*Attendees*

**SAC Members**

**In attendance:**

Jim Bowen

Jud Kenworthy

Jessie Jarvis

Lauren Petter

Michael O’Driscoll

Martin Lebo

**Not attending:**

Fritz Rohde

Wilson Laney

Rachel Gittman

Hans Paerl

Marcelo Ardon

**NCDEQ staff in attendance:**  Note: may not have captured all DEQ staff in attendance

Rich Gannon

Chris Ventaloro

Susie Meadows (note taker)

Pam Behm

Nora Deamer

Anne Deaton

Charlie Deaton

Timothy Ellis

Casey Knight

Karen Higgins

Forest Shepherd

Bongghi Hong

Jimmy Johnson

Heather Jennings

Cam Mcnutt

Elizabeth Kountis

Bridget Shelton

**SAC meeting facilitator:**

Emily Barrett

Meeting notes

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

1. **Convene** (Emily Barrett)
	* DEQ/DWR introductions
	* SAC Roll call
2. **Recap July 2022 SAC Agreement on SAV** **Magnitude, Duration & Frequency** (Chris V.):
* Jud and Hans were elected chair and co-chair.
* SAC members came to an agreement on Magnitude, Duration & Frequency: backing CHPP proposal.
* Magnitude: 22% high salinity SAV and 13 % for low.
* Duration: seasonal component should be used – March to October
* Frequency: a not to exceed frequency applied to the seasonal mean.
* Jud and Hans agreed to write up a scientific justification document on magnitude, duration and frequency.
* Thoughts, questions from the last meeting.
	+ Jud: What do you want that’s different from what the CHPP and Nathan have come up with?
	+ Chris: Just a general summary of the SAC agreeing with or giving a letter of support for the magnitude, duration, frequency.
	+ Jud: When it’s written do we need to give it to the other SAC members or others?
	+ Chris: I think you bring it to another SAC Meeting for all to see.
	+ Jesse: Can we vote on it?
	+ Chris: We’ll need more documented support when we get to the rule making process, moving forward to the EMC.
	+ Emily: Should they express consensus around the document? The Letter of support?
	+ Lauren: A vote is first and then it needs to be written in a document to help have everything characterized best.
1. **Defining Low vs High Salinity** (Cam McNutt):
* Shared a map showing high salinity >10ppt and low salinity waters and SAV waterbody regions. Can we transfer this info onto the current water quality classifications that DWR already has; can we tie it to current up/downstream definitions that are already in rule? After talking with Marine Fisheries and others, came to conclusion we can’t do that because of areas not classified as salt waters. Where would we have lines that would apply?
* The high salinity of 22% at 1.7 meters and low salinity of 13% at 1.5 meters would be the next level of detail on spatial extent. Could take a slightly more stringent standard and push that toward the low salinity areas versus going the other way around.
	+ Jud: We know where our highest salinity sea grasses grow, can we let that biology tell us where to draw the line?
	+ Anne: the salinity supported the SAV presence, we did this work with CHPP workgroup to help create the map Cam is showing. Used 10 ppt as divide.
	+ Cam: Once the clarity standard is put in place, there are other things that we have to consider when doing the assessment. Operationalizing it is going to be complicated.
	+ Nathan: Is there any high salinity SAV on west side Pamlico Sound?
	+ Jesse: *Ruppia* can live in both low and high salinity quite well.
	+ Anne: lower Neuse/Pam are highest fluctuations zones for salinity; no way to really say one or other exclusively. It reflects the biology and the salinity.
	+ Chris: Sounds like there’s more support from Marine fisheries folks and Jud, that these spatial zones already established in the CHPP seem to reflect the salinity and species distribution. Would we have to re-establish boundaries?
	+ Cam: Nothing is close with the classifications; the lines don’t match up. We’ll have to consider the placement of the standards not in the SC rules. We’ll have to have some other way to do that. It will have to be applied to freshwaters in some areas. There are 6-7 waterbodies that are not currently classified as salt waters; we’d have to list these out.
	+ Chris: It doesn’t raise any concerns with me as to where it goes in the rule. We can figure that out later if it will stand on its own or be in the SC rule and we can specifically reference areas that are outside of the SC rule.
	+ Cam: If we reference the SAV waterbodies from the CHPP, then that encompasses these areas that are fresh.
	+ Chris: If we refence the map in the CHPP, how often will it need to be updated? So, that brings up that issue.
	+ Pam: The way the standards are written, it starts with Class C waters, then the standard follows. Want all to understand how the standards are written and with as much clarity as we can get from today and how these maps will translate into language for the standard is not clear yet.
	+ Cam: We may need to just list out waterbodies that are high and low salinities with potential SAVs, because if we just use the map then it looks like we’re applying the map to lakes, fresh streams within areas. So, we need to cut the map to avoid confusion.
