

**Science and Technical Advisory Committee  
Summer Meeting  
Albemarle-Pamlico National Estuary Partnership  
September 12, 2019**

STAC Members: Brian Boutin (TNC), Bo Dame (Chowan U), Michelle Moorman (USFWS), Eric Brittle (VA-DGIF), Heather Deck (Sound Rivers), Erin Fleckenstein (NCCF), Tim Goodale (ECSU), Jacob Hochard (ECU), John Iames (USEPA), Burrell Montz (ECU), Dan Obenour (NCSU), Wilson Laney (NCSU), Greg Taylor (NRCS), Doug Wakeman (NCCF), Rich Whittecar (ODU); Remote: David Glenn (US-NWS), Hans Paerl (UNC), Joel Fodrie (UNC), Paul Angermeier (USGS/Virginia Tech U), Peter Kalla (USEPA)

Guests: Brian Wrenn (NC-DWR), Alexis Bolan (Chowan U), Leslie Vegas (NCCF); Remote: Kelly Somers (USEPA)

APNEP Staff: Bill Crowell, Dean Carpenter, Tim Ellis, Stacey Feken, Kelsey Ellis, Trish Murphy, Jimmy Johnson

**Call to Order / Welcome and Introductions / Meeting Notes Approval / Meeting Objectives**

Brian Boutin: welcomed STAC members. Any comments/thoughts on spring meeting notes? No comments. Motion to approve. Meeting notes approved.

Today's meeting discussion structured around APNEP monitoring plan. Have been getting input from executive board, today we'll be discussing that in more detail.

**APNEP Staff Update and Member Reports**

Dean Carpenter: The compilation of STAC member updates, as well as an update on APNEP staff activities, were distributed to committee members beforehand. Since the spring STAC meeting, APNEP staff has been focused on SAV monitoring: five-year survey of high salinity SAV. SAV monitoring/mapping update.

The 2020 STAC meetings have been scheduled for March 12 and September 16.

Boutin: Next planned flights in October – how are you going to control for the Hurricane Dorian effect? Carpenter: Significant effects could be attributed to Dorian, more subtle effects could be more chronic. Tim Ellis: Talked to Jud Kenworthy/Don Field (STAC members) about this, we can at the least get a pre/post impact – going to keep monitoring, going to have more hurricanes, hopefully will be able to tease out changes from hurricane effects.

Thinking that having a disturbance event may/may not result in long-term changes. Eelgrass may pop back up in a month or so. Discussion of effects of Hurricane Dorian. Updates from STAC members.

**APNEP Monitoring Strategy Design Objectives / Questions Update**

Carpenter: Between now and the March STAC meeting, staff are planning to submit a solid draft of monitoring strategy for STAC review, hopefully in late February. Give STAC time for comments and in March will have a discussion of progress and how we wish to proceed.

Presentation on APNEP Monitoring Strategy / Scheduled a significant amount of time for discussion during this meeting, want input and guidance from STAC on where to go during the next six months.

Overview of timeline since 2000 efforts to develop a monitoring strategy.

Overview of required EPA-NEP elements of the monitoring plan, Tim gave overview at last meeting. Adequate (red text), Good (blue text), Excellent (green text) desirables. Always intention for APNEP to have citizen science component, hopefully for many of the indicators tracked. Challenge with resources at hand.

Michelle Moorman's graphic from spring meeting, paradigm for how to create a monitoring strategy

Dean reviewed the scientific literature to look at other strategies. Course Map / comprehensive approach, includes all of elements from Michelle's graphic, perhaps emphasis on different aspects.

1. Frame the Problem (see CCMP)
  - Healthy A-P system
  - Status of the APES
  - Greatest challenges
  - What actions:
    - Reynolds et al. / Moose example / Outcomes to Objectives Hierarchy Case Study graphic
    - Identify targets
    - Erin Fleckenstein question: how does health of ecosystem come in? Coming up....
2. Step 2: State Objectives
  - Goals from CCMP / Goal 1 Fundamental Objective / human community
  - Goal 2: species goal
  - Goal 3: Water quality/quantity

DSPER model overview. Prior to the 2012 CCMP, an APNEP ecosystem-based-management-transition team worked on figuring out these stressors/factors. Resulted in the 58 CCMP actions.

