

**APNEP Contaminants Management Workgroup  
Meeting Notes**

October 21, 2014

Library, USGS NC Water Science Center  
3916 Sunset Ridge Rd  
Raleigh, NC 27607

Attendees: Tom Augspurger, USFWS; Tim Spruill, USGS (retired); Martin Lebo, Weyerhaeuser Co.; Anne Coan, Farm Bureau; Sharon Fitzgerald, USGS; Laura Gurley, USGS; Sarah Collins, NCLM; Steve Kroeger, NCDWR; Kathy Stecker, NCDWR; Michelle Moorman, USGS; Marie English, APNEP; Dean Carpenter, APNEP; Jim Hawhee, APNEP

On phone: Hans Pearl, UNC IMS; Sid Mitra, ECU; Rhonda Evans, US EPA; Lauren Petter, US EPA; Anna Cornelius, US EPA; Greg Cope, NCSU; Darryl Keith, US EPA; Bill Crowell, APNEP

Jim Hawhee called the meeting to order at 10:07

Chad Wagner of USGS gave an introduction to organizational changes at USGS. Starting Oct.1 the North Carolina, South Carolina and Georgia water science centers merged in order to do science across watersheds without the confines of state boundaries. This merging is being done across the US. The Albemarle-Pamlico has had quite a bit of collaborative science over the past 20-30 yrs.

Jim asked each attendee to introduce themselves and their agencies.

Jim described the Google Drive folders and provided an overview of APNEP's forming Implementation Committee. He noted the opportunity for a member of the Contaminants Workgroup to serve on this committee and asked if there was interest in serving. No one volunteered.

Tom Augspurger presented an overview of risk assessments and their use for metals in sediments and contaminants of emerging concern. Tom distributed a 1-page memo to support his presentation, which can be found on Google Drive. Points noted during the presentation include:

- The group needs to make decisions on when and at what pace to tackle risk assessment tasks.
- The job of a risk assessment is to put together information to answer a specific question.
- The first step is problem formulation and applying this to the contaminants group. The group needs to define an assessment endpoint.
- The second step is analysis, which involves an exposure assessment and effects assessment.
- For APNEP action A 2.5, important questions to be answered include endpoint, geography, timescale, and effects of interest to the workgroup.

- Scientists can provide a menu of study options; managers need to decide what they want from a risk assessment.
- There are currently no sediment metal standards.
- In recent literature, dissolved metals are being connected to harmful algal blooms.
- There was discussion about previous studies found on the information memo.
- The Hyland paper is a risk assessment and the estuarine work was included in the US EPA National Coastal Condition Assessment. This 2012 data may be available by phone call.
- The USGS samples collected in 2012 in the Albemarle are more current and more resolved than the EPA data.
- There was an inquiry regarding opportunities to influence EPA's 2015 sampling plans. Rhonda noted that if the state has an interest, EPA may be able to do this but 2015 is a quick turn around and strong support from the state is needed.
- Tim asked what are the baselines when they are looking at toxicity effects? Tom answered that they look for correlations between biodiversity scores and concentrations. Tim noted the difference between making comparisons with regional average biodiversity scores vs. changes in scores over time.
- Martin brought up the effects of hurricanes on sediment and subsequent contaminant fluxes and questioned if this had been studied.
- Dean noted that for the A2.4 and A 2.5 actions (metals and contaminants of emerging concern (CECs) the group is not restricted to the Albemarle Sound.

Sid Mitra discussed the preliminary findings of local research on CECs. Sid also distributed a 1-page memo to support his presentation, which can be found on Google Drive. Points noted during the presentation include:

- In terms of risk assessment, we are at the same place as metals but further back in the trajectory because there are so many unknowns about how to effectively manage this broad group of chemicals. Septic tanks and the level of wastewater treatment give various magnitudes of input with effects ranging from no effects to community level impairment.
- North Carolina is a state where we rely on a lot of septic systems so CECs have the potential to be quite a concern in NC coastal systems.
- Only a couple of states have attempted to study CECs and they are listed on the A2.4 handout. The approaches varied with some stopping at monitoring and others conducting risk assessments based on literature reviews.
- The first step in North Carolina is to determine levels of CECs. Studies have been done on CEC levels in tributaries and sediments but no studies in the estuary proper. Not knowing the levels means we don't have an idea of which compounds to target yet.

