NC Nutrient Criteria Development Plan – Scientific Advisory Council (SAC)

2/26/2019

Attendees

SAC members in attendance:

Lauren Petter
Bill Hall (phone)
Linda Ehrlich
James Bowen
Clifton Bell
Astrid Schnetzer (phone)
Michael O'Driscoll
Martin Lebo (phone)

SAC meeting facilitator:

Jenny Halsey (Triangle J Council of Governments)

NCDEQ DWR staff in attendance:

Jim Hawhee
Connie Brower
Christopher Ventaloro
Nora Deamer
Brian Wrenn
Leigh Stevenson
Bridget Flaherty

Criteria Implementation Committee (CIC) members in attendance:

In person:

Andy McDaniel
Douglas Durbin

Meeting materials can be found on the Division of Water Resources Nutrient Criteria Development Plan Scientific Advisory Council webpage. Click here for a direct link.

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Meeting notes

All questions, comments and answers are paraphrased

i. **Convene** (Jenny Halsey, Brian Wrenn)
   a. Jenny H. introduces herself as the new facilitator for North Carolina Nutrient Criteria Development Plan (NCDP) meetings.
   b. Desired outcomes for today's meeting:
      i. Shared understanding of the Chlorophyll-*a* document status.
      ii. Shared understanding and resolution of tabled response variables.
      iii. Shared understanding of Nitrogen numeric criteria options.
      iv. Shared understanding of next steps.
   c. Administrative business (Brian Wrenn)
      i. SAC members approve the meeting notes from the November 2018 and December 2018 meeting minutes.

ii. **Chlorophyll-a document update** (James Bowen)

iii. Attempting to organize everything to make task of writing document easier. The NCDP charter does not appear to list writing of documents as a duty of the SAC.

iv. Items for discussion:
   a. Schedule for document completion
      i. August 2019 – Completed draft of chlorophyll-a document
      ii. October 2019 – Final version to send to CIC
   b. Document outline:
      i. Document will have five sections and be about 30 pages in total. Each section has a lead person and contributors. Lead will be responsible for organizing efforts for that section and will handle editing.
      ii. Sections include:
         1. Introduction – James B. (lead), Lauren P., Deanna O.
         2. Literature review – Nathan H (lead), multiple contributors
         3. HRL chlorophyll-a conditions and use attainment – James B. (lead), multiple contributors
         4. Proposed HRL chlorophyll-a criteria – Martin L. (Lead)
         5. State-wide framework – Clifton B. (lead)
   c. Discuss duties of SAC going forward
   d. Comments/questions:
      i. Lauren P.: I submitted comments on the document via email. Have they been incorporated?
      ii. Clifton B.: Yes. Regarding section 5, Intend to preserve the discussion about the establishment of a statewide framework for determining chlorophyll-a criteria for lakes/reservoirs. Will clarify that this approach was ultimately not used for HRL.

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e. Questions for SAC members (James B.):
    i. Is the August 2019 deadline for the draft chlorophyll-a document reasonable?
        1. SAC members: Yes.
    ii. Will we lose momentum?
        1. Clifton B.: Important to remember what we agreed on and to not modify the decisions we made.
        2. Martin L.: We can use the spreadsheet that Brian W. sent out as a guide.
        3. Lauren P.: Chapter 4 is the culmination of what we decided on.
    iii. Preliminary deliverables?
        1. SAC meetings are planned for April, June, and possible August. August is on hold pending academic schedules.
        2. Do we want draft sections finished by April or June?
            a. Martin L.: Can have his part done by April.
        3. James B. proposes a call between the SAC members in April to discuss progress.
    iv. Lessons learned from the creation of the pH document?
        1. James B.: Thinking that the chlorophyll-a document will be about the same length and of similar detail as the pH document.
        2. Clifton B.: The chlorophyll-a document will require more detail as this will be a technical document. Should be reasonable to do this with all of us working on it.
        3. Martin L.: Clifton B. did more of the pH and literature basis. I'm focused on more of the chlorophyll-a framework.
        4. James B.: There are about 7 or 8 peoples involved. Figures have already been generated by Jing and Pam B.
        5. Bill H.: Document should also include the legal basis for the criteria. Clean Water Act and NC regulations should be discussed.
        6. Brian W.: The chlorophyll-a document is a proposal for DWR to take to rulemaking. Legal basis not necessary, but you can include that information if like.
        7. Clifton B.: We could add it. It doesn't need to be long.
        8. Lauren P.: We need to make sure that we have adequate time to review before we get together to agree on final document language.
        9. James B.: If we have the draft sections done by April we will still have June and October meetings to discuss.
f. SAC duties as defined in the NCDP charter
    i. James B.: Some SAC members didn't understand what they were getting themselves into. The charter is only available in draft form. SAC never approved it.

