APNEP Scientific and Technical Advisory Committee
Winter Meeting Notes
January 31, 2012

Auditorium, Pitt County Office Complex, 403 Government Circle
Greenville, North Carolina 27834

STAC Members Present: Marcello Ardon (ECU), Pete Caldwell (USFS), Maurice Crawford (ECSU), Robin Dennis (USEPA), Don Field (NOAA-NOS), Erin Fleckenstein (NCCF), Kirk Haven (VIMS), Jud Kenworthy (NOAA-NOS), David Kimmel (ECU), Wilson Laney (USFWS), Robert Miller (retired), Aaron Moody (UNC-CH), Michael Piehler (UNC-CH, IMS), Tim Spruill (USGS retired), Curtis Richardson (Duke University), Don Stanley (ECU, retired), and Silvia Terziotti (USGS)

State Agency Liaisons Present: Christine Jensen (NCDENR-DMF), Jill Paxson (NCDENR-DWQ), Bill Swartley (NCDA-FS), and Allison Weakley (NCDENR-NHP)

Guests/Public Present: Scott Ensign (USGS), Greg Garman (VCU), Todd Janeski (VA-DCR and VCU), Todd Kellison (NOAA-NMFS), and Michelle Moorman (USGS)

APNEP Staff Present: Dean Carpenter, Bill Crowell, Scott Gentry, Jim Hawhee, Todd Herbert, and Jimmy Johnson

Call to Order

Tim Spruill, STAC Co-Chair, called the meeting to order and welcomed everyone to the winter meeting. The STAC met last in July 2011, and the APNEP State of the Sounds Conference was held in New Bern on November 17. Because it has been several months since the STAC met formally, Tim asked for everyone to do introduce themselves.

Tim noted that meeting minutes were not sent out following the July meeting. These will be distributed for review and approval during the next few weeks. Minutes from the July 2011 and January 2012 meetings will be approved at the spring STAC Meeting.

APNEP Update

Dean Carpenter, APNEP Program Scientist, provided an update on APNEP activities since the last STAC meeting. Dean thanked the Pitt County extension for providing the facility, thanked the state agency liaisons for attending, and welcomed three newly elected members to the STAC (Jay Messer, Randy Swilling, and Marcelo Ardon). The spring 2012 meeting will be held on Wednesday, April 25, and the summer meeting is scheduled for Wednesday, July 25. Both locations are to be determined.

APNEP STAC activities were reviewed. In early August Dean participated in the US Department of Interior's Eastern North Carolina/Southeastern Virginia Strategic Habitat Conservation (ENC-SEVA SHC) Team meeting at the NCSU Arboretum. The ENC-SEVA initiative began in the US Fish & Wildlife Service, but it has gained representation from the National Park Service and USGS.

They are taking an open standards approach to ecosystem-based management (EBM) in developing a Strategic Plan, which will be similar to the new APNEP CCMP. There are a total of six resources themes to be addressed (Wetlands, Riverine, Upland, Estuarine, Barrier Island, Marine), and Dean has been participating as a member of the first resource team (Wetlands) to get started. One of the ENC-SEVA Co-Chairs, Pete Campbell, is a member of the APNEP EBM Transition Team. APNEP's geography overlaps that of the ENC-SEVA, the latter also including the upper Roanoke River basin and the Cape Fear River basin. As the draft ENC-SEVA plans are completed, in particular the inventory and monitoring components, Dean will share this with the appropriate APNEP resource monitoring & assessment teams in the hope that they can closely coordinate with and provide feedback to the ENC-SEVA Team.

In mid-August Dean attended a Submerged Aquatic Vegetation (SAV) Protocol Development meeting. The research team responsible for developing a SAV survey methodology is working to get those items developed. The recommendations will include a protocol for combining in-water work with survey work. NCDOT flights to support this project scheduled for last fall were delayed due to weather and smoke, and APNEP is coordinating with NCDOT to schedule flights for spring 2012.

The South Atlantic Landscape Conservation Cooperative (SALCC) partnership is active, and Bill Crowell serves on their Partnership Committee. The geography for SALCC reaches from southeast Virginia to northeast Florida. APNEP is the northern third of the geography for that partnership.

Dean noted that APNEP headquarters has relocated to the Green Square Complex, adjacent to the NC State Museum of Natural Sciences. Staff will ultimately move into the museum's new Nature Research Center (NRC) in late March, once construction on the building is complete. The NRC is easy to recognize because it has a large silver globe on the corner of West Jones Street and North Salisbury Streets.

In mid-November, Dean, Kirk Havens, and Carl Hershner co-chaired a session on EBM principles and National Estuary Programs at the Coastal & Estuarine Research Federation (CERF) Biennial Conference. STAC members Mike Piehler, Robin Dennis, and Dave Kimmel also presented at the conference.

Seven public meetings were held in November and December, which were conducted to solicit input on the draft CCMP. The meetings were held in Kinston, Washington, Plymouth, Elizabeth City, Raleigh, Beaufort, and Franklin, Virginia. Dean noted that he attend meetings in Elizabeth City, Raleigh, and Beaufort. He thanked Maurice Crawford for attending the meeting in Elizabeth City and Jud Kenworthy and Joel Fodrie for attending the Beaufort meeting. The official comment period has closed, and the final draft of the CCMP should be approved by the Policy Board in March 2012. Once the CCMP is approved, staff will begin working on CCMP "Version 2.1" which will identify the specific indicators or metrics used to track progress. Also, specific targets, both ultimate and intermediate, will be developed for each outcome indicator. As progress on CCMP actions is tracked, if indicators are not changing as anticipated, APNEP will adapt by making changes in implementation.

Bob Miller asked what the reaction was at the public meetings. Bill indicated attendance was light, but reaction was generally favorable. Most of the comments were clarifying or

suggestions. Overall it was generally positive. Dean asked STAC members if there were any questions about the CCMP process. There were none.

Dean noted that the APNEP STAC Executive Board met via conference call in November.