Tom asked if the group wants to go forward with conducting risk assessments in our sounds.

Dean said APNEP's mission primarily concerns ecological health, with human health as a secondary concern. The technical community could make a proposal on the problem formulation and then present it to the Policy Board as a preliminary step to a risk assessment. There may also be an opportunity to interact with the policy and economics workgroup on these assessments.

Anne mentioned that we might not be far enough along for a risk assessment and that a trend analysis might be the place to start.

Tom recommended meeting with the Policy Board to show them the work that EPA and USGS are currently doing and ask what it is they want to have done for our system. This would give a sense of if it is better to focus on things where NC is data poor like organic contaminants.

Sharon noted USGS's capabilities of doing these analyses with appropriate funding.

Dean asked that while Tom and Sid took on the initial steps for the workgroup, if others are interested, they are welcome to contribute. Whether to break the working group into specific subgroups was discussed. Is it best to break off into two sub-groups or as Michelle mentioned, there are impacts from both so is it better to coordinate nutrients with metals and CECs? Jim noted some concerns with APNEP having the resources to staff two groups.

Jim discussed building up the community of interest on CECs and metals, doing some problem scoping through the winter months and touching base via telephone.

Sid asked if we should tell others that we are doing a risk assessment or what should we set forth as the objective? Rhonda said that this has been an issue in other National Estuary Programs (NEPs) and one helpful step in this process might be to do a quick survey of NEPs and see how they have addressed it. She offered to help with this.

Sid said that using CCMP actions as a focus point might be a good place to start and then refine them as gaps in data are discovered.

Tom said that a briefing should be put together for the policy board on what has been done and where there are gaps.

Michelle mentioned that Hyland has a Roanoke River site with long-term toxicity data on benthic invertebrates that includes tissue sample data.

Dean commented that Hyland and Balthis are both on the resources monitoring assessment team so they might be able to provide some insight and would be willing to help.

Martin said that as we go toward a briefing it is important to get a sense of relevance. What is nice to know information vs. relevant? What can you learn from what has already been done?

Tim brought up the fact that standards are very difficult to come up with because you have to understand all of the processes. It could be worthwhile to see what other states have done to look for practical approaches.

Tom also posed the question of whether data should be site specific or if it is better to come up with a number that is generally harmful to benthic community?

Michelle introduced the NOAA SQuiRTs (Screening Quick Reference Tables) which synthesize a lot of data on contaminants. It is a helpful resource for starting this process because it has identified some priority contaminants.

Jim asked if anyone else would like to be looped in on the CEC calls. Michelle and Sharon would like to be included.

Break for lunch at 11:33 PM. Reconvene at 12:30 PM.

Michelle passed around copies of the NOAA SQuiRT tables.

Jim laid out the goals for the afternoon on nutrient criteria as discussing environmental endpoints for nutrient criteria development, reviewing a list of potential tasks, introducing relevant projects and setting the boundary for the Albemarle Sound pilot study area.

Jim asked what things do we want to protect, what are our endpoints?

Kathy suggested using the current designations based on specific uses. There is the option to protect the most sensitive and thereby protect all uses. Tim suggested searching for examples of "healthy estuaries." Are there efforts where they identified characteristics for particular purposes? How do you want the system to be functioning? Are there dead zones? Is there an intermediate part of what is healthy where everyone agrees? Anne agreed that we should start with designated uses because this is why criteria are being developed.

Michelle mentioned NOAA's National Estuarine Eutrophication Assessment (NEEA) report which has several methods of assessment for estuaries around the world and it provides a score for each estuary. SPARROW modeling data feeds into the NEEA assessment. North Carolina's sounds were rated unknown based on insufficient data. She offered to send this paper around.

Tim said that this seemed like a good way to go because if something is judged as healthy then it should be supportive of most uses. A general health report is a good place to start but it does not answer the question of what you are managing for.

Kathy said North Carolina currently has chlorophyll-a standards for everything but trout waters. Is chlorophyll-a adequately protective or do we need other variables that would be more appropriate?

Jim reminded the group of the scope of the workgroup's purview through the NCDP. The group should identify what constitutes sufficiently protective nutrient criteria rather than determining an optimal level of nutrient inputs. The group should facilitate the best recommendations and develop good information to make these decisions. APNEP is concerned with a broader suite of approaches beyond regulatory tools for estuarine protection and restoration, but for the purposes of criteria development the scope of the workgroup's charge is narrower and its approach should align with regulatory processes.