Course map for monitoring – steps to take. Five steps in the Monitoring Design Framework for NEPs.

Monitoring plan tactics – utilize existing monitoring by partners and identify components of monitoring strategy. Kirk Havens: Need to determine what is the responsibility of the APNEP partners and what is the responsibility of APNEP staff. Want APNEP staff to be evaluated by

how this was facilitated, don't want to be responsible for how a particular partner did something. Carpenter: Partners in planning processes have flexibility, if they can adopt the APNEP framework/objectives without major organization sacrifices that would be beneficial. Kirk Havens: That would be a great role for staff to play.

Carpenter: Notion of APNEP as a partnership trying for higher level partnerships/goals. Currently however, immediate purpose is to get the status quo documented. Havens: Need to think about what the partner's responsibilities are and what is APNEP staff's responsibility.

Carpenter: Discussion of exogenic and endogenic pressures.

### **Committee Discussion: Priority SAV and Water Monitoring Objectives**

Michelle Moorman: Are we going to focus on SAV and water quality going forward? Was the conclusion of the STAC monitoring subcommittee. Carpenter: Yes, will start with SAV and water quality affecting SAV and then expand out to other factors that are related. Start small, build out. Tradeoffs to build out – once you add another element, will need to adapt to those linkages.

Boutin: Ultimately, we're going to be dependent on partners to do the bulk of the heavy lifting through existing programs or modified existing programs. SAV and water quality are the focus because SAV has been a focus for APNEP for a long time, water quality because APNEP is an EPA/Clean Water Act program – both fit into the wheelhouse for why this would be the focus moving forward. Plan will be iterative but also needs to be manageable and we need to be able to understand the connections as well.

Rich Whittecar: Is it possible to give a quick overview of the water quality data being gathered? Carpenter: First step will be to gather information about what is being done – hasn't been collected for the entire region. We've been more involved with SAV so know more about that. With water quality we rely more on partners.

Brian Wrenn: We're trying to find out from a nutrient criteria standpoint what are our data gaps. There's a lot of information that we gather on water quality parameters in this area, but in Albemarle Sound NC-DWR has two stations – not representative information to develop criteria. Will need to find data sources as well. Still in data gap analysis.

Greg Taylor: Need to see who's doing what where. USDA is working on collecting soil organic carbon levels and salinity in Albemarle Sound to see how things are changing. Ghost forests, etc. Trying to get basic level info. Soil scientists have made a lot of assumptions about how much carbon can be stored. Collecting a lot of baseline data, are happy to share that data/potentially collect more/different data as needed by the partnership. Carpenter: During the water quality discussion, when we talk about carbon – we'll reach out and ask what's out there. We'll think about the questions we're trying to answer, ask if there are gaps. Think about if things can be improved upon. Taylor: We're working with NC State to look for any existing information to compile it.

Wilson Laney: Was on a conference call this morning with the Mattamuskeet working group – this was one of the topics of conversation. Have a seven-year time series monitoring in the lake. Now are considering, because of funding issues, if we can get by with one station instead of two. Also, Dean Carpenter, remind us – SAV doesn't occur throughout APNEP geography but water quality is an issue throughout geography. What is the spatial scope of the water quality monitoring plan? Carpenter: Given that we're starting with SAV, we're going to focus on the estuarine component and then work up through the watershed. Boutin: We didn't come to a conclusion on what water quality meant, other than to say focusing on parameters that would affect SAV. Nutrients, for example – important to measure across entire watershed.

Boutin: Kirk Havens, thinking about how in Chesapeake Bay there are so many groups with short term projects or long-term projects with monitoring data, different ways of monitoring, how do you/do you stitch together those disparate efforts? Havens: Advantage of Chesapeake Bay is they have paid staffers, huge program, coordinators. Structured through goal implementation teams with members from different agencies and groups. Those groups look at gap analysis, trying to meld metrics together. Comes down to determining specifically what the goal/outcome is. Then what are the metrics needed to accomplish that, does it have the impact you thought it would have. I think that same process is what you want to do here. Gap analysis – but want to be very specific regarding the desired outcome. Starts with knowing what's out there. Will suggest – Governor and Secretary of Natural Resources for Virginia is bringing staff involved in Chesapeake Bay together to go through importance of bay restoration and their job in moving that forward. Laying out that logic framework. APNEP may want a couple staff to attend. Kirk Havens can provide the most recent logic framework process that's being implemented in Chesapeake Bay. Short answer: need to do gap analysis first, need to be very specific with what outcome is going to be. Allows you to design your metrics.

