*Attendees*

**SAC members in attendance:**

Jim Bowen

Jud Kenworthy

Jessie Jarvis

Hans Pearl

Lauren Petter

Fritz Rohde

Michael O’Driscoll

Wilson Laney (not present)

Rachel Gittman (not present)

Martin Lebo (not present)

Marcelo Ardon (not present)

**NCDEQ staff in attendance:**  Note: did not capture all DEQ staff in attendance

Kelsey Rowland

Chris Ventaloro

Susie Meadows (note taker)

Pam Behm

Rich Gannon

Nora Deamer

Jing Lin

Bongghi Hong

Casey Knight

Mark Vanderborg

Forest Shepherd

**SAC meeting facilitator:**

Emily Barrett

Meeting notes

\*\*\*All questions, comments and answers are paraphrased\*\*\*

1. **Convene** (Emily Barrett)
	* SAC Rollcall
2. **NCDP Progress** (Kelsey Rowland):
* March & June 2021 had SAC Meetings on clarity criteria for Albemarle.
* Aug-Sept 2021 met with MD and VA staff.
* Dec. 2021 Jim sent out secchi-based clarity standard proposal to limited group for feedback.
* Feb. 2022 met with limited SAC members for feedback on it.
* March-April several internal meetings and met with DMS and AMS staff to discuss monitoring.
* May 2022 Update to the EMC.
* June 2022 NCDP heard presentations from NSTEPS remote sensing team and Nathan Hall on bio-optical model.
* Update on PAR meters. We have secured funding for them.
1. **Agenda & Meeting Goals** (Emily Barrett):
* We will move topics that are not on the agenda, that might come up to the Sept meeting.
* At the end of the meeting, we will ask for some members to volunteer to write a short scientific justification for the standard that’s decided upon with citations.
1. **CHPP Update** (Anne Deaton):
* 2021 Coastal Habitat Protection Plan Amendment: The Connection to EMC’s Nutrient Criteria Development Plan:
* **Origin**: Fisheries Reform Act of 1979 (G.S. 143B-279.8): required DEQ to draft the plan, EMC, CRC and MFC commissions to approve and implement recommendations.
* **Purpose**: Long-term enhancement of coastal fisheries by addressing habitat and water quality needs of fishery species.
* Current revision focused on **5 priority issues**:

1. **Wetland** – protection and enhancement with nature-based solutions.

2. **Habitat Monitoring** – assess status and regulatory effectiveness.

3. **SAV** protection & restoration through WQ improvements.

4. **Environmental rule** Compliance to protect habitat

5. **Wastewater infrastructure** - solutions for WQ improvement.

* SAV Recommended Actions: 4 actions:

1. **Monitor SAV & WQ**: By 2023, DWR will develop and implement a full-scale assessment program to conduct coastwide SAV mapping and monitoring at regular interval (**≤** 5 years). By 2023, DWR will evaluate and prioritize incorporation of shallow water sites (< 1 m mean lower low water that currently or historically contain(ed) SAV into the statewide ambient monitoring system. By 2022, NC and DEQ, through the Secretary of Emergency Management, will request more accurate estuarine bathymetry data from NOAA. Pursue funding.

2. **Implement protective WQ measures, regulatory**: by 2022, EMC will receive guidance from the NCDP SAC on establishing a WQ standard for light penetration with a target value of 22% to the deep edge (1.7 m) SAV for all high salinity SAV waterbody regions, and a light penetration target of 13% to the deep edge (1.5 m) for all low SAV waterbody regions. By 2024, EMC will adopt scientifically defensible nitrogen and/or phosphorus criteria if recommended through NCDP, to help protect/restore ~12,900 acres of low salinity SAV in Albemarle.

3. **Implement protective WQ measures, non-regulatory**: DEQ will commit to protect/restore SAV to reach interim goal of 191,000 acres coastwide (done), enhance development of watershed restoration plans to protect, restore or replicate habitats and hydrology through nature-based solutions, increase BMPs related to WQ (request increased state cost-share funding) and work with local governments and NGOs to initiate public education/stewardship programs.

4. **Identify pollutant sources**: determine loading and sources of nutrients and sediments, request NC Policy Collaboratory investigate impacts of ag and land use change on WQ and pursue funding for SAV. Also, form public private partnerships.

