NC Nutrient Criteria Development Plan – Criteria Implementation Committee
6/14/2018

Attendees

SAC members in attendance:

Andy McDaniel
Anne Coan
John Fear
Douglas Durbin
T.J. Lynch
Douglas Wakeman
Bill Kreutzberger
Keith Larrick (Anne's alternate)

CIC members online:

Carla Seiwert

SAC meeting facilitator:

Andy Sachs

NCDEQ DWR staff in attendance:

Brian Wrenn
Mike Templeton
Connie Brower
Pam Behm
Christopher Ventaloro
Jeff Manning
Nora Deamer
Tammy Hill

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.

Meeting notes

All questions, comments and answers are paraphrased

1. **Convene** (Andy Sachs)
    a. CIC members, DWR staff and audience attendees provide names and affiliations.
    b. Desired outcomes:
        i. Questions/comments:
            1. Anne C.: Is the SAC pH proposal an action item for the CIC today?
                - Andy S.: The goal today is to make sure that all CIC members understand the proposals.
            2. Andy M.: Can CIC members assign an alternate?
                - Andy S.: Yes.
                - Andy M.: Assigns Brian Jacobson as his alternate.

c. Request for comments on previous CIC meeting minutes
    i. No comments from CIC members.

2. **SAC update** (Brian Wrenn)
    a. Recap of recent SAC activity
        i. Twenty meetings to date. HRL has been focus of discussion.
        ii. CIC members have been provided SAC proposals for pH and chlorophyll-a criteria. SAC has been focused on these criteria since around the time of the last CIC meeting.
            1. Quick review of the chlorophyll-a proposals:
                - These have not been finalized by the SAC
                - SAC is still discussing averaging and assessment of potential criteria
                - Clifton Bell provided two proposals:
                    i. Both are based on a state-wide concept and include an acceptable range of chlorophyll-a values with minimum and maximum limits to protect designated uses
                    ii. Determining the criteria for a lake would require a site-specific analysis.
                    iii. For HRL, recommends a magnitude of 40 ug/L for both proposals.
                    iv. Proposals differ as follows:
                        1. CB-1: magnitude = 40 ug/L, frequency = not to exceed more than once in three years, duration = seasonal geomean
                        2. CB-2: magnitude = 40 ug/L, frequency = not to exceed 10% with 90% confidence, duration = multiple year geomean
                    v. Spatial considerations: either use DWR's existing assessment segments or separate into three assessment units based on shared lake characteristics.
                    vi. Sample requirements for assessment:
                        1. CB-1: at least three years of data from at least five different months. The five different months is how DWR typically does growing season monitoring.
                        2. CB-2: ten sampling events within the five-month growing season period with at least two years of data.
                    vii. Other requirements: sampling to be done at twice Secchi depth.
                - Lauren Petter's proposal:
                    i. 30 ug/L as an arithmetic average of a growing season.

1. Continued discussion may result in the use of a geometric mean which would lower the magnitude accordingly.

ii. Growing season is May-October.
iii. Frequency: not to exceed more than once in three years
iv. Spatial considerations: uses existing DWR assessment units.
v. Sampling requirements: minimum of 1 grab sample per year to bolster DWR's rotating 5-year lake monitoring sampling schedule (lakes are sampled once every five years).

- Bill Hall's proposal:
  i. Magnitude: 40 ug/L based on protection of designated uses.
  ii. Duration: geomean of a growing season (May-October) average.
  iii. Spatial component: Combine all monitoring stations to get a lake average.
  iv. Sampling requirements: one sample per month minimum.
  v. Other requirements: sampling to be done at twice Secchi depth.
  vi. Deterioration of conditions is addressed by antidegradation rules.
- Existing chlorophyll-a water quality standard:
  i. Magnitude = 40 ug/L as an instantaneous value.
  ii. Assessment = not to exceed in 10% of samples with 90% confidence.
  iii. Sampling requirements: minimum of 10 samples for assessment.

2. The most recent SAC meeting was focused on these discussions and we hope to have a write-up for the July meeting.

b. Comments/questions:
   i. Anne C.: When talking about the spatial component is that the assessment segments?
      1. Brian W.: Yes, but can also include things like photic zone sampling.
   ii. John F.: The SAC's job is to develop defensible criteria to protect the uses. Is part of the SAC's job to also restore uses?
      1. Brian W.: This hasn't been a focus of the SAC, but it is something they can look at.
   iii. Douglas D.: How does DWR look at water quality standards versus the assessment methods? What's the difference? There seems to be some disagreement amongst

the SAC member between what they want to establish as criteria versus what DWR does via assessment.

