



**Albemarle-Pamlico National Estuary Partnership  
Science and Technical Advisory Committee**

**Winter Meeting  
10:00 am – 12:00 pm  
February 24, 2017**

Greenville Centre  
Room 1200  
2200 Charles Blvd  
Greenville, NC 27858

**DRAFT MEETING NOTES**

**APNEP STAC Members Present:** Rua Mordecai, Christine Avenarius, Doug Wakeman, Heather Jacobs Deck, Robert Miller, John Iames, Daniel Obenour, Constance Alexander, Robin Dennis, Don Field, Rhonda Evans, Randall Etheridge, Jud Kenworthy

**Guests Present:** Stephen Elbert

**APNEP Staff Present:** Dean Carpenter, Jimmy Johnson, Marygrace Rowe

**Call to Order:** Jud Kenworthy, STAC Co-Chair

Jud called the meeting to order and thanked everyone for coming. He also thanked everyone for all the work they do for APNEP.

**Meeting objectives:** Jud Kenworthy

Jud continued that the committee would address technical business regarding the bylaws and action plan in addition to hearing an update from Dean about APNEP. There will also be time to talk about action items and things to discuss at the joint STAC/Policy Board Meeting this afternoon. Members were reminded that the STAC traditionally meets with the Policy Board annually and this is a great opportunity for STAC members to meet those members and get direct feedback on action items that might be proposed. Jud asked for thoughts on the overall objectives and there were no comments.

**Approval of Winter (February) 2015, Summer (July) 2015, Summer (August) 2016 meeting notes:** Jud Kenworthy

Jud asked the group if anyone had any comments on meeting notes. There were no comments and the meeting notes were approved.

## **Welcome and Introductions:** Dean Carpenter, APNEP

Dean greeted the committee and thanked everyone for being in attendance. He recognized new members Randall Etheridge, Daniel Obenour, and John Liames then welcomed soon-to-be new EPA regional liaison, Constance Alexander. He then asked for introductions and everyone did so.

## **APNEP Staff Update and Member Reports:** Dean Carpenter

Dean expressed that he would give an overview of partnership activities and address questions. He reminded members that any ideas are encouraged to be sent to the STAC executive board. The STAC meets semiannually and the second meeting in 2017 likely will be held during the summer. There are two EPA regional liaisons present in this meeting because Constance will be replacing Rhonda, who is retiring soon from EPA. APNEP has EPA representatives in Atlanta (region) and in DC (headquarters). This is the second STAC meeting where members are provided beforehand a list of recent and near-future activities that has transpired since the last meeting (on screen) and Dean will highlight a few on the list. Dr. Coley Cordiero, an APNEP staff member since January 2016, shifted positions from ecosystem analyst to program manager. Dr. Tim Ellis will become the new ecosystem analyst in March, who is now an observer at the Policy Board meeting (occurring in another room within the same building). APNEP is in the process of activating action teams and “rebooting” monitoring and assessment teams (MATs). The invasives and fish habitat action teams, plus the Wetland MAT have already met in 2017, while the Ecological Flows action team, and Air Resources and SAV MATs will be meeting over the coming weeks. Dean asked if there were any questions so far.

Jud asked if new STAC members have been assigned to teams.

Dean replied that new STAC members initially get assigned to one action team and one monitoring and assessment team based on their expertise. Some members serve on multiple teams. Dean said he is working with Stacey Feken (APNEP’s policy and engagement manager) to create two additional columns on the STAC membership web page that identify member assignments. Dean asked if there were any other questions and no one responded. He then mentioned the highlight exercise via email from members that were distributed among the STAC as an opportunity to share what people are doing on a technical side. Dean asked for comments on this exercise.

Jud asked if the information would be posted on the STAC webpage.

Dean mentioned that this information was intended to be shared among members only but that they can be posted on the STAC web page. He reminded everyone that the information would then be accessible to the public.

## **Approval of Updates for STAC Governing Documents:** Jud Kenworthy

Jud stated that the first action item is the approval of the bylaws, action plan and review protocols.

### **STAC Bylaws**

Jud stated that revisions to the STAC bylaws require a two-thirds vote for approval. He proposed that because two-thirds of the STAC is absent, the present members can vote today and he can gather votes from everyone else via email. He asked for any comments.

Dean reminded members that the revisions are proposed by the STAC executive board.

Jud asked if there was anyone who did not approve. There were no comments so everyone present approved. Jud reiterated that he would harvest votes from other STAC members via email.

### **STAC Action Plan**

Jud asked the committee if there were any thoughts or comments on the STAC action plan.

Dean reminded members that the action plan is revisited every two years.

Jud stated that the action plan does not require a two-thirds vote but does need a majority. He asked if there was anyone opposed and there were no comments. Jud reiterated that he would harvest votes from other STAC members via email.

### **STAC Review Protocol**

Jud proceeded with the final item for approval, the STAC review protocol. Jud stated that this review protocol is a way to normalize or standardize the way the STAC addresses reviewing documents or materials transmitted by the STAC and APNEP. He asked if anyone had suggestions for improvements. There were no comments so everyone present voted for approval and Jud said he would follow up with members who are absent today.

## **Preliminary Topics for Short-Term Deliverables:** Jud Kenworthy

Jud continued to the next topic of short term deliverables and suggested that this item is related to how reactive and proactive the STAC is. There is a broad diversity of expertise on the committee and there are members who are thinking about relevant topics that the STAC can weigh in on. Years ago these documents were called white papers, an example being one written on sea level rise. Jud opened the floor to give committee members an opportunity to get input on topics they would like to address that draws upon their expertise and could benefit stakeholders in the APNEP region.

Dean reminded the group that these white papers are now called issue papers, all available on the APNEP website (<http://www.apnep.org/web/apnep/tip>). These papers are generally three

to five pages and are directed towards policy makers to propose a move from the status quo. Topics have covered issues including sea level rise and data management systems. These papers have a notion of being proactive offer a more organic process of policy. Policy makers could be considered as the customer for these documents. Dean urged members to be proactive and think about topics to propose to the Policy Board during the joint meeting later in the afternoon so that the Policy Board members could receive input.

Robert Miller asked if what STAC provides to the Policy Board is for them to act upon.

