



Assessment Methods for 24-hour pH

Surface Water Quality Assessment Advisory Workgroup Meeting

Somerville Lake



Outline

- Background on pH in Texas Surface Water Quality Standards (TSWQS)
- TCEQ previous assessment method for 24-hour pH
- Other state assessment methods for 24-hour pH
- Case study: Somerville Lake (Segment 1212)
- Next steps

Background on pH in TSWQS

- *General Criteria (§307.4 of TSWQS) - Consistent with §307.1 of this title, pH levels in all surface water in the state must be maintained so as to not interfere with the reasonable use of such waters.*
- *Site-Specific Uses and Criteria for Classified Segments (§307.7 of TSWQS) - Site-specific numerical criteria for pH are established as absolute minima and maxima.*
- There are no 24-hour pH criteria

TCEQ previous assessment method for 24-hour pH

- Implemented assessment method 2008-2012 IR cycles (analogous to 24-hour DO min)
 - Somerville Lake became impaired for pH based on grab data. Projects were developed to collect 24-hour pH to determine if impairment remains or delists
 - The pH minimum and maximum for each 24-hour data set were recorded
 - All values were evaluated against the criteria and binomial was applied (>10% exceedance)

Other state assessment methods for 24-hour pH

- Reviewed 10 states that collect continuous/24-hour pH data to determine water quality standards attainment
- Many of these are long-term continuous stations

Assessment approaches for 24-hour pH

Daily Min/Max - Binomial 10%	Binomial 10% - 10% Rule	Rapid Changes in pH	Evaluation of Chronic pH
<ul style="list-style-type: none"> • Data evaluated using daily minimum and maximum statistics • Each daily value constitutes one sample • Impaired if >10% of the daily min/max values fall outside the appropriate criterion range according to the binomial test 	<ul style="list-style-type: none"> • Data evaluated using a daily statistic • Daily result is considered an exceedance when >10% of readings fall outside the specified criterion range according to the binomial test • Impaired if >10% of the daily results exceed criterion according to the binomial test 	<ul style="list-style-type: none"> • Data evaluated based on rapid changes • Impaired if a specified number of changes +/-0.5 pH units occurs within a specified period 	<ul style="list-style-type: none"> • Data evaluated using a chronic statistic (e.g., hourly, daily, or multi-day) • Chronic toxicity event if an entire period is outside criterion range • Impaired if a specified number or percentage of chronic toxicity events occur

Case study: Somerville Lake

- Assessment history
 - Impaired for high pH based on grab data in 2002, delisted 2010
 - No non-supports for pH grab data since 2008
 - Continuous/24-hour pH data collected between 2002-2004 and 2008-2010 to address grab impairment
 - Impaired for high pH based on continuous data in 2008
 - Carryforward on 303(d) list as continuous high pH impairment
 - Only continuous pH impairment in the IR
 - Currently no method established to assess 24-hour pH or delist impairment

Case study: Somerville Lake

- Consider developing assessment methods to implement in a future Integrated Report
 - Which assessment method is appropriate based on what was intended for pH in the TSWQS?
- Project to collect 24-hour pH data
 - Monthly sonde deployments at three stations
 - dam, mid-lake, upper lake
 - Collect data for up to 24 months

Next steps

- Somerville Lake project is underway
 - Data collection to occur through 2024
- We would appreciate feedback and input regarding 24-hour pH assessment methodology
- SWQM report back to Advisory Workgroup for the 2026 Integrated Report

Discussion

1. Develop method to evaluate Somerville Lake listing but do not implement statewide assessment/delisting methodology for 24-hour pH
2. Utilize the Daily Min/Max Binomial method (similar to 24-hour DO Min assessment methodology) that was implemented for the 2008-2012 IR cycles
3. Binomial 10% - 10% Rule
4. Rapid changes, Chronic toxicity, Other?