1. Brian W.: We try not to limit the SAC in what they discuss. We will only chime in when we feel that what they are proposing would likely pose big problems for us.

iv. Douglas D.: I have some concerns about the interpretation of these proposals. Assessment could end up varying depending on which parameter is being discussed. Why would we assess differently for pH versus chlorophyll-a?

1. Brian W.: We do not currently have consistency between the various parameters.
2. Andy M.: Are assessment units defined in rule? Is there some guidance that can be referenced?
3. Brian W.: The assessment segments are based more on the location of our sampling stations.
4. Nora D.: Cam McNutt (DWR Assessment staff) has guidance document, but it is not in rule.
5. Andy M.: If the assessment is part of a rule it should be defined.
6. Anne C.: Follow-up to Doug's comment. Are the proposed criteria values something that can be affected by future changes to assessment methods? Ex: People have been saying that the existing chlorophyll-a standard was meant to be a geomean of a seasonal period. It was not enacted that way, though. How do we reassure that the science being used to create criteria remains associated with standards are eventually implemented?
7. Brian W.: The SAC is coming up with recommendations for nutrient criteria. Hopefully the context and intent behind any recommended criteria are captured in the meeting notes. If a SAC recommendation is adopted, it will need to be implemented as written.
8. Anne C.: Will want clarification on criteria and implementation.
9. Andy S.: The SAC is discussing magnitude, frequency and duration. Does that address you concerns?
10. Andy M.: The assessment plays a big role in what we are to consider for implementation. Ex: Falls and Jordan Lakes have drastically different nutrient reduction strategies. I feel that this is because of how the assessment methods were established.
11. Bill K.: Sometimes, understandably, the SAC jumps over to the implementation issues which are not necessarily part of the scientific discussion. Ultimately, considering the assessment units and methods is something that the CIC really needs to dive into. We need to discuss the implications of implementing the various suggested assessment units and methods. Ex: photic zone composite sampling has been suggested for chlorophyll-a sampling. The current standard is silent on this, though photo

zone sampling is a basic limnological method. We need to talk about as to whether this needs to be specified by the criteria.

v. Andy S.: SAC did a straw poll during the last meeting and Clifton's second proposal (CB-2) and Lauren's proposal were favored.
    1. Brian W.: There were also SAC members that liked parts of proposals, but not other parts.

3. **Recap of the role of the CIC in the NCDP** (Brian Wrenn)
    a. See presentation slides here
    b. Purpose:
        i. Review previous meeting highlights
        ii. Review purpose and duties of the CIC
        iii. NCDP flowchart
        iv. Criteria considerations and advisory examples
        v. Communication discussion
    c. Previous CIC meetings:
        i. August 5, 2015
            1. Ground rules & charter
            2. Interaction of SAC & CIC
            3. HRL introduction
            4. CIC priorities
        ii. September 25, 2015
            1. SAC update
            2. Presentation of nutrient criteria development case studies from VA & FL
            3. Presentation on NC's nutrient criteria implementation process
        iii. April 17, 2017
            1. Update on SAC
            2. CIC roles and responsibilities described
            3. Presentation of stakeholder analysis is support of HRL nutrient management strategy
    d. CIC purpose (per the CIC charter)
        i. "The purpose of the NCDP CIC will be to provide advice and recommendations to the DWR, on the feasibility, application, implementation and potential implications of nutrient criteria recommended by the SAC."
    e. CIC duties (per the CIC charter):
        i. Advise DWR on the social and economic implications of implementing proposed nutrient criteria, also the relative impacts of alternative criteria and nutrient management strategies.
        ii. Assist DWR with fiscal note preparation
        iii. Other duties as identified by the members of the CIC and the DWR
    f. CIC ground rules
        i. Refer to the CIC charter here