Dean replied that the STAC has ownership of the issue papers.

Robert suggested that STAC let science be the policy. The world doesn't know a lot about the committee and thus STAC needs to get the word out to the general public, not just resource managers.

Dean responded that Stacey Feken is coordinating APNEP's social networking and communications plans to get the word out. The focus is to translate the science into a form that can be understood by a variety of audiences including the non-technical, general public and policy makers. A parallel effort is happening in APNEP assessments, whereby the ecosystem assessment is geared towards technical managers and the report cards are geared towards non-technical audiences. These issue papers would be geared towards technical managers and members could work with APNEP staff to get a one-pager for citizens.

Rhonda Evans reminded the committee that this is the first time that APNEP has been fully staffed. Stacey knows how to communicate with the public and can help with that effort. As APNEP moves forward, the question is how do you get the message to the whole public. How do you better target citizens? The APENP region is huge and each issue needs to be focused in a different way depending on the audience. Who is the audience? A two-pronged approach is necessary.

Dean suggested getting feedback on whether targeted stakeholder groups are being addressed.

Rhonda stated that this committee is to address technical groups.

Dean stated that developing indicators is both a science and policy effort but he wanted to start with creating measurements in a science context.

Rua Mordecai suggested coupling models that people are working on such as harmful algal blooms (HABs) and submerged aquatic vegetation (SAV). Is there a way to quantify restoration efforts? Amongst a full STAC, multiple models can be combined.

Dean went to and pulled up previous (2008-2011) issue papers from the APNEP website. The issue papers are allocated into one of three categories: monitoring and modeling tools, management effectiveness and efficiency, and forecasting. Dean suggested that the science needs to be updated for those topics addressed by the earlier papers.

Heather Jacobs Deck stated that North Carolina legislature activities have included a Senate bill and a regulatory reform bill. There has been discussion of changes to protection of wetlands and wanting to deal with streams and doubling the requirement for riparian buffers. They will propose 300 feet because they don't have to pay for it. Advocate why streams are important for water quality. It's out there and will be voted on this year. North Carolina wants to return to the federal level of 300 feet. North Carolina was going above and beyond with 150 feet. More likely applicable to the piedmont areas. Nutrient management plan. Falls and Neuse lake. University of North Carolina's collaboratory is mandated by legislature to do more research on nutrient plans on the Tar-Pam Basin for nitrogen and phosphorus. Funding?

Dean stated that the Nutrients Action Team has dealt with nutrient criteria. Intermittent streams. Riparian buffers have been under consideration in the past when he worked with STAC member Tim Spruill in planning a science-policy workshop on the topic. He suggested organizing a workshop to convey the ecosystem services provided by buffers and to present science. This is a topic he thinks is crucial for water quality and habitat. He also offered up the idea of doing a risk assessment.

Heather suggested that there is an economic impact of having riparian buffers. The conservation network did a riparian buffer report last year for policy makers and sent it to legislators.

Dean added that the STAC Executive Board could arrange for someone to come and give a presentation such as Michael Burchell (NCSU) in order to get the science out and discuss the costs and benefits. This could be a topic of consideration.

Daniel Obenour suggested updating the issue papers. Often faculty members have undergraduate students looking for summer research and this could be an opportunity for them to do a literature review and synthesize this information.

Jud stated that within the aquatic APNEP region there is an important issue of planning and permitting agriculture. APNEP has an opportunity to be proactive here. The general public is unaware and the Army Corps of Engineers (COE) is about to issue permit criteria for agriculture. The states can negotiate with COE. To where does the 300 foot rule apply?

Heather said it was nationwide.

Jud suggested targeting the approach on SAV protection. There is an interest in North Carolina for permits being processed. It would be very good timing making a statement about that.

Dean stated that the process of issue paper development would start with a STAC member championing an issue paper on the subject. Whoever the champion includes as contributors would get attribution.

Jud stated that in Virginia alone there are 30,000 acres of permits in place for agricultural farms. There is a huge potential for this to happen in North Carolina because the state does not have regulation in place to deal with that.

Jimmy mentioned that there was a contentious meeting in Core Sound with fisherman.

Dean mentioned the topic of estuarine response to climate change. He suggested this could be an overview paper but subtopics can be pulled out to do papers on as well.

Heather mentioned HABs as a topic. There is some desire to coordinate and get more consistent information to public on this issue. There have been issues reported in the Chowan and Pamlico. She suggested getting what we know on paper about HABs and working with the North Carolina Division of Water Resources to disseminate information to the public.

John liames suggested using remote sensing to monitor HABs. Technology and data from NOAA, EPA, NASA, and USGS can help to map out HAB outbreaks in real time. There could also be a public monitoring section within the project using a smartphone app with mapping capabilities. This is not centric to just EPA's work but within APNEP. The Great Lakes area, coming together to synthesize info. EPA could offer an easy paper on future use of monitoring. Public to be able to have info. Not project centric. Cool stuff. How would it play into APNEP?

Dean mentioned that APNEP's Water Resources MAT is exploring a HAB indicator. We could incorporate information into assessment process of change over time on both spatial and temporal scales. Data could be recorded over annual time steps and indicators can be monitored via remote sensing or citizen monitoring. The data could then be reported to decision makers.

John suggested using EPA-NERL's satellite info. 250m pixel resolution. There is a really unique journal article published on this topic. Managers can have this info about a week out. If someone could coordinate with John he could pull data into an APNEP framework.

Dean stated that this is a topic of interest but different than technical issue papers. What is the state of the science and where should we be moving? What needs to change in the policy realm?

Rhonda mentioned the two-pronged approach that involves technical information and reporting. Reporting is a technical issue because you have to define the options. What are avenues to get information to decision makers? This could be explored in short term issue papers.

Dean asked how to report real time info using HABs as a case study. Remote sensing is real-time and monitoring platforms could be installed in the water that are linked to satellite. How would we disseminate that information?

Jud suggested couching this topic in a way to make public aware of what HABs are. The general public doesn't know what a HAB is.

John asked where the public is seeing an impact? HABs near swimming areas and freshwater intakes could have public health effects.

