DRAFT

# Albemarle-Pamlico National Estuary Partnership
# Water Resources Monitoring & Assessment Workshop

**10:00am – 3:30pm**
**June 19, 2017**

The Imperial Centre for the Arts and Sciences
270 Gay Street, Rocky Mount, NC 27804

**MEETING NOTES**

**Team Members Present:** Alan Coats, Heather Deck, Scott Ensign, John Fear, Roger Everton, Sid Mitra, Michelle Moorman, Dan Obenour, Bill Swartley, Brian Wrenn

**APNEP Staff Present:** Dean Carpenter, Tim Ellis, Kelsey Ellis

**Meeting Discussion:**

Dean welcomed everyone.

(10:00) Michelle lead activity: three things that workshop participants value when it comes to water resources, and three things they view as a threat.

Water Resources Monitoring & Assessment Phase I Review

(10:45) Dean Carpenter: Eventually we will develop some core metrics that partners can agree upon regarding water resources.

- Overview of what APNEP is, APNEP mission, APNEP's Transition to Ecosystem-Based Management (EBM).
- APNEP history overview, development of indicator criteria.
- Talking about APNEP Monitoring Proposal form.
- Monitoring Integration Continuum.
- Idea of clearinghouse on APNEP website – compiling what we're doing right now.
- Want to come up with policy questions that are important for the partnership, develop metrics that will be adopted, develop a course map – agree that these are the kinds of questions that need to be answered, these are the metrics we're going to be using, this is the level of certainty.
- History of EBM Transition Team back in 2012. Going over the seven steps to EBM.
- APNEP Ecosystem Assessment example.
- For 2017 – Citizen's Report Card Approach. Manage adaptively. Flowchart of APNEP structure. Comprehensive Conservation Management Plan's (CCMP's) four questions.

(12:20) Break for lunch.

Water Monitoring & Assessment Phase II Expectations

(12:50) Dean: Trying to determine space, time, reporting scales for each. Want to go through list of indicators and vet them. How do these still hold up? Then for near term assessment, we want to begin to developing assessments of indicators. As opposed to having a paper document published with a collection of assessments, we're going to roll these out as they are finalized into APNEP's decision support system. Be thinking, for what 5 or 10 of these metrics do we have good data, that we could do an assessment in the near term? What are the ones we can get started on soon?

Michelle: Afternoon is committed to making some progress on a plan for tackling these monitoring and assessments that are going to be required for this 2017 update. Let's go around the table and talk about what monitoring programs you might be specifically involved in, assessments that you are already doing.

Scott: Would be a user, not a contributor. Status of the North Carolina Coastal Atlas? Would be helpful for me – gauges at the right location in the river to look for evidence of sea level rise.

Brian: Supervisor of Ecosystems Services branch of North Carolina Division of Water Resources. They have a wealth of water quality data useful in long-term trend analyses.

Alan: Working on a best management practice (BMP) strategy for how forests are maintained. He suggests that his agency could help with looking at percentage of the watersheds that are forested and how they could impact water quality.

John: North Carolina Sea Grant and Water Resources Research Institute (WRRI) fund monitoring efforts by others. He stressed the importance of efficiency and narrowing down your number of indicators. Thinks the list of 58 potential indicators is too large.

Sid: East Carolina University (ECU) research on emerging contaminants, trace organics, and toxics.

Dan: He has a master's student who is looking at nutrient input into the Cape Fear River, Neuse River, and Tar/Pamlico River estuaries. Using some tools developed for the Chesapeake Bay – using data to understand whether there are underlying trends. Could be an interesting assessment approach. Long-term goal is to put everything into a simple watershed loading model – can we better understand the sources of nutrient loading? GIS data. Primarily focusing on nutrients, but these tools can be applied to a lot of different data types.

Heather: Sound Rivers are more users than providers. Just completed a project looking at river herring diet relative to land use and water quality – some water samples were also taken. Information is out there and available. Talking with Astrid Schnetzer at North Carolina State University (NCSU) – resin bag sampling for microcystis. Will help out with fish kill sampling.