g. NCDP flowchart:
    i. See slides for NCDP flowchart and the flowchart demonstrating the interaction of the SAC & CIC with DWR and EMC.
h. SAC and CIC interaction:
    i. SAC has provided two proposals for pH criteria in HRL. The SAC could not get a supermajority on a single pH proposal and would like CIC input on the implementation of each pH proposal to help in their decision making going forward.
    ii. Any comments that the CIC can provide will go back to the SAC to be considered as part of their reevaluation of the pH proposals.
    iii. Once the SAC has voted on a final pH criterion proposal, this proposal will come back to the CIC for further implementation review.
i. CIC deliverables
    i. CIC needs to decide on the form that they want their comments to take as they respond to the SAC.
j. Criteria considerations:
    i. SAC efforts are currently focused on creating criteria specific to HRL, but these efforts will ultimately turn to recommending statewide nutrient criteria. CIC may want to keep this in mind as they evaluate any proposals from the SAC.
k. Comments/questions:
    i. Andy M.: Without consensus between the SAC and the CIC, any criteria proposed for adoption as a water quality standard would be a weak proposal.
        1. Brian W.: Keep in mind that the input from the CIC will also be used as part of the greater stakeholder process for standards development.
    ii. Andy M.: How will the CIC provide comments on this proposal?
        1. Brian W.: For example: The SAC looked at the scientific literature and in-lake data to develop criteria proposals. Was that a valid process?
        2. Andy M.: I think we need a statement on this from the SAC. Heard this in the chlorophyll-a discussion, but not the pH discussion.
        3. Anne C.: Agree with Andy. The message has been that this is specific now HRL. Need guidance from the SAC to be able to discuss this.
        4. Connie B**.:** This is appropriate to ask of the SAC. They need to be clear in their proposals whether they are recommending site-specific or statewide criteria. Also, we will ultimate need to address nitrogen and phosphorous criteria.
        5. Bill K.: Andy is right. I also anticipate there will be dialog on this between the CIC and SAC. How we leap from three specific water body types to statewide criteria is not clear yet.
    iii. Andy M.: We can't do a cost-benefit assessment without a clear understanding of how the criteria will be implemented. We will need to make assumptions if it is not clear.

iv. Doug D.: It is critical to understand the cost benefit realities of any criteria. Gen-X is a good example: A lot more money is being spent to address this, but it is a worthy investment because it will help to protect human health.

l. Communication process with SAC:
   i. Meeting frequency: We are planning for the CIC to meet every other month, but we would like feedback from CIC members on the frequency of the meetings.
   ii. How does the CIC want to receive information from the SAC? Do you want to receive pH on its own? Would you rather have a more complete package that contains criteria proposals for multiple indicators?
   iii. Comments/questions:
      1. John F.: In favor of a more complete package so that CIC recommendations for one indicator are not contradicted by decision made for another indicator.
      2. Andy M.: Agree with John. Would like to see a bundle if it is likely that the criteria are not going to be implemented independently. It would be difficult for us to assess indicators individually if DWR is going to implement them together as a management strategy.
      3. Doug D.: There is also benefit for the CIC to receive this information as it is produced. This would allow us more time to synthesize the information.
      4. Anne C.: we need to have it both ways so that we can ask question along the process.
      5. Andy M.: There could be situations where it is appropriate to look at individual indicators as well.
      6. Doug D.: Just as an observation, I haven't heard the SAC discuss correlations between response variables and TN & TP.
      7. Brian W.: We have asked the SAC questions about how the proposed criteria might provide information on TN & TP criteria, but have not received answers to those questions yet.
      8. Andy M.: Are their expectations on CIC products? My impression is that the SAC will be allowed as much time as needed to make their decision. Will this be the same for the CIC?
      9. Brian W.: There is no set timeline for the process.

4. **SAC pH proposal memo and minority report** (Brian Wrenn)
   a. See presentation slides here
   b. Summary of pH proposals and minority report:
      i. Existing pH standard
         1. Detailed in 15A NCAC 02B .0211 (for freshwater)
         2. Magnitude: 6.0-9.0 SU
         3. Exceptions for swamp waters
      ii. Proposed pH criteria option #1
         1. Magnitude: 6.0-9.5 SU

