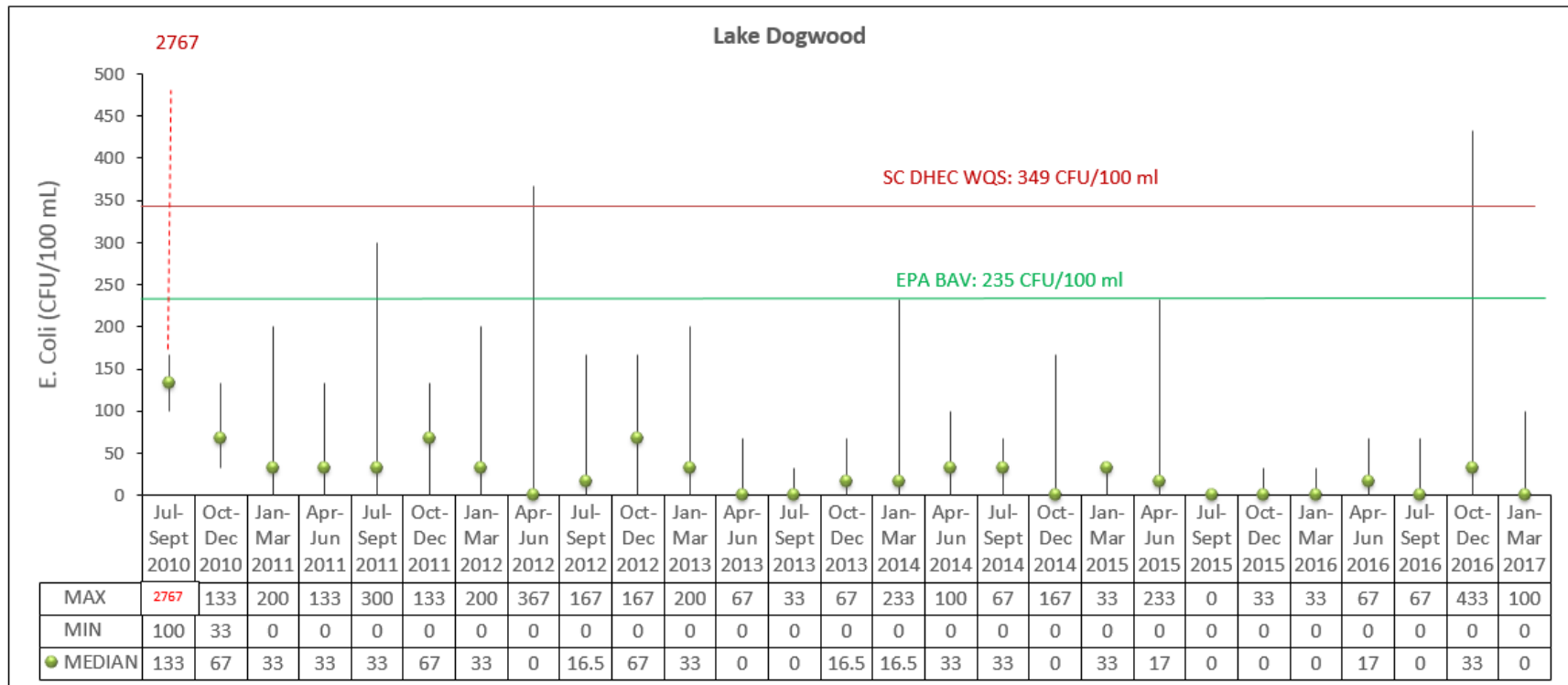


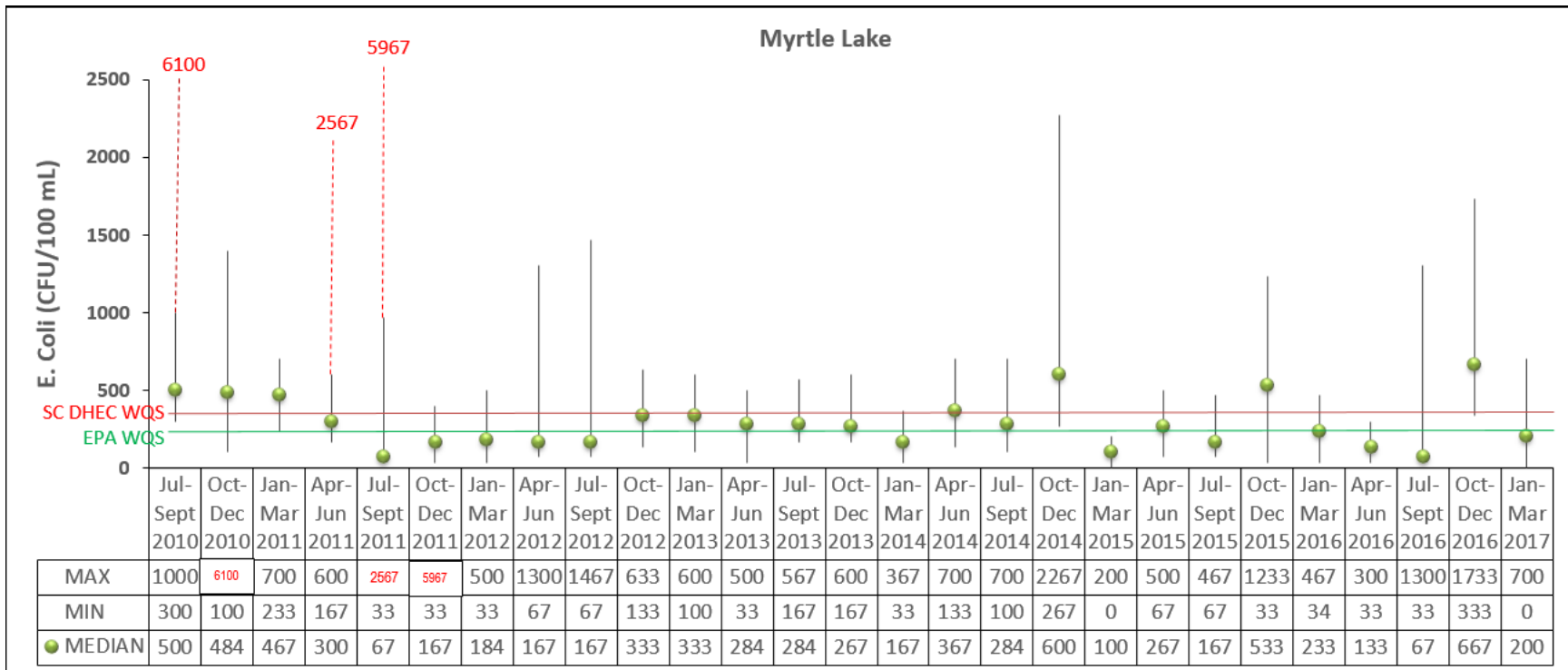
Surfside Volunteer Monitoring Summary Report