Jud suggested the focus be on making the public aware of the risks and dangers of HABs. Hysteria in the 1990s. No one knew what these things were. Hans said there is a difference between algal blooms and HABs. Human health risk. Monitoring tool being developed related to making public aware of HABs.

Heather stated that the public has become desensitized to fish kills. People are more concerned with weekly water report during summer months. Where are people getting this information from? We're not exactly sure. How do you keep the information up to date?

Constance asked how the HAB information would be disseminated.

John mentioned a mobile app. The app is working well and everything is coming together.

Rhoda mentioned that she saw a red tide app on Facebook with color-coded levels for blooms. Who is monitoring this data and what is the source? She suggested that the tools are there, the question is whether we have citizens that use them.

Christine asked what citizen science projects are ongoing. What ideas could be implemented?

John mentioned a journal article on citizen science.

Christine suggested that APNEP pioneer the connection between science and the dissemination of that information.

John mentioned CAFO location in Great Lakes using post office boxes. To model impact, location is required. Is aquaculture a danger to water quality? Or is the leasing a problem?

Jud suggested aquaculture can improve water quality but that there are also spatial considerations. The big issue is the displacement of SAV by shellfish aquaculture.

Christine suggested an app where people can take pictures of areas being impacted by sea level rise.

John asked how to get information out with so many apps. He explained that he comes from a forestry background where "Smokey the Bear" acted as a visible reminder for forest conservation. So perhaps APNEP in terms of HABs need a "marker" to engage citizens.

Rua raised user experience tool development as a way to get science to action. There could be an issue paper on tool development and design to get science into usable tools. He would be willing to do a presentation at a future STAC meeting about creating apps.

Jud suggested presenting issue paper information in a face-to-face setting. Could issue papers be designed so that they could be presented in more detail out in the community? UNC Institute of Marine Sciences director Rick Luettich presented a flood model to a local

community last night and Jud thought he did a good job. This is an issue affecting everyone on the coast. Inundation model. Condense to one pager or put expert in community to relay info. He explained how they modeled and public was able to understand. Documents served as a jumping off point for communities.

Robert mentioned the North Carolina Humanities Council. Science of climate change. People want to hear about the science and how it works.

Jud stated that Dr. Leuttich was trying to avoid politics and policy but couldn't because people in audience who live in the Morehead City area were asking about higher insurance rates. Core Banks are 100 yards from where ocean insurance rates drop. Model to predict flooding. Can predict flooding better on sound than ocean side.

Dean noted that in 2013 APNEP staff were invited to give talk at the museum in Elizabeth City on sea level rise. There was a great local interest in science and information on this issue. He suggested a hybrid between paper and talks. Road shows take a lot of effort but podcasts might be a better way to reach a larger audience.

Jud stated that he was not suggesting any specific outlet but that getting visibility with talks or podcasts would work.

Dean suggested getting ideas about content topics and formatting issues to offer in the afternoon session with the Policy Board. He suggested that technically-inclined managers be given a ten-page document while the general public receive a two-page document. There are many tools and technologies on which to take advantage.

Constance recommended creating a network of community members as a way to disseminate info.

Dean suggested that the retirement community be an active part of the dissemination.

Constance suggested teaching individuals to be moderators so you can expand your area of influence.

John noted that his wife is a science teacher in a private school and participated in the National Science Olympiad Competition. One of the modules at the competition was called "Roads Scholars" and children participants were tasked with navigating topo maps. Two or three of the kids needed to be taught how to do this and he volunteered. He created a weekly YouTube video for them and one of the videos received 30,000 views. He received some negative comments but the National Science Olympiad Coordinator discovered the video and gave it a gold seal of approval. It's not just putting out websites, we must get citizens rallied around it. Get the message out by getting notoriety and linkage with famous people.

Christine suggested displaying such a video to a STAC meeting.



Dean raised the issue of socio-ecological linkages. There are social scientists on the STAC that can help scientists communicate better.

Christine mentioned sea level rise talks in Dare and Hyde county where she met with rotary clubs and church groups.

Dean suggested conducting a social network analysis to see who talks to who. Use technology and tools for targeting.

Robert stated that having the APNEP seal of approval gives credibility.

Jud stated that harvesting models to work together was a good idea. When it came down to discriminating why the beach is less taxed than areas farther inland, it was simply because the model stops in front of the dunes. Different models are used for different areas and models aren't linked for flood surveys.

Rua suggested coupling models. There is a need for models to figure out where to focus our efforts. It would be a way to discover how much effort has been put into education and riparian buffers. Put them together?

Dean suggested raising this topic in the afternoon session with the Policy Board.

**Action Items:** Jud Kenworthy

Jud informed the committee that there were 25 minutes remaining in this session and asked if there were any particular action items Dean wished to raise.

Dean stated that he was done with topics of issues and was ready to open it up to other science issues.

Robert stated he lives along the coast in Pamlico county and there seems to be a lot of misinformation about renewable energy coming into the area. Policy makers need help making decisions on issues including oil versus wind energy and turf versus plow fields. Constituents have issues with both choices when it comes to oil versus wind energy in waterways.

Jud suggested the general subject of renewable energy.

Robert suggested it would have an impact on water quality.

Dean suggested the subject of coastal energy production.

Robert stated that marine pilots will be vulnerable to wind generators.

Jud stated that there is a graduate student with a research idea about generating energy from salinity gradients. North Carolina is an area being considered. There is a weak dataset for salinity gradient and very little is known about the dynamics of salinity. It's so important to the ecosystem and is a potential renewable energy source but we know so little about salinity.

Robert stated that he knows of a creek running into the Neuse River that used to be half salt and half fresh but has been all fresh after Hurricane Matthew passed through.

Rhonda asked if this is occurring because there is more water being drained out.

Robert stated that the hurricane made a lot of areas very fresh and some areas have remained fresh.

Jud stated that there is huge interest in oyster restoration in North Carolina and that there are some STAC members involved in these types of projects. Evidence suggests that Beaufort Inlet and Core Banks are opening and closing. Historically there are none but now there are two inlets. Oyster restoration projects are affecting salinity dynamics in our system and a higher salinity means more predators.

Jud then stated that a list has been compiled for the policy board and asked if anyone else wanted to add more items.

Don stated that deep-water edge dense SAV beds are receding which means there is more wave energy in Core Banks specifically. The same thing is happening in occupied banks further north. Could this potentially be incorporated?

