

UNRBA Comments for Consideration
Draft Site-specific Water Quality Standards for High Rock Lake (HRL)
(Proposed Site-specific rule and Proposed 303(d) methodology as released ahead of the Criteria Implementation Committee meeting, 12/3/2020, attached)

The UNRBA appreciates DWR's ongoing support of the principles established in the Nutrient Criteria Development Plan. Moving forward with a site-specific standard for High Rock Lake is a positive action and reflects the robust database for the lake and the work of the SAC (Scientific Advisory Council). The scientific work of the SAC is extensive and represents a multi-year evaluation of High Rock Lake. The recommendations of the SAC provide well-considered contextual components that should be applied to the proposed site-specific standard proposed by DWR. The Association has closely followed the work of the Division, SAC and CIC. In this context and in the spirit of developing a proposal for High Rock Lake that reflects the extensive work that has occurred, we offer the following comments:

Comment 1

The Draft approach applies the site specific geometric mean chlorophyll-*a* standard to four classified segments. Each of these segments (NCAC 2B .0309 Schedule) includes vast areas of waters located in backwaters, dead end coves, shallow branches, and stream partials with very little drainage area. These waters do not reflect main lake conditions and should not be subject to the geometric mean site-specific criteria. These areas should be specifically excluded from geometric mean assessments for 303(d) purposes. Shallow and back-water areas should be evaluated using NC's narrative criteria. The SAC's site-specific criteria recommendation explicitly evaluated this issue. The SAC's recommendations were based on a spatial assessment context in their derivation of the criterion magnitude. In this context the SAC recommended that all sample results used to assess monitoring results against the recommended criteria be from open waters. The DWR Draft Criteria, as it is currently written, ignores the scientific evaluation and context provided by the SAC. Site-specific standards provide the opportunity to incorporate the geological and morphological characteristics of the lake. Backwaters, shallow waters, coves, and poorly flushed areas provide a nurturing habitat for growing chlorophyll-*a* in quantities greater than the any numerical standards. The SAC was well aware of this condition. Site-specific standards for lakes and reservoirs have been utilized in many other states-including Minnesota and others. It is therefore appropriate for NC to include this critical scientific **context** as recommended by the SAC explicitly within the site specific standard (as quoted from the SAC report):

“Monitoring locations in backwaters, isolated coves, or where water depth is typically shallow (e.g. <10 feet) would be evaluated based on narrative criteria but excluded from the calculation of the chl *a* geomean for open waters based on the expectation that such data are not representative of the data used to develop the criterion itself.”

Index Numbers 12-(108.5), 12-(114), 12-117-(1), 27 12-117-(3), and 12-118.5]

12-(108.5) YADKIN RIVER

(including upper portion of High Rock Lake below normal operating level)

From mouth of South Yadkin River to a line across High Rock Lake from the downstream side of mouth of Crane Creek to the downstream side of mouth of Swearing Creek

12-(114) YADKIN RIVER (including lower portion of High Rock Lake)

From a line across High Rock lake from the downstream side of mouth of Crane Creek to the downstream side of mouth of Swearing Creek to a point 0.6 mile upstream of dam of High Rock Lake, except for the Abbotts Creek Arm of High Rock Lake upstream of Davidson County SR 2294 and that portion of Second Creek Arm of High Rock Lake from source to a point 1.7 miles downstream of Rowan County SR1004.

12-117-(1) Second Creek Arm of High Rock Lake

From source to a point 1.7 miles downstream of Rowan County SR 1004

12-117-(3) Second Creek Arm of High Rock Lake

From a point 1.7 miles downstream of Rowan County SR 1004 to High Rock Lake

12-118.5 Abbotts Creek Arm of High Rock Lake

From source at I-85 to Davidson County SR 2294

Comment 2

A number of states, with EPA approval, have establish site-specific monitoring locations or averages from several monitoring locations explicitly within their site-specific standards to evaluate compliance with 303(d) determinations. This approach provides simplicity and understanding. We specifically note the site-specific application to 6 lakes in Georgia, 39 Reservoirs in Alabama, Pickwick Reservoir in Tennessee, and other applications in EPA Region IV. The use of non-representative, randomized, or “selective” sampling methods can be of concern. Site-specific standards provide the opportunity to establish appropriate approaches for determining compliance.

Comment 3

One of the advantages of site-specific standards, unlike state-wide or regional standards is that site-specific standards provide an opportunity to define assessment methods based on scientific knowledge of a particular lake and its morphological and limnologic characteristics. The database for High Rock Lake is extensive and represents an extensive water quality understanding of this reservoir. The proposed 303(d) assessment methods for High Rock Lake do not fully reflect this extensive work and are potentially very misleading. The SAC recommendation on sample size, as provided in the Council’ report, “is intended to serve as an indicator of average algal growth during the growing season.”

