

# Comments on pH in Advance of September 2017 SAC Meeting

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DWR has requested that SAC members provide pH proposals for High Rock Lake (or agreement with previous proposals) by September 18, 2017. I previously provided a pH proposal dated March 17, 2017. The essence of the proposal is that at pH criterion of 9.5 (no averaging period) is protective of HRL uses, based both on the literature and lake-specific considerations. Specifically:

- The detailed scientific literature review supports the conclusion that pH = 9.5 is protective of non-salmonid fisheries and other aquatic life, absent toxicity by a pH-dependent toxicant such as ammonia.
- A review HRL-specific ammonia evaluation showed that exceedances rates of ammonia criteria were extremely low, even considering prevailing pH and the need to protect mussels and early life stages.
- HRL supports a robust fishery with no evidence of pH impacts to aquatic life.
- The HRL data demonstrate that attainment of pH=9.5 (effectively assessed as a 90<sup>th</sup> percentile) would not be associated with exceedances of pH = 10.0 or 10.5, where acute impacts might actually occur.

This is the proposal I continue to support, and would be consistent with criteria already approved for reservoirs in Georgia. However, in advance of the September 27 SAC meeting, I would also like to offer some observations on two alternative proposals.

## Comments on the 30-day Mean of 9.0

Data from HRL indicates that a 30-day mean pH of 9.0 is statistically similar to attainment of 9.5 with no averaging period, assessed as a 90<sup>th</sup> percentile. Figure 1 displays the 2016 surface pH data at YAD152C, which has the highest pH values in HRL. The relative metrics are as follows:

- pH never exceeded 10.0
- pH exceeded 9.5 at an 11% rate
- The 30-day running mean pH approached but never exceeded 9.0

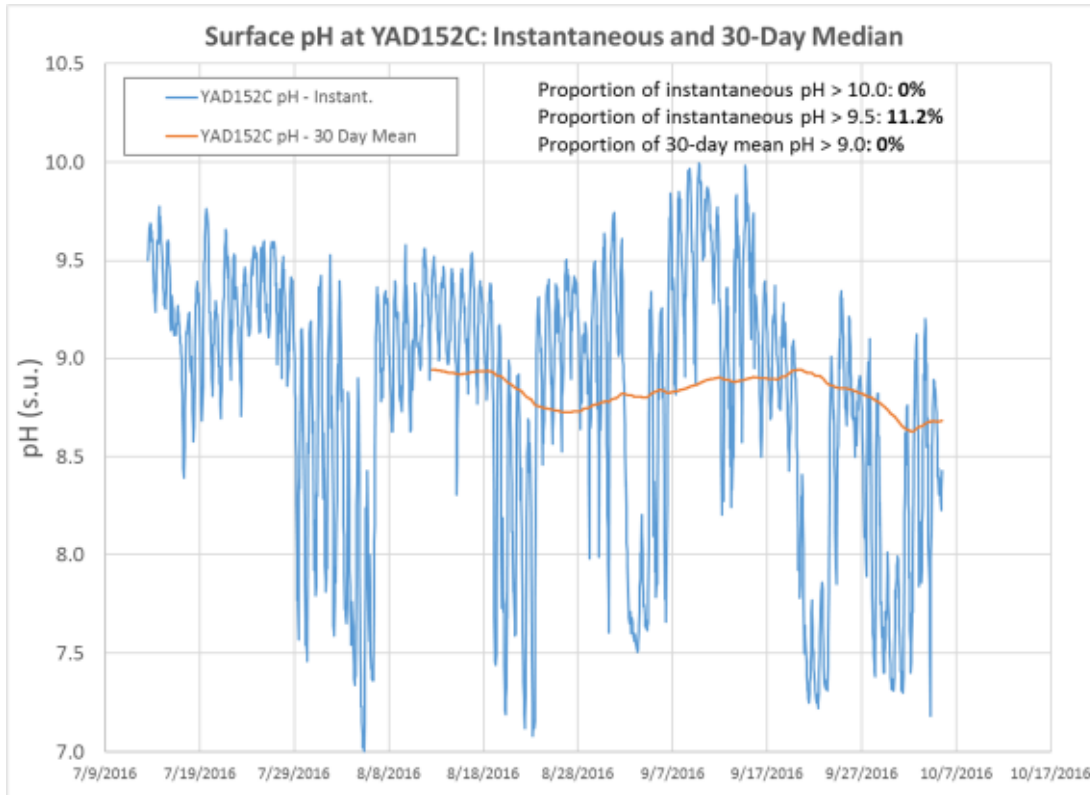


Figure 1 – Surface pH at YAD152C, July -October 2016

Based on this analysis, a pH (no averaging period) of 9.5 is slightly more stringent than a 30-day average of 9.0, but the difference is not large. With either metric, a station such as YAD152C would be close to the attainment threshold; either slightly above or slightly below. The lack of exceedances of pH = 10.0 should provide assurance that neither pH criteria alternative would allow short-term occurrences of conditions at which pH would have direct acute impacts.

The pH alternative of 9.5 (no averaging period) is still preferred to a 30-day criterion of 9.0, because it does not require special monitoring. However, the 30-day mean of 9.0 would be preferred to the existing criteria.

### Comments on 9.0 with Vertical Averaging

I concur with Marty Lebo's conclusion that vertical averaging is technically defensible, given the mobility of fish species, and would support a pH criteria proposal that uses vertical averaging. Consideration of the habitat available based on DO is important. I would still conclude that 9.0 is not the appropriate magnitude for a warmwater reservoir. However, to the extent that it partially ameliorates the overprotectiveness of the existing standard, 9.0 as a vertical average would be preferred to the existing 9.0 as a surface-only sample.