Mobile Bay National Estuary Program
Science Advisory Committee Meeting – Fowl River Marsh Study
Killian Room, International Trade Center, Mobile AL
February 8, 2017

In attendance: Alex Beebe, Ruth Carmichael, Just Cebrian, Marlon Cook, Bethany Craft, Patric Harper, Steve Heath, John Lehrter, Fred Leslie, Kari, Servold, Randy Shaneyfelt, Tim Thibaut, Bret Webb, Byron Webb

Phone-in: Dennis Devries

MBNEP Staff: Tom Herder, Jason Kudulis, Paul Lammers, Roberta Swann

Takeaways:

- Group agreed to flesh out Task 1 (condition assessment) before starting Task 2 (experiments) discussions. A Google doc project outline will be created to tackle Task 1 objectives and outcomes. People should attach their name to items of expertise/interest. The third stage will be a discussion of the budget.
- The collection of background information (Task 1) will help us determine the "smoking gun." Need to characterize and understand current state before fully developing Task 2 (experiments to mitigate, protect, preserve).
- The group agreed the Marsh Study will be exclusive to the Transition Zone of Fowl River in the lower watershed (see embedded image below).
- Equally important goal is to monitor and study these marshes comprehensively to understand conditions elsewhere too, not just Fowl River.

After a brief welcome, Christian Miller presented a characterization of Fowl River derived from the WMP.

Marlon Cook gave a summary of the Fowl River Sediment Study. The full report can be found here: http://www.mobilebaynep.com/images/uploads/Fowl_River_Watershed_GSA_Pre-Restoration_Assessment-Final.pdf Wetlands represent the largest percentage of land cover, agriculture is small comparatively but important to sediment loading. Priority of a sediment study is to get discharge readings in low and high water events to depict clearest image. Of the sampling sites, sediment loads in tons/per year were higher near agriculture and timber harvesting sites in the watershed as opposed to undisturbed areas.

Total sediment loads compared to other local watersheds show Fowl River has low values and near "pristine" with relation to sediment loading. Fowl River is the second lowest sediment load Marlon's seen in his career. Nutrients and metals were tested as well using samples from the water column. Marlon finished by noting some interesting facts about Fowl River: Dykes creek had a negative regression (very rare scenario), perhaps wetlands upstream are capturing most of the sediment during highwater events; tannic acid influenced streams so lower pH values were expected. Marlon looked at natural erosion rate and it is at or near natural level, so it seems pristine in his opinion and not necessarily starved. We don't really see any bed sediment upstream in Fowl River, we should have been able to measure it in most places. Most of the river bottom was hard, could be evidence not enough sediment or simply a natural feature of river.

After the presentations, the group moved on to project specifics.

STUDY COMPONENTS:

1: Develop Comprehensive Assessment of Marsh Condition

For the transects across the study area measure a number of metrics indicative of marsh health.

1.1 Plant density and morphology - provides current status of marsh health. Compare data of healthy and impaired marsh to determine stressors. This data will also be valuable to set a triage strategy.
1.2 Elevation profiles – group agreed a platted stamp survey is needed and should include boundaries and topography within the Transition Zone. See item 1.8 for inclusion. The group wanted confirmation on LIDAR available at 2ft resolution? (2014 Mobile Co. LIDAR survey). LIDAR may be poor for marsh mapping, depending time of year. Need to determine if MBNEP funded habitat mapping project is applicable and its resolution. Concerning access to marshes for profiles, MBNEP has a boiler plate document, but no agreements in place.
1.3 Sediment balance (accrual/erosion) – Group felt deep core samples (1.6) will be beneficial. Also, noting shallow cores from marsh fringe to shore may be needed. Cores will have value for other studies in addition to marsh study. Point bar deposits should show some accretion rates.
1.4 Sediment porewater salinity (saltwater intrusion) pore wells can be used. This data can be used in conjunction with the elevation profiles to produce fine-tuned information to determine status/stress. Other metrics:
1.5 Comprehensive sediment characterization
1.6 Deep cores→history of marsh accretion dynamics, entrapment of pollutants/organic carbon
1.7 Continuous topographic maps (drones/LIDAR) (tie up with 1.2) Group agreed, will be narrowed down to focused study area.

