Submerged Aquatic Vegetation (SAV) Team

Fall Meeting
9:30 AM – 4:00 PM
November 25, 2019

University of North Carolina at Chapel Hill - Institute of Marine Sciences
3431 Arendell Street, Morehead City, NC 28557

https://apnep.nc.gov/about-apnep/committees/action-teams/submerged-aquatic-vegetation-team

MEETING HIGHLIGHTS

Team members in attendance:
Anne Deaton (NCDMF)
Matt Duvall (USDA - NRCS)
Don Field (NOAA; APNEP STAC)
Jessie Jarvis (UNC-W)
Jud Kenworthy (NOAA - ret.; APNEP STAC)
Joe Luczkovich (ECU)
Brandon Puckett (NERR)
Mike Sanderson (NCDOT)
Tyler Stanton (NCDOT)

APNEP staff in attendance:
Dean Carpenter
Tim Ellis
Heather Jennings
Jimmy Johnson
Trish Murphey

Guests in attendance:
Jessica Carlton (NCDMF)
Charlie Deaton (NERR)
Joel Fodrie (UNC-IMS; APNEP STAC)
Noah Gwynn (ECU)
Megan Mackey (USEPA - Region 3; NEP liaison)
Kristin Regan (USEPA - Region 3)
Kelly Somers (USEPA - Region 3)

Highlights:

- The focus of this meeting was on SAV monitoring. Meeting objectives included documenting current monitoring capacity, identifying where to target additional capacity and research for more effective and efficient monitoring, and to establish a monitoring sub-team to provide guidance on SAV relationships with other Albemarle-Pamlico sub-ecosystems. It was noted that SAV monitoring supports implementation of the NC Coastal Habitat Protection Plan and the development of nutrient criteria for Albemarle Sound.
- Dean provided an update on the 2019 flights.
- Jessie provided an update on high-salinity sentinel site research where the main goal is to determine what Tier-2 level sampling (and some Tier 3) is needed to better understand why the resource is changing. Jud noted that he, Jessie, and Joel received an NSF RAPID grant to look at storm impacts on SAV; two years of hurricane impacts to study thus far.
- Joe provided an update on analyses of low-salinity SAV linear extent loss based on data collected from shore-parallel surveys with sonar. Approximately 34% of linear extent has been lost relative to historical information.
- Tim provided an update from team member Rob Emens (NCDWR) regarding Eurasian watermilfoil monitoring in Kitty Hawk Bay. There was some team discussion about how sampling techniques, including coring at sentinel sites by ECU staff and raking by NCDWR staff may miss milfoil due to the structure of the plant.
- Joel gave a brief update of the research his lab is doing, which focuses on ecosystem services, particularly fisheries habitat. His lab does have some data on SAV biomass and species composition.
- Updated and corrected data for both the 2006-2008 and 2012-2014 mapping cycles are now available on public GIS portals. The team also discussed TNC's new fish productivity tool and the NCDOT Project ATLAS.
- Jud provided an update on key findings from the high-salinity SAV extent metric report. Relatively remote areas in the North had a smaller change (~0.5%/year decline) than Back and Bogue Sounds (~1.5%/year decline), which suggests that a higher rate of SAV loss is linked to higher development.
- Anne introduced Jessica Carlton who was hired by NCDMF with collaborative funding from NCDEQ and APNEP to do SAV interpretations of the 2019 imagery. Jessica began by cleaning up all of the available ground-truth data, which is now under NCDMF internal review and next will be put into GIS. Jud and Anne discussed how to proceed with making the species composition data from ground truthing available for further analysis.
- The team discussed each of the various SAV metrics using a provided set of questions (see agenda) as guidelines.
    - SAV Extent and Deep-water Edge: High Salinity
        - Jud reviewed the seasonal challenges (tropical and temperate) and the need to find a peak overlap. He asked if what we have done so far working to get the data we need or should we increase our frequency but only subsample each year and alternate regions across years. He also asked if this NCDOT resource (plane and photogrammetry unit) is sustainable; it was noted that APNEP pays for it and NCDOT is eager to work with us.
        - The team discussed continuing with the five-year cycle for the whole region versus rotating sub-regions every year. Brandon suggested looking at the literature on cost/benefit for temporal versus spatial resolution. Jud asked if the effort needs to be recalibrated to better fit adaptive management (is synoptic survey best?). Others noted that there are roles for citizen science. There was general agreement

to try a rotating design, with a gap analysis to be done on the 2019 effort to inform where to start for a rotating design.