4/18/17

Lake Dogwood: E. coli remain low with a few exceptions. Most recently a high value on 12/6/16. This was traced back to a construction of new phase at Mallard Landing during which a sediment pond had to be drained to enable its expansion. This suspended fine grain sediments that discharged offsite. Ho Co asked them to install more sediment control devices. Bacteria adhere to particles, so more were transported with the sediment. See Lake Dogwood turbidity graph on page 5.



Myrtle Lake: Levels are episodically elevated, especially during Oct to March. These are conservative estimates.



Myrtle Lake E. coli results in context

Ken Harth has asked for guidance in explaining what these numbers mean for people who might want to recreate around Myrtle Lake. The following is a summary of what Dr. Libes provided:

The regulatory recreational water quality criteria updated by US EPA in 2012 removed guidelines on safety regarding relative levels of usage, i.e. "designated beach area" vs. "lightly used full body contact recreation". This was replaced with a single sample maximum value of 235/100 mL at a risk level at an estimated illness rate of 36 per 1000 primary contact recreators. This is called a beach action value (BAV).

In South Carolina, SC DHEC issues swimming advisories at sites that are designated beach waters when bacteria levels exceed a single sample water quality criteria of 349 E. coli /100 mL. If more than 10% of the samples exceed the criteria, a permanent (long-term) advisory is posted. SC DHEC explains how to use these advisories at <http://www.scdhec.gov/HomeAndEnvironment/Pollution/DHECPollutionMonitoringServices/BeachMonitoring/> as follows:

"We routinely collect water samples at more than 120 locations along South Carolina's beaches. If high numbers of bacteria are found, we issue an advisory for that portion of the beach. An advisory means that DHEC advises you NOT to swim in those areas. This is especially true for young children, the elderly, and those with compromised immune systems.

Advisories do not mean that the beach is closed. Wading, fishing, and shell collecting do not pose a risk. Advisories may be issued due to high bacteria counts or rainfall."