Finally, APNEP staff is partnering with Virginia Department of Conservation & Recreation (VA-DCR) on a Healthy Waters Initiative in the Chowan River Basin. Staff met with DCR staff on January 30 to "kick-off" the project. More information about this project will be presented later at this meeting.

The Policy Board will meet in Columbia, North Carolina on March 14 to discuss and hopefully approve the revised CCMP and accept the 2012 Ecosystem Assessment. Kirk Havens and Wilson Laney are the STAC representatives to the Policy Board.

There was no public comment.

Habitat Quality for River Herring in the Chowan River

Dr. Scott Ensign, Research Ecologist at the USGS National Research Center in Reston, Virginia, shared findings from his research of river herring-related water quality studies on the Chowan River. Scott noted this presentation is based on his PhD work, which STAC Executive Board member Mike Piehler chaired. He also collaborated with Dina Leech, and commercial fishermen Herbert and Bobby Byrum helped locate sampling sites. The research was funded by two Fisheries Resources Grants in 2008 and 2009. Scott's work at USGS is unrelated to this Chowan River research.

Scott began by showing data from the North Carolina Division of Marine Fisheries (NC-DMF) long-term fishery-independent sampling Program 100, which are collected in the Chowan River. The data clearly show that river herring have declined dramatically, and current populations are about 1% of historic levels. The Chowan basin was once the epicenter of the herring population as the river and its tributaries provided abundant habitat for these species. The projected data are combined for alewife and blueback herring.

NC-DMF closed the river herring fishery in 2007. One of the issues that arose was available food supply for river herring. Scott's study proposed to address that question by looking at zooplankton and water quality in the Chowan River. They conducted a two-year project, which was completed in May 2010. The study began with four sites, and the second year they added upriver sites on both tributaries (Wiccacon River and Bennetts Creek) and the Chowan River. Herbert and Bobby Byrum were looking at other sections along the river, in which they ran pound nets. They no longer harvest river herring, but they do have a contract with NCDMF to continue sampling river herring.

The Chowan River is wide and deep at the sampling site while the two tributaries sampled are much smaller. Four sites were accessed by boat and two sites were accessed by truck.

Sampling was conducted monthly from April 2008-May 2010 and bi-weekly during February-June months. To sample zooplankton, two samples were taken from the surface and two samples were taken from the bottom. Samples were then counted in the lab. Water quality

parameters were sampled, including temperature, dissolved oxygen, salinity, and chlorophyll a, the latter two on which Scott indicated he would focus.

Scott reviewed the dominant zooplankton taxa and summarized the results from the zooplankton sampling. Cladocerans were most abundant in Bennetts Creek, followed by the Wiccacon River and Chowan River. There was a seasonal pattern to abundance. The upstream sites were similar to downstream sites, except in Bennetts Creek where cladocerans were more abundant upstream. Rotifers were most abundant in Bennetts Creek. Cladocerans and copepods are the most important food source overall, but rotifers are important environmentally and for juvenile fish.

Overall, rotifers were most abundant, followed by copepods and cladocerans. Bennetts Creek and the Wiccacon River had higher zooplankton abundance than the Chowan River. See the summary page for more detail.

Scott's team was interested in evaluation of abundance relative to importance as a food source. They compared their work to work done by Sam Mozley during the 1980s (Winslow, Mozley and Rulifson 1985). There was more temporal variability in this study versus in the 1980s. Scott and colleagues found more copepods and more rotifers than were present during the 1980s. Comparing the two studies, Scott indicated that they are at least in the "ballpark" for other systems that have river herring. Zooplankton abundances seem to be as high, if not higher, than when river herring abundance was much higher.

Scott turned to the water quality side of the story, noting the areas they sampled are important for spawning and nursery habitat. The areas are largely fresh, except in the fall. Dissolved oxygen (DO) was periodically less than the North Carolina water quality standard, except in the lower Chowan River. There were periods of extended hypoxia in the tributary sites during summer 2009. The study also observed hypoxia at the upstream stations on the Chowan. From a habitat perspective DO appears to be the most obvious problem for finfish.

With regard to chlorophyll a, there were spikes which exceeded the standard in the upper Chowan and in both tributaries during the summer months. The systems are very productive from a chlorophyll a perspective.

To compare their results to those observed in the past, they used the STORET database. They looked at DO and chlorophyll a. In terms of DO on the Chowan, the sites have had periods of hypoxia in the entire record, for both the upstream and downstream portions of the river. Hypoxia is nothing new at these sites. For the tributary sites, there wasn't much data for Bennetts Creek, but the Wiccacon site has had hypoxia for a long time.

For chlorophyll a there appeared to be a decreasing trend over time, but there were some exceedances.

Phytoplankton biomass has decreased over time in the Chowan River. This may be in part due to reductions in nutrient inputs, but also in some part due to increased grazing on the phytoplankton. Phytoplankton has also decreased in the Wiccacon River.

Scott reviewed his conclusions. Zooplankton abundance is similar or greater to the early 1980s, and to other rivers hosting river herring. The tributaries generally contain greater zooplankton abundance, which shows their value as habitat sites. But the tributaries also have more prolonged periods of hypoxia. The DO may limit habitat quality for river herring and other fin fish. Historical data indicate that hypoxia has been a long-standing problem in this system but that chlorophyll a has declined over time.

Scott reviewed continuing and future research. Questions moving forward include the following: How do river herring and other planktivorous fish affect zooplankton abundance in the Chowan River system? What are the relative influences of resource availability (e.g. light and nutrients) versus zooplankton grazing on control of phytoplankton growth? How will changing river flow regimes affect flushing times of tidal rivers and associated hypoxia events? To download the Sea Grant project report, visit www.ncseagrant.org/home/research/core-research/, and search for ZAP.

