DRAFT

Science and Technical Advisory Committee
Winter Virtual Meeting
Albemarle-Pamlico National Estuary Partnership
February 15, 2024

STAC Members: Paul Angermeier (Virginia Tech/USGS), Jud Kenworthy (US-NOAA ret.), David Glenn (US-NWS), Donna Bilkovic (VIMS), Wilson Laney (NCSU), Lee Bodkin (USGS), Paul Cough (US-EPA ret.), Don Field (US-NOAA ret.), Timothy Goodale (ECSU), Nathan Hall (UNC-IMS), David Hallac (US-NPS), John Iiames (US-EPA-ORD), Pete Kalla (US-EPA-R4), Rua Mordecai (US-FWS-SECAS), Hans Paerl (UNC-IMS), Brandon Puckett (NOAA), Kelly Somers (US-EPA-R3), Greg Taylor (US-NRCS), Rich Whittecar (ODU ret.)

EPA Staff: Angela Padeletti (Reg 3)

APNEP Staff: Dean Carpenter, Tim Ellis, Bill Crowell, Steve Anderson, Stacey Feken, Jimmy Johnson, Heather Jennings

Call to Order

Kenworthy: Called the meeting to order.

- Welcomed all members and others to the meeting.
- Provided an agenda review and meeting objectives.
- Meeting notes from the STAC fall meeting were moved/seconded and approved.
- There were no public comments.

Puckett: Being unable to attend the fall meeting, really appreciated the meeting notes that were distributed recently.

Laney: How are notices of upcoming STAC meetings advertised?

Carpenter: Staff posts it on the state/DEQ government public calendar.

Crowell: Staff also includes it in APNEP newsletters.

Anderson: Happy to share links in case members know others who would be interested in advanced notice of meetings.

Kenworthy: It is worth advertising STAC activity and encouraging the public to tune in? Perhaps this is something also the Citizens Advisory Committee (CAC) would be interested in as well.

APNEP Staff Update

Carpenter: Members received the staff updates report prior to the meeting. Wish to highlight a couple of the update topics (focusing today on upcoming events):

- Comprehensive Conservation Management Plan (CCMP): after STAC and CAC feedback on the proposed CCMP actions, staff is seeking additional feedback from individual partners. Leadership Council (including the STAC co-chairs) is meeting monthly during February to April as the push to finalize APNEP's third-generation strategic plan continues.
- Monitoring Strategies: Staff will be facilitating MAT activities over the next quarter, including encouraging the Wetlands, Aquatic Fauna, Terrestrial, and Human Dimension Teams to re-activate and evaluate candidate indicators/metrics as preparation for the spring STAC workshop.
- Integrated Monitoring Network: Looking to establish in 2024 some kind of integrated monitoring network in both low-salinity and high-salinity areas of APES, ideally with all MATs contributing. This will enhance APNEP's capacity to support adaptive management, as CCMP actions are implemented.

Laney: Regarding human dimensions and metric review, I sit on the Board of the North Carolina Wildlife and Outdoor Recreation Foundation. Recently the Foundation embedded a YouTube video under their "Planning Your Legacy" section of their website. Direct access to the video can be accessed at the following link: https://www.youtube.com/watch?v=6Yy0-6GuqC0&t=92s Note the video segment occurring 1:14-1:31: featuring an animated map of housing density of North Carolina: 1940-2020, produced by the North Carolina Wildlife Resource Commission. What most members would find of great interest is viewing that animated map and seeing the increasing human footprint that has occurred over those 80 years. It drives home the point that those of us who work with organizations such as APNEP and the STAC need to pay attention to those trends and realize that if we want a sustainable North Carolina in the future, we must consider the human dimension and figure out ways to mitigate our own impact.

Carpenter: Past Human Dimension MAT discussions have recognized two indicator responsibilities: one being extraction activities such as various harvesting activities, and the other is monitoring human interest and knowledge, usually done through a type of survey.

Somers: I was just in another conversation with staff from another national estuary program that's interested in social science side and the reactions of climate resilience with those kind of social science behaviors. The topic is something that we're starting to see. Know that the social scientists at EPA-ORD are accessible to engage in a conversation.