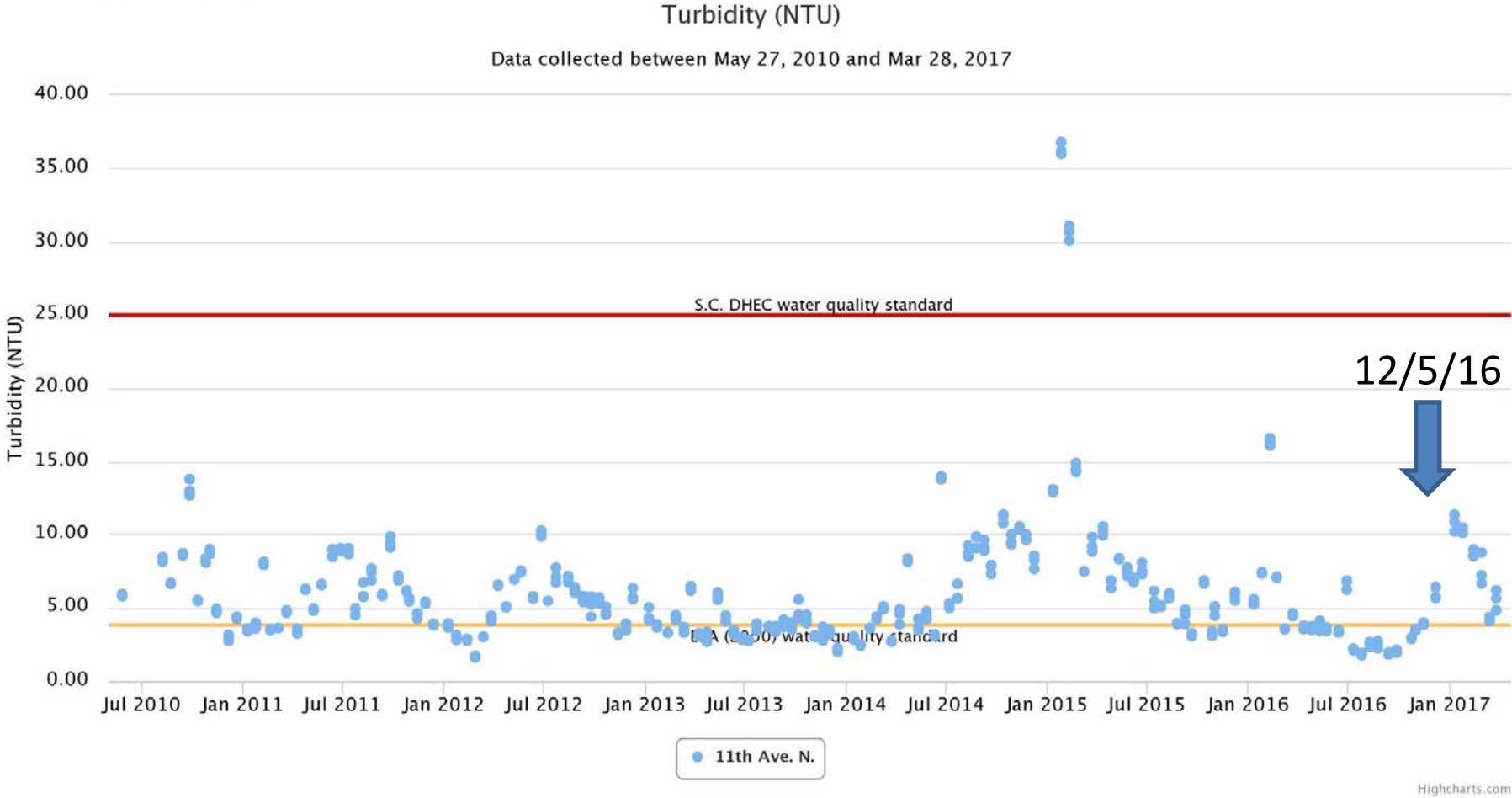
Note that Myrtle Lake is not classified by SC DHEC as a recreational water and therefore is not a designated beach monitoring site, but if we apply the SC DHEC water quality criteria, a permanent advisory would be posted. At <https://gis.dhec.sc.gov/beachaccess/help.htm>, SC DHEC provides the following instructions regarding recreating where long-term advisories are posted:

"Swimming is not advised within 200 feet on either side of the sign because high bacteria levels may be present, especially following rain due to storm water runoff. Wading, fishing, and shell collecting do not present a risk. Health problems typically come from swallowing the water."

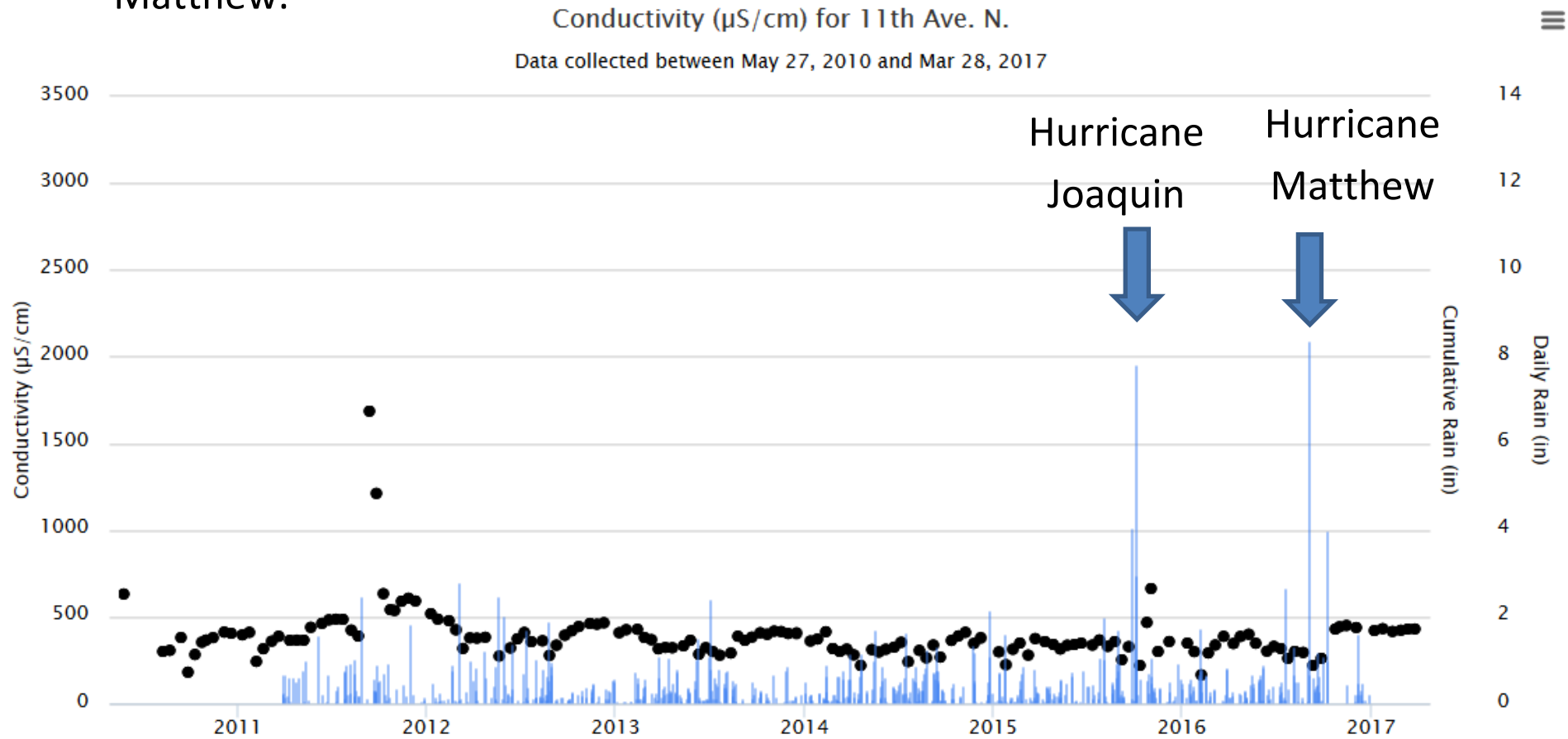
The last piece of quantitative insight I can offer is that we have no evidence of human-sourced fecal bacteria in Myrtle Lake based on the following: (1) during dry weather, E. coli levels are lower than the threshold at which a sewer line break would be suspected (>12,000 MPN/100 mL)*, (2) septic tanks or homeless people are not present in the Myrtle Lake catchment, and (3) genotypic assays performed in samples collected from Myrtle Lake in the summer of 2015 were negative for human-sourced *Bacteroides*. Finally, there is a significant non-human source of E. coli in Myrtle Lake, i.e. waterfowl including a resident Canada goose population.