Boutin: APES vs. Chesapeake Bay – you have those Teams, the money, the directive. Gives me pause thinking about how we expand too much beyond what we're starting with. Forced synergy in the Chesapeake Bay – not the case there. Just thinking about who's doing what in water quality is a monumental task. Moorman: To follow up on what Kirk Havens said on being specific, as someone who had to do a gap analysis in Albemarle Sound and get info, I would say it was a fail – got like 1% of the academic's information. If we're really specific about our questions – who's monitoring nutrients, then have very specific Google form for them to fill out, maybe gap analysis can get done without monumental effort. Don't want to take on too much. Need to be very specific about suite of water quality parameters we're interested in.

Bill Crowell: There's a difference between what water quality parameters are available in our ecosystem and who is doing monitoring. Monitoring pool is very small, lots of gaps, different sets of parameters. Can get a snapshot assessment of condition but there is a small pool of resources for long-term monitoring. Going through this effort will also show a need, can go to legislature to show need and show value of estuarine resources. Make argument that long-term investment is important. Boutin: I just wanted to be clear that we're talking about the responsibility of one or a few partners, not everybody. There are some long-term academic

monitoring stations out there. Question is- do you bring in data that you think is going to be long-term, but may or may not get funding.

Hans Paerl: Problem is that we have good data on other components of the system but aside from North Carolina's ambient monitoring program there is no long-term consistent data set for Albemarle Sound.

Discussion of how to best combine data sets, compile things. Michelle Moorman: Water Quality Portal by National Water Quality Monitoring Council. Putting all water quality data in a common place with metadata, development of scripts to utilize data. Taylor: Would like to know more about that, if I'm out there sampling I would like to be able to gather other data that can be of use.

Carpenter: One of the components of the monitoring plan is development of common protocols for partners. Taylor: Giving everyone a sheet/punch list – make sure you collect this data when you're out there.

Laney: All the commercial and recreational catch data are already in that ACCSP warehouse – available to the public. At some point will be looking at aquatic resources and how they relate to SAV/water quality.

Fleckenstein: Endorse this plan, feel like it's a good idea to focus. Carpenter: Plan has also been endorsed by Leadership Council. Burrell Montz: In terms of water quality parameters, is this a fishing expedition or do we know what we want to measure? Boutin: Will talk after lunch, have some ideas from the monitoring subcommittee but we want to get everyone on the same page.

Laney: With respect to monitoring strategy planning, hear consensus that the first thing is to figure out who is doing what. Do we need to get into the weeds now or will the subcommittee be doing that? Need to have some means of surveying to figure out who is doing what.

Tim Ellis: Will talk about identifying study objectives – what are priority questions? Then figuring out iteratively where we need to go next. Will drill down after we establish what our priority monitoring questions are.

We have EPA guidelines, but are also advised by Leadership Council and STAC. Rely on STAC to advise us where the program should go. Tampa Bay Estuary Program for example, many NEPs choose not to focus their resources on monitoring – lack of resources to accomplish it. Need to find middle ground between feeling like we have to monitor everything versus not doing anything. Starting with SAV and water quality, consensus that it's a good place to start. Spent a many years in planning phase, need to move to implementation. STAC can do a lot more than consult about monitoring, but we need to move forward so we can shift to other things.

Whittecar: So by the time we're done, we'll be deciding who will be doing gap analysis? Tim Ellis: Yes, you can expect that APNEP staff will be doing the heavy lifting but will rely on

partners to provide expertise and keep us on track. Crowell: Could result in us hiring a postdoc or something like that. Carpenter: In NEP guidance from early 1990's, charge was to tell STAC to design the program. There were more federal resources then.

Dan Obenour: Idea of creating maps showing current stations, which are active, frequency of collecting data. Would be a good visual tool to bring people together to talk about where data is available and where it isn't. Is it true that there are only two stations in the greater part of Albemarle Sound? Pulling together the water quality portal, DEQ, USGS data, etc. People will then know about additional sources of data. Carpenter: Agree. Laney: Trying to adequately resource the plan through other entities that are already out there gathering data, maybe having graduate students analyze data.

