Mobile Bay National Estuary Program
Science Advisory Committee Meeting
10 am – 12:00 pm January 24, 2018
Killian Room, International Trade Center
250 N. Water Street Mobile, AL 36602

<u>**Agenda**</u>

Welcome - review and approval of minutes from previous meeting
Dr. Ruth Carmichael, Dauphin Island Sea Lab

<u>**Updates and Presentations**</u>
CCMP Estuary Status and Trends Strategy Review
Jason Kudulis, Mobile Bay National Estuary Program

Ecosystem Service Models for Mobile Bay Sub-watersheds
Rich Fulford, US Environmental Protection Agency

State of the Bay
Tom Herder, Mobile Bay National Estuary Program

Sub-watershed Hydrologic Modeling
Christian Miller, Mobile Bay National Estuary Program

<u>**Other Business**</u>
2018 meeting dates.

Adjourn

The Mobile Bay National Estuary Program Science Advisory Committee was established to bring area experts together to provide advice, guidance, and recommendations to ensure that the MBNEP activities will be conducted in a scientifically relevant and rigorous manner.

In attendance:

SAC Voting Members Present: Becky Allee, Alex Beebe, Kevin Calci, Ruth Carmichael, Renee Collini, Marlon Cook, Mike Dardeau, Stephen Jones, Latif Kalin, Julien Lartigue, John Lehrter, Fred Leslie, John Mareska, Randy Shaneyfelt, Tim Thibaut, Bret Webb, Byron Webb

Phone-in Voting Members: none

Proxy Voting Members: Dottie Byron for Ken Heck

Other Attendees: Jacob Blandford, Jerome Langlinois, Chris Johnson, Patric Harper, Rich Fulford, Leah Sharpe

MBENP Staff: Jason Kudulis, Roberta Swann, Tom Herder, Christian Miller, Paul Lammers, Bethany Dickey, Jackie Wilson, and Ben Brenner (Cobia Digital)

Takeaways

- Reviewed CCMP Estuary Status and Trends strategies to evaluate progress to date and consider content tweaks/additions for the 2018 CCMP update.
- A Coastal Inventory Data Subcommittee was chartered to assess data/monitoring we do have and what is missing spatially/temporally.
- Building a Biological Condition Gradient for coastal Alabama will likely remain a major activity for the SAC in the CCMP update.
    - BCG, Stream Team and Monitoring Team subcommittees will need to reconvene.
- Mrs. Roberta Swann issued a challenge to the SAC to develop a communication piece explaining baselines for watersheds with plans already in place that answers basic questions regarding condition.

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Dr. Ruth Carmichael called the meeting to order at 10:00 CDT. Newcomers gave quick introductions.

The bulk of the meeting was spent reviewing Estuary Status and Trends (EST) strategies from the current CCMP. Mr. Kudulis began by providing background and context to relate the importance of this "gut-check" review, noting that CCMP EST charges are guided by and executed in coordination with the SAC. Additionally, this review is an important first step in revising the CCMP, as well as outlining EST content for a new State of the Bay Report, both of which will be published in 2018. Current EST goals and considerations for the CCMP update guided discussion and are inserted for reference.

EST-1.1	Maintain/improve existing level of coastal monitoring.		Considerations for next CCMP
	a	Facilitate access to data by encouraging registration of metadata with an agreed-upon data management portal.	Are we capturing all data? Need for Monitoring/Data coordination/"Dashboard"?
	b	Identify funding and organization to query various agencies on a regular basis for background estuarine data.	Need for Monitoring Coordination
	c	Identify data gaps and needs and facilitate increased monitoring by appropriate groups.	
	d	Conduct high resolution mapping of habitats within the estuary to establish present-day baseline of distribution and coverage, and continue to monitor.	Addressed through Habitat Planning effort- standardizing habitat classifications and methodologies for mapping
	e	Develop remote sensing strategy to inform coastal monitoring efforts.	Need for Monitoring Coordination
	f	Monitor acres and species of SAV and wetlands.	Ongoing

Notes from discussion of EST 1.1

MBNEP uses DISL as its data portal, data is then provided to NCEI. ADEM uses WQX STORET. Questions regarding comprehensive monitoring and coordination efforts were raised: are we monitoring conditions better and are those data better coordinated now than they were five years ago? If not, what could we do to make it better? This needs to be fleshed out over the next few SAC meetings before the CCMP update. Consensus was yes and no.