Dean stated that there will be an assessment update for SAV extent in 2017. During the upcoming SAV MAT workshop on Monday, another SAV metric to be discussed is the deep-water edge. How to convey to general public and decision makers. Could be a podcast!? New members in NEPs. We have a strategic plan to make a healthy ecosystem but are we doing our job if we are only holding the lines where they are? We want things to be getting healthier instead of seeing no change and just breaking even. There is a tradeoff between economics and development and ecosystem health.

Don asked if APNEP has ever done podcasts on social media.

Dean stated that APNEP is just beginning that media product. Before their departures from APNEP staff, Katia Griffin-Jakymec worked on videography and Jim Hawhee organized a "Sound Series" that brought in speakers (including STAC members) to conduct science café discussions. The events are posted on the APNEP YouTube page.

Rhonda stated that people were saying there is an interesting linkage about why the Triangle area impacts the coast.

Jud suggested that this is a national issue as well. One of the outreach activities that NOAA did to make the public aware of hypoxia in the Gulf was to reach all the way up to upper Midwest to educate people. They also physically transported such groups to the Gulf.

Robert asked if this method was effective.

Jud said it is still to be determined.

Daniel stated that NOAA staff said they are seeing changes. There was denial among agricultural community and that has changed.

Jud noted Federal agencies had undertaken an initiative before the Bush administration and an explosion of corn farming in Midwest threw a wrench in the process.

Rua stated that there is still a lot of research being gathered about the agricultural influence in the Gulf and there are many groups working on the Gulf hypoxia issue. In North Carolina, most people who live in the headwaters have been to the coast unlike people living in the Midwest.

Jud suggested reaching all stakeholders within the APNEP region.

Rhonda brought up the Teacher Institute as a means to communicate messages and new information to teachers. There could be ways to incorporate new information into the curriculum of an already running program such as "Shad in the Classroom". There could be a focus on upper regions.

Jud stated that one of the best things North Carolina did when they remodeled the aquarium on Bogue Banks was to incorporate a "mountains to sea" approach. People now get a whole education of coastal system and uplands.

Dean reiterated that APNEP has not just an estuary focus, but are mountains to sea as well. Podcasting and getting the word out. This year marks the 30<sup>th</sup> anniversary of APNEP. Staff are promoting a yearlong celebration. On the APNEP website, staff are promoting founders or influential APNEP contributors and interviewing them in a series call "Sound Reflections" (<http://portal.ncdenr.org/web/apnep/SoundReflections>). There is interest in featuring STAC members as well in this series. Just wanted to give members a heads up that it might be a while but any member may be asked for an interview. This will give APNEP's stakeholders an idea of who volunteers with our partnership.

**Adjourn for lunch with the Policy Board.**



**Policy Board / Science & Technical Advisory Committee Meeting**  
**Albemarle-Pamlico National Estuary Partnership**  
**12:00 pm – 3:00 pm**  
**February 24, 2017**

Greenville Centre  
Room 1200

2200 Charles Blvd  
Greenville, NC 27858

**Policy Board Members Present:** Dr. Wilson Laney (USFWS), Todd Miller (NCCF), Dr. Kirk Havens (VIMS), Dr. Tom Allen (ODU), Dr. Susan White (NC Sea Grant), Mac Gibbs (retired, NC Cooperative Extensive), Joanne Benante (USEPA)

**STAC Members Present:** Rua Mordecai, Doug Wakeman, Heather Jacobs Deck, Robert Miller, John Iames, Daniel Obenour, Robin Dennis, Don Field, Randall Etheridge, Jud Kenworthy

**Guests Present:** Constance Alexander (EPA), Rhonda Evans (EPA Region IV Liaison), Stephen Elbert

**APNEP Staff Present:** Dr. Bill Crowell, Dr. Coley Cordeiro, Stacey Feken, Dean Carpenter, Jimmy Johnson, Marygrace Rowe, Dr. Tim Ellis

**DRAFT Meeting Notes**

12:00 p.m. Call to Order

Dr. Kirk Havens, Policy Board Chair and Dr. Jud Kenworthy, STAC Co-Chair called the meeting to order. Kirk asked for roundtable introductions and everyone did so.

12:15 p.m. Open for Public Comments

No public comment

12:30 p.m. Director's Comments

Dr. Bill Crowell

Dr. Bill Crowell gave a brief review from the morning Policy Board meeting and noted that Kirk had been elected as the new chair and Holly White vice-chair. He knows the STAC received updates that morning from Dean as well. He welcomed thanked everyone for their support and interaction. Partnerships are what make the program. Infrequent meetings but attendance and input is greatly valued. He noted that participation in the Action Teams and Monitoring and Assessment Teams is greatly appreciated and that the teams will meet more frequently in the upcoming months.

Bill explained APNEP is in the process of reviving the program. We just hired Tim Ellis, the new Ecosystems Analyst who starts in a few weeks, and are in the process of hiring one other person hopefully within the next few months. There have been leadership changes at state and national level.

We are still investigating the move to a university host, that is moving forward and an update will be provided at the next meeting. APNEP is planning a conference for the fall, November 14 or 15 in New Bern. There will likely be a very moderate registration fee. There will be a program review with EPA next year, we may call upon folks to participate, he is glad to answer any questions. We usually hold the Policy Board meeting in the spring and talk about the EPA grant application. We are working on methods for tracking CCMP implantation and making sure that when we fund something we get out of it what is anticipated, would like to do a joint meeting to share that this summer. One combined session likely.

12:45 p.m. The NEP and the CCMP a Brief Overview

In 187, several estuaries were designated as estuaries of national significance by Congress under Section 320 of the Clean Water Act, which led to the Albemarle-Pamlico Estuarine Study (APES). The APES period included an ecosystem characterization, somewhat of an ecosystem assessment, assessing the condition of the estuarine system. From the beginning, there was a holistic approach, it was not just focused on water quality. There are 28 NEPs around the nation and one in Puerto Rico. There are a variety of hosts, some are housed in state government, universities, non-profit, and one is its own special governmental

agency. Currently NCDEQ is the host and is only responsible for the fiscal administration of the grant, he explained that those present and other members comprise the management conference (Policy Board, STAC, other committees and teams) that guides the direction of the partnership. The management conference relies on citizen guidance, provides direction based on local priorities. The MC helped guide development of the first CCMP or strategic plan in 1994. They starting reevaluating what had been done around 2008, the Policy Board adopted the Ecosystem Based Management (EBM) approach in 2009, which will Dean will discuss further to remind everyone why we are doing what we are doing, we can have more discussion on that later.