Points made during the discussion: Several attendees noted we must examine rise in sea level. Does it make sense to restore these marshes or plan for new emergent salt marshes overtaking freshwater wetlands? Conservation in upper watershed may make more sense long term. Unprecedented opportunity to play with science in a real-world scenario to consider which options will serve greatest benefit and be cost effective. Stormwater runoff, boat wakes, and nutrients impacts need to be considered.

2: Experiments

2.1 Demonstrate the causes of marsh (and shoreline) decline (“nailing the smoking gun”)

2.2 Develop cost effective recovery techniques and determine metrics that will serve us best in similar scenarios/watersheds down the road. The group discussed if shoreline loss and marsh loss are interrelated, and if this study needs to be completed before engineering is done? Dr. Bret Webb stated both can be done at the same time, or to a 60-70% of engineering then reassess options based on results at that time. He went on to make two points: 1) adaptive management is going to be needed if we implement a marsh restoration, as it will likely not keep pace to natural changes. 2) possibility of higher sediments loads benefitting marshes by increasing accrual rates. Thin layer deposition from dredged material was also mentioned as an option to feed starved marshes, or alternatively allow them to drown in place. Forecasting future development, more shoreline armoring is anticipated likely resulting in future marsh degradation. Task 2 of the marsh study presents an opportunity to not just protect marshes but better understand cost effective recovery options to save/repair marshes elsewhere.

The purpose of this study is to identify cause(s) of Fowl River marsh degradation and provide corrective actions based on our scientific understanding to restore or prevent further degradation, but not to recommend one project over another. In addition to future restoration opportunities, managing human impacts through

regulation needs to be considered/implemented to ensure long-term sustainability of any restoration work. Secondarily, information from the marsh study could be used to make an economic case for "protecting" or "doing nothing" scenario relating to fishery health and recreation opportunities.

2.1 Demonstrate causes of wetland (and shoreline) decline

2.1a) Wake Experiments (euhaline reaches)→ creating wakes and measuring wetland response

2.1b) Salinity intrusion (meso- and oligohaline reaches)→increasing porewater salinity and measuring wetland response

2.2 Identify cost effective recovery techniques

2.2.a) Experiments testing cost-effectiveness of different designs of wetland/shoreline stabilization:

control/breakwater/breakwater+sediment filling/breakwater+sediment filling+ planting

Other points and meeting content:

Other possible factors to test for: soil supplements/mycorrhiza; nurseries vs. natural donor sites

Thoughts posed by the SAC at the January 17 meeting: possibility of inoculating plant roots to accelerate growth (USACE has a project inoculating plant roots, they may want to pilot here. See Dr. Webb for contact info - engineering and research development center in Vicksburg VA.); elevation profiles linked with the tide gauges; typical marsh restoration takes seven years, is there a way to accelerate this study to know results sooner? differential subsidence a factor for loss of spits – natural factor with SLR. How can we determine what would be natural evolution or what we want the river to be with engineering options? Use of geotechnical assessment before E&D; what material will be used for breakwater; timing and integration of the three overarching components, i.e. marsh study, hydrological study and engineering design.

As the watershed continues to grow and get more sediment are we speeding up the accrual process? Would it fix itself over time with increased land use? Taking some cores would be beneficial to understand the background of geologic deposits. Question posed if spits were even worth saving? If data supports this it is up to decision makers and community to decide, not SAC. Anthropogenic impacts from jet skis have been shown in ADEM studies – consider sediment accrual rate and see if it is accelerating at natural curve, may help show wake damage.


Zone III – Fresh
Zone II - Transition
Zone I – Marine
Goat Island
Mon Louis
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