Mr. Mike Dardeau stated system wide level of monitoring for chlorophyll is insufficient and has a horrible track record over the last 40 years. Sustained funding for monitoring remains an issue. MyMobileBay sites have a few more years on current grant and adding some things that are important. Nitrogen, Phosphorus, organic matter, and hypoxia are lacking spatial/temporal coverage. In general, the bay isn't holistically monitored. Mr. Leslie stated that ADEM has tried to address some of the shortcomings to a degree and samples once a month. Satellite signal to tease out chlorophyll is getting close and will be a future improvement, ocean color is valuable too. Dr. John Lehrter seconded Mr. Dardeau's sentiments. Also, need to consider beyond terrestrial remote sensing and incorporate those technologies to fill gaps in our monitoring of the bay, i.e. chlorophyll A, turbidity, and ocean color. Some work using remote sensing has been done in Mobile Bay but not published as it has elsewhere on the Gulf Coast. Consistent funding stream to put these datasets together and manage them is not perennial. This is where better coordination would be advantageous.

Concluded that some individual metrics have significant gaps, but stepping back and viewing from a broad scale of monitoring datasets or metadata have we made progress? Yes, improved monitoring of seagrass and other indicators of habitat have occurred, and it is better coordinated. Also, instituted metadata standards. Most granting agencies require metadata now so that helps ensuring it is developed and made publicly available. Realize some specific metrics where we need more data and gaps still exist.

Dr. Bret Webb recommended before we initiate the CCMP update to undertake an integrated assessment of data/monitoring we do have and what is missing both spatially and temporally, or if we filled the gaps. Mrs. Roberta Swann agreed, now is the time to do this. Mrs. Renee Collini mentioned the monitoring inventory updated a few years ago as a starting point. Perhaps a white paper, webpage or data portal to easily access monitoring data would serve everyone. Mr. Steve Jones mentioned a GOMA Gulf Star award to expand Water Cat into Alabama – is a catalog of ongoing and water monitoring related data. **Mrs. Swann suggested the creation of a Coastal Inventory Data Subcommittee of the SAC – Steve Jones, Renee Collini, Bret Webb, Jacob Blandford, an ADEM representative will be included, DISL Data Management Center.**

EST 1.1: going forward we have a lot of data, but we don't have a lot of analysis. Do we want to add

"analysis" to EST1.1 in addition to monitoring only? Dr. Lehrter and Mrs. Swann felt this was a good idea.

EST-2.1		Build a Biological Condition Gradient Framework for coastal Alabama.	Considerations for next CCMP
	a	Define/refine indicators of ecosystem health.	Monitoring Framework? Need to refine framework to establish ranges (Excellent, Above Average, Fair, Below Average, Poor)
	b	Calibrate Landscape Disturbance Index to estuarine conditions (as alternative to impervious cover if deemed necessary).	This needs to be built out; should be a major activity of the SAC in next five years.
	c	Develop/adopt indices of biological integrity for streams and rivers (and riparian buffers), freshwater wetlands, and intertidal marshes and flats	
	d	Determine numeric criteria for habitat condition for streams and rivers (and riparian buffers), freshwater wetlands, and intertidal marshes and flats.	
	e	Construct BCG framework and report on estuary condition.	