### **Nutrient Criteria Development in Albemarle Sound**

Brian Wrenn. Links nutrient criteria with protection of designated uses – “fishable, swimmable, boatable.” Evaluates causal and response variables (nutrients, chlorophyll-a, pH, dissolved oxygen).

SAC – Scientific Advisory Council. CIC – Criteria Implementation Committee. Overview of the Nutrient Criteria Development Plan (NCDP) process and plans going forward to the Chowan River/Albemarle Sound.

### **APNEP Monitoring Strategy Planning Update**

Tim Ellis: We need to start thinking more about a subset of indicators – between April and now, decided that initial cut of monitoring strategy will center on SAV health and water quality related to SAV health. First part of that is we need to come up with our priority questions that are going to address what we want to find out related to SAV health. Second part is thinking more about the end user and usability of the monitoring – what do we want our monitoring to produce? No right or wrong answer, but we want to be more specific about what our monitoring objectives are.

### **Committee Discussion: Monitoring Strategy Planning**

Moorman: You stated that our water quality monitoring program should be designed to look at water quality effects on SAV, or water quality separately? Tim Ellis: Today's discussion will discuss that the water quality side is pretty big in general – need to focus that even more. First cut should be integrative approach between water quality parameters and SAV health, then we can build from that.

Boutin: It's up to us to determine how loose or tight of bounds to put on that. Need to have a good reason why we choose the parameters that we do.

Laney: Focus is good, but if you focus just on SAV and WQ then you're overlooking the fact that you'll need other water quality factors in the future for other indicators. For the sake of efficiency, it should be broad enough that you capture the basis for other indicators at this point in time.

Havens: Slight caution – while I agree it is important to get that additional information, want to know why we're getting that additional information. If we want to look at SAV and water quality, want to think about the actions we need to get things to the level we want, what it takes to get there. If we want to add other things, then we need to be specific about why we are adding it and what level we are looking for. Don't want to collect a bunch of stuff and fit it in later on.

Laney: For SAV, is going to be clarity, turbidity, and nutrients. But for the sake of efficiency, agree that we need to justify – but dissolved oxygen is fundamental for all aquatic fauna. Thinking about it from a process efficiency standpoint, trying to think things through so we don't have to do more work later on. Pull subset for what we need for SAV. Want to have more than three parameters.

Havens: If we take the dissolved oxygen example, need to say why are we monitoring it. By determining specifically why we want this outcome, will determine the metric to use to see if we're successful or not. Need to be specific.

Moorman: Taking it back to SAV – from my experience, at Lake Mattamuskeet we did adopt the model by Davis and Brinson(?) – not perfect, still needs updates. Didn't have a gazillion arrows, used it as our framework for our monitoring design for SAV. Helped focus partners and bring them to the table. Showed them how monitoring contributed to overall goals. One potential theoretical framework, there could be others out there. We were interested in algal blooms, turbidity, secchi depth, suspended solids, dissolved oxygen, pH. We took a lot from the Chesapeake Bay – setting up benchmarks, thresholds, etc. **Action Item: APNEP needs to compile examples of these frameworks, what monitoring parameters go into these designs?** Tim Ellis: For SAV and water quality specifically. Moorman: Yes, but mine isn't perfect, it's an iterative process.

Laney: I agree but it is designed to look primarily at SAV and it does provide at least one good example. I would guess there are others from the Chesapeake Bay and even Currituck Sound. There's also a human health aspect to this as we have discovered at Mattamuskeet. There are now warning signs there – cyanotoxins present.

Carpenter: APNEP has a water-quality outcome – waters are safe for personal contact. Two indicators related to that, and under algal blooms they laid out [a bunch of metrics] to support algal blooms as an indicator. But that's not SAV related. Laney: But it sounds similar to what Michelle Moorman said.

Heather Deck: In local communities, there are a lot of questions about waters being safe to swim, eat, etc. Bacteria is another thing with the Swim guide program – great engagement tool and eye opening for people. Very critical and important component – doing work that is meaningful for the communities living there. Fleckenstein: Looking at water quality, you can look at a suite of things. Like keeping it focused on SAV and WQ related to SAV, but there is

other data being collected and we can take advantage of that – need to keep the why in there but it's low hanging fruit and the data is already being collected. Why not use it in describing the health of the sound, it wouldn't be too heavy of a lift.