Michelle: National Monitoring Network for collaboration with estuaries throughout the country. As part of that, compiled report about monitoring efforts throughout the Albemarle Sound. Source of public monitoring data sets. Anything we do needs to be done on existing data sets. She is also working on a watershed plan for Lake Mattamuskeet National Wildlife Refuge with US Fish & Wildlife Service (USFWS), North Carolina Wildlife Resources Commission (NCWRC), and North Carolina Department of Environmental Quality (NCDEQ) – water levels, focusing on submerged aquatic vegetation (SAV) as an indicator and link everything back to the restoration of SAV. Useful tool from a communications to manager standpoint – able to get funding.

Roger: Virginia Department of Environmental Quality (VADEQ) provides lots of water quality monitoring data. Water quality monitoring strategy, special programs – involved in Chesapeake Bay monitoring. Remnants of fish tissue monitoring program. Lakes program. Fixed monitoring network and probabilistic monitoring network. They do an integrated water quality assessment every two years as part of the federal requirement. Internal/external databases - they report all data to STORET. Co-chair of Virginia habitats force. Estuarine waters task force on harmful algal blooms. Local group – Elizabeth River Project. Sediment conditions and sediment remediation.

Bill: BMP implementation survey. A multimillion dollar Upper Neuse basin paired watershed study that North Carolina Forest Service (NCFS) is doing with NCSU– everything can be found on water quality website. Final grant reports, journal articles, etc. Restoration project for stream mitigation due to Highway 70 bypass around Goldsboro going through NCFS property. Project was totally devastated by hurricane Matthew.

Heather asked Dean if APNEP wants to consider using citizen science to contribute to monitoring efforts.

Dean: APNEP has had a water quality monitoring network, was more focused on the education/engagement aspect. Consideration of public workshop in the future to demonstrate citizen monitoring. Dean also noted that in seeking efficiency, APNEP will look for ways to automate and streamline data collecting (e.g., remote sensing).

Roger: Virginia has a citizen monitoring network where individuals are audited and if passed, their data are used.

Brian: Virginia, Indiana – good examples of citizen science monitoring. Idea of needing quality assurance.

Michelle: Citizen science at Lake Mattamuskeet – people analyzing water level. One example of a robust citizen science program that's going on and fits our mission.

Heather: Tar has lost a lot of water gauges – no longer have that data. Maybe a way to supplement what we have?

Michelle: Thanks everyone for sharing. Next chunk of time – narrowing down to 5-10 indicators that the team feels could be assessed in the near future. Idea of uninformed policy/people being biggest threat – interesting outcome from this morning. Amount of work it really takes to re-analyze data sets and start from scratch.

Dean: If this MAT needs assistance with data analysis for a particular indicator, Tim is available to assist.

Water Indicators Evaluation and Prioritization

Michelle reviewed the threats the team identified in the morning: uninformed policy and people, pollution, unsustainable development, climate variability, water overuse, emerging contaminants.

Brian: People in Chowan/Albemarle really want NCDEQ to respond to algal blooms. Becoming a big issue in northeastern North Carolina in particular and across the state.

Michelle: Agree completely. Have worked on a lot of cyantoxin issues, people are very scared by this.

Brian: We're already having blooms start this year, earliest they've started in the past 3-5 years.

Heather: Citizens have a lot of questions about how safe things are to eat. Also bacteria – how safe the water is for that. Hard to get answers.

Brian: When it becomes a public health issue, especially with public health advisories, it becomes a lot more on the front of people's minds.

Roger: WIthin estuary/marine, we're seeing species that were never dominant become bloom species. Question is are we primed for species that cause issues with shellfish to become dominant?

Sid: Bringing it back to a scientific perspective, trace pesticides, organics, organic nitrogen, etc. – aren't easily seen but have large impacts on ecosystem. Keeping that balance.

Michelle: Hearing hazardous algal blooms (HABs)/cyanotoxins as one indicator.

Brian: NCDEQ is now calling them "potentially hazardous" algal blooms. We don't have anything clearly documenting that, so keeping with "potentially" for now.

Roger: Noted it is the same for Virginia with regard to terminology…"potentially harmful".

Heather: State has fairly extensive database for bacteria in estuarine areas – not available in the freshwater areas. Other datasets from ECU – extensive, long-term datasets.

Roger: What is public's perception of runoff from urban/agricultural areas?

Heather: In general, people want to get water off their property as quickly as possible. May not understand/care. Not much of a connection between stormwater runoff and water quality.