*Values greater than 12,000/100 mL have only been reported twice and were from samples collected by CCU's EQL in 2015 during mid-ebb tide immediately following large rain events (≥ 2 "). The 12,000 MPN/100 mL threshold is from: https://www3.epa.gov/npdes/pubs/sw_idde_bacteria.pdf

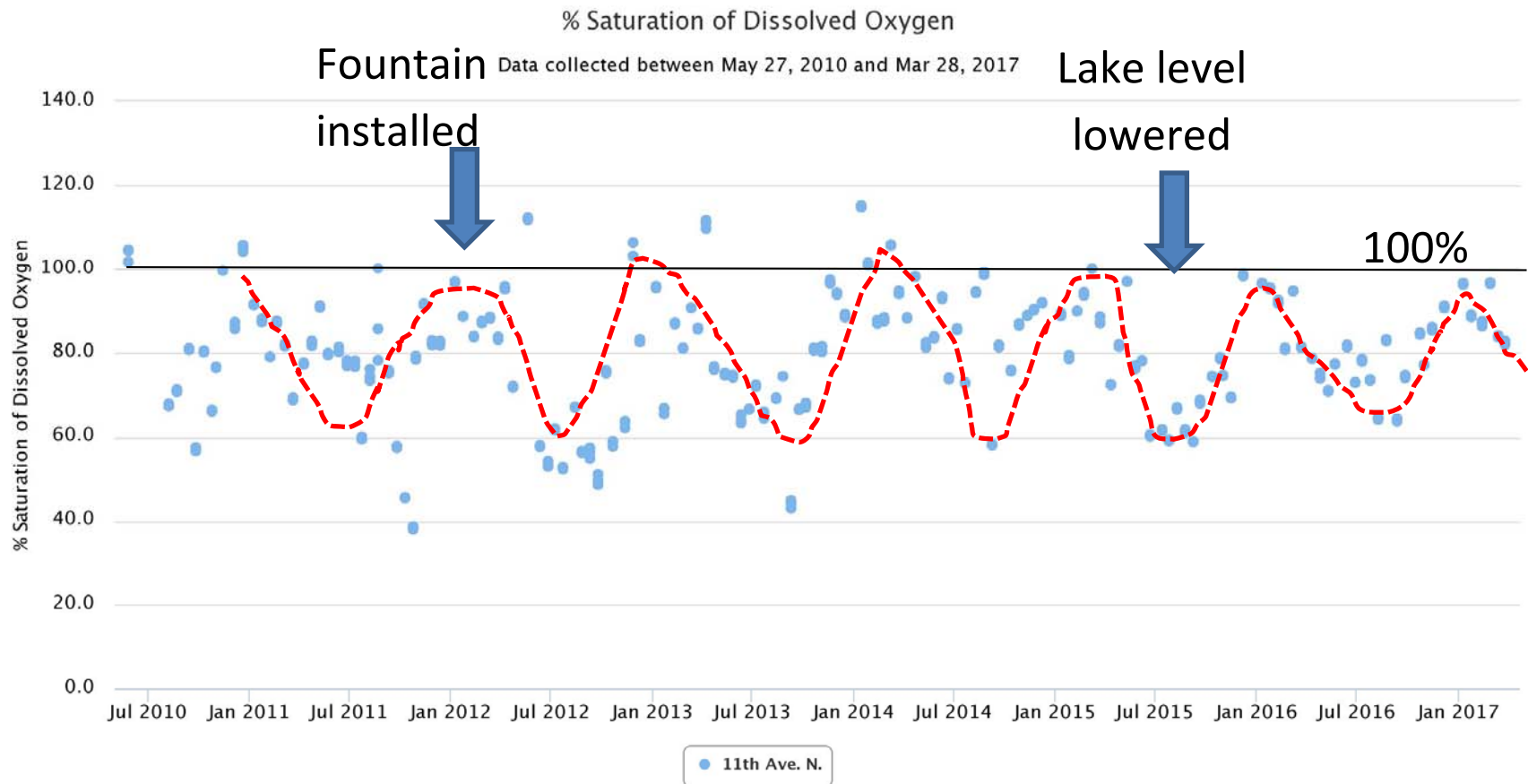
Lake Dogwood: Turbidity issue has recurred, but is much smaller than in Jan 2015