Tim Ellis: What I'm hearing is, incorporating the human component into the SAV question wouldn't add a greater level of intensity to monitoring design because the parameters would overlap. But the question is – are those parameters routinely collected all together? Do we have to expand our monitoring design to accommodate the human component/harmful algal blooms?

Boutin: For some, yes. Others, no – example fecal coliform bacteria. It's fine to have a human health component but we must be clear about our objective. If it's out of the bounds of direct relationship to SAV, fine to collect it but we need to be clear. Tim Ellis: Agree, but we need to be focused and we don't want to end up where we were before where we were trying to collect everything. Focus on SAV because it's a traditional indicator of estuarine health and long APNEP history. Important to the system, important habitat, etc. Want to focus – we're going to miss stuff at first, we can then go back and add to it. Sounds like there's a lack of monitoring and data coordination, so that could take a lot of resources.

Heather Deck: Today the NC Environmental Management Commission is meeting. If they approve what is proposed, there's going to be a three-year process to reevaluate the NSW(?) for the Neuse and Tar-Pam. Opportunity there? They will need a lot of data, opportunity for collaboration. Wrenn: Jim Hawhee would be the person to talk to there.

Eric Brittle: We need to think about what questions we want to answer and what our audience is – how do we communicate it? How much SAV, what species, is it changing over time. Audience – general public, landowners, or legislators? Big picture perspective – what questions do we want to answer?

Tim Ellis: We want our questions to be able to drill down and say what the status is and why. For user aspect, that's another discussion we need to have with this group. Some staff think this will be used at a management level, but we've gotten feedback that it's also our responsibility to inform people living in the region. Still needs to be ironed out. Before deciding metrics, etc., need to identify priority questions and who will use the information.

Laney: Potential questions - What are optimal conditions for SAV growth and sustainability? Where are we relative to those standards in our estuarine system? Chesapeake Bay may have addressed some of these questions.

Boutin: Being that we're in the transition zone between temperate and tropical SAV, standard could be temperature.

Havens: What is the ecosystem outcome for SAV? Tim Ellis: The outcome is part of the native species goal – just that the estuary supports habitat diversity and species diversity. There are



two SAV actions that support that outcome. They aren't very specific. Protection and restoration strategy. Efforts to date have been focused on protection.

Havens: What are the factors affecting your ability to accomplish those two actions? Important discussion to have. Trying to determine how we would evaluate whether we've accomplished that or not – the two actions associated with SAV.

Moorman: Management objective is to maintain and potentially restore SAV. Monitor SAV over time, monitor water quality parameters. Thinking about how we're structuring it.

Boutin: We want to see sustained SAV goal. How we measure that – threshold around that – is really that bottom part. Need to get to the middle components here now so we can develop that user tolerance. What does sustaining a population look like?

Carpenter: We have SAV indicator reports, don't have imagery from a long time ago. Proposed target could be to hold the line on the 2006-2008 era extent/density. Targets aren't regulatory but is a conversation about what we want to achieve.

Laney: If I heard you correctly earlier, imagery sets were taken in different parts of year so don't know how much of the difference was due to seasonal differences. So, won't really know what was going on until this current set of data was analyzed.

Carpenter: Bogue Sound was measured at the same time for both missions. Seasonality an issue up north, there are some aspects of change in extent that can be contributed to decline in water quality, some are more related to seasonality. Sentinel sites – goal is to measure in spring and fall.

Bo Dame: I propose taking a look at Michelle's questions, specifically #2, and to address issues of human dimensions side – is there enough information in the water quality data to ask question #1? And if there is enough water quality data that is being used to support the SAV question to also answer question #1, then let's go there. But if we need to add more to it than I'd say let's not go there.

Moorman: Or could look at it the other way. Harmful algal bloom questions could kind of be a cross indicator. If we narrow #1 to cyanotoxins, would fit. But as is it's very broad. If it's a question that Heather is hearing about and it's important to this group, I don't think it's a big ask to include in this monitoring design.