Martin suggested having a biological health context beyond just a nutrient number and said other states do this. If you optimize to protect grasses, you reduce nutrient levels which can reduce the food base so you have to keep in mind that you are managing for multiple objectives. Anne also mentioned the importance of being able to adjust for naturally occurring sources like phosphate mines.

Jim asked about managing to protect against algal blooms. While discussions indicated that eliminating all blooms might not be the best approach, the group agreed that large and frequent blooms are a problem and an endpoint to be concerned with in the nutrient criteria development process.

Kathy reminded everyone that the standards are not concerned only with fish and that all trophic levels of aquatic life including primary producers are included. Martin asked about researching species assemblages and commented that this should be considered.

Tim asked if we are interested in the concentration of certain parameters or the nutrient loads because focusing on all tributaries that are loading could be another approach. Martin identified criteria and concentration as what we are looking at while nutrient load is the cause/problem.

Tim said the only way to control something is through loading and it is necessary to work back up the watershed in order to maintain concentrations.

Michelle said we have estimates of loads coming in from tributaries and lands adjacent to estuaries but there are a lot of missing sources.

Sarah mentioned that nutrient criteria should not go too far up the watershed and reminded the group of its charge to evaluate estuarine waters using Albemarle Sound as a pilot. Other groups are working on riverine standards.

Jim reminded the group that setting criteria is the primary focus of the workgroup and setting strategies to reduce nutrients comes later if it is necessary.

Kathy read the definition of biological integrity from the red book and said that finding a balance that is least impacted is important and that it must be similar to reference conditions.

Tim asked about setting reference conditions. Jim said that reference conditions are one approach to setting criteria. It was then asked whether setting criteria that are protective for aquatic life uses is sufficiently protective regarding other uses because aquatic life are typically the most sensitive to nutrient inputs.

Lauren suggested using maintenance of biological integrity as a starting point because it narrows the focus. Some states use a weight of evidence approach. Depending on scope, different parts of an estuary might have different things that should be protected.

Martin brought up the importance of how the criteria are to be averaged. The averaging period is as important as the number. Kathy mentioned how the current criteria being written as “not to exceed” is confusing and that people need to understand more about magnitude, duration and frequency.

Jim asked if there were any other endpoints the group is interested in examining other than: fish kills, anoxia, submerged aquatic vegetation or drinking water. It was noted that Albemarle Sound is not a current source of drinking water. Tim mentioned influence of turbidity on Albemarle.

Jim moved on to a discussion of the proposed task list for the Albemarle Sound. The idea is to work in two phases. Tasks 1,2, and almost 3 have been completed. Today we want to accomplish task 4 (workgroup recommends focus area of study for the Albemarle sound criteria development). There are no deliverables between now and Nov. 2015 except for routine meetings, but the final phase I report is due in March 2016. In the plan we committed to evaluate both causal and response variables. What is a good indicator and what are the reasonable thresholds? Are there comments on the approach outlined in the plan?

Jim asked where investigatory resources should be focused in phase I. One approach is to spend equal time and resources vetting all proposed indicators in the Nutrient Criteria Development Plan. Alternatively, some discussion at the last meeting indicated that the group might prefer to invest more time and resources examining select indicators based on expert knowledge. After some discussion, the group agreed that a broad review of all proposed indicators was the preferred approach, which aligns with the approach outlined in the Albemarle Sound section of the Nutrient Criteria Development Plan.

It was clarified that the “numeric thresholds” reported in the phase I report for November 2015 can potentially be a range and something can be refined later based on additional research. The workgroup is not proposing the final nutrient criteria but is instead recommending criteria to DWR.

Tim reminded the group of the EPA research in the 1970s that was based on 20 years of good research. He indicated that looking at these ecoregional numbers might be the cheapest, most effective way to evaluate criteria.

Martin said that phase one should end with revised information on the next steps to take. By the end of phase I you should know what you want to do for phase II. The report has to be written carefully so numbers are not lifted and misused.

Jim provided an overview of several potential projects that would begin to help the group gather relevant information for consideration in the nutrient criteria development process.