1:00 p.m. Progress and Plans for Implementing Ecosystem-Based Management (EBM)

Dr. Dean Carpenter

Dean explained that the current STAC was a mix of participants including a mix of Policy Board members, STAC mix of founding members, others with years of experience with APNEP and some new folks. He will give us a look behind the curtain and discuss the EBM approach, the veterans may have heard this before. He will provide a great deal of information which can be found on his slides, summarized below:

In 2008 he and Bill attended a talk at EPA where Dr. Carl Hershner, current Policy Board member, touted the benefits of EBM. He shared international case studies and concluded while there was no recipe for EBM, there were 4 elements that led to successful programs: 1) Holistic vision and plan, effective engagement, adaptive management, framework with authority, implementation area, management institutions.

A Comprehensive Conservation and Management Plan (CCMP) is required for all the NEPs. It is a strategic plan that relies on buy in from stakeholders and the community, it is less of a top down approach that also relies on engagement with citizens and the community. Dean was hired in 2003 and charged with developing indicators, evaluating what makes a difference in the environment, getting feedback. In 2009, Carl was invited to pitch the EBM idea to the PB. They brought in all the partners to draft the proposal which was approved December 2009. They formed an EBM transition team composed of 10-12 individuals from PB, STAC, citizens' advisory committee, state and federal planners, and EBM tech transfer—VIMS team, and staff. They met monthly in person to craft a new strategic plan, our current CCMP adopted in 2012.

Dean shared 7 steps for EBM enlightenment:

1. Articulate program goals. Ecosystem health goals: human communities, native species, water quantity and quality (p. 9 of CCMP). Designed to answer 4 questions about the health of the system (p. 7 of CCMP). There are 5 components refined into 15 objectives, further refined into 58 actions (starts on p. 19 of CCMP).
2. Develop system level model for goal attainment (see slide). Ecological management actions / multiple stressors not just one. There are 3 goals and 12 outcomes (pp 10-11 of CCMP contains candidate indicators). Went through exercise thinking about what factors influence the outcome the most.

See slide of spreadsheet from effort to develop model: 12 outcomes in column across top. Factors on left side influence outcomes including biological, physical, human dimensions. They developed a laundry list that went through vetting. They ranked factors: level of impact, influence or control over outcomes, end up with a rating (High high low low etc.) Ex: atmospheric, global carbon emissions, might be harder to control.

3. Assessment current management efforts, identify gaps. Look at what partners are doing, APNEP is a boundary organization designed to fill gaps. Did a survey of partner plans of varying levels of specificity and types of publications, such as the NC WRC Wildlife Action Plan. Then did an action extraction, try to align with APNEP outcomes/strategies, was directed by conceptual models. They then did interviews with senior management to get buy in. Found there was often a tendency to maintain status quo, the approach can cause pain and discussion. Since we are rebooting, will go back and talk at division director level, find out if goals same. Bill mentioned they sent CCMP back out for review but some were delegated to staff who may not have had a full understanding of what they were signing off on.

4. Implement CCMP / establish teams to implement actions. Ended up with 58 actions in the CCMP. We are frequently asked how do we determine how to prioritize? The answers is that all are priorities. Example 2b. outcomes, actions, workgroups...on the ground implementation. Native species, habitats. Multiple factors can influence a particular outcome. The actions are divided up into 15 or so action teams. It will take a coordinated effort from several teams working together to impact an outcome.

5. Monitoring...notion of developing indicators. Link candidate indicators to CCMP outcomes. Monitoring data is the fuel for the assessment. Had to put on hold was getting ahead of policy. Monitoring is going on, such as the AP ambient water quality monitoring program, but could add value with systematic coordinated strategies across different programs.

6. Assess performance: An interim regional ecosystem assessment was done in 2012, based on who had high quality dataset and those willing to volunteer to write sections. Was just status and trends / Heinz center format. Quantitative metric but no judgment whether good or bad, no diagnostic assessment as to the cause. Ideally we would get into forecasting...then could show if you invest in these ecosystem services, conditions should improve in the region. Show policy makers the tradeoffs that can occur if go down different paths.

APNEP Ecosystem Assessment: example. Invasives from recent Wetland team discussion, Phragmites.

Assessment planning: challenge of design a monitoring system. You need to make the investment up front. Hard to go back and collect data ad hoc. Ideally answer these types of questions: bioregional assessment questions. Example with SAV, we had to go out and collect data for baselines vs. Tampa Bay they had imagery from 50s.

7. Adaptive management: most difficult step. Need managers and policy makes to act on the information. Have dialogue. Expect system to behave a certain way, if doesn't change approach, invest in more research, do more monitoring, applied initiatives (BMPs). This is the best science we have, but if things are not working that way we can change.

He shared Figure 2 from the CCMP: Plan Manage Assess Monitor. With the original CCMP mid 90s was the implementation phase, then things changed in DC and federal resources dried up, this is 2<sup>nd</sup> cycle. Happened again hope to make more progress now. Iterative cycle. What do we want to achieve, having discussion with MATs now, eventually will move into policy arena.

Indicator Planning Decisions slide. Thorough vetting. Reconvening MATs to vet and get commitment on monitoring.

Organizational / network chart slide. Dean shared that he embraces complexity. Showed the relationship between APNEP, PB, STAC, EPA, Action Teams, MATs and organizational structure of APNEP.

Dean shared a slide of planned APNEP Deliverables 2017-2018:

- a. Regional ecosystem assessment 1.1
- b. CCMP 2.1
- c. Indicator specification & targets 1.1
- d. EBM plan 1.1
- e. Action Team implementation plans
- f. Integrated monitoring strategy 1.0
- g. Indicator development 1.1
- h. Regional ecosystem model 1,0 lead effort, EBM transition team first worked on.