2. Duration: 1-hour median (no explicit requirement for 1-hour monitoring; can be a single measure)
3. No spatial component
4. Frequency: Current DWR assessment methods

iii. Proposed pH criteria option #2
1. Magnitude: 6.0-9.0 SU
2. Duration: Time needed to perform pH profile of water column
3. Spatial: Arithmetic average of water column where DO is greater than or equal to 4.0 mg/L
4. Frequency: Current DWR assessment methods

iv. Minority report
1. Critique of pH option #1:
- Disagreement with health status on HRL
- Conclusions in the literature regarding fish species are not fully addressed by the proposals
- Lab values from literature do not consider synergistic effects of pH and other stressors
- Ammonia toxicity risk increases at two monitoring stations in HRL (YAD152C & YAD169B)

2. Critique of pH option #2:
- Disagreement with health status on HRL
- Allowance of pH levels above 9.0 SU is affected by the same critiques for option #1.

c. Comments/questions:
i. Doug D.: It seems odd that the pH criteria in option #2 applies only up to where the DO requirement is not met.
1. Nora D.: The intention was that any fish would be occupying that area with the higher pH anyway. As long as pH is good there, fish should be ok.
2. Bill M.: I second Doug's request to change this to mention the photic zone. The current pH standard applies spatially anywhere at any time. Would like to see profile data to see what area we see a high pH in. It would be good for us to understand the background.
3. Brian W.: We can pull data for this.
4. Jay S.: See pages 14 & 15 of the pH proposal document for the data.
5. Bill M.: We shouldn't immediately go back to the SAC with questions. We should first discuss amongst ourselves and determine if we need to go back to the SAC.
6. Doug D.: DWR could do that comparison and provide us a summary.

ii. Anne C.: Regarding the minority report, it did not discuss assessment methodology. The existing rule does not have a duration and frequency. Is the minority report based on current DWR assessment methods?
    1. Brian W.: Based on discussion with the authors it assumes current DWR assessment methods.
iii. Andy M.: The minority report states that a 1-hour median has a stronger scientific basis, but they allow for an instantaneous value. Why?
    1. Brian W.: Impact on staff time was a consideration.
iv. Andy M.: Regarding how the SAC votes on criteria proposals, is it a simple majority that is required?
    1. Brian W.: A super majority of 70% of the SAC members is required.
v. John F.: It is useful to have minority reports. The ammonia toxicity component was interesting. Need to know how this analysis was done and how it differed from the proposals.
vi. Doug D.: For option #1 there was discussion about how the median is better, but then option #2 proposed an arithmetic average. Why did the SAC come recommend both? In my opinion, going from 9.0 to 9.5 will require some major effort to get EPA buy in. Looking at option #2, this could be implemented within the existing standard just by changing how the data is collected. This is already being done for chlorophyll-a. You're already getting this data. Where you measure makes a big difference.
    1. Anne C.: I would just want to make sure we were there with the data.
    2. Brian W.: The photic zone is considered to be twice the Secchi depth. The sonde meter is read at each meter in this zone. We do this for DO and pH.
    3. Anne C.: Would this be written into the standard?
    4. Brian W.: That would be up to the SAC.
vii. Anne C.: In the minority report the frequency assumes the current DWR methods. This should not be assumed. It should be clearly stated.
viii. Andy M.: Regarding cost, there is nothing in either proposal that includes language that would be interpreted as a requirement on North Carolinians. The criteria proposals are more statement of goals that are to be met in the lake to maintain good water quality. There is no indication on how those goals should be met. How does DWR see this? We need to know this before we consider costs. Ex: one requirement could be that WWTP must keep discharge pH between 6.0 and 9.0 SU. What are other ways that regulations can be applied to achieve this goal?
    1. Brian W.: That depends on the scope of how this is applied. Ex: technology-based permit limits would not change. We could look at this more.
    2. Andy M.: I'm representing stormwater. Understanding how these criteria will be implemented is important in considering potential costs. The standards are essentially goals for what the state wants the water quality

to be. The requirements tied to achieving those goals are where the costs come in. We don't have that defined yet for these proposals.

ix. Anne C.: On page 25 of the pH proposal document it states that multiple measurements within one hour are not required to satisfy the duration requirement. Should that read that instantaneous readings are not allowed?
    1. Brian W.: It was written that way to not burden field staff.
    2. Andy M.: It should be written to say that instantaneous values can be used due to fiscal concerns.
    3. Doug D.: The sondes are averaging as part of how they make measurements.

x. Anne C.: Criteria assessment can also rely on third party data. Do these groups follow DWR SOPs?
    1. Brian W.: No, but we do approve their methods.