Scott opened the floor for questions. Tim noted that zooplankton are more abundant now than during the 1980s, yet the fish population has decreased. The low DO doesn't look surprisingly different from historic levels. Did the study look at other factors like toxicity or emerging contaminants? Scott noted that a lot of contaminants research was done in the 1980s, mostly at NCSU, so there has been some work done. He couldn't remember what substances were examined. One big issue was a paper mill in Virginia and the effluent from that facility. Tim stated that the water quality was not any worse and actually somewhat better than in the 1980s. Perhaps river flow issues need to be examined.

Wilson noted that the river herring assessment is underway. It will be released in March by the Atlantic States Marine Fisheries Commission once the peer review panel is done.

Don Stanley asked what the historic levels of river herring were. Scott did not know. Wilson noted that the current coastwide landings were about 3% of the historic landing. They had looked at the landings time series as far back as 1880.

Don noted that human harvest was a major factor in his opinion. Human efficiency and resourcefulness in catching this fish has likely been a significant factor in bringing down these populations.

Bob Miller asked what the response has been to the moratorium that began in 2007. Wilson and Christine explained that the life span of river herring is about 5-6 years on average, so it is still early to tell. Christine noted there are other factors as well, such as increased striped bass predation and increase offshore bycatch in other fisheries.

David Kimmel asked about looking at the life cycle to check for any mismatches between the zooplankton and the juvenile river herring. Scott noted that is a good question and something good to do.

Pete Caldwell asked whether there was any idea how much of the hypoxia was natural versus anthropogenic. Scott noted that was another good question.

Don Stanley noted that the Chowan was the grandfather of hypoxia studies, in part due to the Raleigh News and Observer's coverage of the story. Don asked what the current observations are relative to algae blooms. Scott noted that there have been blue-green blooms lately. Don noted that if they aren't being covered by the news media then they are missed by many citizens.

Marcelo asked how common the saltwater intrusions are, based on the historical data. Scott noted that was another good question. He has the data but has not really looked at them, but thinks that such intrusions were an annual event.

Facilitating Ecosystem Approaches to Management

Todd Kellison, Chief of the Fisheries Ecosystem Branch of the National Marine Fisheries Service (NMFS) at the NOAA Laboratory in Beaufort, provided examples of research outcomes involving NMFS-Beaufort scientists designed to facilitate ecosystem-based approaches by natural resource managers.

Todd thanked Dean and Wilson for the opportunity to speak. Todd explained the NOAA Beaufort facility has two components, the National Ocean Service and National Marine Fisheries Service, with a lot of collaboration between the two divisions. Todd noted that Wilson and Dean asked him to address how Beaufort is implementing NOAA mandates for ecosystem-based fisheries management (EBFM). He noted that it would be easier to address EBFM if he crossed out the "ecosystem-based" part. Much of the work they do relates to fishery management. Todd could not comment specifically on what the ecosystem-based management mandates are within NOAA. Most of NOAA's mandates derive from the Magnuson-Stevens Act (MSA), the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA). Wilson was encouraged to weigh in if Todd missed any Congressional mandates.

Todd reviewed the Magnuson-Stevens Act (MSA) passage and its reauthorizations. Several provisions of that act include admonitions for the use of "ecosystem principles" in fishery conservation and management activities. They also are to identify essential fish habitat (EFH) and may include management measures to conserve target and non-target species. NMFS has a clear mandate for single-species fisheries management, but it is less clear for ecosystem approaches, aside from guidance to consider them. Ecosystem models are being developed in some areas, such as the Gulf of Mexico. Todd provided some examples of ecosystem modeling and multi-species modeling.

Todd summarized how he sees things operating in the south Atlantic. The focus remains heavily on single-species management, stock assessments, and ending overfishing. Funding for stock assessments is increasing, but research staff is decreasing. Funding sources for ecosystem-based initiatives are limited. In the southeast the main funding sources are the Marine Fisheries Initiative (MARFIN) and Cooperative Research Program (CRP). There are some programs that are ecosystem-focused, such as Comparative Analysis of Ecosystem Organization (CAMEO) and Fisheries and the Environment (FATE), but there is no new funding for these programs in the present budget picture. Ecosystem research and approaches are viewed as lower priority, in Todd's opinion, at least in the south Atlantic.

Todd noted they do find ways to conduct research that will inform ecosystem-based approaches. Todd reviewed the work conducted by the Fisheries Ecosystems Branch.

A new survey, created in 2010, is the Southeast Fishery-Independent Survey (SEFIS). It was created in response to declines of important reef fish species (red snapper), reductions in fishery-dependent data, limitation of the existing survey (MARMAP), and gear selectivity issues. Todd clarified that when he says "south Atlantic" he is referring to the federal waters from Cape Hatteras to south of Cape Canaveral. He explained the SEFIS objectives: increase spatial footprinting and sample sizes, implement video cameras as survey gear to address trap selectivity and develop indices of abundance, map hard bottom habitats to improve survey design, and apply research to inform survey methods and address management issues.

Todd reviewed the sampling methodology. They use Chevron traps, video cameras affixed to traps, multibeam mapping, and directed remotely operated vehicles (ROV), longline and fisheries sonar efforts. Todd showed the sampling universe on a figure. The program is mostly on the Continental Shelf and shelf break. Approximately 6% of the continental shelf off the coast of North Carolina has been mapped (SEFIS and MARMAP/seamap)

Todd reviewed their 2012 plans. They anticipate 30 days at sea on the NOAA R/V Pisces and 50 days at sea planned on R/V Savannah. Todd showed an example of video footage from one sample and noted that the usefulness of the samples is dependent on water clarity. Video provides a better way of assessing what is in the environment than traps, and it allows you to see species that would not be trapped otherwise, such as tiger shark. Todd reviewed the realized and anticipated results. They have had 100% increase in annual survey sample sizes over historical levels. They will have improved capability to assess multi-species trends and species interactions.