Lake Dogwood: Rises in conductivity shown are likely due to saltwater getting up into Lake Dogwood following Hurricanes Joaquin and Matthew.

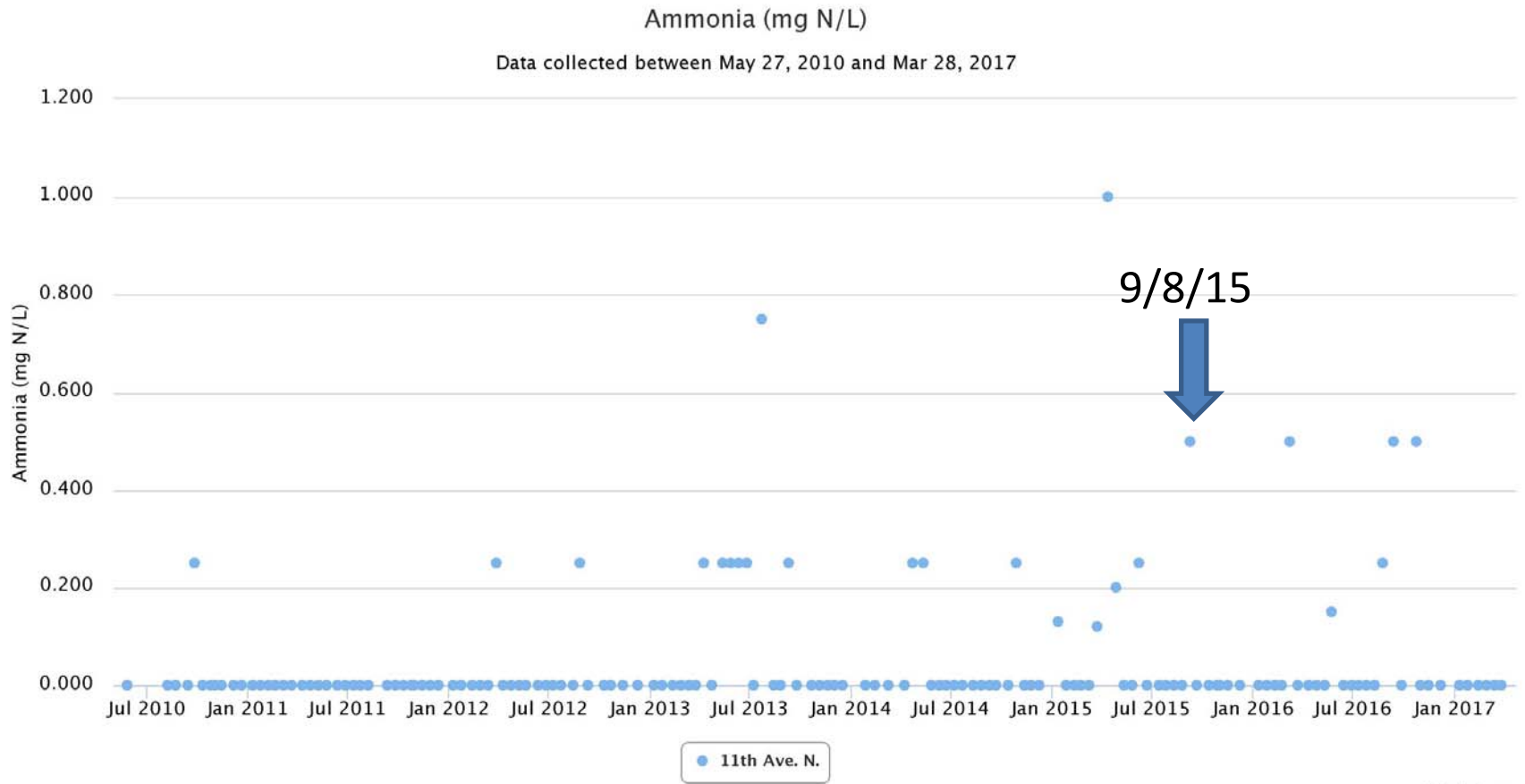


Lake Dogwood: Oxygen levels vary seasonally, even when corrected for temperature solubility effects. Suggests diminished aerobic microbial decomposition of detrital organic matter when temperatures are low. Summertime oxygen levels seem to be improving.