	+ Jud: We do have those maps for low and high salinity.
	+ Emily: So, can we expect at the next meeting staff would have proposed language to reflect a standard that might match this map?
	+ Chris: Possibly. We’re narrowing it down at least how to include the spatial part into the rule. But we have to figure out how we will call out the specific waterbodies.
	+ Cam: There are a lot of other things/consideration (like wave action) that might be better addressed outside of the rule in the assessment process.
	+ Chris: Yes, the question is whether to list in rule or do in assessment.
	+ Jesse: Language is already out there. Chesapeake already has definitions approved by EPA. We can build off that. The technical document, Ambient Water Quality Criteria for Water Clarity, …for Chesapeake Bay, is a good starting point.
1. **Discussion: using SAV habitat definition 03i rule** (If we use SAV habitat definition in 03i rule, are descriptive terms adequate? How state CDOM exclusion? Any other fixed factors that preclude its presence?)(Chris V., Cam M., Pam B.):
* Talk more about SAV habitat, provide a definition for it or use what’s in the fisheries 03i rule?
	+ Chris: Is the SAV habitat definition in the Marine Fisheries rule 03I .0101 enough? (showed it on screen)
	+ Jud: We have a lot of info on how deep these plants will grow, it’s indicated in this rule, and we can stand behind that. Problem is to think about it in the context of the space. If we could get reasonably close to that space. One thing about this definition after the CHPP amendment was produced, we do rely heavily on the historical maximum extent which goes way further back than the past 10 annual growing seasons. This would be a constraint on us if we’re looking at long term restoration and other issues, so this 10 annual growing seasons isn’t consistent with what’s in the CHPP.
	+ Anne: At the time the definition was written, we found especially on the coast they weren’t taking into account that SAV might grow in winter… so look at other times of the year. It was done for development projects and not water quality. So, the 10-years there is a compromise. You could refer to the definition, however our target is the maximum extent.
	+ Cam: The secchi depth reference seems problematic too. It is a light requirement and then we are going to add another light requitement. Could use maximum extent map and have that data set govern in some way so that we’re using this definition and we can use everything except the 10 annual growing seasons. Then at each monitoring station, decide if everything but clarity is present. Not sure the definition covers the full spatial extent.
	+ Jesse: Definitely feel much more comfortable with extent mapping vs arbitrary last 10 years.
	+ Casey: CBP cautioned against going back too far, like pre-colonization, because we will never get back to those conditions.
	+ Jud: Adding to Casey’s comment – they overshot their goal by going so far back in history. Q is how faithful are we going to be to the CBP. We should be faithful to the coastal habitat protection plan. Use that as our weigh point. We may need to refine this particular definition because it was constructed for a very different reason then we’re pushing for with this standard.
	+ Anne: Agreed, shouldn’t stick to 10 yrs.
	+ Jim: Agree with what I’ve heard; seems like the definition as it’s written, both because of the short time period and the conflicting light standard with the secchi depth, I don’t think we can use it as is.
	+ **Need a new definition** –
	+ Chris: What about species under the little (i), it specifically lists out the species. Do you feel that description would be critical to maintain in a rewritten definition?
	+ Jud: As the definition is revised, it should stay consistent with high and low salinity categories and the 2 clarity numbers. Grouping the species according to these categories.
	+ Chris: Is that assuming the same salinity split we’ve been talking about at the 10 ppt?
	+ Jud: Yes, with *Ruppia* fitting into the 2 categories.
	+ Chris: **next step – we should make a new definition then bring back to the SAC for review**.
	+ Rich: Language in the middle of ii, areas with limited wave exposure, is there any way to bound limited wave exposure phrase to avoid circular reference and make clearer?
	+ Jud: Could refer to historic extent and maximum depth of growth.
	+ Martin: Recognition of the physical environment as a driver, that’s in the CBP assessment of how to actually define. The historic extent may define why it isn’t or hasn’t been present in an area.
	+ Anne: Instead of rewriting the definition, maybe keep the definition as the (i), but cut off (ii) right at suitable physical conditions. Just call for appropriate physical requirements. Or even cut that off, just list species and reference historical extent.
	+ Cam: Concerned about something being unsuitable because it violated the standard but also by violating that standard it would no longer be suitable habitat because of that. I think we should have a definition somewhere else. Where the habitat is agnostic to the water quality standard.