“Therefore, the SAC recommends sufficient data be collected to provide a representative average for the growing season, including samples collected in at least five different growing season months for each year of data included in the analysis.”

As stated in the proposed language provided for the 303(d) assessment methods, “**Growing season geomean calculation requires a minimum of 5 samples per growing season, collected during 5 separate months**”. This definition inadequately provides for representative sampling and further promotes rather selective sampling. As written, the proposal allows minimum data requirements to be achieved by sampling one location (any location) once in each of five different months.

Comment 4

The 303(d) proposed methodology is a concern.

“At least 2 full growing seasons are needed to make listing or delisting decision. Data can be augmented if there is only 1 growing season in current data window. To augment, step year by year back until there are a total of 2 years of geomeans including the current data window, only as far as previous 5 years”.

The goal appears to be the opportunity to maximize waters on the 303(d) impaired list. In conjunction with the current minimum sample size, it would only take a total of 10 samples over two different assessment periods to provide a “two-growing season” assessment. The samples would not even be required from the same location or even from a group of “representative locations”. This approach provides for selective sampling bias and non-representative results. The application of a site-specific standard offers a great opportunity to provide site-specific compliance context without variations in unforeseen interpretations or segment changes based on highly variable monitoring results. Unforeseen interpretations can be avoided by including well-constructed context on how data should be collected to evaluate compliance with the site-specific standard(s).

Comment 5

It could be agreed that based on SAC recommendations, impairment (303d) decisions based on a number of water quality monitoring locations within the open waters (greater than 10 feet in depth) each sampled monthly for five months and resulting in geometric means >35ug/L for at least 2 years within a five-year assessment period may likely represent excessive productivity. However, the current proposal provides for a non-representative monitoring strategy to list waters – as worded this is over-protective. The SAC found the waters of High Rock Lake to be meeting the designated uses. A number of states are now incorporating combined narrative eutrophic impact factors as a means of adding more assessment certainty to the very uncertain establishment of numerical chlorophyll-a standards. The SAC approach is designed to avoid both type one and type two errors in listing waters.

Comment 6

Both the proposed water quality standard and the proposed 303(d) method fails to establish the site-specific approach to establishing segments (and monitoring locations). This is a significant lost opportunity in the context of 4 decades of site-specific knowledge of High Rock Lake. This rulemaking is an appropriate time to improve this situation. Segmentation decisions should not be based on the high degree of variability of chlorophyll-*a* data susceptible to severe changes in climate and hydrology. Site-specific segmentation should be based on information related to the geological and limnologic characteristics of High Rock Lake and the management and classification of High Rock Lake.

Comment 7

DWR should provide a technical support document in addition to the SAC report. The Division’s proposal needs to be related to the SAC report. For example, the SAC recommended excluding “monitoring locations in backwaters, isolated coves, or where water depth is typically shallow (e.g. <10 feet)” from the calculation of the chl *a* geomean for open waters”. No justification is provided on why DWR did not follow all of the SAC recommendations. Chlorophyll-*a* is not a toxic substance, does not indicate algal toxin issues, nor does it provide

for a measure of designated use attainment. Chlorophyll-*a* is an indicator of algal growth. The shallow, backwater areas are highly prized habitat and forage for fish that rely upon high biological productivity. There are approximately 2,000 species of cyanobacteria and only about 50 species are thought to be capable of producing toxins (<3%). Appropriately, the SAC concluded that “cyanobacterial abundances (or chl *a* concentrations) are not reliable indicators for the presence of cyanotoxins since not all species within a genus produce these substances and those that can, do not do so continuously (e.g., Kaebernick and Neilan 2001; Loftin et al. 2016)”. The SAC did not include locations in backwaters, isolated coves, or where water depth is typically shallow (e.g. <10 feet) as part of their method to derive the recommended site-specific standard – thus these waters should be excluded. The NC narrative criteria are sufficient to provide adequate protection for these waters. This approach is consistent with the scientific understanding of the SAC to focus the criterion development on longer-term measures of the reservoir’s trophic state. Scientifically, the SAC determined that there is a lack of clear nutrient-driven acute effects in High Rock Lake. This approach is also consistent with the original intent of NC’s 1979 water quality standards development process.

² The chair of the advisory group that recommended North Carolina’s existing chl *a* criterion confirmed the intent of the 40/15 standards were based on “growing season” averages and not any time / any place standards (Mike McGhee, elec. comm., May 10, 2009).

