

Science and Technical Advisory Committee
Fall Meeting
Albemarle-Pamlico National Estuary Partnership
December 5, 2018

STAC Members: Brian Boutin, Jessica Whitehead, Bo Dame, Eric Brittle, Don Field, Erin Fleckenstein, David Glenn, Jud Kenworthy, Wilson Laney, Rachel Noble, Dan Obenour, Hans Paerl, Doug Wakeman

Guests: Chris Baillie (UNC-CH-IMS), Leslie Vegas (NCCF), Jacob Boyd (NC-DMF), Mike Graven (NC-DMF), Anne Deaton (NC-DMF), Ken Reilly (NOAA), Chuck Weirich (NC Sea Grant), Tracey Baver (NC-DMF), Lora Clarke (Pew), Joel McCormick (Chowan University), Donna Schwede (USEPA), Rick Savage (Carolina Wetlands), Marcia Berman (VIMS, remote), Pete Peterson (UNC-CH-IMS)

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

Welcome & Introductions, Approval of Winter (March) 2018 meeting notes, Meeting objectives, Public comments (Brian Boutin, STAC Co-Chair)

Brian Boutin: Thanks everyone for attending. Moment of silence for hurricane impacts.

[STAC member and participant introductions]

APNEP Program Update and STAC Member Reports (Dr. Dean Carpenter, APNEP)

Dean Carpenter: Regarding highlights from APNEP staff 2018 timeline (distributed to members before the meeting), there was a mid-May program evaluation by EPA's National Estuary Program staff. This "implementation review" happens approximately every five years. Staff again wish to convey appreciation to members who assisted during the review team's tour of the A-P basin (Boutin, Field, Fodrie, Kenworthy, Moorman). Members were also provided in advance a compilation of activity reports submitted by individual members.

Carpenter: On behalf of APNEP staff, want to recognize some members who recently stepped down from committee leadership roles who've been really instrumental to the Partnership. Recognition of Jud Kenworthy who completed six years as STAC co-chair. Recognition of Wilson Laney for six years of post-co-chair service on STAC executive board. Also, recognition of former member Michael Piehler in absentia, who served on the STAC for 12.5 years, including ten years on STAC executive board.

Indicator Reports by APNEP Monitoring & Assessment Teams (MATs) (Dr. Tim Ellis, APNEP)

Tim Ellis: Gives indicator report presentation. Overview of what all MATs are doing. Six MATs, the Submerged Aquatic Vegetation (SAV) MAT recombined with Action Team and still focuses on monitoring and assessment. 2017 – first workshop. March 2018 – STAC briefing. 2018 – workshops, webinars, indicator development, draft assessments for Tier I indicators – enough

data to go ahead and start with assessment. Went through each MAT, talked about Comprehensive Conservation Management Plan (CCMP) outcomes and Tier 1 (highest priority) indicator lists. End goal is getting assessments in draft format so we can move ahead with comprehensive ecosystem assessment. Hope to get drafts finalized in next few months.

Carpenter: We want these indicators grounded in the science but will also want to vet them through the Leadership Council and other stakeholder input.

Boutin: Appreciate staff's effort to get this coordinated.

Ellis: It's volunteer MAT members who do the work.

Boutin: One of the screening criteria that we're using for indicator development is if data are currently available, keep that in mind and let us know if you see anything where data isn't available.

Carpenter: Keep in mind that it's also important to think about what data we don't have, know what is missing. Hopefully will tee things up for MATs to discuss monitoring strategies and how we can fill those gaps.

Introduction to Mariculture Development in Estuarine Waters (Dr. Wilson Laney)

Boutin: Now will be shifting to mariculture. Wilson Laney will give background on what STAC has been charged with by the Leadership Council.

Wilson Laney: Introduction to what Leadership Council feels is an issue/topic of concern that needs to be addressed. Special Topic Briefing Document (September 6) was sent to members about mariculture. Lots of mariculture activity/discussion in North Carolina, our question is – how will ecosystem services provided by North Carolina's estuaries be affected by expanded mariculture and how will the expansion affect APNEP CCMP goals and strategies? STAC is going to develop questions that need to be addressed regarding potential impacts of an expanding North Carolina mariculture industry. STAC has opportunity to be proactive in a timely way. Outcome could be a white paper.