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ii. The list of duties (pages 4 & 5) don't exactly say that SAC will write up documents. Do we need to change the language in the charter to reflect that we are writing recommendations?
iii. Brian W.: These details are in the NCDP document but are not explained in detail. Note also that the CIC is not mentioned in the NCDP plan.
iv. James B.: I'm surprised by how much I'd be writing. Should be manageable, but it depends on how much we write. Nathan will be working on a chapter that will be long.
v. Mike O.: Maybe we can request that DWR assist with certain parts?
vi. James B.: Agrees, but does that introduce conflicts?
vii. Clifton B.: *Pulled up the NCDP* The writing of documents is well within our role.
viii. James B: What about examples of these types of committees from other states?
ix. Lauren P.: In EPA Region IV, different states have done this differently. There is room for flexibility.
x. Doug D.: I was on a committee in Florida. We were not a part of the writing of documents we served to review documents provided to us. In Illinois, their version of the SAC put out a 40-page document outlining nitrogen, phosphorous and chlorophyll-a criteria.
xi. Bill H.: Worked in Ohio. State prepped proposal for nutrient criteria and set up a stakeholder group to comment.
xii. Clifton B.: James River, Virginia – SAC produced document of synthesis of studies. State wrote up the criteria language. In the Chesapeake, technical documents were written for DO, chlorophyll-a and clarity. State proposed these as criteria.

g. What will the role of DWR in the write-up of the chlorophyll-a document?
i. Jim H.: As general staff, in terms of the body of research, this world is closed. SAC is at the stage of memorializing decisions.
ii. James B.: When writing the document there may be gaps that need to be filled.
iii. Brian W.: We're not saying that we won't help, but to echo Jim H's comments, it would not be appropriate for staff to generate new information. The SAC should be able to base their decisions on the information already discussed.
iv. Jim H.: All of us have big projects to work on. If we are going to be taking on bigger responsibilities as part of the SAC we will need to have a discussion with upper management.
v. Lauren P.: We should be able to get the draft finished and then figure out where the gaps are that need to be shored up.

v. **Resolution of tabled indicators for HRL** (Brian Wrenn)

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a. Brian W.: Pulls up table of the indicators initially considered by the SAC for criteria in HRL and the designated uses of the lake.
    i. During the discussion of these indicators the SAC decided to put off decisions until chlorophyll-a was examined. Now that a chlorophyll-a criterion has been proposed do prior decisions need to be re-evaluated?
    ii. Clifton B: We don't need to modify any of the criteria. Would require significant science to warrant changing what has been decided. Will be important to discuss how we apply what we've done to other lakes in NC.
    iii. James B.: For cyanotoxins, may be covered already in the narrative criteria, but don't need toxin criteria.
    iv. Brian W.: That may be included in the narrative criteria but there is nothing in the chlorophyll-a criteria to address this.
    v. Clifton B.: Cyanotoxin criteria can be worked into the lake criteria framework.
    vi. Lauren P.: Not sure that a narrative statement would address the toxin component.
    vii. Hans P.: Agree that toxin issue is complicated. Initial toxin screening is the best way to go.
    viii. Connie B.: Remember that EPA is working on criteria for microcystin and cylindrospermopsin.
    ix. Hans P.: In NC, toxins don't seem to be the main problem with cyanobacteria, it is more of a taste and odor issue.
    x. Linda E.: Agrees.
    xi. Hans P.: Biomass is another consideration.
    xii. Bill H.: The things we are addressing are not the things that actually cause impairments.
    xiii. Clifton B.: I don't feel like we've ignored anything in HRL. Toxins are present but in low concentrations.
    xiv. Hans P.: True, but taste and odor are difficult to trace back to one species or parameter.
    xv. Linda E.: taste and odor are often seasonal and can be tied to specific genera.