Michelle: When people's properties are getting flooded, they don't want to hear about water quality.

Michelle: We have an expert in the group about emerging contaminants.

John: That was me. All large utilities are worried about being the next one to find a contaminant in their water.

Michelle: Do we have a willing/able person to tackle this?

Roger: Any evidence of problems with this?

Sid: No studies done.

Brian: There are some studies, classified as unregulated contaminants.

Dan: City of Raleigh monitored 100-200 emerging contaminants in a few studies.

Sid: I would be interested to know if there was a report from that. Utility companies are worried about something being put on a list and they have no idea how to deal with it. Other issue is what is being released by wastewater treatment plants.

Sid: What about mercury poisoning, lead, coal ash issues?

Dean: Metals concentrations. We don't have to tell a bad news story, we could tell a good news story as well. Any comments on lead (Pb)?

Michelle: Are we really busting into drinking water? Or are we sticking to natural waters?

Dean: Looking both at habitats and potable surface/groundwater.

Roger: Pb in tissues has dropped significantly since we stopped using lead in gasoline. High levels of methyl-mercury Virginia, as well as polychlorinated biphenyls (PCBs). Not sure what to do about the mercury and PCB problems. Interstate transfer and atmospheric deposition causing problems with mercury.

John: Nutrients as an indicator for free.

Dean: I hope there's some kind of nutrient-nitrogen-phosphorus metric that we're tracking. APNEP has been facilitating a two-phase study and with phase I complete there should soon be a summary document.

Michelle: Mattamuskeet model – SAV indicator, link everything else back to impact on SAV. Like idea of having this endpoint and linking everything back to how it impacts this endpoint.

Brian: We have a model that incorporates…

Roger: Does North Carolina have a lot of dissolved oxygen (DO) impairments?

Brian: Most of what we have right now – instead of DO problems, we're seeing more problems with our chlorophyll-a and DHO(?) standards. Those indicate nutrient problems more than DO.

Michelle: Something I might volunteer to work on with Brian maybe – eutrophication indicator – nutrients, chlorophyll-a, pH, water clarity.

Brian: Those are all parameters that the council will review.

Michelle: Matter of taking the legwork that's been done. Relates back to harmful algal bloom but is separate. Something that managers are interested in.

Dean: Sounds like a eutrophication index, supported by multiple indicators. Chlorophyll a, DO, nutrient concentrations.

Michelle: This is the type of information that is constantly being updated in STORET. Proposed a step down of water clarity being an initial indicator, pH, chlorophyll-a data. If have high pH, low clarity, collect a water sample. We already have a good standard for DO, chlorophyll-a – we know what a bloom is.

Brian: For ambient monitors, they do something similar.

Michelle: Nora's app, online interactive watershed map. Can click on a stream segment and it tells you the status. Or do we want to provide a summary of these eutrophication metrics?

Dean: I'm confused, there are a lot of reports out there. The question is, I think there's value to a regional synthesis. What does it mean?

Dan: Also, long-term trends are important. Data back to the early 1990s is available in a lot of cases.

Michelle: For these parameters, slightly different approach would be synthesis of available information or do we just want to concentrate on each one individually? Other issues, we don't have that ability to synthesize.

Dean: I would like to see an assessment of chlorophyll a and of nitrogen and maybe a multi-metric assessment in the form of a eutrophication index. Or is there one commonly used now?

Michelle: I don't think I would make up anything.

Roger: There's difficulties in doing all those independently. DO for example varies diurnally, sometimes is hard to interpret. Swamp waters are naturally low in DO. Don't have nutrient standards in Virginia.

Dean: I don't think it's essential…if there isn't a standard, we can still report on the status and trends. Still think nitrogen is an important element to track.

Michelle: I feel like we should rely on the assessments that have already been done. It's not a minor task to delve into all the data quality issues, etc. I'm not sure I could do something better in the next six months that hasn't already been done.

Dean: Please provide an example of something that's already been done.

Michelle: Examples from the state, Duke, USGS, etc. – sparrow model. I'm sure Dan is aware of academic studies, as well as Hans.

Scott: Didn't the habitat protection plans from North Carolina Division of Marine Fisheries also have that kind of data?