Dean shared an example of how the process will work: Goal 2 slide: native species goal. One outcome is 2a. refined to wetlands.

- a. What indicators reflect wetland condition, such as wetland birds. MATS make recommendation, help develop model, identify what actions can ameliorate stress.
- b. The products or outputs are in blue. Ecological indicators track wetland bird health. What are actions we can take to lessen stressors? Wetland creation, invasive species control, predators.
- c. Then the action teams come into play, identify management intervention actions. Then monitor, do management evaluation, adaptive management.

Joann asked if there was a time factor. Will certain things happen sooner than later? Dean replied with the example that riparian buffers could take decades, there may be a nutrient management strategy in the headwaters that takes years to see results downstream. John liames mentioned that he works in the headwaters and it can take 2-3 years before we expect first order streams to show improvement. Agree upon upfront. However, if not getting better, may not understand system or science. Need to track mgmt. activity, partners may not be implementing BMPs could be explanation.

Robin noted that management intervention is not just APNEP it requires all the partners. Dean said it's all the partners in the room that help craft strategies and implement the CCMP. Robin clarified they have the power to implement the strategies. Dean clarified not just staff, help facilitate implementation but rely on partners to help. Staff may have expertise in certain area and can participate.

Bill said teams may evolve over time. For instance, in the beginning if we have to assess or map where problem is, could be different folks dealing with that vs. the implementing side. With the ecological flows team, they decided they need

to collect more data before developing strategies on the ground. This may also be needed with the freshwater habitats and fish passage team based on their initial meetings.

Dean showed an example of the relationship between the Action Teams and the Monitoring and Assessment Teams and different actions that achieve common goals using actions related to anadromous fish: the Freshwater Fish Habitat and Fish Passage Action Team will address actions to protect and restore aquatic habitats, and remove barriers, the Ecologic Flows Action Team will address actions to improve flows, the Living Aquatic Resources MAT will deal with indicator development and monitoring. STAC members assigned to 2 groups, one action team and one MAT.

Dean feels like we're on course. He said Kirk shared at the recent Wetland MAT that he will be happy if we get metrics and adaptive management triggers in place. Seeing managers make decisions and having the ability to adapt would be success.

Wilson said the concept is beautiful but the devil is in the details. When this was initiated several years ago we talked with many big APNEP and partners in agencies doing on the ground monitoring. As we reactivate teams, so much has changed since began work in indicators in 2004, we have to reinitiate contact with different partners. There is a lot of groundwork to do to reestablish foundations for the MATs to feed the action teams. When push comes to shove, we need to be sure will have data coming in, need to be able to determine whether management actions are having an impact. We may not see the results of an action taken in year one in year 2, for example with fish it could take 30 to 50-60 years and different generations. A lot of thought should be put into triggers used to assess how well we have or haven't done.

Kirk noted that if someone is advocating a management action, if we have an idea of what we expect to see and the result, the types of trends, etc., the STAC could help in this area and help define those. What is the level of uncertainty establishing the trend? If we do this action in 20 years we expect to see this happen, are we comfortable with the trajectory. If action isn't happening how thought, STAC could help define.

Wilson said some things could be easy, if we take barriers out, could target areas using habitat. Kirk said even WQ with lag times is challenging. Overlay changes in external factors like climate, changing administrations makes things even more interesting. Some factors hard to influence. Maintaining continuity in face of challenges is a challenge in and of itself. Kirk said thinks STAC could really help with that role. Did we do what we said we would do, and did it have the desired effect.

Joann asked about the outcomes and goals.

Bill said it was critical to not just get an indicator, need to make sure we set reasonable targets and trigger points, thresholds. He gave an example of a water quality goal...waters are safe for its designated use. With beach closures, the potential metric is a decline in beach closure days. A goal of no closures is not likely realistic. Managers buy into decline. Set a point in 4 years what is the percentage of decline should we see. May be more important than the end target.

Kirk said the managers must also be able to determine if whatever actions being done are not getting you where you want to go you need to reevaluate and adapt. Joann said monitoring is usually after the fact, almost always shows an impairment, need to make sure monitoring program set up properly. Indicator of whether actions are taking effect. For example, in Chesapeake Bay, it looked like the goals were not being attained, Kirk brought in a colleague to evaluate. Should be able to go to monitoring program to see what the goals are and on flip side. They went to senior managers, at the assistant secretary levels from 3 states and asked what information do you need? What do you want to accomplish? They wanted to delist impaired waters, also wanted to show that actions in the upper watershed were having an effect. They were monitoring the bay mainstem, needed to allocate resources into monitoring in watershed. The proposed reallocation caused discussion. In the end, they reallocated a few million into the watershed to see if actions in watershed having an effect downstream. **An important point for the Chesapeake STAC was that the senior managers were very pleased the scientific community asked for their input into the monitoring scheme. It is very important to keep this in mind when developing APNEP indicators and monitoring schemes.**

**Joann said from experience at EPA and monitoring and what it tells us is that the assessment methodology is very important. How you take the data and assess it is very important. Using the best science available very important as well.**

Bill asked if any questions about where we are trying to go. Wilson asked about the timeline for the MATs to reactivate. Dean said it has begun, there are 7 teams, Wetlands was the first one held this week, next Monday would have SAV, he's working with Dr. Moorman and Robin to get water resources and air going soon, overall late winter through spring. He's looking at all the rosters from Phase I to see if need adjust team. Experts in each group are taking pieces back to experts in their agency. Bill said now have analyst coming on board to help manage the information.

Rua Mordecai said while he understands the desire to make progress on all, but given the history and knowing how long this can take can we focus on a few MATs. Dean said with the wetland team, they would be ranking the top 5 or 10 that they want to roll

out. He asked about the SALCC process and how they approached this with their document. For instance, can we take the first 5 for wetlands and feature them in assessment.

Dean hopes by the fall we can roll out a report that include the state of ecosystem health. It will take coordination and integration across the MATs and Action teams. Kirk said the STAC can help here, making sure the linkages to the actions are taking place. If not there are usually 3 reasons: 1) someone else doing it, some other organization is addressing it, if so we need to know who that is and track, 2) not important, but need to understand why, and 3) it's beyond doing practical management. STAC can help make sure linked. All indicators should have an associated action. Dean said each team would do a mini indicator assessment. If we say a factor is influenced it should have an action tied to it.