Laney: Idea of public trust doctrine is important here – protecting/preserving resources for the public use. Applies here in North Carolina to bodies of water. Also applies to the resources maintained in those bodies of water. What are ecosystem services? A User's Guide to Ecosystem Services (Phillips 2013) is a good source. North Carolina estuaries provide many different ecosystem services.

Laney: Management always involves tradeoffs. Hopefully managing for ecosystem services makes management more proactive. Adaptive co-management could enhance management for ecosystem services, fits with APNEP's goals/mission. Idea of payments for ecosystem services – fairly controversial.

Laney: Today STAC will be educating ourselves about this issue.

North Carolina Shellfish Lease and Franchise Program (Michael Graven, NC-Division of Marine Fisheries)

Michael Graven: Shellfishing in North Carolina goes back to 1858. Traditionally bottom leases, first water column lease was 1991. Water column leases are becoming more popular, need to have bottom lease as well. Application process takes four to six months. DMF does investigation of site as part of process, sends results to different agencies. Public comment and public hearing part of process as well. Shellfishing more a way of life in some parts of the coast than others. Contracts last for ten years. Siting criteria and general criteria are used in determining lease. Uses GPS to conduct site investigation. Results are recorded in biological investigation form. There are marking requirements for the lease, and public still has right to fish and navigate across it. There are also federal conditions, including some related to SAV. Samples can contain 15% or less SAV, sampled during growing season, consistent with NOAA methodology. There are minimum production requirements for leases, things can get confusing/overwhelming because methods of reporting product differ a lot. Challenges include navigation, commercial/recreational fishing, etc.

Laney: How did the state arrive at the fees per acre?

Graven: Set in legislation, determined by legislature.

Laney: North Carolina originally had no SAV criteria in place, was the change made to comply with federal guidelines?

Graven: Not sure.

Anne Deaton: I was involved when change happened. Federal guideline was 0% - if there was one shoot in a ten-acre lease, you couldn't have a lease there. In Pamlico Sound there were areas with random shoots, interest in working on it. Came out of Coastal Habitat Protection Plan (CHPP) quarterly meeting, asked subgroup to decide what would be acceptable. The outcome was 15% cover, in line with the "very sparse" category (5-10% cover). Can also move/alter boundaries so there is very rarely SAV in lease area. When federal guideline was reissued, that same criteria got in there formally.

Laney: Would potential legislation increase that number?

Ken Riley: No, will fall back on National Marine Fisheries Service. Know that on shellfish farms with sparse seagrass, grasses will flourish and grow. Thought is that it's a conservation measure.

Laney: Recent article in News & Observer about oyster growers. Movement of structures on lease due to storm surge – any requirement for growers to recover gear?

Graven: In application, there is a section that talks about clean up and gear responsibility. Not as formal or extensive as the management plan. Trying to come up with ways to improve that process.

Hans Paerl: What happens when someone decides to leave the business and they're within their lease? Requirement to clean up structure?

Graven: Required to remove signage. Gear piece was left out of that, we're working to get that added.

Eric Brittle: What are the trends your seeing with different kinds of leases?

Graven: Franchises don't fluctuate much. Lease applications in general have doubled every year for the past few years for individual leases, particularly for water column leases.

Dan Obenhour: Collection of water quality data?

Graven: Yes, YSI sonde.

Understanding Mariculture Activities (Dr. Chuck Weirich, North Carolina Sea Grant)

Chuck Weirich: North Carolina the 15th most productive aquaculture state. Mainly freshwater, very diverse. Significant room for growth in marine sector. Grown using hatchery, nursery, and grow-out. Most mariculture does grow-out. Hatchery process is very complicated. Grow-out phase is where North Carolina is seeing a lot of growth. Floating bags and off-bottom cages are what's been utilized in North Carolina so far. Involve a lot of work – sorting and grading, repairing and cleaning. Currently there are 60 or so really productive farms, others are part-time fishermen, etc. Industry is located from Dare County south to New Hanover County. Clams haven't taken off the same way oysters have, a lot of potential. North Carolina Sea Grant's position – lots of activity, kind of like a gold rush, but has to be done in a sustainable way. Lot of good there but has to be done in the right fashion. Looking at Virginia, much bigger aquaculture industry. Issues and trends – intensive culture using containerized systems growing. Lots of interest in seed production growing. Reputation of product is growing, product branding in place and expanding. Idea of Napa Valley of Oysters – terroir and “merroir”. Entry into industry is difficult, especially water column. No programs for start-up funding, lack of hands-on training opportunities. After Florence – total property/product loss is about \$7 million. Industry likely won't take a major hit but is difficult to assess in the short term. Good support program for research in Carteret County.