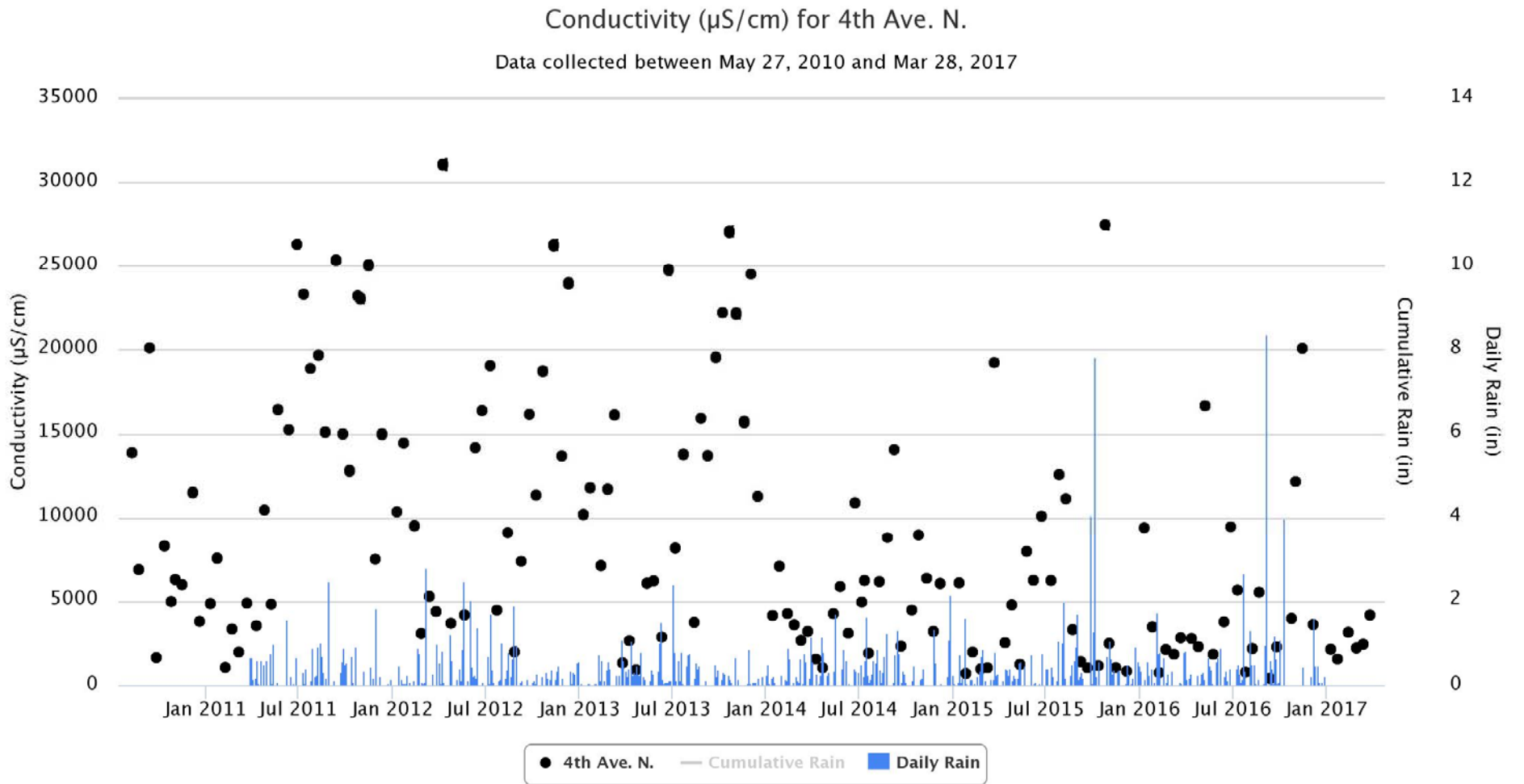


Highcharts.com

Lake Dogwood: Ammonia levels have been episodically elevated at higher levels since 9/8/15.