	+ Milton: How does natural CDOM fit in to that?
	+ Cam: We can do natural conditions on anything as part of assessment.
	+ Jud: Possible thought to deal with some of these issues. We can map small-scale at low salinity using sonar. Example, through APNEP, we established 10 sentinel sites in the Albemarle Sound and we could incorporate those and water quality stations with the smaller-scale mapping. That might be something to think about.
* **How to state CDOM exclusion**? As part of the standard or captured as part of the definition of habitat, do we need to address the exclusion of habitat based on things like CDOM or wind? Are there other ways to figure out if CDOM has an impact on a particular area that may show as a historical extent?
* Lauren: If we put weight on the historical extent, won’t that capture the effects of CDOM? Is CDOM not already captured in the extent map?
* Chris: To add to that, is there a threshold of CDOM that could be occurring at a certain concentration or certain frequency?
* Nathan: You could have CDOM at high enough concentration where its going to disallow the light thresholds set. It’s going to constantly add to light attenuation. Don’t know of significant manmade CDOM, but papermills are, but the rest is natural and contributes to light attenuation. Not sure how to assess the threshold, Pasquotank River is a good example of one that will never meet the light requirements.
* Rich: Maybe we just point to the historical extent. With increase in climate change, driving water out of wetlands likely to increase CDOM?
* Nathan: In Literature one of the biggest contributors of CDOM is rainwater, after years and years of acid rain. As the pH of rainwater decreases it can cause more of the leaching of those acids, in Europe it’s called brownification. By measuring it they can see big changes in how brown the water is. We don’t have records for that.
* Martin: Tropical storms/thunder storms will have pulse swamp waters in and have temporary increases in CDOM effect but are short-lived.
* Emily: Question in agenda – Are there other fixed factors that preclude its presence?
* Chris: We talked a little bit about that. Wind, CDOM, are there any other factors that we need to consider doing assessment?
* Martin: Is there any physical alterations to that that would preclude SAV in an area?
* Jud: Pay attention to rising water temps. It reinforces the need for the clarity standards to be a little more liberal because as temps rise, light requirements go up.
* Jesse: Agree with Judd about Temp., but I think the standard we have is solid and reviewing it every 3 years, we can look at how temperature may impact the standard, especially with higher salinity species.
* Lauren: **It might be something to put in the document written up, that temperature might be something that may result in making it a more stringent criteria in the future, but for now the temperature is technically sound**.
* Chris: **Take-aways: DWR Staff will revise SAV Habitat Definition and bring back to SAC for agreement and regarding consistent suitable habitat and potential exclusion conditions and how to judge those, it sounds like using historic extent of SAV areas is serving as an indicator of the habitat? Yes**.
* Cam: Maximum extent is a good idea and that covers our CDOM. What we’re saying is we’d have to assess if we have a new source of CDOM in a currently identified area where we have sea grasses. We would have to evaluate CDOM at that time. Right now we don’t have to worry about if it’s natural because its covered by maximum extent SAV mapping that exists.
* Jud: No disagreement with what was said. Want to say: think about chl-a standard and segue into where we go with nutrients. Shouldn’t get stuck on CDOM. If we progress and adopt the bio-optical model as a tool, it will serve both defining thresholds of light as well as exploring what are the driving stressors from those components, be it chlorophyll, turbidity or CDOM. We’re going in the right direction.
* Martin: When you say adopt the tool, are you saying from a standards perspective or as an assessment tool that helps to understand and translate? Judd: the latter. Martin: I agree with the latter. Rather than having it codified.
* Chris: That discussion on optical models, we aren’t going to talk about now, but want to have discussion in future meetings.
1. **Assessment approach for representing growing season?** (Chris V., Cam M., Pam B.):
* Talking about adoption of the criteria in the rule and how that defines the conditions that are protective of the use. How do we go about determining if those waterbodies are meeting those conditions.
* How would the standard be assessed? How do we get into monitoring those areas? Sample design, what should monitoring be like to support a good assessment? Do we go with individual stations? Sentinel sites? Consider minimum sampling sizes and distribution? Do we need any statistical tests?