Boutin: The data needs to be speaking to something. Laney: But is making it available for future use not a good justification? Boutin: I agree, but we're not in agreement about what making things a bit bigger means. Laney: That's the purpose of this discussion, Michelle Moorman and Heather Deck have thrown out ideas. Human health perspective has been raised as important. Cyanotoxins. Would also argue that dissolved oxygen is important as well. Fairly fundamental for all aquatic life.

Dame: Stronger link to algal bloom issue than SAV for dissolved oxygen. Obenour: Unless you have continuous sampling, dissolved oxygen isn't going to tell you much about algae. Laney: Continuous water quality monitors all over the place would be ideal, we're far short of that – will defer to monitoring subcommittee to say what the minimum suite of water quality parameters we can put into this plan that will address SAV and human health/cyanotoxins. Put into context of APNEP staff time/resources. Indicators tightly linked to water quality that we can justify – killing multiple birds with one stone.

Wrenn: Can't imagine scenario where some of these basic measures – dissolved oxygen, temperature, etc. – aren't being taken when sampling alongside nutrients, etc. Basic set of parameters could easily be included – ubiquitous. Turbidity too. Havens: Talking about justification, am talking about linking it to our CCMP outcomes. That's what we're here for. Want to make sure we've made that direct link to something that's been identified in the CCMP.

Dame: Most physical parameters can be linked to SAV.

Fleckenstein: Are you looking for priority questions or parameters? Tim Ellis: We're drilling deeper, I'm wondering if the priority questions need a little more thought before integrating with the water quality/SAV folks in a meeting to ask them what's important to them, before returning to the STAC. We're not quite sure what to hang our hat on yet – need to see what's important for the human side, for the SAV side, etc. Part of this is also cost-benefit – if parameter is important, we need to figure out a way to monitor it, but for some things we may not have the resources. Would be great if we can come up with a handful of ideas. It's up to the STAC to specify where we go next.

Moorman: If STAC today could leave us with two priority questions to bring back with a framework and minimum needed to address the question, that would give us direction as to where to move forward.

Obenour: What's related to SAV? And what's related to human health? Could those be the two questions?

Taylor: While you're out sampling, want to get minimum data set that you're going to have. Obenour: Agree, but that's a different question. If APNEP wants to create additional data collection, then that's a different conversation. But if we decide for example that for SAV we need nitrogen, phosphorus, and salinity, what I think you're asking is what questions do we want to answer with this data?

Tim Ellis: The questions that Michelle Moorman came up with are a good example of the level of question we're thinking.

Tim Ellis: For SAV, talk a lot about questions 2 and 3, talk about bringing in aspect of human health relate to question 1,

Go to Water Resources Team, what are water quality parameters needed to answer these questions, where do they overlap, is adding #1 too much/add too much intensity, pare down revisit later?

Bill Crowell: Two blocks of questions, first is core block which come from ecosystem outcomes in CCMP, second is which ones are we going to answer first.

Deck: From engagement standpoint/need to engage public to advocate for increasing monitoring have to get them upset , understand why they should care about water quality issues and protecting SAV / get so many calls about water quality / SAV/ what is this grass in front of my property, take away two truckloads.

Fleckenstein: Make relevant to policy and decision makers/hard for public to make second link.

Decision for the Water Resources and SAV teams meet and integrate this discussion. Laney: Want to make sure APNEP staff and Brian Boutin got what they wanted out of the discussion.

#### **Committee Discussion: Non-Monitoring Planning Issues**

Brittle: Issues with giant log jams on the Meherrin River, causing flooding and erosion in the county. Meeting to discuss how to address this. Last meeting went that was similar, they brought in explosives. Could dredge reservoir, harden shorelines, etc. Also, Chad Boyce – Back Bay issues. Back Bay Restoration Foundation suing City of Virginia Beach.

Stacey Feken: We were invited to attend some focus group meetings, told them they should engage people at a more local level. Discussion of opening up historical inlets.

Havens: Would like to continue discussion about anadromous fish and log jams.

#### **Public Comments and Action Items**

No public comments.

#### **Action Items:**

- Scheduling of monitoring subcommittee soon to discuss what was talked about today
- Starting monitoring strategy > draft plan for next meeting (February)
  - o Moorman: Would be helpful to have an APNEP staff member working with the Team to record what it took (time, resources, etc.) to develop strategy – helpful for next effort.