Mobile Bay National Estuary Program
Science Advisory Committee Meeting
Killian Room, International Trade Center
250 N. Water Street, Mobile, AL 36602
Tuesday, October 21, 2014
10:00 a.m. – 12 p.m.

Telecon: 1-888-848-0190 Passcode: 6307392

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

1.   Call to order   .

2.   Approval of minutes of July 18, 2014 meeting

3.   Old Business

   • Bays and Bayous Symposium Monitoring and Indicators Panel, Wednesday, December 3, 2014

   • Other?

4.   New Business – Moving towards BCG framework for coastal AL streams

   • Randy Shaneyfelt (Alabama Department of Environmental Management) – ADEM activities contributing to stream assessments

   • Tim Thibaut (Barry A. Vittor & Associates)
      o A framework for a biological condition gradient for coastal AL streams.
      o Testing the conceptual Wetland and Stream BCG in the D'Olive Bay Watershed comparing pre- and post-restoration biological and stressor data.

5.   Discussion of monitoring strategy development – What data is available for moving forward? What gaps exist?

6.   Adjourn

Minutes of the Meeting of the MBNEP Science Advisory Committee (SAC)
Killian Room, International Trade Center
Tuesday, October 21, 2014

In attendance: Dr. Steve Ashby (Northern Gulf Institute), Dr. Alex Beebe (USA), Renee Collini (DISL), Marlon Cook (Geological Survey of Alabama), Mike Dardeau (DISL), Brian Dzwonkowski (DISL), Steve Heath (ADCNR-MRD-Retired), Steve Jones (GSA), Dr. Latif Kalin (Auburn University), Dr. Julien Lartigue (NOAA), Tom Strange (Restore Ecosystems), Tim Thibaut (Barry Vittor and Associates), Roberta Swann, (MBNEP), and Tom Herder (MBNEP)

1. <u>Call to order</u>. Tom Herder called the meeting to order at 10:04.

2. <u>Approval of minutes of July 18, 2014 SAC meeting</u>. He asked if there were any revisions to the minutes of the July 18, 2014 SAC meeting. Mike Dardeau said that Bill Walton had questioned his assertion that a paper authored by Sean Powers proposed using oyster length as an indicator and upon further review, Bill was correct. Noting that, Julien Lartigue moved to accept the minutes, Marlon Cook seconded the motion, and the minutes were approved unanimously. .

3. <u>Old Business</u>. Tom reported that the Panel Discussion on Monitoring and Indicators would be held on the afternoon of the second day of the 2014 Bays and Bayous Symposium, Wednesday, December 3. He noted that the panelists include Dr. Maria Dillard of the Hollings Marine Lab in Charleston and Dr. John Lehrter of the EPA Gulf Breeze Ecology Lab on Indicators and Dr. Luiz Barbieri of Florida Fish and Wildlife Research Institute in Tampa and Dr. Mark Woodrey of the Grand Bay NERR on Monitoring.

4. <u>New Business</u>. Randy Shaneyfelt of ADEM NPS Coastal Programs assumed the floor to discuss his experiences with the **Coastal Alabama Pilot Headwater Stream Survey**. Their purpose was to survey, document, and comparatively assess low-impact, "natural" headwater reference streams along with higher-impacted headwater stream segments in Mobile and Baldwin counties. Further, they sought to assess and correlate land use/land cover valuations with surveyed fluvial geomorphology and water quality parameters to gauge a new ADEM coastal headwaters assessment tool for these systems. Finally, they pursued deriving new data to amend the 2005 Coastal Alabama Regional Curve and reference reach designs for natural stream design and restoration projects. To expand regional curve information, the survey limited data to Rosgren E-type streams with single channels, low gradients (<2%), high meander/width ratios, and intact riffle/pool sequences.

The original idea of the Survey was to study *first order* coastal streams, but with so many of these ephemeral, they modified their target to "headwaters" with one square mile or less drainage areas. They spent a great deal of effort walking targeted sites. To initially determine target areas, the Survey conducted a Desktop Evaluation using 2008 NRCS 12-digit HUC overlays with secondary roads and topography layers to create 76 recon maps for southwestern Alabama. HUC areas that fell below the Coastal Management Zone elevation were rejected due to tidal influences.

From these maps, candidate sites were selected for initial roadside reconnaissance. Randy discussed the sequence by which sites were selected, with often five to 30 potential sites per 12-digit HUC. He noted that the county tax plat book was employed to determine the names of landowners for sites.