Puckett: Regarding the staff highlights, an impressive list of well diverse tasks so kudos to STAC leadership and staff, and other STAC members associated with the highlights. Excited to see the integration of engaging staff at the NCSU Center for Geospatial Analysis as well as NOAA's C-CAP. Thinking about the geographical breadth of national estuary programs, remote sensing is going to be a key piece. Could you provide a brief update on C-CAP coordination progress and a brief introduction to the Center for Geospatial Analysis team?

Carpenter: STAC members who participated in the STAC winter 2023 workshop broke into session groups to discuss SAV, wetlands, and disadvantage communities. Their feedback was

intended to feed into an initial spatial targeting exercise. At the same workshop there was a discussion where members agreed that given staff's limited capacity to tap spatial analysis expertise, there was a need to establish a North Carolina academic institution as a contractor that would assist APNEP in spatial analysis. Based on partners (including Management Conference members) input, a leading candidate was NCSU's Center for Geospatial Analysis (CGA). Before the holidays, staff shared with CGA a proposed scope based on input from a Project Steering Committee whose charge is to support the spatial targeting exercise. CGA staff found the scope helpful to jumpstart progress toward developing a final scope. In January and early February CGA and APNEP staffs began refining the scope. Note that this scope is not only for the spatial targeting exercise, which is envisioned to take 12 months or less, but also a spatial planning assessment. The assessment will compile various spatial datasets and assess potential use conflicts as information needed to begin to support spatial planning of the estuarine waterscape, to accommodate all the needs and demands on the system. Both projects together are envisioned to last 24 to 30 months. We hope these initial projects will be a springboard to a longer-term relationship with CGA in support of conducting various assessments and analysis.

Carpenter: NOAA C-CAP is in a period where they are pivoting from their reliance on Thematic Mapper (TM) 30-meter spatial resolution to one-meter resolution, which shrinks the spatial grain 900 times. Recently C-CAP distributed their initial one-meter product for the coastal zone of the continental US (CONUS). This Level One product provides a coarse classification (e.g., impervious, vegetation, water) for management support. It is the Level Two product which is of more interest to APNEP and partners, with 20-plus classes including six wetland classes (three palustrine, three estuarine). There has been a 12-month exercise on seeking other partners to contribute funds to maximize the amount of classified landscape at Level Two. An initial collaborating partner, the NC Division of Marine Fisheries habitat staff, has been interested in wetland monitoring in support of the NC Coastal Habitat Protection Plan. The collaboration has snowballed in that we have sufficient support to classify the entire state, thanks in part to South Carolina agencies who agreed previously to classify all North Carolina watersheds that drain into their state, which is substantial. The bottom line is that APNEP has taken the lead to establish the scope and contract with NOAA (Nate Herold, C-CAP coordinator).

Puckett: Those are two big items, so thank you for the explanations.

Carpenter: You are welcome and notice that we are pursuing funding for parts of Virginia in the Albemarle-Pamlico Basin as well, not only the APNEP programmatic area but the entire basin.

Field: I was one of the original NOAA C-CAP members, but since then C-CAP doesn't do any image processing in-house. It's all done through contractors and the mechanism is very efficient. They use much stronger, semi-automated processing techniques than I used. When combined with the 2019-2020 lidar data, I feel very confident that this will be by far the best statewide salt marsh classification.

Carpenter: Thank you for raising that issue, Don, because in addition to the coverage across a large area, we are also discussing the merits of breaking the coastal wetlands in finer categories, like high and low marsh, at a minimum. Nate Herold shared that two east-coast states, I believe Rhode Island and New Hampshire, had a 12-15 level C-CAP wetland classification. Having done a status estimate, now they are interest in trends, so they are funding a repeat effort. We have enough resources to probably do the high- and low-march and will seek out finer classes but that remains non-committal.

Mordecai: On the topic of land cover, there is at least the Atlantic Coastal Joint Venture and some previous work on high and low marsh mapping that covers the entire Atlantic Coast, but it's not refreshed regularly. We have been working at the Southeast Conservation Blueprint on improving how we capture important grasslands because heretofore they just can't distinguish lawn and pasture versus managed grasslands.

Carpenter: I would like to pursue that topic in our Terrestrial Monitoring & Assessment Team, because it sounds like a great metric that we can incorporate.