NOAA plans to link fisheries acoustics and multibeam data to assess relationships between fish distribution and habitat characteristics. One aspect of their work is to identify reef fish spawning aggregations (FSAs). Fish can be solitary but then come together at a single place to reproduce. Spawning aggregations targeted by fisheries can contribute to the decline in fisheries. NOAA is assessing such aggregations in the Florida Keys. They have developed a conceptual model linking "drowned" outlier reefs with reef fish aggregations sites. The objective is to enable prediction of additional aggregation sites. Todd showed a map of several sites being investigated. The identified sites can be used for long-term monitoring. The reef system in the Keys is only mapped to about 20 m in depth. He shared one specific example of the work they have done, which discovered a gray snapper spawning area. They are working closely with the Florida Keys National Marine Sanctuary staff and program.

Another project is working on invasive species, such as lionfish. They are looking at the predation impacts and documenting stomach contents. Lionfish diet includes grouper and snapper, as well as prey of those species. NOAA is conducting experimental removals to assess community impacts, and they have concluded that there is potential for significant impacts to the invaded community.

NOAA is also assessing deepwater Marine Protected Areas established by the South Atlantic Fisheries Marine Council (SAFMC). They are conducting multibeam mapping and ROV surveys in these areas. Work involves assessing the changes in fish communities over time.

They are also working with Gray's Reef National Marine Sanctuary to map habitats, to collect baseline information on the reef fish community, and look at changes inside and outside the reserve over time.

Finally, they are also working in the Poplar Island (Maryland) Environmental Restoration Project, in Chesapeake Bay. This work will assess habitat use patterns and changes.

In conclusion, they have multiple research efforts underway to inform and facilitate EBM approaches to management. Todd envisions that efforts will increase in the future.

Scott Ensign asked if there was any way to automate the counting of fish from the video imagery. Todd noted that is a great question and that it takes a lot of staff time to evaluate the videotapes, and species identification is difficult. Methods are under development, but nothing is currently available.

Tim asked if the cameras are left in place on the traps. Yes, they are soaked for 90 minutes. Todd explained that they read only about 20 minutes of each video. They are trying to obtain the maximum amount of information by reading the shortest amount of video. Units are self-contained high-definition cameras in water proof housings. Tim asked if they were left deployed in position for longer times. Todd noted that they don't do so on purpose and explained how one camera had been lost.

Don Stanley asked if the traps/cameras attract fish. The traps are baited and will attract some species. They are trying to establish a relative index of the species present.

Jim Hawhee stated that there is no mandate for EBFM. He suspected that if management targets were set based solely on ecosystem considerations, there might be some pushback. Jim noted that working on reef fish, and looking at community structure in Hawaii, it was eye-opening for the managers.

Jud asked, isn't Marine Protected Areas a variant of EBFM. Todd stated that you can use them to protect some particular areas, but it is also is a fishery tool. Todd noted that he doesn't really know the answer. Jud was just asking from the perspective of any existing models. Todd noted the National Park Service, in Biscayne National Park, is working to establish a reserve in their park. Jud noted that the whole idea for EBFM is theoretical, but there are some examples out there.

Wilson noted there are examples where Marine Protected Areas have been established based on ecosystem principles. There are many factors to consider, including how much you need to preserve to keep fisheries healthy, and the relationship between the species and the habitats. For many, we don't know. Wilson noted that one example is the Channel Islands Marine Sanctuary, in California. Wilson noted that Todd did a good job covering the issue.

Working Lunch: APNEP Ecosystem Assessment Discussion

Dean Carpenter briefed STAC members on progress in developing APNEP's Ecosystem Assessment. He noted that lunch would arrive shortly, so in the meantime he would brief the

STAC on the status of the APNEP Ecosystem Assessment. The process of developing the Assessment has been drawn out for various reasons, and it will be provided to the STAC for review once complete. The Policy Board wants to have a STAC-approved draft at their next meeting, which will take place in mid-March. This means a STAC-approved document should be ready by the end of February. Dean noted that 20 of the draft indicator assessments have been received, and about half of these are ready for review. Dean proposed to send the draft document out to the STAC by mid-February. This will give the STAC a week to comment on the completed product. Dean will work with the STAC Executive Board on reconciling any comments and getting the revised draft to the Policy Board. Completed assessments will be made available through the APNEP website, and Dean will notify the STAC which ones are available. Because he had the flu for a week earlier this month, he is behind and thus couldn't provide materials available for review before this meeting. He indicated again that he will send a message to the STAC later this week, with instructions on the review process. By the middle of the month, the entire draft will be accessible. Dean noted that the assessments are only two to three pages in length, with a front part and technical notes.

Robin asked how many total pages there would be. Dean indicated there would be around 60 pages of assessments, plus the introductory materials. He noted that this will be the initial version with more indicators to be added later, as appropriate.

Don Stanley asked for clarification on the process. Dean said the Executive Board will help to reconcile any comments. In early March, the STAC-approved draft will go to the Policy Board. Don asked if the STAC work will continue. Dean responded, yes. He explained that most STAC members are members of the Resource Monitoring and Assessment Teams, and those persons will continue to develop monitoring plans. Don asked if Dean anticipated that quarterly meetings will continue. Dean noted that one-third of STAC members will have terms end on June 30. Also, the two co-chairs will end their second term at that time. Thus, the STAC will need to elect two new co-chairs, and they in turn will select a new Executive Board. Dean noted that the Executive Board has been discussing meeting frequency and the types of meetings. The new Executive Board will discuss whether to continue quarterly meetings and where to meet. It is likely that comments will be solicited from the entire committee on the best way to move forward. Dean asked if there were any other questions on the assessment. There were no other questions.

Michelle Moorman (USGS) spoke briefly about a new water quality monitoring pilot project, which will occur around Albemarle Sound. There was a proposal in 2004 for a new national monitoring network. Since then they have been working on program design, and there have been three pilot studies. The intent is to adequately sample all US estuaries via a "network of networks" which would entail little new funding. There is a link on the handout provided by Michelle, to the National Monitoring Network for US Coastal Waters and their tributaries. The idea for the pilot project is to inventory current monitoring programs in the Albemarle-Pamlico system and identify where there are gaps. Much of the information has already been gathered by APNEP. Michelle indicated that she would likely be contacting some STAC members for further information on existing monitoring sites, types of data, metadata, lab analysis, and procedures used to collect data. They want to work with people who are currently doing work in the Albemarle-Pamlico system, to identify current management issues, and identify collaborators.