Michelle explained a few of the proposed projects that related to USGS.

- The Albemarle Sound pilot project she is working on is part of the National Monitoring Network for U.S. Coastal Waters and their Tributaries. In the early 2000s a plan was developed to integratively monitor our coastal waters. This provided money for a 4-year demonstration project in the Albemarle Sound to be completed in September 2015. On the website there is a report of all of the monitoring activities currently underway around Albemarle Sound. This effort provides a ready source of information to examine historical monitoring data to facilitate the nutrient criteria development.
- The NASA DEVELOP program has a project underway to examine the spatial extent of HABs in the Albemarle using remote sensing data. NASA is providing in-kind support for this project. There have already been toxic blooms reported in embayments in the Albemarle Sound.
- Grant with ECU: Through this grant there are some data sets that were previously inaccessible that are now being added to STORET.
- A proposal is underway by several partners in the workgroup to the NOAA ECOHAB program to examine processes and sources driving HABs in the Albemarle Sound for three years. This grant has stiff competition, but if not funded by NOAA the proposal may be suitable for other opportunities.
- Historic data was collected and reported by Duke students who developed an ArcGIS toolbox using STORET data from the state to look at data spatially and temporally. The R script can be adapted for use on this project. The project was completed in March 2014 with USGS as a client and the report is available online.

Kathy asked if the statewide trend analysis for 2000-2012 could be shared on Google drive. Jim indicated that he would add it.

Jim said to let him know if there are any analyses the group would like to see that would help inform decisions on nutrient criteria development.

There is a broader discussion about EEP, DWR, USGS, and APNEP developing a SPARROW model to inform N and P inputs into the sounds because the current ones are dated. SPARROW is not a tool for modeling nutrient criteria per se but can serve as a screening tool to determine areas of potentially high nutrient inputs. Funding prospects for the project are uncertain.

Kathy led a brief discussion on modeling and purposes. SPARROW models will give relative contributions of loading from different areas. Other models in other parts of the state are deterministic models to represent the system and then run scenarios to see if a target can be met.

Michelle passed around a fact sheet on SPARROW.

Jim suggested going through phase I without sophisticated modeling and then determining the necessity of further modeling as part of the phase I report.

Jim noted that literature reviews tailored for this workgroup's purposes would be useful and several have been done across the country. Jim proposed seeking a tailored effort for this workgroup's purposes that might be done through EPA's NSTEPS (Nutrient Scientific Technical Exchange Partnership and Support) process.

Jim also expressed interest in a legal and policy analysis, specifically analyzing case studies regarding estuarine criteria development. This might be good for Duke students to study various cases and report back in Feb. or March of 2016. It can help identify best practices while also identifying the legal and practical challenges that criteria development efforts have encountered.

Hans asked about the most effective mechanism for pulling together papers that are applicable to this work like Martin Lebo's paper on the Neuse, Bob Christian's work and Don Stanley's work. Tim also asked who is doing the lit review. Jim answered that graduate students or the contractors available through the NSTEPS program are the best options for the literature reviews depending on resources and availability.

Jim asked if there were any objections to moving forward with these initiatives as described. There were no objections.

Jim introduced boundary options for the study area. Setting boundaries for the Albemarle Sound effort is one of the tasks delineated in the NCDP. These included various jurisdictional approaches like the study area, ranging in scope roughly from all of North Carolina's estuarine waters north and east of Roanoke Island to the smaller SB designated use boundary for Albemarle Sound. Many members of the



workgroup preferred to use a broader study area for the purposes of nutrient criteria study during phase I of the report and coalesced around the area being examined by the USGS Albemarle Sound monitoring study.

Anne and Sarah suggested keeping the boundary to a narrow interpretation of the Albemarle Sound without going too far south or too far north into the Currituck Sound. Reviewers of the NCDP are on notice that criteria will be developed for an area commonly understood as Albemarle Sound.

Jim asked if the workgroup could move forward with a compromise position where the scope of study for the phase I reports included the broader USGS boundaries, but with the understanding that criteria recommendations from the workgroup should be limited to the SB designated use boundary around Albemarle Sound. No objections were made to this proposal.

Jim reminded members of an opportunity to serve on APNEP's implementation committee but there are no volunteers at this time.

The meeting concluded at 3:05 pm.

DRAFT