This is more of Pam, Cam’s specialty.

* + Pam: Our traditional assessment approach for the majority of our parameters is station by station to define timeframe. Heard different things like grouping stations, but we don’t have a good representative data set to play with.
	+ Cam: Simpler the better because if we have to have a new work flow for an assessment process that will be another thing we have to go through with the EMC and public comments on our 303(d) methods. As far spatial extent, whatever the monitoring stations look like, that we make a decision on what is the spatial extent sampling at that time and not try to define it ahead of time. Doing spatial averaging data, isn’t ideal, because it can dilute the data either way. Station to station assessment, make decisions on the assessment units and how that’s broken up at the time you do the assessment over whatever time period we’re talking about, usually for us it’s 5 years. Ideally, all the SAV we have mapped, I station every 2-3 miles that would be representative of that and we would have a data point at least once a month in the growing season over a 5 year period. We could use the geometric mean or whatever the group thinks is the bast way to evaluate that.
	+ Jud: could Cam repeat: If 1 station per mile of shoreline in areas where there’s present or documented past SAV, then based on the extent we have here, especially in low salinity areas where there are patches of SAV, that may complicate that. In higher salinity areas there might several acres of it so more comfortable with that. Need to persistently see that it is not meeting water quality standards. Assume it would be the same way for the clarity.
	+ Anne: That’s PAR data and we don’t have that now. The sensor costs like $4,000. So, keep in mind how many sensors we’ll be able to afford. We have plenty of stations to get that data if we can get enough sensors.
	+ Pam: What I’ve heard so far is it’s going to be spotty and maybe not consistent amongst the different stations. We’ll be relying on other programs outside us to collect data as well.
	+ Cam: Where do the stations need to be in relation to the SAV without driving a boat right into it. What’s ‘representative’ data.
	+ Jesse: Where to measure - looking at distribution of purple dots (active sites), we do try to get very close to the edge of it. The data itself, PAR data once a month, it’s a snapshot. Will have to rely on a snapshot. Having a greater spatial extent, when we can’t go out as frequently and having more data is better. Meters are easy to use.
	+ Cam: What about places where there used to be SAV, but there isn’t now, where do you collect then? You don’t have a bed as a target, you just have a spot.
	+ Jud: If there is no grass then take it at 1 meter.
	+ Anne: Use maps of maximum extent. Once at a spot, then keep going to the same spot. The stations and other programs, I was hoping we’d look at sites where folks are getting their data, get some for us too.
	+ Martin: from standards perspective, we’re defining an active depth in the standard, then the measurement should be assessed at the standard depth. We can do assessment to understand more at 1 meter or other depths but compliance with standards is at defined depth.
	+ Anne: Were you including depths in the standard?
	+ Martin: Yeah, the 13% at 1.5 meters and 22% at 1.7 meters.
	+ Anne: So, you want the station to be at that depth? Is it more important to be at that depth? Because of tidal waters the depths change.
	+ Cam: Would be good if the stations could always get to the depth.
	+ Chris: Some of the language we were toying with was like light penetration shall be measured at bottom surface depth of 1.7 meters or at the deepest point of the existing historic SAV population if the depth is less than 2 meters. Something like that. To allow some flexibility.
	+ Nathan: I think it should just be expressed as a PAR extinction coefficient which alleviates need to measure at same depth. We’re only talking about <2 meters.
	+ Chris: That could change us from using 13% to the 1.36 coefficient.
	+ Martin: One caveat you have in doing that is, if you get less than the std, but you have a thriving SAV bed, because your water depth is less than, do you call it impaired? That’s something you have to consider going over to extinction coefficient. You may actually assess a thriving bed as impaired.
	+ Jesse: Chesapeake says if the grass is there then that meets the standard.
	+ Cam: Don’t want to run into a situation where it’s meeting the use, but it’s not meeting the standard.
	+ Lauren: Wonder if we can we stick to the 13 and 22 that we’re all familiar with, but then, in the companion document that’s not in the Regs provide what a corresponding light level should be at a different depth. That would be a resource to people that are assessing. What is the equivalent to 13%, at a half meter, 1 meter, 2, etc. You are just providing more guidance for assessment.
	+ Chris: The std could be 13%, but in the assessment methodology it could be defined further.
	+ Lauren: If there is an equivalent number at a different depth. As long as there is good documentation.
	+ Cam: We might get challenged on that.
	+ Pam: As much that can be clearly defined the better for the EMC. It has to be explicitly clear in the standard, the safer and the more consistent the implementation will be.