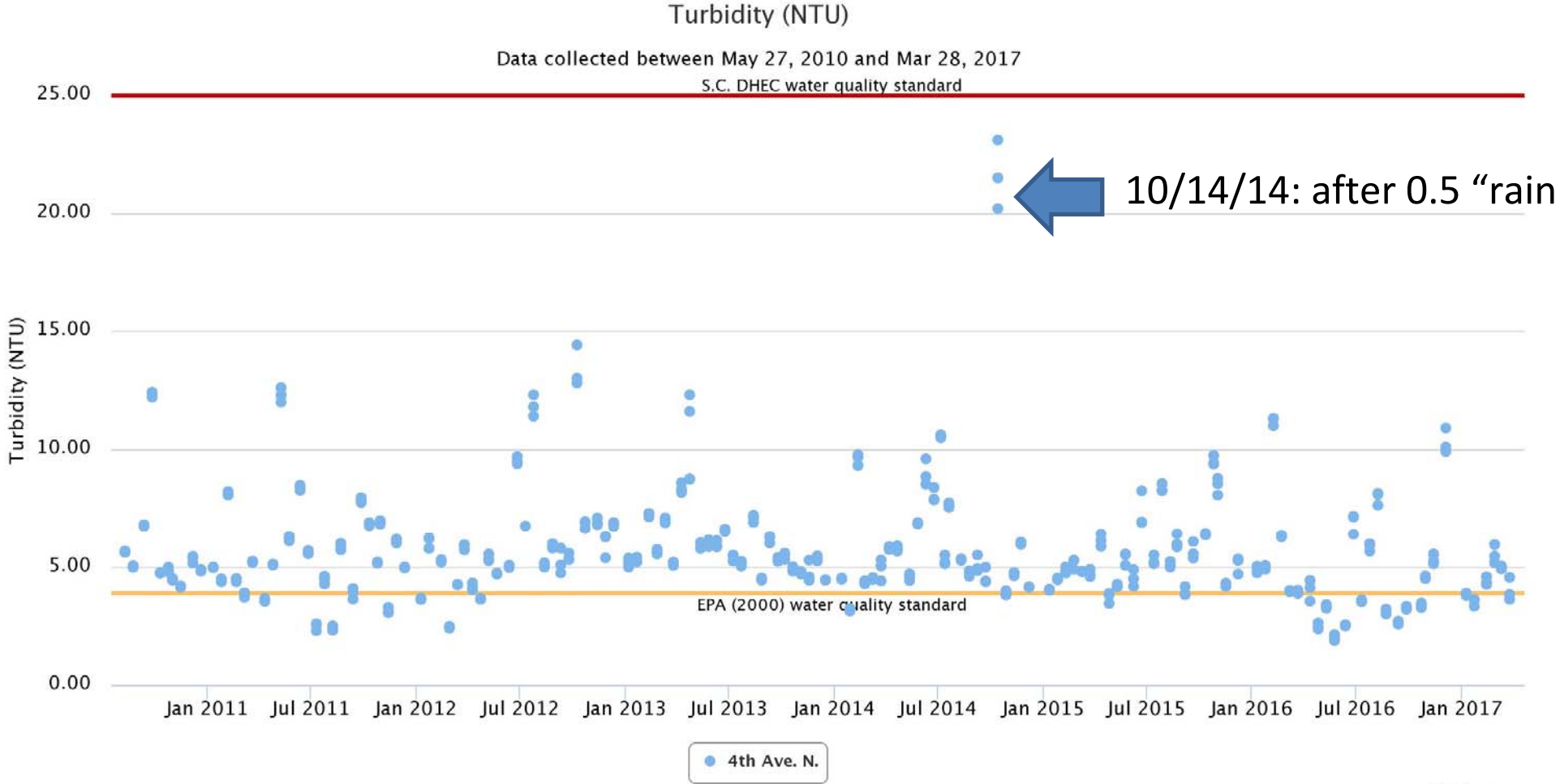


Myrtle Lake: Conductivity has been declining since 2013, due to increased rain fall.



Highcharts.com

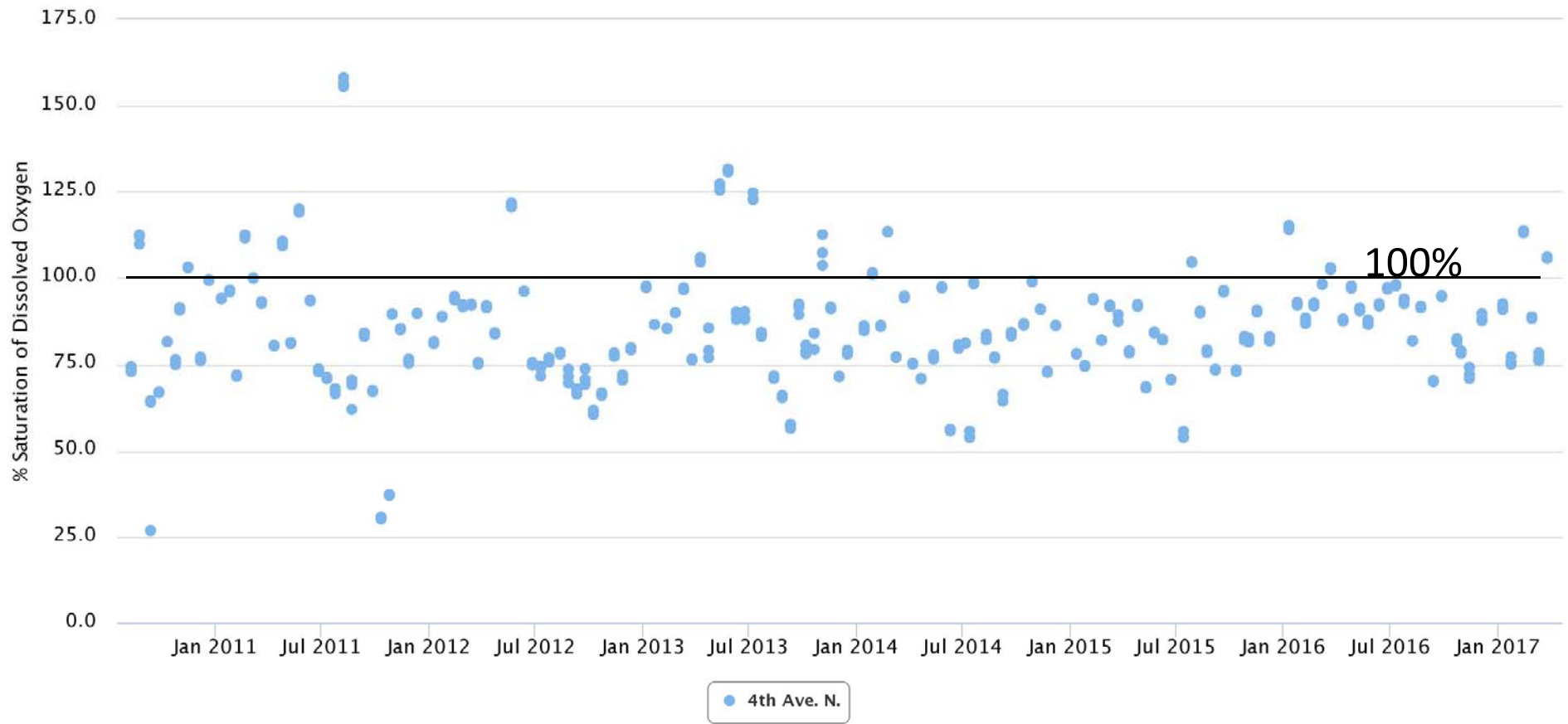
Myrtle Lake: Range in turbidity is about the same as in Lake Dogwood