Laney: Have a feel yet for to what extent gear was moved around during storm?

Weirich: Varied a lot. Floating bags didn't do well, may cause growers to move to another gear type. Silting up of bottom gear also an issue and low salinity due to storm.

Laney: Possible to pull oysters out if you know storm is going to be severe?

Weirich: Depends on location.

Jess Whitehead: Also, people need a place for people to move their gear.

UNC Shellfish Aquaculture Industry Study (Dr. Chris Baillie, UNC Institute of Marine Sciences)

Chris Baillie: Shellfish Mariculture Advisory Committee (SMAC) has mandated considerations. SMAC has a diverse group of people from regulatory industry, academia, etc. Divided into five topical working groups. Lots of involvement from North Carolina Coastal Federation (NCCF). High economic potential, need to overcome challenges. Virginia model – very large acreage. Everywhere is leased. Low production per acre, not a good model for North Carolina. Looked at other states. Need elevated productivity per acre – production or investment requirement. Statutory changes also needed. Overall feel like plan has fairly good consensus, addressing concerns.

Kenworthy: Didn't mention much about how SMAC addresses industry growth effects on public trust resources. What is thought process relative to environment and ecosystem?

Baillie: Was cut out of presentation, trying to consider how this is a benefit to the environment in terms of water quality. Gear clean up. Went into appendix as top research priority for research programs.

Riley: This is all contentious, there are certain recommendations that have not been able to build consensus.

Baillie: A few growers depend on relay, bulk of research says it's not beneficial, costs a ton for DMF to monitor. Saying it doesn't provide these other services, need to be adding other shellfish to system.

Riley: Report is so focused on hitting \$100 million benchmark, now \$33 million benchmark. Likely to have mixed reviews when it hits the long session.

Baillie: People do say they won't support legislative bill, we say that it's a series of recommendations. Evolving process, encouraging people to talk to their representatives.

North Carolina Shellfish Initiative: Role of Mariculture (Erin Fleckenstein, NCCF)

Erin Fleckenstein: Lots of threats to oysters in North Carolina. Don't have great idea of what exactly oyster population is, DMF and Nature Conservancy are working on that. Harvest has decreased considerably in the last century. Species of concern in North Carolina. Oyster blueprint has seven goals related to restoration and protection of oysters. Environment and economy don't have to be mutually exclusive. Strategies include oyster sanctuaries, cultch planting, mariculture. Collaborative meetings, trying to build consensus. Annual state of the oyster report. Been happening since 2003 with lots of progress. Tie in to National Shellfish Initiative in North Carolina – this summer North Carolina launched a shellfish initiative. Benefits

are about elevating importance of these activities on a national scale. Collaborative state/federal/local efforts. Idea is to improve economy and protect the environment. North Carolina Shellfish Initiative is complementary to Oyster Blueprint.

Laney: Provision about allowing nurseries in prohibited waters – what are prohibited waters?

Baillie: A lot of issues with prohibited waters, very specific locations where they could be. Sheltered areas are good. Areas too polluted normally, from human health and consumption perspective.

Working Lunch: Chesapeake Bay Mariculture Case Study (Marcia Berman, Virginia Institute of Marine Science)

Marcia Berman: Data doesn't show SAV is harmed by leases, but there is an issue of SAV encroaching on current leases.

Mariculture Implications for National Wildlife Refuge Presidential Proclamation Boundaries (Wilson Laney)

Wilson Laney: Rebekah Martin wrote letter to DMF, questioning compatibility of shellfish leases with refuge use by migratory birds. Questions of disturbance of birds. Not concerned about individual leases, more concerned about commercial operations. Ongoing conversations between Swan Quarter NWR staff and DMF about leases.