	+ Chris: May need to talk about that more if we switched to the coefficient. We’d be deviating from the CHPP. What kind of supporting scientific documentation is there?
	+ Anne: there is supporting documentation because it’s a formula.
	+ Nathan: 1.36/meter for low and -0.89/m for high. That’s exponential decay.
	+ Pam: I’d like to have the standard laid out first and then go from there.
	+ Chris: We can try to figure out the standards language more and then revisit this part of it.
	+ Nathan: I think it should be expressed as a PAR attenuation coefficient which alleviates the need to measure at the same depth.
	+ Jesse: Agreed.
	+ Jud: If we switch gears here we need to think about what we are obligated to the EMC.
	+ Jesse: Wondering is there a way to write the rule so that the 22 & 13 doesn’t have to be measured exactly at their **exact** meters (1.7m and 1.5m)? Is it possible?
	+ Martin: Assessing by extension coefficient would get around the tides, but expressing the standard in terms of something the public can easily understand.
	+ Karen: Want to make sure the SAC understands the CHPP is a valuable tool, but it doesn’t limit you in your recommendation of what to do. Don’t feel limited by that.
	+ Anne: Agree with what Karen said, but I think it’s saying the same thing, just not expressed exactly the same. You could leave the 13 and 22 in the language.
	+ Nathan: It’s already in there, the clarity has to be X amt to achieve 13% at 1.5m, so it’s the clarity there and that’s what we’re measuring with the coefficient.
1. **Expert magnitude, duration, frequency write-ups for November meeting** (Chris V.):
	* We need to internally think about rule language if we switch to using coefficients, then we’ll need to ask for a write-up on that, describing that. We need to put a pause on that until the next meeting.
2. **Next Steps** (Emily Barrett):
* Next meeting is on Nov 17, 1-4pm.
* Future agenda item: Have DEQ Staff rewrite definition.
* Ina future meeting, look at bio-Optical model
* Write-up of decision.
	+ Anne: I think we need a summary from the SAC as to what they have agreed to (to date) on the standard language? Would like to hear what all the pieces are now.
	+ Judd: that was my thought. Can we agree to advance our recommendation 4.7.
1. **Brief Open Comment Period for Non-SAC Members and Non-NCDEQ Staff** (Emily Barrett, all):
	* Karen: Susie put in the chat from the previous July SAC Meeting – what the SAC members agreed upon. Kelsey had asked specific questions of the SAC Members, if they were in agreement on magnitude and frequency. **Kelsey said that 22% and 13% is what we have support for at this time. Is there any SAC member that doesn’t agree with this? There were NONE**. For **Frequency**, **Kelsey said, 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 and others all had a thumbs up for this**.
	* Jud: Feel we went thru that rather fast, but still agree with it.
	* Martin: Agrees that was covered very fast in last meeting but doesn’t agree as much with the frequency now. We should have further discussion on it. In terms of write-up, would like to have **further discussion on the frequency** component of the clarity. **Agrees with the 22% and 13% and the seasonal median, but** the never to exceed in any year, I’d rather a 1 in 3 would be more appropriate to target the conditions we’re trying to get to and not inadvertently have impairment on waters if we have multiple tropical storms in the same year.
	* Jud: what’s the 1 in 3?
	* Martin: Not more than 1 in 3 could the median be below the target. So, it takes into account natural variability and if you meet it in 2 years then you meet the standard. **So, I am asking for more discussion because we went through it very fast last time.**
2. **Next Steps** (Emily Barrett):
* We should **look at Frequency further**.
	+ Jesse: feel we should move past what we’ve already agreed to and voted on.
1. **Non-Staff Comments** (Clifton Bell):
	* Want to comment on the CHPP and the clarity standard that we have so far. Speaking on behalf of NWQA, support the development of a clarity standard.
	* Concerns:
2. Depth identification (can range from 0.5 - 2 meters), not sure every site could meet 1.5 m, for example. Recommendation was to express the standard as a percent of the water column and a segment specific depth identification.
3. Frequency, (Regulatory community doesn’t like) the not to exceed, I believe that recognizes the inter-annual variability of SAV to recover. Think it would send NC to create a standard that is not attainable. The CHPP uses 3years and looks a t the best years for meeting the standard. Highly encourage the SAC to consider a viable frequency component.
4. **Additional**:
* Jud: **Requests a copy of Clifton’s comments**.
	+ Anne: I don’t think we need to change the 13 and 22%.
	+ Chris: What you’ve decided still stands, but we need to have discussion on the assessment side and how best to approach it from a rule-writing standpoint.
* Jesse: What we voted on in July, is that enough? Don’t want to go through any more again.
* Emily: I think we’re good, it’s documented.
1. **Closing** (Emily Barrett)
* **Dates for next meetings**:

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

**Possible next meeting in January.**

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