xi. John F.: Do the SAC members have a preference between the two pH proposals?
    1. Brian W.: It is very close. Some SAC members wanted to wait for CIC comments prior to choosing.

xii. T. J. L.: How the criteria are implemented is important. It seems that option #2 would be the easiest to implement.

xiii. Doug D.: The minority report said two things. (1) Either proposal results in a lessening of the current pH standard for HRL and (2) The proposal misrepresent the science to say that the roll-back is appropriate. I am working to understand this more. Will there be more experiences of expensive impacts to the designated uses?

xiv. T. J. L.: We have heard discussion of this in the SAC meetings. Raising the standard to 9.5 is to capture the lakes natural condition.

xv. Bill K.: That's been a key question in the SAC. It's a fine line between impairment and non-impairment. Leaning toward the spatial averaging of pH similar to chlorophyll-a. There is not a great correlation between pH and chlorophyll-a. I'm leaning towards option #2. Some states have raised pH to 9.5, but it may be hard to get agreement from EPA.

xvi. Carla S.: Raising pH to 9.5 SU would be tricky. Backsliding needs to be taken into consideration. For option #2, if putting this into an NPDES permit are we averaging an average? Need to look into this more.

xvii. Bill K.: Anti-backsliding is a permit issue not a water quality issue. It's not likely that the pH in the lake will impact permits. It would more likely impact any nutrient strategy that might be developed for HRL.

5. **Next steps** (Brian Wrenn)
    a. SAC looking for comments to indicate a preference between the two options.
    b. What timeframe will the CIC need to respond to the SAC?
    c. Comments/questions:

i. Doug W.: Regarding implementation, are we considering impact to staff as well as impact related to TN & TP?
    1. Brian W.: Considering implementation impacts to the whole regulatory perspective. From the DWR side, we'll provide a universe where we think impacts will occur. We would then want information from CIC on how this would impact day to day operations and costs.

ii. Doug D.: If talking about new criteria related to a response variable such as pH, we need to understand TN & TP because that is what the stakeholders have control of. Can we do a poll of CIC members to see what preferred proposals are?
    1. Brian W.: We can do a vote if CIC members are willing?
    2. John F.: Are we considering two or three proposals?
    3. Brian W.: The two proposals are official. The minority report is for informational purposes.
    4. Andy M.: There is a fundamental difference between the SAC and the CIC. The SAC represents the science. Several of us CIC members represent different sectors of stakeholders. Concerned about the CIC being required to provide a single viewpoint. We should give the SAC a full picture of how each sector is impacted. How do other members feel about this?
    5. Brian W.: The SAC along with DWR will have to weigh these impacts.

iii. Andy S.: Where are the CIC member leaning?

iv. John F.: Option #2. Don't like that it is tied to DO, would be better to use the photic zone. Don't like raising the pH maximum to 9.5 as it seems like backsliding.

v. Doug D.: Option #2.: Does not require a change from the current criteria. Can tweak current assessment method to get to this. Would still like additional information.

vi. T.J L.: Option #2.

vii. Anne C.: Leaning towards option #2 with the caveat that more information is provided on assessment and spatial components. Want specification written out. Concerned that EPA may not accept an increase to 9.5.

viii. Andy M.: From a stormwater perspective having a hard time understanding the difference without having information on how implementation would work.

ix. Doug W.: Need to hear more about the analysis used in the minority report. Can't decide right now.

x. Bill K.: Leaning toward a modified version of option #2. Agree with John about using the photic zone and should specify what pH criteria would apply to the area outside of the stated criteria zone. Need more information to understand the impact on data collection.

xi. Carla S.: Option #1 poses a problem with backsliding. For option #2, would need to see vertical water column data to assess how the criteria would impact the whole water body.

1. Brian W.: We will look at the vertical data to compare the photic zone vs. pH.

xii. Doug D.: Is it true that the proposals would loosen the existing standard and, if so, is that appropriate?
    1. Brian W.: Remember that the pH in HRL is the result of algal growth not industrial release. Likely won't see a change in the pH of the lake until TN & TP are addressed.

xiii. Anne C.: Does option #2 say what standard would apply outside of the DO zone?
    1. Brian W.: No. Algae are generating the pH problem in HRL. Outside of the photic zone there shouldn't be the potential for high pH.