vi. **Water body discussion** (Brian Wrenn)
a. There are two more pilot studies to address as part of the NCDP and it has also been proposed by some SAC members that we stay focused on lakes and look into statewide criteria for lakes/reservoirs.
b. For the pilot studies we have the middle Cape Fear River and Albemarle Sound. Both are important to DWR and there are many issues and a lot of work going on in both systems. Moving to one of these systems would be the preference for DWR. What does the SAC think?

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c. Clifton B.: Wasn't suggesting we rush into statewide lakes criteria. Wanted to preserve the discussions that we have had regarding this. Are there ongoing studies in the pilot water bodies?
d. Brian W.: There is a DWR and monitoring coalition study that has begun in the Cape Fear River. It is a 2-year study. Also, the phase I portion of the Albemarle Sound study has been completed and provides recommendations for next steps including bioassay studies and the creation of a light model. These are more in the academic realm. Phase II can be started without the completion of the phase I recommendations.
e. Hans P.: Seven proposals have been submitted. Focus has been on the Chowan/Albemarle system. There has been an increase in bloom activity recently and it is considered a high priority area.
f. Brian W.: DWR will be working with academics. We have also added monitoring stations in the Albemarle. Various groups in the area are doing more studies to locate nutrient sources. Could be useful to discuss the response parameters identified in the phase I report. What parameters would apply for a river system? We had some discussion early on but haven't dug into that topic.
g. Jim H.: There has been some internal discussion of N & P criteria in a lake vs. a riverine system.
h. Mike O.: USGS is doing a study of the Cape Fear River that incorporates land use and ecological modeling. Would be good to check in on the progress of that.
i. Brain W.: Does the SAC have a preference for which water body we look at next?
j. Clifton B.: From this discussion we seem to be leaning towards the Albemarle.
k. James B.: Agreed.
l. Connie B.: Regarding the Cape Fear River, we will have a lot of people out on the water looking into various things that could also gather information for the SAC.
m. Linda E.: Who will be on the water?
n. Connie B.: There is a lot of work related to perfluorinated chemicals and 1,4-dioxin contamination.
o. Nora D.: For the Cape Fear, there is a nutrient issue, but the recent high flows have been suppressing it.
p. Lauren P.: Can we look at both?
q. Hans P.: It is critical to understand what is going on in the Albemarle. Clear that the problems there are nutrient related. Cape Fear River seems more related to residence time and light issues.
r. DWR will discuss this further and bring the topic back for the next SAC meeting.

vii. **N & P criteria options** (Lauren P.)
a. References 40 CFR 131.3 (b) for examples of what these criteria might look like.
b. N & P criteria provide a degree of certainty for the regulated community. Also take into consideration variability and updated science.