- Jud recommended that rakes no longer be used in ground truthing and noted that a rotating design should reduce the need for raking as a means of saving time in the field. Anne and Trish noted that some NCDMF staff won't get in the water, so our sampling requirements need to be flexible. Tim noted that we are using ground-truth data for species composition information, so rakes can miss species with smaller profiles (e.g., thinner blades). Kristin noted that in Delaware Bay they use diving at slack high tide for ground truthing.
- Don is tracking the deep-water edge metric and Jud noted that this could fit into a sentinel-site protocol for high-salinity SAV, including the selection of the sites.
- Joel inquired as to why much attention has been given to monitoring and tracking SAV decline relative to improving policies to stop the decline. The team discussed this topic openly for ~15 minutes.
- There was some discussion on the use of satellite data and an upcoming workshop by the Chesapeake Bay Program on using remote sensing to monitor SAV. Don, as well as Kristin and Kelly are planning on attending. Don noted that he thinks there are still some hurdles to overcome, including weather restrictions (wind, clouds, etc.) and costs, but that we will eventually be able to rely more on satellite imagery to monitor SAV. Jessie noted that Chesapeake Bay used a lot of satellite data for their last SAV status report.
- Jessie provided an update on her continuing research using drones to map SAV. This technology provides good detail but only for very small areas. She had CRFL funding to continue this work for another three years and is working with the NERR to analyze those data. Anne mentioned that NCDMF is working with NCSU and Duke to develop drone protocols for intertidal oyster habitat. The group agreed that drones were most useful for monitoring sentinel sites and could provide important seasonal and interannual information at a smaller scale.

- Following a break for lunch, guests from EPA Region 3 provided a brief overview of the Field Services Branch. They have resources and expertise to help with developing and implementing SAV monitoring.
- SAV Extent and Deep-water Edge: Low Salinity
    - Joe briefly described the boat-based sonar protocol to estimate SAV linear extent and biovolume.
    - Jud asked what can be reported on now with some confidence and is this protocol sustainable for the long term. Joe and Jud discussed what needs to happen to write up a report on the change in SAV linear extent, which has declined in Albemarle Sound and the Pamlico and Neuse Rivers.
    - Dean asked about repeating the shore-parallel survey again and Joe replied that it is not a wide swath and would be hard to drive the same transects as before, but it is good timing to try it again since it was last done five year ago. He added that including side-scan and multi-beam sonar to the approach would be useful. Jud noted that depth is also collected, which can provide information on deep-water edge as well.
    - There was discussion about the role citizens can have in this monitoring. Joe thinks it is doable with Lowrance systems. Jessie noted that there is also a phone app called Seagrass Spotter that citizens can use to identify SAV and report sightings.

        - It is unclear who (citizens, NGOs, agencies) should be responsible for long-term low-salinity sentinel-site monitoring, as well as other aspects related to the sustainability of this protocol; Joe will formalize some suggestions.
        - The team agreed that proof of concept needs to be demonstrated for the use of drones to monitor low-salinity SAV, but it can be done and would likely improve the existing sonar- and quadrat-based protocol.
    - SAV Species Composition
        - For high-salinity SAV, it was reiterated to move forward with compiling and analyzing the ground-truth data.
        - There was some further discussion about the need for a new, separate survey for species composition, which was outlined by Jud and discussed at previous team meetings.
        - For low-salinity SAV, Noah is planning on analyzing the data from core samples taken at sentinel sites as part of his thesis.
- The team discussed ways to link water quality and SAV in a monitoring strategy. Jud noted that there are case studies from comparable systems, and we should start there; Texas has coastal lagoons that would be analogous to our system. Jud also noted that water quality data are limited. Brandon mentioned using existing water quality data and relating it to SAV information (e.g., Corps data from Currituck Sound, ModMon in Neuse River). He has mapped chlorophyll *a* for all of Pamlico Sound based on satellite information. Jessie mentioned salinity and light-level requirements are in the literature; a lot of this has been done for other systems.
- Other topics of discussion included a brief update on an upcoming water quality and SAV technical workshop, an APNEP-funded SAV economic valuation study, and quality of the 2019 imagery that collected. Jud also announced that the world seagrass conference will be held in Annapolis, Maryland (first time in the U.S.) in 2020; Jud and Brooke Landry are planning it.
- ACTIONS:
    - Don will finalize the high-salinity SAV extent metric report
    - Joe will produce a comparable low-salinity SAV extent metric report
    - Anne will provide final SAV species composition data to Jud