Laney: Is this an arena in which we could say that artificial intelligence is having a very positive influence, as opposed to all the negative stuff we have been hearing about in the press lately?

Carpenter: The short answer is "yes". I know Nate Herold when discussing the release of the Level One C-CAP products, emphasized how the contractors utilized artificial intelligence in their classification algorithms.

Cough: How is sea-level rise incorporated into the spatial analysis since everything will shift and keep shifting for a long time?

Carpenter: Most of the resources are quite dynamic and they will be shifting. The extent of water resources is one that is considered relatively static, but as you know, lakes expand and contract due to droughts, so I expect the Water Resources Monitoring & Assessment Team will be tracking such a quantity metric.

Taylor: Shared his screen display so he could demonstrate how his NRCS team is updating coastal soil maps for APES and this capturing not only changes in shoreline position but the disappearance of significant amounts of organics.

Kenworthy: Thank you Greg. We would like you to give a presentation on that work, perhaps one of our special issue meetings.

Taylor: Will be happy to present.

Laney: What happens to all that carbon? All those organic soils get broken down. Do they get converted to some other type of carbon or do they into the atmosphere or what?

Taylor: You just asked the million-dollar question! All we know is that it is gone and have not figured out where it went.

Discussion Topic: 2023 STAC Member Survey Response

Kenworthy: To be assured, the STAC Executive Board spent a great deal of time navigating through member answers to the survey questions. Dean took the Executive Board's thoughts and condensed them into this list of items that was provided to members. We feel there was a pretty powerful consensus that our meeting scheduling and the way we conduct meetings presently is acceptable to most of the STAC. There seemed to be agreement that at least one of the quarterly meetings should be in-person. One of the items that we still need to contemplate is how we improve our STAC integration and cross-resource exchanges and that wasn't a surprise. If fact, it was kind of encouraging knowing the diversity of skills and expertise that occurs on the STAC. Further suggestions on this topic are welcome. There was also identification of under-represented disciplines, and we also welcome suggestions on this topic as well. We are in pretty good shape with STAC membership and thus don't feel that a region-wide recruitment advertisement is necessary currently. Any comments?

No member comments.

Discussion Topic: STAC Member Interest to Serve on Focus Groups to Address Proposed 2024 CCMP Priority Actions

Angermeier: A new proposed STAC operational change is the establishment of Focus Teams, whose purpose is twofold: (1) to increase member participation by getting them more deeply engaged in the things they care about, and (2) with the BIL fund infusion to accelerate the implementation of priority actions in the new CCMP. Focus team activities are of a shorter-term than the Monitoring & Assessment Team activities. We anticipate getting dedicated contractors (e.g., graduate students) to facilitate these teams. In addition to STAC members, the teams can also include Leadership Council members, academics, and others.

Angermeier: The STAC Executive Board meet recently and discussed in detail how to best proceed in operationalizing the teams. Staff and leadership are seeking members feedback regarding which of the CCMP actions to address initially. Members have seen the full list of proposed CCMP actions. Board members selected ten actions from that full list that they feel are worthy of initial attention. During this session we are seeking member interest and ultimately sufficient commitment to start two to three teams. The teams could be organized along five themes, each with an exclusive subset of the ten actions: mapping, targeted protection/restoration, planning, monitoring, and development/refinement. I wish to have an open discussion on which seem to be worth investments.

Somers: I have a question and comment. How would Focus Team work on the mapping Action A1.1. “Facilitate mapping the distribution of significant ecological, bathymetric, geologic, demographic, and cultural features” complement the spatial targeting work that Dean mentioned earlier?

Carpenter: The spatial targeting exercise with its short-term focus would be gathering existing spatial data to feed habitat suitability algorithms, whereas the Focus Team would address collecting better spatial data for future assessments.

Somers**:** My comment is regarding Action D3.2 “Enhance the targeted ecosystem management by federal, state, regional, and local governments, and communities by assisting with the incorporation of resilience, climate change and sea level rise considerations into planning processes.” EPA does have guidance on being prepared for climate change, a risk-based adaptation plan framework. This may be a helpful tool for the Focus Team.

