from stochastic adverse effects	**Recruitment Cons** • Subtidal oysters are more labor intensive to acquire the same indicators and may be under represented compared to intertidal oysters • Will these parameters give us enough information on the health of the oyster community?
Density Pros • Provides resultant info on spat settlement • Result of competition/predation, so analog for direct observation of mobile predators and variable planktonic components	**Density Cons** • Subtidal oysters are more labor intensive to acquire the same indicators and may be under represented compared to intertidal oysters • Will these parameters give us enough information on the health of the oyster community? • Time consuming measurement • Hard to acquire for subtidal oysters in turbid systems in situ

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

Coastal Wetlands	
General Pros • Lots of data sets (GIS) • Many habitat classification systems	**General Cons** •
Acreage Pros • Acreage is comparable across many indicator types, which allows larger scale comparisons across multiple indicators. • With acreage, need to take historic trends into account, as loss to urbanization and mangrove encroachment into salt marshes both influence acreage	**Acreage Cons** •

Coastal Wetlands	
Species Composition Pros • Anything that can be determined by remote sensing data can be applied statewide.	**Species Composition Cons** • Most mapping efforts lump salt marsh as one community. Makes salt marsh trends of changes harder
% Cover Pros •	**% Cover Cons** •
Size Frequency Pros •	**Size Frequency Cons** • There is a large degree of variability in size of mangroves naturally. A scrub mangrove forest is just growing in a naturally challenging habitat. • Latitudinal variability.
Benthic Invertebrate Community Pros •	**Benthic Invertebrate Community Cons** • Likely limited data availability for this indicator and when it is available, methods are variable.

Table 3-5. Partner Team Pros and Cons for Unconsolidated Substrate

Unconsolidated Substrate	
General Comments (neither pro/con) • Refer to as something more descriptive like unvegetated soft bottom ○ Wording as “unconsolidated substrate” is not descriptive ○ Neither name is good to present to public, as they won’t know what it is, so managers can call it as they need and then create another way to present the habitat to general public – Intertidal or Subtidal Mudflat ○ Use CMECS, SCHEME for classification standards ○ Water Words That Work – translate scientific language to better communicate with public audience ○ South Atlantic LCC also a resource for definitions/language	
General Pros •	**General Cons** • Not enough data region wide
Species Composition Pros •	**Species Composition Cons** •
Abundance Pros •	**Abundance Cons** •
Sediment Bulk Properties Pros •	**Sediment Bulk Properties 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. Species Composition
3. % Cover

Water Column

1. Chl a
2. Nutrients
3. Ambient Water Quality (salinity, DO)

Oyster/Oyster Reef

1. Acreage
2. % Live
3. Recruitment

Coastal Wetlands

1. Acreage
2. Species Composition
3. Size Frequency

Unconsolidated Substrate

1. Species Composition
2. Sediment Bulk Properties
3. Abundance

3.2 Data Gaps

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

- Need to know temporal component for hardbottom habitat
- Subaqueous mapping of the soils
- Understanding role of marine benthos (nutrient cycling)
- Hydrocarbon sampling
- Hydrodynamic models (to predict spill path)
- Genetic diversity of seagrass beds and mangroves; most coastal wetlands
    - Restoration, bringing in plants from different areas
    - SAV susceptible to disease if there is limited genetic diversity
- Benthic water quality coupling – relative to nutrients and chemical contributions
- Larval distribution and abundance (fish)

Unconsolidated Substrate:

- Not enough data region wide
- Beaches – important baseline data

Oyster/Oyster Reef:

- Listed as con: % Live/Acreage – seems like in most regions are lucky to have presence/absence maps, and those that do know information is missing. – Most of this seems like a gap.
- Listed as con: % Live/Acreage – Not enough consistent info/data program wide
- Listed as con: % Live, Density, Recruitment, Size Class – Subtidal oysters may be under represented compared to intertidal oysters

Submerged Aquatic Vegetation:

- Not centralized data for community databases

3.3 Product Formats

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

- ESRI Story Maps
    - Can take scientific jargon and data and helps illustrates/translates that in a way that's engaging, informative, etc.
- Water Atlas (USF, Sean Landry)
    - WQ data for contour mapping for a parameter; can graph parameter; also raw data download
    - Want to look at specific site and get data
    - Good example of keeping the databases up to date (downloads regularly from STORET and incorporates into the database).
- NOAA Digital Coast – no specific examples
- Some databases (NOAA habitat databases) relied heavily on resource managers to stay up to date
    - Should draw from existing database so easier to keep up to date
    - Not rely so much on resource managers to update these
- Want database that can integrate all indicators together
- Funding problem – must keep people interested in keeping funded
    - User friendly also to public/government to keep interest
- Exported into GIS or Excel – some kind of exportable database
- End user flexibility
- Logos and proper citations
    - Have source watermark on the graph when exported
- Map-driven the best way for spatial data
- Meet federal metadata standards
- Sensitive data – LCC people collecting data did not want to put out publically
    - Data sources you have to be approved to view