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c. Florida technical support document – there is a need to control both N & P. Established a lake default and also includes site-specific criteria. Florida felt confident in the science to establish state-wide criteria but also left the door open for site-specific criteria to address individual systems.
d. Some comments from the December 2018 SAC meeting indicate that there is not a lot of interest in pursuing N & P criteria for HRL.
e. Some options were discussed including establishing criteria based on loading. Even if there is no interest in N & P criteria we can discuss other ways of addressing this that would fit within water quality standards.
f. Where to go next?
    i. Single vs. dual nutrient criteria
    ii. Concentration vs. loading-based criteria
    iii. Water quality standards regulations (magnitude, frequency and duration)
    iv. Other options outside of water quality standards regulations? TMDL?
g. Comments/questions:
    i. Jim H.: Is the normal course of action to establish criteria on a broad scale and then focus on alternative site-specific criteria as new data and more information becomes available?
    ii. Lauren P.: This was the approach that Florida used. Site-specific criteria are preferred, but in practice, general default criteria are typically used. It's also important to recognize that in Florida they had a lot of site-specific data to work with.
    iii. Jim H.: How common is it to establish a TMDL without first having a standard in place?
    iv. Lauren P.: All TMDLs are established alongside a site-specific standard.
    v. Hans P.: In Florida do the site-specific standards take into consideration downstream uses?
    vi. Lauren P.: Florida has default downstream protections. Requires an analysis be done if changes are made to an existing standard.
    vii. Connie B.: Most recent triennial review had over 1,000 comments supporting the protection of water supplies with regard to algal blooms. There were also responses from the regulated community. Numeric criteria for N & P are on peoples' minds and they may not be satisfied with only response variables being addressed.
    viii. Clifton B.: It's not controversial that there are nutrient impairments, but what does N & P criteria get to that you don't already have? What are the downsides?
    ix. Lauren P.: When you mention that we can get to N & P by way of TMDLs, modeling, management strategies, etc…why not just establish numeric criteria up front and save all of the administrative work.

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x. Clifton B.: Those are management decisions.
xi. Lauren P.: Isn't there an N or P concentration that should not be exceeded?
xii. Clifton B.: I don't see the advantage to N & P criteria. Better to explore a modeling scenario for chlorophyll-a. That needs to be done anyway.
xiii. Jing L.: Benefit of using both response variables and N & P is to protect downstream. For HRL and Albemarle Sound, response variables are heavily affected by flow. There are often loading problems that are masked by higher flow conditions. These will manifest as problems in areas downstream where flow is reduced.
xiv. Clifton B.: Downstream is important but need to make linkages. Chesapeake did not go with N & P. They used response variables and modeling.
xv. Lauren P.: Do we have the resources to do that here?
xvi. Clifton B.: We already have a HRL model.
xvii. Lauren P.: If SAC is going to focus on response parameters is DWR going to look at N & P. What are the alternatives?
xviii. Jim H.: In NC we are talking about regulatory management strategies, not just TMDLs. Hopefully we will have a management strategy for HRL soon.
xix. Lauren P.: How did Chesapeake do this?
xx. Clifton B.: Used model to set allocations. Includes policy decisions. Suggest if interested in N & P for HRL state could set an allocation as criteria. Don't think the SAC needs to work on this.
xxi. Brian W.: Would we need to consider N & P together?
xxii. Clifton B.: Maybe, but it can be addressed by modeling.
xxiii. Brian W.: What about setting an indicator/action level to serve as a basis for action?
xxiv. James B.: Can base it on a regression analysis to relate N & P to chlorophyll-a. Can see a way to do this. Is there a benefit though over just having chlorophyll-a criteria?
xxv. Brian W.: Threshold approach may be applicable to protecting downstream uses in HRL. If we see N & P higher than what we want in the lake, we'll know that it can lead to issues downstream.
xxvi. Mike O.: I can see this. Further impact downstream will be impacted by increased loading.
xxvii. Jim H.: Nutrient strategies involve many stakeholders and can drag out. Meanwhile loads increase. How might criteria be helpful to provide short-term benefits while working on site-specific criteria over time?
xxviii. Connie B.: Permitting group would say that N & P criteria would make it easier, but Chesapeake does provide for an alternate approach. Don't want to say that we need N & P but we want to see improvements.