This project is at its very beginning stages, as funding was just awarded a week ago. Michelle wants to develop a short-term monitoring network, which hopefully will grow with time. She noted that this will make it easier for everyone to secure data.

Kirk noted that the CCMP will be a good place to start, with regard to compiling management recommendations.

Dean asked Jim Hawhee to discuss some updates to the APNEP website. Jim reminded the group of his presentation to the STAC last year on the website and social media. There is a STAC page with all past meeting agendas, minutes, and presentations. There is a new section is called Resources for Scientists, and there is also a modeling section. All of the APES studies (1988-1994) are now online and searchable. The APNEP site now has an "initiatives" tab, which covers staff activities and includes APNEP-funded projects. There is also a news feed on the front page. APNEP also has a LinkedIn subgroup for scientists. Jim noted that he occasionally posts things there, but he encourages STAC members to do so. Finally, APNEP is starting an "Ask an Ecologist" forum. Dean will take the primary lead to provide answers, but he may come to STAC members for assistance in answering questions from the public. Dean may call on STAC members at some point to provide a paragraph, or longer, response. These results will also be publicized on Twitter and Facebook. Jim asked if there were any questions. There were none.

Chowan Healthy Waters Project Plan

Todd Janeski, Virginia Healthy Waters Initiative and VA-DCR Non-Point Source Manager, and Dr. Greg Garman, Director of the Center for Environmental Studies at Virginia Commonwealth University (VCU), briefed STAC members on the draft plan of the Chowan Healthy Waters Project and asked for committee feedback.

Todd noted that he made a short presentation to the STAC last spring about a VA-DCR grant application to establish this Conserving Virginia's Healthy Waters Program. This is an ecologically-based program, which is led by VA-DCR, VCU, and the Virginia Department of Environmental Quality (VA-DEQ). The program is seeking to identify the highest-quality waters in Virginia, and is so doing are looking for the presence/absence of particular species and biodiversity. They are also looking at the provision of ecosystem services and social and economic benefits. Success will be based upon partnerships with local champions, such as APNEP and The Nature Conservancy (TNC).

This initiative is part of a new national program that is based on the EPA Healthy Watersheds manual. Virginia's approach is seen as a pilot concept for other state programs. Todd reviewed the motivation for development of the program. He noted that high population growth, rapid rate of land conversion and even higher increase of impervious cover, thousands of known water quality impairments, and other factors have led to this effort to conserve remaining resources. Restoration is expensive, and this is a proactive approach to protect existing resources.

Todd reviewed the benefits of conservation and the development of the program. Healthy Waters wasn't initially based on existing water quality, but rather it relied on Natural Heritage data and fish index of biotic integrity (IBI) information. An objective, statistically-based approach is used, which includes an application called InSTAR (Interactive Stream Assessment

Resource) to access and manipulate aquatic data. All information is available online through VCU at Instar.vcu.edu/. Original funding came from an EPA 319 grant and NOAA.

Todd displayed a map with data across Virginia but showing a large void in the southwest part of the state. Data is available for a portion of the Chowan River Basin.

Todd reviewed how the data produced by the program are being used. They are targeting healthy watersheds for Agricultural BMP Cost-Share Program funding, updating conservation mapping and disseminating healthy watershed information to coastal localities, incorporating healthy waters data into Natural Heritage Program (NHP) biological data bases, connecting healthy waters to the Phase II Bay Watershed Implementation Plan or other conservation plans, and implementation.

Todd gave an example of how the project has been used in Richmond County, Virginia. They have prioritized streams and watersheds for protection and restoration, identified significant living resources, and informed zoning, land use, and comprehensive planning decisions. This county has seen a population decline in recent years, but they are planning for another population boom. Another use is to develop and implement local zoning controls.

The Healthy Waters Program is now being expanded with EPA 319 and NOAA Virginia Coastal Zone Management Act (CZMA) funds. They are leveraging and coordinating natural resources management programs and activities, providing technical assistance to local governments, and developing new partnerships. In addition, they are conducting a State Code review.

VA-DCR wants to partner with APNEP to do a pilot, two-year study on the Chowan Basin. Objectives include: advance Virginia interstate watershed and basin activities; expand the partnership with North Carolina on shared watershed activities and develop an Interstate Watershed Memorandum of Understanding (MOU); partner with APNEP to develop a Chowan Basin Protection Plan, thereby advancing the APNEP CCMP; identify and recommend protection of ecologically sensitive resources; and provide recommendations for modifying the EPA Implementation Plan for protection as opposed to restoration.

Todd reviewed the schedule, which will span two years starting in the winter of 2011/2012. The study will start with a coarse scale remote assessment of the Chowan basin. They will form a stakeholder group to provide input and suggest three sub-basins in the Chowan watershed, one in Virginia, one in North Carolina, and one overlapping both states. In the spring/fall of 2012, they will collect in-field data. The stakeholder engagement and outreach process will begin in spring/summer of 2012 and could include input from APNEP's Citizen Advisory Committee (CAC). During winter 2012/2013 they will assess the data and in spring 2013 they will collect more data and begin data integration. Todd reviewed where they are thus far, based on the InSTAR approach. Their website will contain all project information.

Greg Garman assumed the presentation and thanked the STAC for their time and the opportunity to speak. Greg noted that the first deliverable will attempt to leverage existing data to conduct some coarse scale prioritization. They will populate the entire Chowan Basin but not entirely with new data points. Funds are not available to acquire data at the density used in other areas, so they will take a "triage" approach to identify 12-digit HUCs with high potential to support high-function, high-ecological integrity stream systems. They want to analyze green

infrastructure that correlates with blue infrastructure. They have a high degree of confidence that the "green" can be a good indicator of the "blue." When this initial prioritization task is complete, they want to come back and discuss with STAC where they should really focus their subsequent efforts. That will not just be an ecological decision.