Notes from discussion of EST 2.1

A number of projects and resources were initiated in the D'Olive watershed to monitor restoration efforts and to build a Biological Condition Gradient for coastal Alabama. Mrs. Swann asked, "are we doing it (a BCG) or not?" Is it necessary to wait another five years to calibrate a BCG, or is there anyway we can calibrate it with the limited data we have and have some form of a BCG in place by September 30, 2018 to include in the State of the Bay Report?

Primarily the BCG is a communications tool. We could continue to collect data but need some analysis to "gut check" where we stand and guide next steps in BCG development. Mr. Tim Thibaut noted that we are not going to be able to do the BCG coast wide, for both counties with data we currently have. D'Olive or Weeks Bay could serve as a test case. Some of the indices (i.e. riparian buffer, WRAP, and FQI, etc.) already collected could be used in locations where they were collected and then using a remote sensing approach could predict BCG values in other watersheds. Predictions could be stitched together to assign a score for coastal Alabama. Using pre and post restoration data, analysis can be performed, and restoration sites can be scored. Mrs. Collini mentioned a biproduct of intensive D'Olive monitoring was for it to also assist keying-in on what measurements should always be included, could be left out, or sampled less frequently in future comprehensive monitoring endeavors.

Could we take the watersheds with completed management plans and use the compilation of collected data to get a statement of watershed condition and/or utilize the EPA fuzzy decision analysis method? Potentially, it depends on what we have for land cover maps because a BCG includes condition, not just spatial extent. Mrs. Swann issued a challenge to the SAC to develop some sort of communication piece that shows baselines for watersheds with plans already in place by September 30th. It wouldn't necessarily be based on monitoring data per se - a boiled down version of vital indicators from the Monitoring Framework to be able to communicate directly, e.g. "Fish River is in better condition than Three Mile Creek." Mr. Thibaut again noted that it could certainly be done, but it is not going to be entirely easy or perhaps as accurate as we want it to be. It was understood that a first iteration wouldn't not be entirely accurate, but also recognition that something needs to be done to move a BCG forward. Additionally, the process would be under a continuous improvement evaluation. It may be best to initially start with wetlands and riparian buffers – tied to stream condition.

Mrs. Collini commented if we use a subset of the metrics available now compared to say five years later when the full suite of metrics from the Monitoring Framework were collected could a comparison be made? There are existing baselines and indices to make comparison. Proxies within a watershed are already defined by the Monitoring Framework. **Recommendations from the framework should be integrated into**

all watershed management plans being developed. The framework includes indices, available materials, where calibration would be needed, and procedures to use for a given habitat to able to assess and grade condition. Proposing to use SAC identified three most stressed habitats (freshwater wetlands, intertidal marshes and flats, and streams, rivers, and riparian buffers). First will need to know what data are available to begin to assess analysis and gaps and then act quickly if we are to meet September 30 deadline. Goal is to communicate status and trends – need to reconvene State of the Bay, BCG, monitoring subgroup to consider alternatives, proxies, and analyze available data to calibrate some form of a BCG/watershed condition gradient. This discussion transitioned into EST 3.1 – a conceptual model using D'Olive from the monitoring work being implemented.

Timeline for State of the Bay September 30 narrative draft – final report produced by end of 2018.