To ensure adequate/appropriate drainage areas, the Survey used available GIS tools (e.g., USGC-NHD) to estimate stream length and drainage area, which was recorded using both acres and square miles as units. Potential reference streams were selected based upon a sub-HUC drainage area of less than one square mile (259 hectares). Two urban streams – Three Mile and Twelve Mile creeks – exceeded this size but were determined to be appropriate. Access to the selected sites became the next challenge.

The Survey developed a standardized Recon 1 Field Sheet to conduct initial field reconnaissance of candidate sites. All sites required permission from the landowners, and Soil and Water Conservation Districts, State Forestry, and NRCS were very helpful in facilitating access. Indicators of access limitations, including signs threatening violence, were noted on Recon Sheets and never ignored.

A primary purpose of initial field recons was to determine is streams in question exhibited flow. Candidate locations required periodical inspections to ensure that flow was perceptible or above for most of the year. Down time incurred as a result of the Deepwater Horizon oil spill afforded the Survey the time needed to make flow observations, since most sites lacked any USGS flow gauges. Field intensive roadside surveys for selected sites were conducted, and unfortunately many/most sites were eliminated due to installed infrastructure of anthropogenic impacts. Over 80% of sites were determined unsuitable for secondary field recon due to E-Type stream requirements and flow conditions. Over 400 sites were reviewed in the Recon-1 Phase for the two counties. Approximately 225 were initially deemed possible, but based upon drainage areas and continued flow observations only 75 sites were selected for access and entry by the Survey team. Following intensive secondary recon, **only five final "reference sites" were determined as suitable**, with **an additional nine "non-reference sites" selected to show comparisons for LU/LC change impacts**.

Randy spent some time reviewing examples of impacts that compromised headwater stream condition and the Headwater Stream LU/LC Assessment, which quantified land use impacts within a 500-foot radius of stream sites by polygons that allowed determination of a metric between 0 (Urban/Impacted) and 5 (undeveloped).

Forestry canopy cover evaluation was also included in assessments. A Model C Concave Spherical Densiometer was used. Presence, absence, and maturity of forest canopies were assessed.

Since stream flow so strongly determines aquatic communities and stream flows were generally small and channels rough, conventional flow meters were problematic. The survey team employed a portable USGS Pygmy Meter Model 6205 to determine flow. Dr. Kalin asked whether flows were determined following rain events, and Randy responded that since determination of some flow not corresponding to events was more important, the sampling protocol included waiting over 24 hours after any rain event to take flow measurements.

Since the Survey team was involved with the EPA Region IV Regional Project Development Team, the they adopted the Identification Methods for the Origins of Intermittent and Perennial Streams, Version 4.0 from the North Carolina Department of Environment and Natural Resources. It provided an EPA-recognized assessment tool to identify quantifiable stream types based upon three key indicators: geomorphology, hydrology, and biology.

Water quality parameters were recorded on an ADEM WQ field data sheet, and survey data (fluvial and geomorphic measurements) were recorded on survey site sheets to allow calculation/refinement of regional curve data. A Headwater Stream Assessment was developed that complemented ADEM's existing "Wadeable Stream" criteria.

Randy displayed Stream site assessment scores. GIS-adjusted New Scores for the five coastal reference sites ranged between 0.902 and 0.854 with an average of 0.883. Non-reference urban stream scores ranged from 0.771 to 0.340 with a 0.551 average score. Non-reference agricultural streams averaged 0.410 with a range of 0.440 to 0.380.

Final water quality parameters and other Headwaters data are being processed to determine the significance of land use impacts and other stressors. Using turbidity as an example of one indicator for stream condition or quality, the seasonal average reference stream sites was 1.56 ntus, compared to 10.31 ntus for urban sites and 21.61 ntus for agricultural sites. Specific conductivity is another parameter that could be used as a reliable indicator of stream health and land use impacts most predictably. QA/QC for this project is being wrapped up, and Randy expects that this data will be available in December, 2014.

Tim Thibaut assumed the floor to present a conceptual framework for developing a biological condition gradient for Alabama coastal streams. This tool would allow periodic assessments that over time and a metric to assess restoration activities. Like the conceptual wetlands BCG, which describes the relative proportion of acreage having good, fair, and poor biological conditions within an assessment area, a stream BCG would describe the relative proportion of stream feet having good, fair, or poor condition.

In assessing streams, Tim displayed useful attributes of macroinvertebrate communities, fish communities, and habitat quality. He felt that macroinvertebrates provide a better route to pursue, since some local streams may lack fish communities, but all include macroinvertebrate communities that include fly and insect larvae.