Dean: But if they're biological parameters, we'd have our aquatic fauna team take that on. Is it a matter of pulling things together to create a unique story? Or a eutrophication index, that would be a definite APNEP value added.

Roger: To redo a assessment is a very time intensive thing. One person can take a whole year just to put things together.

Michelle: How about I just put eutrophication indicators and a ?

Dan: How about salinity? Indicator of a lot of things going on in the watershed in terms of drought, etc., what type of algae can be in a place, SAV, etc.

Dean: This crosswalks with the APNEP Ecological Flows action team – cutting back consumptive use up in the watershed. That's an issue this team has been working on. I think salinity is one that we should be able to report on.

Michelle: Scott, I know you had talked about water levels. In North Carolina, we have the sea level rise report. Still one of those that's pretty ambiguous in our estuarine system, from a water resources standpoint. If that's one you're interested in working on.

Scott: I don't think it's really up there in priority relative to other things like fecal coliform.

Michelle: So far, metrics that have risen to the top are pHABs and cyanotoxins, bacteria – safe for swimming, emerging contaminents (are they a risk), potentially metals, eutrophication index (DO, Chlorophyll a, TSS, water clarity, pH), salinity.

Roger: Must add sedimentation. In Virgina, impaired piedmont and coastal rivers/streams are most likely due to sedimentation.

Michelle: Total suspended solids (TSS) should be lumped in that suite of eutrophication indicators

Roger: it's runoff from urban and agriculture. It's really a sediment issue.

Scott: This pretty much mirrors what other state agencies are using as their regulatory goals and guidelines

Michelle: Right

Roger: What does emerging contaminants include?

Michelle: New contaminants –

Sid: Pharmaceuticals, flame retardants, things that are candidates on the US Environmental Protection Agency's (EPA's) list but haven't made the cut in terms of regulatory action.

Brian: Nutrients are going to be more my wheelhouse, cyanotoxins, algal blooms, chlorophyll-a.

John: Is there anything on the team's mind where no data already exists?

Dan: Emerging contaminants could be a discussion of what we wish we had.

Sid: Birth control medicine for example, but there aren't data out there. For some of these contaminants, there just hasn't been any studies done in this watershed.

Dean: If we don't have any data, don't see that being featured in a near-term assessment.

Tim: A lot of what we try to do is fill in gaps – if there are indicators that are data-poor, we can try to provide funding. Take that to the APNEP policy board, try to get people involved in collecting data on that indicator.

Dean: What I've been doing, putting in italics things that are possible for the first cut. There are about 25 things we're considering. We can go through and add/subtract. Then take this to the

entire team and give those not present today the opportunity to chime in. Then Michelle and Dean will contact people and see what they'll be working on for the first draft.

Dean: Human pathogens, we don't have to define exactly what will be included. Other one, algal blooms. Those are the two with the human component. Nothing raised in the habitat area. DO and salinity raised in the hydrologic regime.

Dan: Don't think DO should be in that one, put it in nutrients.

Dean: I'll move it to the nutrients group. In nutrient group, chlorophyll-a, nitrogen/phosphorus loading, nutrient concentrations. Toxics: metals – maybe mercury, personal care and pharmaceutical byproducts. Sediments: suspended sediment concentration, secchi depth. Any comment on those as a proposed group to focus on initially?

Dan: Secchi may be driven more by chlorophyll-a in a lot of places than by suspended sediments depending on where you are.

Dean: True, it's more about water clarity.

Michelle: Nutrients, chlorophyll-a, suspended sediments – all linked under chlorophyll-a. Maybe good to have a section where they're all linked together, talk about eutrophication, then can have the individual ones underneath.

Roger: Any large datasets out there that we know of that haven't been included?

Dean: Any other general comments?

Roger: Timeframe?

Dean: We'll see – I'll send out the adjusted table to group, if everyone's good with that I'll talk to Michelle about who would be appropriate to handle different aspects of the indicator report. Whoever does what gets credit in the report.

Scott: Seems like this effort is really paralleling state-level and federal-level efforts in the region. Define health, status, threats, and actions. In the past, have you relied on state habitat protection plans, etc., from DWR? Do those form the background of where you start with DWR?

[Notes missing for remainder of workshop]

(3:10): Meeting adjourned.