

Questions for SAC regarding pH proposals

• Option #1

- *If 1-hour median is scientifically defensible, why allow instantaneous reading? Should proposal read median or instantaneous?*

Response: The proposal is correct stating a 1-hour median. The 1-hour median would be calculated from multiple instantaneous measurements over an hour if they were available. If only a single measurement was available, it could be taken as representative of the 1-hour median for the purposes of determine individual exceedances. This is directly analogous to acute criteria for toxics, which are technically 1-hour averages but are usually evaluated with grab samples that represent a single point in time.

• Option #2

- *Could Option #2 be implemented under existing pH criteria?*

Response: The proposal already includes the statement, "Since the magnitude of the criterion is unchanged, this option could be implemented through a change in assessment methodology." (See, Draft at 2)

- *What is criteria for water column where DO <4.0 mg/L?*

Response: The criteria of 6 – 9 for pH would be unchanged and apply throughout the water column. Evaluation of attainment of the criteria would be limited to waters where DO is greater than or equal to 4.0 mg/L.

• General

- *What is the difference between the ammonia toxicity analyses conducted for the pH proposals and the minority report?*

Response: The analysis presented in the pH proposal was based on individual data point assessment (Figure 3-7 shows the observed ammonia concentration and pH versus the calculated chronic criterion for each data point). The minority report uses the same approach. The DWR evaluation referenced by the minority report (Lin 2017) used older (pre-2005) data, whereas the evaluation in the SAC report used data from 2005 and later. Also, the DWR evaluation evaluated individual stations, whereas the evaluation in the SAC report was reservoir-wide.

- *Why did proposals use different metrics for determining general tendency (median v. arithmetic mean)?*

Response: The two measures of central tendency originated from the two original proposals considered by the SAC. The SAC briefly discussed the concept of making them consistent, but ultimately chose to leave them as formulated.

Option #1 proposed the median for reasons stated in section 4.1.1:

... pH values are inherently logarithms, and the arithmetic mean of log-transformed values has somewhat different properties than the arithmetic mean as it is commonly used for non-log-transformed data. Although this does not invalidate the arithmetic mean as a measure of central tendency for pH, the median value is proposed as a more straightforward measure of central tendency for pH.

Option #2 used the arithmetic mean to retain information about the magnitude of pH above and below the criterion of 9.0 since the intent was to represent whether habitat was present with a lower chance of pH stress to organisms.

The SAC did not make a formal determination that either the median or arithmetic mean was a clearly preferred.

- *Proposal “assumes that North Carolina will apply its current practice of evaluating compliance using the 90th percentile and the 90-percent confidence level.” Shouldn’t this be explicitly stated in the proposal?*

Response: Good suggestion. Sections 4.1.4 and 4.2.4 of Frequency will be changed to read as follows (shown in redline):

Rather than an explicit frequency component (x allowable exceedances in y years), option #1 ~~assumes that North Carolina will apply its~~ is based on application of North Carolina’s current practice of evaluating compliance using the 90th percentile and the 90-percent confidence level.

The approach for frequency for option #2, as with option #1, is based on application of~~assumes that~~ North Carolina’s ~~would apply its~~ current practice of evaluating compliance with the pH criterion by using the 90th percentile and the 90-percent confidence level.