He noted that both neighboring states, Mississippi and Florida, have developed indices of stream condition or quality. The biological metrics employed in Mississippi's Benthic Index of Stream Quality include percent of total taxa in the insect orders, Ephemeroptera, Plecoptera, and Trichoptera, excluding those within Caenidae (% EPT [no Caenidae]); percent of total taxa in family Caenidae, number of taxa within tribe Tanytarsini; % of total taxa filterers; Beck's Biotic Index; and the Hilsenhoff Biotic Index. BISQ score is a prescribed aggregation of the metric scores, with totals ranging from 0 (worst) to 100 (best). The biological metrics used in the Florida Department of Environmental Protection Stream Condition Index include number of total taxa, number of Ephemeropteran taxa, number of Tricopteran taxa, number of clinger taxa, % of total taxa filterers, and % tolerant taxa. Summed points from each metric determine an over score of biological health, with 64-100 indicating "exceptional," 40-63 indicating "healthy," and 0-39 indicating "impaired."

Tim recommends designing and testing a macroinvertebrate index of biological integrity for the MBNEP study area. He described the steps required:
1. Collect physical, chemical, and landscape data to develop stream site classes, and identify reference and degraded sites.

2. Develop numeric criteria to describe the expected biological attributes of a minimally impaired aquatic community and for impaired conditions; show an empirical and predictable change in value along a disturbance gradient.
3. Calibrate and test biotic indices and associated metrics.
4. Combine metrics into an index.

5. <u>Discussion of monitoring stategy development</u>. He recommended using the restoration of streams in the D'Olive watershed to test the biotic indicators and the BCG. With priority actions intended to stabilize sources of runoff and sedimentation that continue to impact the system, this watershed and its downstream habitats offer a unique opportunity. He noted some data gaps, including lack of detailed data describing condition of wetlands, the lack of any pre-restoration stream biotic assessment, and limited water quality data. While some work has been completed in the Joe's Branch subwatershed, he questioned whether pre-treatment water quality data exists. Marlon Cook responded that regression-based pre-restoration data on sediments, nutrients, and metals is available. Tim pointed out that with more restoration planned, pre-restoration sampling could be undertaken and even worked up at a later date. Pre-restoration data for wetland and stream conditions are necessary for comparisons with reference sites (and Marlon commented that none were available in the area) and post-restoration conditions.

Roberta Swann reviewed activities and plans for D'Olive watershed restoration, and the discussion turned to what kind of a product could be anticipated using BCG frameworks to measure improvements related to restoration there. A stated hope was that we could measure improvements in intertidal waters and tie them to what is occurring upstream. It was agreed that water quality monitoring was a definite need, and Renee Collini questions whether changes/improvement should be expected over time or after specific events. Marlon Cook felt that regression from base flow to flood events should be generated. Monitoring protocols were discussed.

Mike Dardeau questioned whether NFWF would consider paying for the development of a statewide macroinvertebrate IBI. Tim responded that an estuarine BCG would only require an IBI calibrated to the two coastal counties. Roberta asked whether an IBI could be calibrated to a single watershed, and the cost of IBI development was discussed. Randy responded to a question that the cost of his headwaters survey was about $200,000. It was generally agreed that attributes common to Mississippi and Florida could be used to assess biological condition in streams in the D'Olive watershed and that the Mississippi macroinvertebrate IBI could be used to do so. Since we are building data relative to sediment loading, D'Olive vs. West Fowl River represent two ends of that spectrum. She asked whether we could use the D'Olive Watershed to measure changes in biological condition.

Tim answered affirmatively, expressing that WRAP analysis or HGM could be used to assess pre- and post-restoration wetland conditions and that, for now, the Mississippi macroinvertebrate IBI could potentially serve as an indicator of biological condition for stream BCG.

Renee volunteered to chair a working group to develop a scope and determine cost to monitor biological attributes, water quality, and sediments to test BCGs effectiveness in measuring restoration-related changes in the D'Olive Watershed after 13 stream segments and several wetlands are addressed.. Tim hoped that we could develop a plan for testing the BCG in D'Olive and perhaps subsequently in West Fowl River. Working group participation was discussed, and Roberta felt that both Ashley Campbell and Bruce Renkert should be a part of the team, along with Just

Cebrian, Tim, Marlon, Randy, Tom, and Lisa Huff. Alex Beebe and Steve Ashby both expressed enthusiasm for participating on the working group. Renee expects that the group will convene prior to the Bays and Bayous Symposium in early December, and Tom expressed willingness to help her in whatever manner she needed to get the working group moving on developing the scope and determining costs.

6. Adjourn. The meeting adjourned at 12 noon.