Bill thanked everyone for their input and noted it was a complex system.

2:30 p.m. APNEP Needs Assessment

Dr. Coley Cordeiro

Coley said she was relatively new to APNEP and have been here a little over a year. Having a social science background, she immediately thinks of evaluation and assessing where we are, so she conducted a needs assessment for the program. The assessment was done for "little APNEP," asking whether we are meeting the needs of "big APNEP" and the environmental community. She hopes most folks participated in the survey. The survey was conducted using the Dillman method. She sent out the survey, followed up, then followed up again in 3 weeks which is supposed to increase return. There was a good response which is a good indicator that we captured good representation of our audience. She mentioned that some had shared with other partners and thanked Sound Rivers for doing so.

Coley then explained the purpose of needs assessment, which will be utilized as a systematic way to analyze: (1) The priority concerns and requirements of our partners; (2) The state of the organization's performance in relationship to its mission and goals. She explained that staff have been having conversations regarding how to evaluate CCMP implementation, how to address the needs of community, what is our niche what are we good at, how are we assessing progress and can we do anything about it.

She explained the results would be divided into different categories throughout presentation: 1) Partner Information, 2) Management Priorities, 3) Communications, and 4) Science and Technology.

In the first slide, we are trying to figure out our audience, who are our partners: Q1: How would you describe your organization. The majority were from academic/educational institutions, nonprofit organizations, or NC state government. Doug Wakeman said he was surprised to see more respondents from VA city or county govt than NC. Coley said it was a function of respondents, you get what you get.

Q3 asked How long your organization has been a partner of APNEP? Over 75 percent were 5 years or more. Jud Kenworthy asked if we knew how many partners we had. Wilson noted that it was likely quite a large number given the APNEP geography, and that is not counting potential partners. It would be interesting an interesting metric to see how many exist versus how many there could be. We could include in the partner engagement strategy discussed at the morning Policy Board meeting. Jud asked if we knew how many partners there were total. Stacey replied we did not know off the top of her head but would evaluate and include in the strategy.

Wilson said all were essential, however some are more influential and implementing things on the ground or influencing policy. He wonders if it might be more effective to partner with some groups than others, for instance it's important to teach children and teachers, but the payoffs may be farther off down the road, and for some issues we could get results sooner by influencing local government and policy makers. We need to evaluate how knowledgeable our partners are and how engaged, and the level of influence they may have, we could make progress faster vs. citizens that will not be part of the voting public till age of 18. This will be part of the Human Dimension team's charge. Kirk said it was not that you just have increased participation or many partners, you need to evaluate does it result in something and how does it tie back to CCMP implantation. Stacey said this was all good feedback and would be incorporated into the partner engagement strategy.

Coley mentioned that APNEP had contracted out a social network analysis in the past, and staff had discussed building on this. We could get students at Duke University to play into the conversation.

Q4: Why did your organization become a part of APNEP? The majority replied their organization has similar goals.

Q5. Overall what is your satisfaction of APNEP in achieving its mission. She noted that obviously, we want to look further into those that are dissatisfied. The program allows you to go back and look at other questions, in some cases it appeared those respondents had minimal interaction with the organization.



Q6: Rank importance of APNEPs action teams. If we were to prioritize what is the perception. Restoration strategies, Education and Engagement, Freshwater Habitats and Fish Passage, and Policy and Economics are at the top. Someone asked why Oysters was so low, and Bill replied it might be because the NCCF takes the lead, we provide support and funding but there is not a need for us to take the lead so it is prioritized lower as an APNEP team.

Q7: Rank importance of APNEPs monitoring and assessment teams. Water resources, living aquatic resources, and wetland resources ranked highest.

Q8: Asks what additional topics we should address to accomplish our mission? Climate change impacts ranked highest, with habitat restoration and land use planning coming in a close second. Other topics included estuarine shoreline, harmful algal blooms, energy development, economics, marine debris, dredging.

Q9: What is primary form of assistance APNEP provides your organization? The network of partners ranked highest, this seems to be a niche APNEP is filling for the environmental community. We bring groups together. We attend learn about projects and initiatives, and assist by bringing people together to leverage resources.

Information and research ranked 2<sup>nd</sup> highest, and not applicable was 3<sup>rd</sup>. Coley though funding would be higher it was only 12%. Planning and management is low it is something we could be doing.

Q10: What service do you think APNEP could perform to enhance partnership and coordination? Workshops ranked highest, identify potential ?? second, and other 3<sup>rd</sup>.

Q11: What is your overall satisfaction with the E-newsletter, over 33% satisfied, 26% somewhat satisfied, and 25% neutral. She noted that communications efforts are constantly being evaluated. In ranking the different parts of the newsletter, results not very clear, most ranked equally.

Q15: Rate how satisfied are with aspects of website, results not lean one way or another. Though technical support rate lower, could providing insight on an area where we could pick up the ball.

Q16: Which social media platforms do you use if you follow APNEP? Most used Facebook, Twitter, and LinkedIn, others included Instagram, INaturalist, YouTube, and Pinterest. Coley asked if Sea Grant looks at this, Susan said yes but the results can be confusing. Wilson mentioned the frequently changing demographics of use, reflection of an aging population using Facebook and younger people using Instagram. Susan mentioned it also deals with ethnicity. Stacey noted that graduate students are very active on twitter.

Q18: How familiar are you with APNEPs CCMP? Raise awareness that the plan exists if nothing else.

Q19: Ecosystem assessment 2012. Many were not familiar that it existed, so it shows an area where we can work on our communications for the next version and getting this out to the environmental community.

Q20: What medium use most often stay current on scientific advances of relevance to APNEP region? Conferences, science journals, etc.

Q21: Rate the level of importance of the use of technology in your decision making, she noted we were getting the decision support tools group together at the time. Online mapping remote sensing, GIS, online databases, and visualization ranked high.