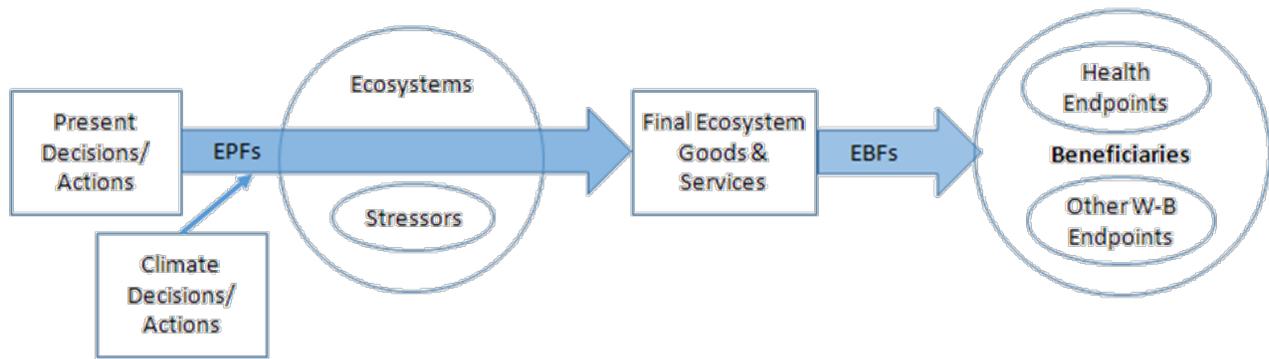| EST-3.1	Manage system for multiple services.	Considerations for next CCMP
a	Develop and test conceptual model that goes from stressor to ecosystem service utilzing D'Olive watershed restoration.	Entering final year of D'Olive data collection, what are next steps for "conceptual model" and is the data being collected currently useful for this exercise?
b	Predict changes in fish biomass related to changes in habitat quantity and condition.	Needs to be done. Do we have baseline conditions on fish biomass for D'Olive Bay?
c	Predict changes in water quality related to management of ecosystem services.	What tools place valuation on ecosystem services, and how can they and the BCG guide coastal Alabama monitoring, restoration, and protection needs?

Notes from discussion of EST 3.1

Suggested activity "a" is not ready to be tackled due to ongoing restoration in D'Olive. Data collected thus far is quality data but does not truly represent post-restoration conditions across all sites.

Is anyone currently trying to answer "b" regarding fish biomass? Fish biomass is a very broad term – what was the question being asked? With a 2018 CCMP update on the horizon is this the question we want to be asking and is it stated appropriately? Was mentioned that the language originated from "What is important to you? We want more fish." – showing that restoration has increased fish populations – SAV could be used as a proxy for fishery improvements. Not certain data for baselines conditions of fish biomass has been collected or data on fish for that matter. Alabama currently has an Index of Biological Integrity in place for streams but not for the bay.

It was always assumed that accomplishing EST 3.1 would take time and that other CCMP items would need to be accomplished before 3.1. Restoration work in D'Olive represents the premise that restored water quality and sediment reductions will improve habitat for SAV in D'Olive Bay, not fish biomass but that a biomass increase could be correlated i.e. SAV habitat = more fish - "if you build it they will come." Do we scratch biomass and select another indicator that can be better tied to improved SAV habitat? Is there data about fish we could access, or do we need someone to get baselines? Should EST 3.1 "b" be modified to "predict coverage of SAV?" – for the purposes of D'Olive. Mrs. Swann asked to keep in mind that each suggested activity is exactly that, suggested. Do we need to have another discussion to define the ecosystem services are and which ones specifically apply to D'Olive? Alter language in "b" from: Predict changes in ~~fish biomass~~ <u>aquatic faunal community</u> related to changes in habitat quantity and condition. Motion was made to accept the change, motion passed.

Next, Dr. Rich Fulford Mrs. Leah Sharpe with EPA's Gulf Ecology Division gave an overview of their ecosystem services research. Mr. Fulford discussed linking ecosystems and the goods and services they produce to the well-being of people. The diagram below summarizes the logic flow showing how actions that change ecosystems may change human well-being.

Ecosystems

Present Decisions/ Actions — EPFs — Stressors — Final Ecosystem Goods & Services — EBFs — Beneficiaries

Climate Decisions/ Actions

Health Endpoints

Other W-B Endpoints

This Coordinated Case Studies approach leverages the benefits of conducting in-depth research at a place-based location and the benefits of examining transferability/scalability/utility across communities. Mrs. Shapre then discussed her Stakeholder Engagement Tool. Sharpe and Fulford would like to integrate their work to help with the identification of ecosystem services to assist in coastal Alabama watershed management planning/restoration activities. The FEGS (final ecosystem goods & services) Scoping Tool is designed for community decision-makers use at an early project scoping stage to help identify and prioritize stakeholders, beneficiaries, and the environmental attributes of a particular decision/decision context. Fulford and Sharpe have worked for about a year on quantifying ecosystem services models to predict ecosystem services changes.