1. **Components of a Clarity Standard** (Chris Ventaloro): Overview and Discussion.
* What’s purpose? 2 goals:
* **Goal 1** is protection of aquatic life: direct and indirect SAV dependent species, measure clarity (light attenuation).
* **Goal 2** is NCDP numeric nutrient criteria.: measures N & P
* **Various components of the standard**: magnitude, duration, frequency, narrative components (how do we develop language).
* **Magnitude**: what level of light is necessary to support SAV?
* Recommended values per NC CHPP (% light through water):

**22% - High salinity** SAV

**13% - Low salinity** SAV

* **Duration**: What timeframe should clarity criteria apply? Usually an instantaneous value or an average over a period of time.
* SAC previously discussed a growing season of **April-October**.
* **Frequency**: How often can clarity criteria be exceeded while still protecting SAV?

Examples:

* Not-to-exceed (must be at all times).
* Not more than once in ?? years.
* Not greater than 10% of samples.
* **Narrative**: How to develop language?
* Spatial: where should criteria apply?
* CDOM: how to address areas that will naturally not support SAV?
* Biological assessment?
* Other considerations?
	+ Questions:
* Judd: On Frequency: Are we working towards the capacity today or aspirational?
* Chris: looking at long term impacts of SAV, if clarity goes below these values -how often can that occur before we see impacts? How often does that clarity have to be met, scientifically backed?
* Jud: that overlaps with spatial extent and compelling info we have. We really need to be monitoring where the SAV are.
* Unknown: You want to know how long the grass could survive? Because you need to be sampling more frequently than that.
* Chris: If you’re looking at a magnitude that’s covering an averaged period of time, a growing season, how many growing seasons that are having poor clarity will it take?
* Unknown: Some of the transition areas may fall under the2 categories, so would you pick the more restrictive one? We’d probably need to define that.
* Anne showed the map where they are clumped into the different categories.
* Nathan: regarding frequency, all the literature about the seagrass light requirements are based on seasonal median values. If we’re not going to increase capacity and only get maybe 12 samples per year at a station, we really need to consider what seagrasses are used before one goes on the impaired list.
1. **Overview of the Clarity Standard Magnitude** (Jud Kenworthy):
	* High salinity magnitude SAV = 22% @ 1.7 m.
	* Low salinity = 13% @ 1.5 m is restoration situation.
	* **Three main topics to address**:
		+ 1. **Why are they diff**? Low salinity SAV are canopy forming species and Seagrasses (high salinity) are meadows forming species and stay on the bottom.
			2. **How are they Derived**? Historically, the plants tell us. We measure or estimate Iz (the light requirements). Moving towards the optical model. We have a robust data set on depth (been doing it since 2010). Nathan’s APNEP report.
			3. **How might they vary**? Light at canopy vs light at leaf. Nutrients and DO.

Also think about as we increase the level of impairment in the coastal system the plants light requirements go up. So, they’re not fixed at 22%. Looked at turbidity, chlorophyll and CDOM. Climate change has an effect also (sea level rise and increased water temp). Just an FYI: the 13% and 22% might not be a fixed value.