They are using the Virginia Watershed Integrity Model, developed by VCU and other partners with funding from NOAA. The models being employed have already been widely used. Greg explained the methodology of the original model, which will be extended into North Carolina. It has five layers at the local scale (30 m resolution): streams, shorelines, and floodplain forests and forested wetlands; forests in headwaters and on steep slopes; forest protecting drinking water supplies; large contiguous blocks of forest; and sustainable, managed working forests. The Index of Terrestrial Integrity is based on work done by Ralph Tiner. They add layers representing habitat integrity at the landscape scale (12-digit HUC). Greg showed the data layers used to build the model and showed the metrics that went into the modified index of biotic integrity. They include the number of intolerant species, native species richness, number of rare, threatened, and endangered species, and so forth.

Each of the metrics received a weight, based on the results. Greg indicated they are proposing to use of a number of data layers for the Chowan River Basin. Many of the indices they propose to use have already been published by Ralph Tiner. They should have the first run of this "triage" approach in two to three weeks. This process aims to create a GIS product that classifies the 12-digit HUCs to help them classify and direct on-the-ground efforts. Greg stressed again that they will be asking the STAC to help identify existing data sets. They will be talking to Jeremy McCargo (North Carolina Wildlife Resources Commission, NC-WRC) and Bryn Tracy (North Carolina Division of Water Quality, NC-DWQ) for fisheries data. They will return to the STAC with the coarse scale prioritization for review of the areas identified. The plan is to be out and on the ground, beginning March 1, to look at invertebrate communities, fish communities, and perform instream habitat assessments. They want to develop criteria appropriate for this region. Todd and Greg can be contacted at their respective email addresses: Todd.Janeskie@dcr.virginia.gov and GGarman@vcu.edu.

Allison Weakley indicated that she was the Conservation Planner for the North Carolina Natural Heritage Program (NHP) and works closely with APNEP. She noted that North Carolina is very fortunate to have produced a lot of field data, not only through the NHP but also through many state agencies. Her job is to compile all those data and map them for the state. She is working with TNC to update their freshwater priorities, and they are using the data which Allison processed. Greg noted that he and Todd are at this meeting to make such connections. Greg asked if she would be willing to talk to their GIS folks. Bill Crowell stated Allison has committed her input to the project.

Allison noted that it is important to work across state lines. NC-NHP has Landscape Habitat Indicator Guilds, which were developed to evaluate landscape integrity and function. Greg noted they are also doing something similar with Maryland. Greg noted that the artificial boundaries are just that, artificial, and he finds this work exciting. He noted that they can't accomplish this work without support from others. They hope to expand the resources that are shared between Virginia and North Carolina.

Tim asked about the water quality measures included in the Healthy Waters Initiative. Greg indicated it is purely biological and hydrological. This was done to de-couple Healthy Waters from the permitting and regulatory process. Those agencies were concerned that all the project would do is find more impaired streams. This will provide some insight into the relationship between healthy streams and water quality.

Tim felt they must access water quality data at some level. It seems that they do but don't want to admit it. Greg stated they are just taking a different approach. He noted they believe that they can infer water quality from the biological data.

Tim asked if they are staying for the next presentation. Greg and Todd will stay as long as they can. Tim noted they may want to include water quality data once they hear the next discussion.

Christine noted that NC-DMF also has a lot of data, including data on river herring, which they will be pleased to provide. Greg noted they are really looking for community data, not just single species data. They will look at those and try to figure out how to integrate them, however. Christine noted NC-DMF does have some experimental gill-net data and data from seines, which do tend to capture more of the community.

Allison noted that the NC-WRC also has some community data. Greg noted they have been in contact with Jeremy McCargo.

Michelle Moorman referenced another USGS database called Biodata, which is new and provides a resource to locate biological data sources. It is a national database. USGS hasn't done a lot of work in this area, but they have provided all the North American Wetlands Conservation Act (NAWCA) data, for which stations are sampled over time.

Greg indicated that they have assessed some 2,500 stream in Virginia to date.

Don Stanley commented there are many online databases, for other purposes, and we are still here trading cards and just finding out about existing data.

Greg and Todd thanked the STAC members for their time and indicated they would follow-up by sending their maps to APNEP for input.

STAC Support Letters for Revisions to NC Water Quality Standards

Co-Chairs Laney and Spruill briefed STAC members on the process of creating draft text to support revisions to North Carolina water quality standards for metals and nutrients.

Tim noted the STAC is supposed to be an advisory committee, but he wasn't sure the group has advised anyone during the seven years he has been involved. One area where the STAC could provide advice is water quality standards. Tim noted that in North Carolina water quality has actually improved in recent years. Data shows that point sources have been improved. However, there are still problems in the sounds, estuaries, and in freshwater systems. At this time, no state has nutrient standards for aquatic life, yet research over the last 30 years documents that nutrients are an issue for aquatic life in both freshwater and estuarine systems. Tim suggested that some standards are needed to put things on an even keel.

Tim noted that he is going to discuss nutrients. Wilson briefed the STAC on the status of the letter on which he and Tom Augspurger of USFWS are working, which will address the metals standards. Following the presentation from Connie Brower (NC-DWQ) at the last spring's STAC meeting, Wilson, Tim, Tom, Dean, and others met with Connie to discuss metals standards. The letter, which is close to being submitted to the STAC for review, will be submitted to NC-DWQ in support of updating their standards related to metals.

Tim reviewed the problems associated with nutrients. These include periodic over-production of phytoplankton and resulting depletion of oxygen from bacterial decomposition of massive amounts of organic growth in estuaries of the Albemarle-Pamlico system. Basically, too much nutrients causes problems. Despite the volume of research that shows nutrients are a major problem, few states have standards for them. Virginia has established nutrient standards for lakes.