Potential Interactions Between Shellfish Aquaculture and SAV (Jud Kenworthy)

Jud Kenworthy: North Carolina has diverse, reasonably pristine SAV ecosystem that will likely interact with expansion of mariculture. In other states with mariculture, does occur in conjunction with SAV. Have good understanding of SAV in North Carolina. Idea of economic development and environmental protection not being mutually exclusive. Salinity gradient in North Carolina causes high and low salinity SAV ecosystems. Different species, growth dynamics. Lots of annual and interannual variability in SAV. Mariculture is occurring in high and low salinity areas. Areas of high SAV suitability are also areas that would be highly desirable for mariculture – high water quality. Looking at aerial photography, can see large persistent patches of seagrass. But many patches are constantly moving, being buried/uncovered by sand, etc. Issue with lease-placing criteria – SAV moves/changes a lot, can plan a lease for an area without SAV but that may change very quickly. What we call seagrass habitat and how we define it needs to be thought about with that in mind. Concern because SAV habitat is a public trust resource and has economic value. Economic growth resulting in SAV impairment can lead to the loss of that value. SAV has unique ecological functions and economic value. There are demonstrated risks and demonstrated benefits, we should draw on scientific literature in planning next steps. Best management practices (BMPs) are also available. Need to be very cautious – we have a very unique system in North Carolina, unique biogeography. Different from many of the areas where research has taken place, means we have more SAV species. Temporal issues of the different range of growing season for different seagrass species – can survey during “growing season” and miss SAV that is there. Opportunity to explicitly revise CHPP/CCMP to address mariculture issues. Need to think about developing industry

performance standards – make sure best practices are being applied/confirm that BMPs work. Need to form an alliance between mariculture, SAV conservation, and shellfish initiatives. All have good water quality needs in common. Temporary/permanently closed shellfish areas likely correlate well with water quality issues that affect SAV. Need to consider risks of introducing another human activity into an area with many other factors going on. If SAV is negatively affected, restoration is expensive and success is uncertain.

Jacob Boyd: Would dynamic nature of SAV beds be impeded by floating cages/water column leases as opposed to placing cultch on the bottom?

Kenworthy: Floating cages are less likely to impede movement of SAV, depends on current, wave action. Floating cages will affect wave action. Thinking ahead, for instance – sinking floating cages ahead of a storm will lead to scouring of grass beds.

NOAA-NOS Mariculture Spatial Planning (Dr. Ken Riley, NOAA)

Ken Riley: Aquaculture is fastest growing sector of coastal development. Aquaculture is a priority for current federal administration. National Ocean Service – develops tools to support coastal managers in making timely decisions. Want to support aquaculture growth by anyone's definitions of sustainability. Lots of tools for aquaculture – google aquaculture portal. Tools for rules, tools for the future, tools for planning. New tools – wave energy exposure model, National Aquamapper tool. Ocean Reports – automated data sets used in marine spatial planning. Discussion of potential issues with the way that leases look, potential to impact/decrease tourism. Happening estuarine waters, not on beach.

STAC Deliberation

Boutin: Now is the opportunity to discuss STAC response to SAV issue.

Laney: Shows initial set of questions, created by Bill Crowell, Wilson Laney, and Tim Ellis. Proposes smaller working group to continue pursuing this since group is running short on time.

Boutin: Potential for finfish mariculture to be an issue as well, a lot of people have already thought about shellfish mariculture.

Carpenter: From a historical perspective, this is an opportunity...this committee tried before with sea-level rise, this is a chance for the STAC to be proactive. Process started before proposed legislation, chance to do something prior to decisions being made.

Bill Crowell: If the STAC develops a product, make sure there is an audience for the product.

Whitehead: Need to make sure we have a defined purpose for this. Some of these questions have already been answered by other players. In some ways APNEP is new to the sandbox. CCMP was developed 2010-2012, aquaculture was not a strong component. As MATs are updating monitoring and assessment plans, I would like to see a product that will help

incorporate these issues into the CCMP. Conversation right now, majority is very economically focused.

Fleckenstein: A lot of the conversations have stemmed around promotion of mariculture with the caveat that it's properly sited. Balance of environmental and economic components. Siting has been issue #1 on the table in balancing those different uses. DMF feels huge responsibility to make sure whatever they allow is within best interest.

Whitehead: Questions is then, what is proper site placement.

Fleckenstein: That's where Ken's tool can be really useful.

Deaton: South Atlantic Fishery Management Council (SAFMC) has policy with reference to SAV...some other group has something similar. DMF has guidelines, #1 thing has been avoiding impacts to other resources including SAV and shellfish. Think there are a lot of things out there already are providing that guidance.

Boyd: All agencies are on same page in terms of siting, working to be proactive and go above what is required by statute.

Whitehead: Better question is, where do you see APNEP in this space?

Deaton: If APNEP has additional concerns, try to compile that information. Don't try to be comprehensive, look at what's been covered and see if anything needs to be added. A lot has been covered already. Example could be issue of SAV moving around.