* + What we’re dealing with in the **high salinity is a protection situation** and **low salinity is a restoration situation**.
1. **Discussion of the Clarity Standard Magnitude** (all):
	* Lauren: To clarify, the protection and restoration assessment on this is relative to Nathan’s presentation, would you say the 22% and 13% are still valid for possible standard?
	* Jud: These were derived from established SAV patterns and in a restoration situation, where we aren’t necessarily working with established meadows, the light requirements could be higher.
	* Lauren: Is there any research that talks about epiphytes or organic matter or complicating conditions?
	* Jud: The organic matter has a fair amount of research and the epiphyte research shows they can change.
	* Lauren: We probably should get 22% and 13% on the books for now and be able to move forward with something more later.
	* Jud: Can criteria be written that has an adaptive component to it?
	* Chris: Yes, there are different ways to approach this, and need to think about it and biological assessment. If we can frequent monitoring? Similar to how we use DHHS fish consumption advisories, take those into account when assessing toxics. Or maybe use narrative language for SAV.
	* Chris: I have a question for Lauren. Are there other states that have taken into account the variability of a species based on existing conditions? How they might have approached it?
	* Lauren: Can’t think of any that would fit this part of the conversation. So I’m wondering if the 22% and 13% can go on the books and there can be a provision if the low salinity parts are so impacted now that as long as conditions are improving. Not sure how easy it is to quantify it.
	* Chris: Our intent is to go with Coastal Habitat Protection Plan. There are concerns that we need to address, but do the SAC members generally support that direction? We need some sort of document or support to move forward with rulemaking. That document would be sharable with the public.
	* Kelsey: 22 and 13% is what we have support for at this time. Is there any SC member that doesn’t agree with? None.
	* Jud: what’s the SAC’s charter state?
	* Kelsey: Charter states: under the consensus-based decision-making process, members understand the reasonings behinds the decisions and are willing to support them. Consensus does not mean that everyone will be equally happy, but all do accept that this decision was the best they could make at the time.
	* Hans: Should write in there that there are other things that could change the threshold over time. Two things that will have an effect from climate change will be sea level rise and episodic storm activity.
2. **Discussion of Duration, Frequency, and Spatial Extent** (Chris Ventaloro, all):
* During what timeframe should clarity std apply? At all times or seasonal?
* How should this timeframe be expressed? Average value, median, geomean, other?
* What information can support these decisions?
* Jessie: Seagrasses are there year-round, but not growing and some species aren’t around during winter, but their seedlings are and they need light – so seasonal, but could look at it during winter.
* Lauren: Are the seedling a known need?
* Jesse: Maybe, we know they need more light.
* Jud: The thing about a high salinity environment is in the winter when the seedlings are growing the water is extraordinarily clear, like the tropics. Could start in March for the seedlings.
* Chris: **Could change the seasonal range to March to October** for both low and high salinity.
* Chris: How should this timeframe be expressed? Ave value, median, geomean, other?
* Jim: Seems the justification for the standard of 22% and 13% based on a lot of data, the frequency and I guess duration too. I’d say the duration is a long-term median. Whether or not that particular spot in the estuary is suitable for SAVs is by taking multiple measurements over a period of time and is that habitat suitable. Seems to me that the frequency is a median and the duration is a multi-year average.
* Lauren: Keep spatial scale in mind so we don’t over-average.
* Jud: This is a question for Nathan. Some high salinity stations we have long-term records, why not use that data in a Monte Carlo simulation, where we can pull from that dataset and then simulate different frequencies?
* Nathan: Important if we’re putting a statistical process on this. There are other datasets that could be used. There is a lot of low salinity data out there too. But we don’t have a model calibration for the low salinity.
* Hans: We have PAR data since 2000 and is available; it’s open-water data.
* Chris: What would that analysis help us get to?
* Hans: Tell us something about patchiness and spatial distributions.
* Lauren: I thought the original suggestion was to look at the PAR results, seeing how far out to average long-term, multi-year, single-year, frequency of samples in the season. If it was just PAR, we would have to wait for low salinity optical calibration.
* Nathan: There’s not enough PAR data, there is secchi disc data. It’s being gathered.
* Jim: I recall a figure that Nathan showed in the WRRI presentation that was a station-by-station comparison of median to 90th Percentile values. That to me is an approach to use under frequencies but seems to me the tie between the justification and the magnitude is that long-term median. And then you can do some statistical analysis to link it to some other end point.
* Nathan: I agree.
* Lauren: Jim, what does long-term mean to you?
* Jim: Depends on what has existed in a spot over a multi-year time period. Something along the lines of the life expectancy of a seagrass. I’d have to defer to the others.
* Jud: These are clonal plants. Can live long time. They die-off quicker than they recover. They can respond in a growing season. I think the simulation would be worthwhile if someone can do it. When you say duration, are you saying what duration of data do we need to make an assessment? It’s either meeting the criteria or not.
* Chris: The duration would be the period of time that your looking at data to compare to the numeric value and then from there the assessment side would say, how often can the conditions during that duration not meet that magnitude, that would be supportive of that SAV population. So, you couldn’t have more than one year of that growing season being less than the 13% or 22% because of the potential impacts to the SAV population?
* Yes
* Jim: **Monthly average over a growing season not to exceed the 13% and 22% as a median. Monthly median**.
* Emily: Chris you’ve got magnitude, duration, frequency, what about narrative components?
* Kelsey: We could sample on a monthly basis and then take the median value for the growing period, not to exceed the magnitude.
* Do we have thumbs up from SAC members? Jim, Hans, Lauren.
* Emily/Chris: Can **leave the narrative (spatial component) for the next meeting**.
1. **Next steps** We need a brief scientific justification summary with citations?
* For magnitude, duration. Written up by Hans and Jud.
* **Jud and Hans agreed to be Chair/Co-Chair of SAC for the next year: Jud (chair) and Hans (co-chair)**. Jesse nominated them.
* **Next meeting** can talk about narrative.

Incorporating the spatial component, like the depth and where the standard should apply across the waterbody, more towards the shallow areas. Thoughts on how to address CDOM and maybe thoughts on how to incorporate SAV surveys. And discussions about how to tie potential clarity criteria to nutrient side of things.

1. **Closing** (Emily Barrett)
* **Dates for next meetings**:

**Sept. 28 9am-12noon**

**Nov. 17 1pm-4pm**

1. **Meeting Adjourned** (Emily Barrett)