Nutrient Criteria Development Plan
Criteria Implementation Committee Members

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Draft Site-specific Water Quality Standards for High Rock Lake (HRL)
Proposed changes being presented to the NC NCDP CIC for HRL Site Specific Standards

4 **15A NCAC 02B .0211 FRESH SURFACE WATER QUALITY STANDARDS FOR CLASS C WATERS**
5 In addition to the standards set forth in Rule .0208 of this Section, the following water quality standards shall apply
6 to all Class C waters. Additional standards applicable to other freshwater classifications are specified in Rules .0212,
7 .0214, .0215, .0216, .0218, .0219, .0223, .0224, .0225, and .0231 of this Section.

8 (1) The best usage of waters shall be aquatic life propagation, survival, and maintenance of biological
9 integrity (including fishing and fish); wildlife; secondary contact recreation as defined in Rule .0202
10 of this Section; agriculture; and any other usage except for primary contact recreation or as a source
11 of water supply for drinking, culinary, and food processing purposes. All freshwaters shall be
12 classified to protect these uses at a minimum.

13 (2) The conditions of waters shall be such that waters are suitable for all best uses specified in this Rule.
14 Sources of water pollution that preclude any of these uses on either a shortterm or -longterm- basis
15 shall be deemed to violate a water quality standard;

16 (3) Chlorine, total residual: 17 ug/l;

17 (4) Chlorophyll a (corrected): **except as specified in Sub-Item (a) of this Item**, not greater than 40 ug/l
18 for lakes, reservoirs, and other waters subject to growths of macroscopic or microscopic vegetation
19 not designated as trout waters, and not greater than 15 ug/l for lakes, reservoirs, and other waters
20 subject to growths of macroscopic or microscopic vegetation designated as trout waters (not
21 applicable to lakes or reservoirs less than 10 acres in surface area). The Commission or its designee
22 may prohibit or limit any discharge of waste into surface waters if the surface waters experience or
23 the discharge would result in growths of microscopic or macroscopic vegetation such that the
24 standards established pursuant to this Rule would be violated or the intended best usage of the waters
25 would be impaired;

26 **(a) Site-specific High Rock Lake Reservoir [Index Numbers 12-(108.5), 12-(114), 12-117-(1),**
27 **12-117-(3), and 12-118.5] Chlorophyll a (corrected): not greater than a growing season**
28 **geometric mean of 35 ug/L in the photic zone based on all samples collected in a minimum**
29 **of five different months during the growing season. For the purpose of this Sub-Item, the**
30 **growing season is April 1 through October 31 and the photic zone is represented by a**
31 **composite sample taken from the water surface down to twice the measured Secchi depth.**
32 **Chlorophyll a shall not occur in amounts that result in an adverse impact as defined in 15A**
33 **NCAC 02H .1002.**

34 (5) Cyanide, total: 5.0 ug/l;

35 (6) Dissolved oxygen: not less than 6.0 mg/l for trout waters; for nontrout- waters, not less than a daily
36 average of 5.0 mg/l with an instantaneous value of not less than 4.0 mg/l; swamp waters, lake coves,
37 or backwaters, and lake bottom waters may have lower values if caused by natural conditions;

DRAFT

High Rock Lake
Site Specific Chlorophyll-a Criteria
Proposed Chlorophyll-a Assessment Methodology

(to be included in 303(d) Assessment Methodology for EMC Approval after the site-specific standard is approved)

October 28, 2020

Minimum Data requirements

1. Growing season geomean calculation requires a minimum of 5 samples per growing season, collected during 5 separate months.
2. At least 2 full growing seasons are needed to make listing or delisting decision. Data can be augmented if there is only 1 growing season in current data window. To augment, step year by year back until there are a total of 2 years of geomeans including the current data window, only as far as previous 5 years.

Impaired – at least 2 years Exceed Criteria

- If there is 1 growing season geomean in current data window – both current and augmented year exceed growing season geomean of 35 ug/L.
- If there are 2 or more growing season geomeans in current data window – more than 1 growing season geomean exceeds 35 ug/L.

Delisting (decision for a water already listed as impaired) – at least 2 years Meet Criteria

- If there is 1 growing season geomean in current data window – both current and augmented year do not exceed growing season geomean of 35 ug/L.
- If there are 2 or more growing season geomeans in current data window – zero years exceed growing season geomean of 35 ug/L. Unless there is a full 5 years of data – then zero exceedances in most recent 2 years of data (and maximum of one exceedance of geomean in 3 older years).