Boyd: Reason this was not addressed in CHPP or other plans yet is because increase in applications is really recent. Catching up to the industry in relation to their plans, etc., is next steps for groups like APNEP.

Kenworthy: Definitely room for us to make specific modifications to CCMP, we also really need to...because APNEP is a partnership, we need to look at the CHPP. Firmly believe in need for performance standards, those are the ways we can check for BMPs and help develop new unique ones for North Carolina. CHPP is one way to do it, CCMP is another. Performance standards are one way to provide oversight.

Boyd: Would encourage everyone, the report that Joel and Chris and NCCF haven been developing, is very pertinent and will be released in the next few weeks. Will be talked about a lot in the next few months. There are research needs listed in the report, addresses environmental side as well as economic.

Don Field: Now that APNEP and cooperators have put together SAV mapping, will be interesting to see what's going on, effects based on mariculture and SAV.

Fleckenstein: Want to keep in perspective, there are less than 2,000 acres of leases in North Carolina, important to keep in mind.

Laney: Interested in knowing the finite acreage that remains and appropriate for mariculture development. The amount of acreage is limited.

Erin F: Comes to performance standards, making sure leases are kept to performance standards.

Baillie: Depends on production and composition of lease types.

Riley: Other nexus for APNEP is EPA and Chesapeake are doing a lot to reward the shellfish industry for performance standards based on nutrient mitigation. NOAA has publications and tools for that as well. Industries here are very different from Chesapeake, somewhat unique to Chesapeake but it is an opportunity for APNEP.

Fleckenstein: Looking at strategic areas for water quality improvements, need for good areas for water quality regardless, area to work together.

Deaton: There has been research in other states on impacts from aquaculture to SAV. Issue dealt with in oyster fishery management plan. Boiled down to gear, activities, extent of work. Nothing for North Carolina but now there are several ongoing research projects looking at impact of aquaculture on SAV. Joel Fodrie doing something, others as well.

Boutin: Seems like if we do anything on the oyster/shellfish side, it's reviewing what's already being done and see if there are opportunities. On finfish side there is a lot of work to do, two very different boxes.

Laney: Is there a need for any sort of a buffer zone adjacent to areas primarily terrestrial designated for conservation – state parks, national wildlife refuges, etc.? Something that seems relatively easy for the STAC to do.

Boyd: Part of internal lease process, if it's near a location we send it out to them for review.

Laney: There are things the public would want to know about suitability, extent, etc.

Laney: Point of this exercise, is there an area into which the STAC could look, to determine/provide factual information? Thinking about a sustainable landscape for the future.

Boyd: I agree, but there are already buffers around all those areas. More appropriate to do it site specific.

Deaton: What Wilson is saying, he's talking about spatial planning but adding more layers – conservation land overlap, etc. One piece of what we have to consider. Maybe can look at this

method that NOAA is using with Bogue Sound, if it's good, thinking about expanding it across the coast.

Riley: Greatest challenge in North Carolina is not APNEP territory.

Deaton: Two opinions on leasing and conservation lands. For growers and states, less conflict in conservation lands. But you want to preserve aspects of the conserved areas.

Kenworthy: When the committee is finished with their report, what is going to happen with the committee. Legislature going to have an outside advisory committee?

Baillie: As written, gets delivered to them by December 31. Whoever takes it up would then reach out to the group to come and present?

Fleckenstein: Oyster Steering Committee has mariculture as a goal, committee won't die, will live on in some shape or form.

Action Items (Brian Boutin)

Boutin: Will work with co-chair Whitehead to wrap up with what was presented today. Don't have specific marching orders but what we've discussed in a general sense is taking a look at what's going on, seeing if anything additional needs to happen, improvements, etc. Anything else needed for consideration. How to wrap our heads around finfish aquaculture in the APNEP region.

Whitehead: I concur, looking at tools, looking at gaps. Then thinking, what's the most productive and useful way that we can move forward.

Laney: If there are no objections, send list of questions out to committee, can hear if there are additional questions or if they've been answered.

Whitehead: Can use questions and Google doc – everyone can add resources, things they've heard of, etc. Way to synthesize what everyone already knows.

Fleckenstein: Will be referring to the SMAC plan.

Whitehead: Will be able to see what SMAC covers and where the gaps are.

Pete Peterson: North Carolina has great aerial coverage of SAV. Could be very useful, provides us with robust test of how these operations may be affecting SAV.

Adjourn