These following tools are being calibrated in the D'Olive Watershed. Once the data is collected Fulford and Sharpe would like to schedule a demo webinar.

- H$_2$0 Tool: Analyzes land use land cover data, built infrastructure data, and soil data to forecast change scenario.
- VELMA (Visualizing Ecosystem Land Management Assessments): analyzes changes in land cover, soil data, climate data and combines them together to look at long term shifts in the landscape.

Due to time restraints, Mr. Tom Herder's State of the Bay planning presentation was tabled. Attendees were solicited to volunteer for assignments and contribute to document creation. MBNEP staff will continue to reach out to recruit participants and engage the SAC accordingly.

Lastly, Mr. Christian Miller provided an update on Fowl River Hydrologic Modeling. John Curry with Hydro Engineering Solutions is the contractor for this activity. To configure a model in Fowl River, four Davis weather stations and three hydrologic gauges were installed. The Fowl River USGS gauge was also used. Unfortunately, some equipment tampering in one area was an issue. A GSSHA Hydrologic Model was employed - elevation, land use, and soil data. After the model was built, rainfall events were needed for calibration. On June 20-21, 2017 - 5-6" of rain fell across the watershed. This rain event was used to gain an initial understanding of how the watershed reacts. Typically, a model calibrated to a small rain event will not translate to a larger storm. On August 29-30, 2017 - 7-8" of rain was recorded. A second substantial rain event was used to see if the variables would apply to a larger discharge event. Using the GSSHA results versus the field measured results, a calibrated product was ready. The timing of the peak discharge was reasonable, however peak discharges were too high. Several iterations and adjustments to the Manning's overland 'n' value, channel 'n' values, hydraulic conductivity, and initial soil moisture were performed. Each adjustment made some improvement, however the peak discharges at the Half Mile Road gauges were still outside the range of a reasonable comparison. Retention depths were added throughout the model. Retention was added to the GSSHA results and these were the outcomes: The timing of the peak discharge was reasonable; retention helped bring most of the discharges into a reasonable range except at Half Mile Road; another rain event was necessary for comparison. An October 22-23, 2017 rain event produced more rainfall in a shorter time period and led to the following outcomes: The timing of the peak discharge was reasonable; retention helped bring most of the discharges into a reasonable range except at

Half Mile Road; it was determined that appreciable storage is occurring between I-10 and Half Mile Road; The topography in this area starts to flatten, there are also a lot of trees and wetlands; it appears that the railroad bridge acts as a constriction providing detention-like storage; a hydraulic structure was added to the model to replicate detention.

Conclusions:
- Adding retention (throughout the watershed) and detention (between I-10 and Half Mile Road) helped bring the discharges into a reasonable range at all locations.
- There is significant storage throughout the watershed.
- A 5-year rainfall event produces rural basin discharges despite the development in the headwaters.
- Until a larger rainfall event is captured, it is undetermined the impact the storage will have on peak discharges during larger flooding events.

Stay tuned for next steps and draft outline.

As the meeting reached conclusion a few announcements were made. Dr. Carmichael announced that the current SAC Co-Chairs' tenure will end September 2018**. If you are interested in filling a SAC Chair vacancy, please contact Mr. Kudulis.** Dr. Bret Webb is forming a new regional chapter of the American Shore and Beach Preservation Association (ASBPA) that covers Louisiana, Mississippi and Alabama. Their next meeting will be the Coastal Summit in D.C. March 20-22, 2018 where they will receive their charter.

At 12:05 Ruth Carmichael made the motion to adjourn and Tim Thibaut seconded it.