Without specific in-stream water quality standards, nothing gets done. Tim gave a specific example for Bear Creek (Neuse River basin) and showed the yield for nitrogen (N) and phosphorus (P) in this stream. It has three times the average yield of N of other streams and four times the yield of P. The typical yield from watersheds is far less than what has been measured in the Bear Creek watershed. Tim noted that biologically the stream is fine, but there is no way at the moment for the state to step in and indicate we have a problem.

Don Stanley made a comment playing the devil's advocate, asking how the amount of N coming from this stream compares to that coming from the total watershed. Tim said it is contributing about six percent of the total watershed amount, so cutting it in half would reduce it to about three percent. Don asked if Tim could say why this was the case. Tim stated that in the upper reaches of the Bear Creek system, everything is cleared down to the stream and there is no buffer present. Tim noted that for P, a linear relationship has been shown between total P loading and the ratio of depth to residence time in a fresh water body (Vollenweider 1975). You can put in a lot more loading in a rapidly moving stream. In Bear Creek there are many animals and lots of row crops, with no riparian buffer.

There are several other North Carolina streams where there is no way to address problems, in the absence of a numeric standard. In Bear Creek there is a lot of N being added to the system, but N and P both need to be controlled. Phosphorus concentrations that are likely to cause excessive growth have been known for a long time and Tim reviewed those, as well as problem levels of N. The EPA proposed standards are 0.36 for total N and 0.02 for total P.

Tim proposes dual control of N and P in the Albemarle-Pamlico watershed. Dual control is necessary to limit chronic algal blooms in freshwater grading to saline portions of major river basins. He proposes 0.1 mg/L for P and 0.7 mg/L for N in streams, and for lakes and estuaries, 0.05 mg/L total P and 0.35 mg/L total N. The loading rate for rivers entering lakes/estuaries would be set at 0.085 tpsm. A slightly higher rate of 0.1 tpsm P would probably be effective in limiting chronic algal blooms in the Albemarle-Pamlico watershed, with 0.7 tpsm the target for N.

Tim noted these numbers have been proposed before but not adopted. The STAC is considering these standards for recommendation to the Policy Board, as standards for adoption by the state.

STAC members should review Tim's proposal and try to get a feel for standards to recommend to the state. Most states have not had them because of the argument that it is too expensive for industry and municipalities to comply. Responses will be compiled and a letter will be sent to Connie Brower, in time for the triennial review. If North Carolina does not adopt nutrient standards, the EPA can impose them.

Don asked for the big picture here, as to what parties are involved and why now. Tim indicated the state is now in their Triennial Review process, and during this time they consider the adoption of new standards. Don asked who has the final say. The Environmental Management Commission does in North Carolina, although EPA has the final authority. What other groups will be making inputs? Bill noted that Tim is proposing that the STAC look at nutrients and proactively propose adoption of these to the Policy Board and ultimately to the state.

Don noted there has been scientific debate whether to focus on concentrations or loads. He noted that this would be a pretty big deal. Tim agreed, but he noted that the numbers he is recommending are nothing new and commonly agreed on. They haven't been adopted because that would force action if they are exceeded.

Jud asked if it wouldn't be more effective to address loads, which would force addressing the symptoms. He noted that if you are just measuring concentrations, you don't know the source. He felt that for management purposes you have to go back to loads. Tim wasn't sure how much would be gained from measuring loads. Jud asked, how do you implement action?

Don noted that a hog farmer could work around this by holding onto his waste until the next high flow event. Then discharge it to keep the concentration low. Tim stated that if you are monitoring flows, that isn't an issue. You can look at the entire annual cycle and create a flow-rated concentration. In the Neuse, early concentrations were about 1.5 mg/L. By the late 1990s there were big improvements. This is just a simple way to inform people when a watershed is putting out more than it should.

Curt stated that he has worked for 12 years on a variation of this for the Everglades. EPA finally set a P standard, which no one could meet. They debated concentration versus loads for years. The reason they settled on concentration was because that could be tested in the laboratory. Curt indicated that they had to have three different standards: for blackwater streams, the Everglades, and other areas. Curt agreed that it would be good to have something, to avoid imposition of standards by some other entity.

Bob Miller asked if it is problematic for the standard for streams is lower than for the estuaries or lakes. Tim noted he isn't proposing any estuarine standards. If a river is entering a lake, you could keep it low. Bob noted that everything in eastern North Carolina ends up in the estuary.

Don noted that the estuary is a mixing zone, and everything does generally get diluted. He asked if states couldn't set standards more restrictive than EPA, but not less than EPA. Curt stated that was true, but in Florida there were no prior standards. They were able to set the standards, and EPA approved them. Don asked if we foresaw any issues here, in setting standards which are less than EPA standards. Tim felt he had good arguments, and people in the room could assist him with those arguments.

Curt suggested that the criteria in Florida should be carefully read. He noted that 85% of the numbers in an area should be below the standard. Florida has a standard less than concentrations at their reference sites. The EPA is now considering shutting down things in Florida because they can't meet the standard.

Don asked if Tim had any feel for what fraction of stations would have violations. Tim stated that he felt the sampling should be done monthly. The standard could be set on an annual basis, if desired. Don suggested that STAC should look at the data, and see to what extent the standard would be violated. Tim stated that he had looked at a lot of the data, and many of the stations were in compliance. Nevertheless there would be some violations. Don asked, what percent would be in violation now? Tim indicated about 50%. Don felt that if STAC are already in violation of the standards to that extent, it likely won't fly. Tim stated it would have to be based on the number of violations across a year, not just one sample. Don stated that the STAC needs to be prepared to answer that question, otherwise the proposal won't be successful.

Curt described how the Florida sampling is done and the caveats. He noted that even with the caveats, Florida could not meet the standard. Tim stated if stakeholders establish the standards themselves, they can establish the criteria. Curt noted that it took years to get people to agree to this approach in Florida. He isn't disagreeing that the state needs them; just saying that it won't be easy.