4 Appendices

Appendix A. Meeting Participants

First Name	Last Name	Email	Organization	Area of Expertise	Managed Area	Attendance
Aaron	Brown	aaron.brown@watermatters.org	SWFWMD	SWIM Program, restoration ecology, seagrass mapping	Tampa Bay, Sarasota Bay, Charlotte Harbor	Day 1
Brita	Jessen	brita.jessen@dep.state.fl.us	Rookery Bay NERR	Research coordinator, National Monitoring Network	Rookery Bay NERR	Day 1,Day 2
Caroline	Gorga	caroline.gorga@myfwc.com	FWC	Species action plans, species and habitat management coordination	FWC Wildlife Legacy Initiative, PFLCC	Day 1,Day 2
Eric	Milbrandt	emilbran@sccf.org	Sanibel-Captiva Conservation Foundation	WQ monitoring, seagrass monitoring related to river flows, seaweeds/Seaweed Guidebook to SW FL, restoring oyster reefs, oyster metrics and mapping	SCCF director of marine lab, Caloosahatchee and Pine Island Sound	Day 1,Day 2
Gary	Raulerson	graulerson@tbep.org	Tampa Bay Estuary Program	Mangrove ecology, restoration and monitoring	Tampa Bay Estuary Program, Tampa Bay APs	Day 1,Day 2
Heather	Stafford	heather.stafford@dep.state.fl.us	FDEP	Regional manager	SW APs manager	Day 1,Day 2
Jeff	Carter	jeffrey.a.carter@dep.state.fl.us	Rookery Bay NERR & AP's	Monitoring	Rookery Bay APs manager	Day 1,Day 2
Keith	Laakkonen	keith.laakkonen@dep.state.fl.us	Rookery Bay NERR	Administrative, research preserve	SW Regional Administrator, director of RB NERR	Day 1,Day 2
Kent	Smith	kent.smith@myfwc.com	FWC	Marine and estuary management, habitat restoration	Statewide	Day 2
Laura	Yarbro	laura.yarbro@myfwc.com	FWC/FWRI	SIMM editor, seagrasses	FWRI, mouth of Suwannee to Alabama	Day 1
Lesli	Haynes	lhaynes@leegov.com	Lee County Natural Resources	Coastal watershed issues, oyster ecology	Charlotte Harbor to Estero Bay	Day 2

First Name	Last Name	Email	Organization	Area of Expertise	Managed Area	Attendance
Melynda	Brown	melynda.a.brown@dep.state.fl.us	DEP-Charlotte Harbor Aquatic Preserves	Monitoring (seagrass, WQ, etc.)	Charlotte Harbor AP manager	Day 1,Day 2
Ron	Mezich	ron.mezich@myfwc.com	FWC	Seagrass, manatees	Statewide - Administrator FL Manatee Program	Day 2
Stephanie	Erickson	stephanie.erickson@dep.state.fl.us	FDEP Estero Bay Aquatic Preserve	Monitoring (WQ, seagrass, rookery)	Estero Bay AP manager	Day 1,Day 2
Stephanie	Molloy	smolloy@naplesgov.com	City of Naples		Natural resources manager for City of Naples	Day 2
Randy	Runnels	randy.runnels@dep.state.fl.us	FDEP	Benthic communities, hardbottom monitoring	Tampa Bay APs manager	Day 1, Day 2
Rachael					Tampa Bay APs (intern)	Day 1
Dave	Reed	dave.reed@myfwc.com	FWC	Data access	FWRI research information services	Day 1, Day 2
Heather	Young	heather@tbrpc.org	TBRPC	Environmental planner, wetlands	Tampa Bay Regional Planning Council	Day 1, Day 2
Roger	Debruler		Charlotte County Natural Resources	Fisheries, seagrasses, WQ, artificial reefs	Charlotte Harbor within Charlotte County	Day 1, Day 2
Trevor	Fagan	trevor.fagan@swfwmd.state.fl.us	SWFWMD	WQ monitoring surface water	Tampa office	Day 1
Libby	Fetherston-Resch		FIO	Marine wildlife and fisheries monitoring	Florida RESTORE Act Centers of Excellence Program	Day 1, Day 2
Kara	Radabaugh		FWC	Research in salt marsh	Coastal Wetlands Group	Day 2