Carpenter: To help implement actions in the second-generation CCMP (2012-2022), we developed Action Teams, with the thinking that we didn’t want to be too prescriptive in the CCMP on how to address an action. Rather through the action teams we would bring together the regional experts to discuss how to get started and suggest next steps. I think there is something analogous with regards to the Focus Teams. We would welcome any proposed activity and don’t went to reinvent the wheel.

Somers: Do you have an idea when the Level 2 C-CAP data will be produced because some of these actions would benefit from that information.

Carpenter: My understanding is that once the contract is in place and contracts begin work, it takes about six to nine months. So early 2025, hopefully.

Cough: Having an interest in carbon accounting, I see multiple actions where there would be a fit.

Taylor: I am interested in the Mapping Focus Team.

Puckett: What sort of expected outputs from a Focus Team?

Angermeier: There are not hard and fast expectations currently, but possibly some preliminary tools/data and a proposed course map for a more sustained effort.

Carpenter: Agree, I envision a short narrative report.

Angermeier: Using a chemical analogy, I see Focus Teams as catalysts to get the reaction started.

Laney: It might be helpful to review the list of actions through a systems perspective and determine whether there is benefit of doing them in a certain chronological order. Also, there is a case to tackle those first that have a bunch of information upon initial assessment relative to others.

Hall: Given that we are trying to support management decisions with limited data, it suggests prioritizing the integrative monitoring and mapping. Regarding categorization, I don't see the need to separate mapping and monitoring because mapping is a static tool for monitoring. I would be interested in contributing to these Focus Team areas.

Iiames: I would be willing to contribute to the mapping group and network with my agency (USEPA). For example, we have the Environmental Atlas, which takes terabytes of data and reduces it down to the 12-digit HUC level. We also have raw data as well. I think it would be beneficial for my colleague Annie Neal give the committee a presentation on the atlas and databases in general. Secondly, the research that being done by Blake Schaefer's group is excellent. They are getting chlorophyll measures from satellite down to the 20-meter sentinel type of resolution, as opposed to the 300-meter resolution capacity of the recent past. Also, I am an adjunct at NC State, so I can network there as well.

Angermeier: That's exactly what we need for these Focus Teams, not so much data layer creation but helping us connect dots and develop the appropriate networks.

Paerl: I tend to agree with Nathan that mapping and monitoring is a top priority, including remote sensing. The third Focus Team (Planning) is more of a synthesis-oriented effort, which all members could contribute in one way or another. I am interested in contributing to both those Focus Teams.

Field: The product that we hope to receive from C-CAP is going to be powerful and enable more paths than we have ever been able to do in the past. If we can get this good base map, it is not like it was in the old days where you must conduct this very detailed and time-consuming effort to develop another layer to look at change detection. There is all this imagery coming online currently such as produced by Planet. For example, if a hurricane hit Carteret County and you wanted to look at there has been shift in marsh edge, all you must do is get some new imagery. Very quickly implemented image differencing techniques will allow detection of habitat destruction.

Carpenter: Regarding that discussion of mapping versus monitoring, one reason there are separate CCMP actions is to address the mapping of relatively static resources versus monitoring dynamic changes in more dynamic resources. For example, the classification of soil types is an essential metric for diagnosing change in associated resources, but soil horizons don't require monitoring their change on a regular basis. The rationale could be applied to bathymetry as well (excluding highly dynamics areas at inlets).

Paerl: I urge that the mapping and monitoring effort be combined, because there's good synergy between those topics.

Kenworthy: The last few years I have had a chance to work with Lidar and learned it is a huge data set and it's hard to access, but the information in it is just remarkable. It can cross the aquatic-terrestrial boundary. For example, I recently used it to look more closely at a watershed of a tidal creek and was able to identify drainage that are not obvious at all. I wonder if Lidar is a resource that we ought to investigate further. Also, topographical bathymetry is phenomenal if it captures what is missing from existing navigational charts.

Laney: Doug Newcomb is the US Fish & Wildlife Service's expert on the use of Lidar data, with applications for birds and being able to focus on what habitat metrics are of importance to different bird species, like red-cockaded woodpeckers.

Action Items

- Members provide feedback on Focus Team participation.
- Executive Board has plans to complement the quarterly meetings with a series of presentations by external partners.