Q22: Stakeholder engagement overwhelmingly ranked highest in terms of the most useful type of technical assistance that APNEP can provide. For example, with our contracts we have, we are discussing how to get the information out to the environmental community so that it can be used, she thinks that is something we can assist with and not just have reports sitting on a desk. Jud asked if we view data access as data delivery. Do you spoon feed the information, or put something out there that triggers an interest when you go to it. Coley replied that SAV good example. We could share the mapping that we have done in AGOL in an open data source, and set it up to allow people to filter, manipulate, and query the data, add data to it. We've had meetings to discuss this process. Jud said it sounds like an atlas and asked Tom if NC Coastal Atlas was set up that way. Tom said it's not necessarily mobile compatible, is somewhat open access. Coley asked if one could manipulate data and Tom said not easily, he noted there is a difference between setting it up as a data clearinghouse vs. warehouse. Do you want to go through APNEP to get to data sources housed elsewhere, or do you want to set it up where data can be downloaded directly?

Doug Wakeman asked about economic assistance, he noted one slide suggested previously that economics was important, this one suggests otherwise.

Coley then summarized the questions regarding the “little APNEP” internal assessment used when analyzing the results and assessing the need for follow up assessments:

- 1) What do we contribute to our partners?
- 2) What do we do well?
- 3) What should we prioritize
- 4) We develop baseline data and can re-evaluate 2020.

For the external assessment: Our focus is on our partners so we are asking the following:

- 1) Where is the gap in the environmental community?
- 2) Should we complete an assessment of our partners?
- 3) We are developing baseline data through the exercise, similar to Jane Harrison’s blue economy survey.

Heather asked what we mean by gaps? Kirk said you look at factors in the CCMP, if no one is acting to address an issue, that may be where APNEP can step in and either do it or provide funding for a partner to do it. We could do a factor analysis. An example that came up in the policy board meeting that morning was doing an economic analysis of the shrimp industry. Coley mentioned that we have been somewhat reactive or responsive to requests in the past, and would like to think more proactively moving forward.

Coley asked the group if any of this was needed, are future assessments needed?

Joann said yes, she thinks there could be value for topics such as climate change and sea level rise.

Susan asked to what end? APNEP already has a robust set of activities going on. Ex drought is important, but what can we do about it as a program or even with partners? Capacity questions are an important piece. While it is important to know where gaps are, it is not always helpful for program.

Coley clarified we were thinking about in terms of reevaluating the CCMP, since several years have passed since it was published and there have been extenuating circumstances surrounding our ability to implement. For that purpose, it would be an excellent opportunity and could provide a service to the community. Heather agreed.

Coley said we do not want to sit in the information, we want to get it out to the community. Susan asked who is community? We should think about or may need help strategically selecting areas. We may want to prioritize who are partners are. We may engage with certain groups but they are not necessarily partners, by definition. Is the public our audience, or is it our partners? When talking about the scope of our partners, who is more important, may even need to talk about weighting partners.

Kirk said they are actively helping address CCMP issues or implementing actions then they should be considered important partners. Wilson said we should look at the entire geography and potential pool of partners. For instance, we can pull out county and municipal government as important partners who set policy and do zoning. How many do we have, how many are we effectively engaged with, to extend we can measure? Who have we contacted in the past, who have we provided funding to in the past, who is excited about becoming involved? For instance, at the public meetings held last month for the Roanoke River expansion, Brian Roth, Mayor of Plymouth asked what APNEP had been up to lately and how he could get involved. We should look at the pool of the most influential partners to see how many we are engaged with, if not and they have no clue who we are, they become an important target for communication and outreach for future, groups such as city councils. We want to see on the ground conservation in the watershed. Kirk agreed, we should look at ones that are actively working and others we may not know anything about.

Bill said we have a long list of partners covering everyone from citizens in the watershed that take part in activities such as the Museum’s Roanoke River Days, to those that we have funded, he mentioned Sound Rivers as an organization we were involved with early on that has grown and evolved. We are having ongoing discussions regarding who are our partners, who is our target audience? Coley said we could also look at the network analysis and see where the nodes are. We are evaluating the partners associated with each CCMP action, tracking everything in access and with our contracts.

Heather asked what was the most surprising thing that came out of the needs assessment Coley said for her it was funding, she thought it would’ve ranked higher as a service we provide. Bill said the role that APNEP plays in networking and facilitating is something we strive for, and though the numbers are not great it’s reaffirming to see how high that ranks in terms of importance.

Jud said they had talked about writing issues papers in the STAC that morning and wanted to get feedback from the Policy Board on ideas for important topics to focus on. Topics included integrated differential models to assess different topics, nutrient management, riparian buffers, harmful algal blooms, agriculture, renewable energy, gaps in knowledge. They could produce short documents, podcasts, share on social media. Dean reminded everyone this had been discussed at the last STAC, the notion of a short-term deliverable where the science community can weigh in on particular topics. They had tried this through the technical issue papers in 2008, did one on climate change impacts estuarine system, data management. They present to the policy board who can help negotiate topics that might be of interest.

They discussed what is the most effective format, what topics to address, used HABs as an example. Kirk thinks the idea is valuable and that as we move through CCMP implementation and science and technical questions come up, the STAC can make the policy board aware of what might happen if we try and implement an action, the board can take to the agency heads and show them you need to be monitoring this.

Tom said the SALCC holds third Thursday webinar forums, at a recent one on salt marshes in the Southeast, 80 people attended in SE, 80 people attended online, they did a blog post to go along with it, it is very effective. People will make time to sit in on a webinar even if they do not download documents.

Wilson mentioned there was a team in eastern NC and southeastern VA looking at riparian buffers, they are meeting next week with a GIS analyst. They will establish targets, look at percent of riparian buffers, evaluating whether you can use LIDAR data to get the numbers. They are working with the Amy Keister of SALCC.

Constance Alexander said it was important to get the message out that this type of information is available to scientific community. There are ways to disseminate and check and see if being used or if successful.

Bill recognized Rhonda Evans, EPA Region 4 Liaison and noted it was her last meeting as she is retiring. He thanked her for her help and support of program, she has assisted with the budget, policy, and even came out and helped sample for the coastal condition assessment. He thanked her for being easily accessible and responsive. Rhonda said she has enjoyed working with the group, though there was a bit of a technical learning curve coming from programs in Florida with smaller management regions due to APNEP's large program area. She hopes the best for everyone moving forward.

The meeting was adjourned at 3:10.