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xxix. Clifton B.: Interesting in how this helps permit writers. In rivers could do a simple mixing calculation to get to a number. Still would need modelling for downstream.

xxx. Jim H.: We are working with a relatively data rich water body in HRL. Is it appropriate to apply this discussion to lakes state-wide? Might be better to look at a broader collection of lakes. What is the goal now?

xxxi. James B.: Considering HRL, to get to N & P we need to consider the entire watershed, load allocations, etc. and work with that information for a time. That is beyond what the SAC should take on. How do we get to N & P from where we are now? Might be better for the CIC to weigh in? It seems sticking with chlorophyll-a is better for right now.

xxxii. SAC members agree that deciding whether to do N & P criteria needs to be determined on a site-specific basis and that for HRL they are not in favor of working toward N & P criteria.

1. Rational: For HRL, the information that is needed to get to appropriate N & P criteria would require a watershed model to develop load allocations to equitably establish load restrictions.

xxxiii. Connie B.: Remember that the establishment of standards is only to consider scientific information, not cost.

xxxiv. James B.: This is what is done for nutrient management strategies.

xxxv. Clifton B.: Different combinations of N & P cause different problems. You need to determine what those combinations are.

xxxvi. Connie B.: We need to do things in a specific way for the Environmental Management Commission and Committee.

xxxvii. James B.: If the goal is to protect the water body there may be a different way to get there. To determine what the limits are would require considering cost. Don't think this is a science decision, it is a policy decision.

xxxviii. Connie B.: If N & P criteria could be established as a range that would be a more holistic option for us. Can we work around this thought?

xxxix. Hans P.: There are also a lot of other issues in HRL that will factor into what N & P criteria would be. Ex: nitrogen fixation. How much N is fixed plays into cost estimations.

xl. Jim H.: A curve can be generated from the HRL model. If any point on that curve is no better than any other point is establishing a range appropriate from a regulatory perspective?

xli. Lauren P.: Can loading be calculated from the curve?

xlii. James B.: Sensitivity of the system to loading is variable. The translator between chlorophyll-a and N & P is difficult to determine.

xliii. Lauren P.: Can we establish bounds for HRL?

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xliv. James B.: Can use percent reduction to get to a desired water quality endpoint by trading off N & P. Possible to get multiple models but because plankton response to nutrient loading varies due to conditions in the lake (especially light reduction due to turbidity) the models would produce a cloud as opposed to a line.

xlv. Lauren P.: This would be good information for Connie.

xlvi. Clifton B.: Specific considerations include: hydrologic variability, residence time complexities, uncertainty & variability regarding chlorophyll-a linkages, concerns over implementation flexibility, lack of technical benefits.

xlvii. Hans P.: Regarding uncertainty, can that come back to haunt us. Why didn't we do an uncertainty analysis?

xlviii. Jing L.: All of these are reasons to not have N & P criteria, but if there is a conflict between chlorophyll-a and N & P what's missing is considering protections for downstream uses because we don't have a tool to correlate the upstream and downstream uses. We have chlorophyll-a that is protective of HRL but it does not address conditions downstream.

xlix. Clifton B.: We don't know if the proposed chlorophyll-a criteria is or isn't protective of downstream uses. Would need more information.

l. Jing L.: We have several impairments from the 2016 3030(d) list in the downstream reservoirs. Need to acknowledge that the proposed HRL chlorophyll-a criteria is not going to be protective of downstream uses.

li. James B.: Don't see that as part of a justification for not establishing N & P.

lii. Lauren P.: Important to note that it's not that the SAC is commenting that it is not important to establish N & P for HRL, but rather we are saying that there is not enough information available to make that decision.

liii. Clifton B.: Also, that there are other things to take into consideration.

liv. DWR will work with this and send out something for the SAC to review.

viii. Wrap up

a. For the next SAC meeting James B. will provide an update on the status of the HRL chlorophyll-a draft proposal document.

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