Greg noted that he serves on the Chesapeake Bay STAC, and they considered going down this road. They are having a two-day technical workshop in March to determine whether they can quantify the benefits of high-functioning ecosystems and streams, in lieu-of upgrading sewage treatment plants. If anyone is interested, Greg invited them to attend.

Don suggested that if Tim was called to testify and the Florida statistics came up, he needs to have some answers. Tim stated it is better to be proactive than be forced into standards by EPA. Don stated that cost-benefit is the reason North Carolina hasn't already adopted such standards. It is human values and not monetary values, which drive the system. Tim noted that the intent is to identify areas where there is too much coming in to the system. Don stated that residents can live with blue-green algae.

Curt asked where EPA came up with their proposed standards. He thought the standards were higher for Piedmont streams. There was some further discussion from Pete Caldwell and Curt regarding how these numbers were generated.

Robin Dennis asked, how do these numbers relate to numbers proposed in the past. Tim referenced the Vollenweider numbers, and Curt stated those come from European studies. Tim noted they are based on a lot of research, and many of them come out to be about the same thing. Don suggested STAC invites input from Hans Paerl, who has spent a lot of time on these issues. Tim noted that Mike Piehler thinks that the numbers are pretty good.

Bob Miller asked, what happens if a stream doesn't meet the standards? Tim indicated that all the normal control measures would be implemented.

Bill Crowell suggested taking this issue to the Water Resources Monitoring & Assessment Team, and let them assist with drafting something. He suggested the draft would be brought back to

the STAC and that it would then go to the Policy Board. Tim said he would like to have some feedback from the STAC today. Bill stated the Team has some representation from state and federal agencies that may bring a different take on the issue.

Don suggested that STAC might want to have some idea of what levels cause blue-green algal blooms and then propose something. Robin said this has been done.

Tim noted that there is no reason to not at least try this. Otherwise, the state will get stuck with standards that it can't meet. This is in the state's best interest.

David Kimmel noted that if he received the letter, he would want to know what will be managed first. He would like some information as to why these numbers are critical, in terms of loads. David indicated these numbers are hard to get, but STAC needs to try. When he was working on the Chesapeake Bay, some of the models indicated they would see less fish production. The letter needs to have not only a proposed standard but a reason why the standard is being proposed. Tim felt that he had included that reason. David asked what the loading would be for the Neuse, which would prevent problems. Tim stated the numbers he is proposing have been developed over time. The purpose here would be to identify problem areas.

Curt agreed this is an important issue. He noted that he hasn't had time to review the materials which Tim provided. Tim indicated the time frame is rather short. Wilson noted that the time frame has been delayed, and the due date is uncertain.

Curt noted that he sits on the advisory board for Durham, and they are trying to figure out how they are going to meet the TMDL for maintaining water quality in Falls Reservoir. Curt noted that if this nutrient standard proposal comes along, in addition to the TMDL requirement, there will be more questions. Tim stated that in general, Falls Reservoir waters would be in compliance. Jud stated that the standards are designed to meet some threshold.

Curt asked if a sub-group could be set up to look at this issue. Tim stated that STAC could, using the Water Resource Monitoring & Assessment Team and bring in others. He wondered if the process could be accomplished in time for the current review.

Don Stanley suggested the STAC approach this proposal as a scientific issue and go no further. His concern is that anyone who puts their name on something, without having gone through a full analysis, could have to answer serious questions down the road. Tim stated that will always be an issue. Don said there will be questions about how the analysis was done. Robin noted that if STAC misses input to this review, it will be several years before there is another one.

Don said we could pick up the newspaper next Friday, and the EPA may be gone. He felt that doing something through the EMC would be faster.

Curt asked if the STAC could make a recommendation to the EMC. Tim suggested that STAC would make some recommendation to the state, via a letter to DWQ. Without some sort of proactive measure, Virginia and North Carolina will wind up with the short end of the stick. Robin indicated that the EPA Office of Water is pushing for adoption of standards, so it would be nice to be ready for that action.

Tim suggested that he would just draft a letter at this point suggesting the state adopt standards, naming a few things but not be specific. Then the STAC would establish a small work group, which could move forward with a recommendation to the EMC or some other body.

Erin suggested that this group was more charged with the science, and the Policy Board should deal with the standards. She didn't see the STAC communicating directly with NC-DWQ. Tim noted that it is harder to get things done if there are too many links in the chain. He stated that the STAC could provide advice. Curt suggested that the proposed EPA standards should be referenced in the letter. Bob Miller stated that the letter should strongly reference the EPA proposed standard. Robin asked if there are numbers floating around NC-DWQ. Pete stated that NC-DWQ is working on revisions to the chlorophyll a standard, in lieu of nutrient standards. Pete noted that EPA could pull out the rug at any time, but the chlorophyll a revisions are what came out of the triennial review. Tim noted that the recommendations have been there for a long time, but there has been no response.

Don Stanley noted that you could bring in some folks from Duke, NCSU, UNC-IMS, and possibly include JoAnne Burkholder (NCSU), capturing all of that input at once. This would be advantageous over using the STAC as a vehicle.

Tim said he will send out a revision of the letter to everyone and hopes that STAC can do something. This is an important issue, and if North Carolina doesn't act soon, EPA will do something.

Curt commented that Florida had ultimately quit.

Tim noted that he would send out a general letter, looking at the adoption of standards for nutrients. It would not be specific and aim to provide support for NC-DWQ standards folks. After review by the STAC, the letter would be sent directly to NC-DWQ along with another variant that would be prepared by the Policy Board.

Action Items

Tim Spruill confirmed the he will send out a general letter for review by the STAC, recommending standards for nutrients. The Committee will provide comments, and a final letter will be sent to NC-DWQ in advance of the triennial review.

Tim asked if there were any other action items. Bill Swartley indicated that he was providing some North Carolina Forest Service information on water quality accomplishments and the 2011 year in review for anyone who is interested.

Adjourn 2:45 p.m.