Myrtle Lake: No strong seasonal signal at this site.

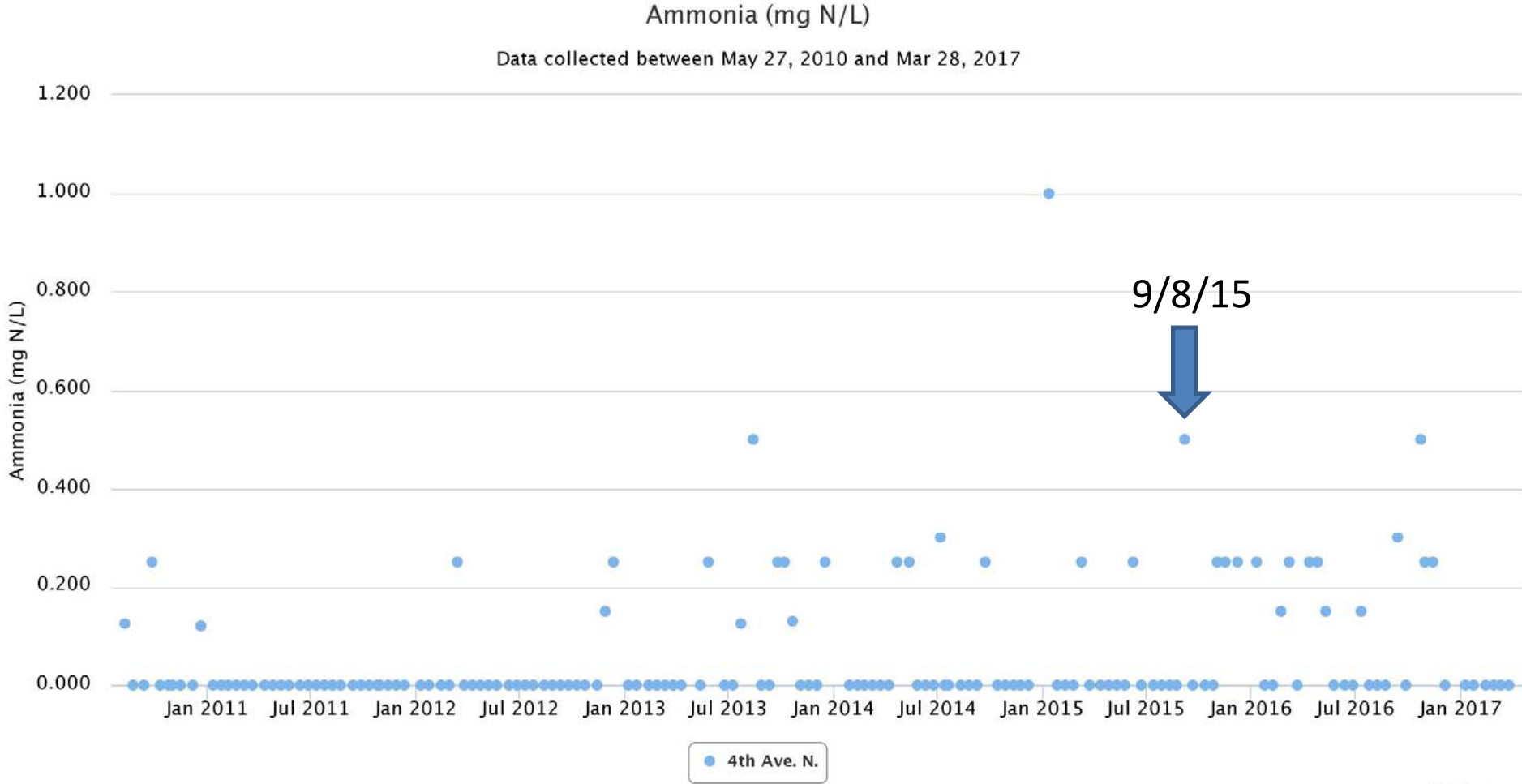
% Saturation of Dissolved Oxygen

Data collected between May 27, 2010 and Mar 28, 2017

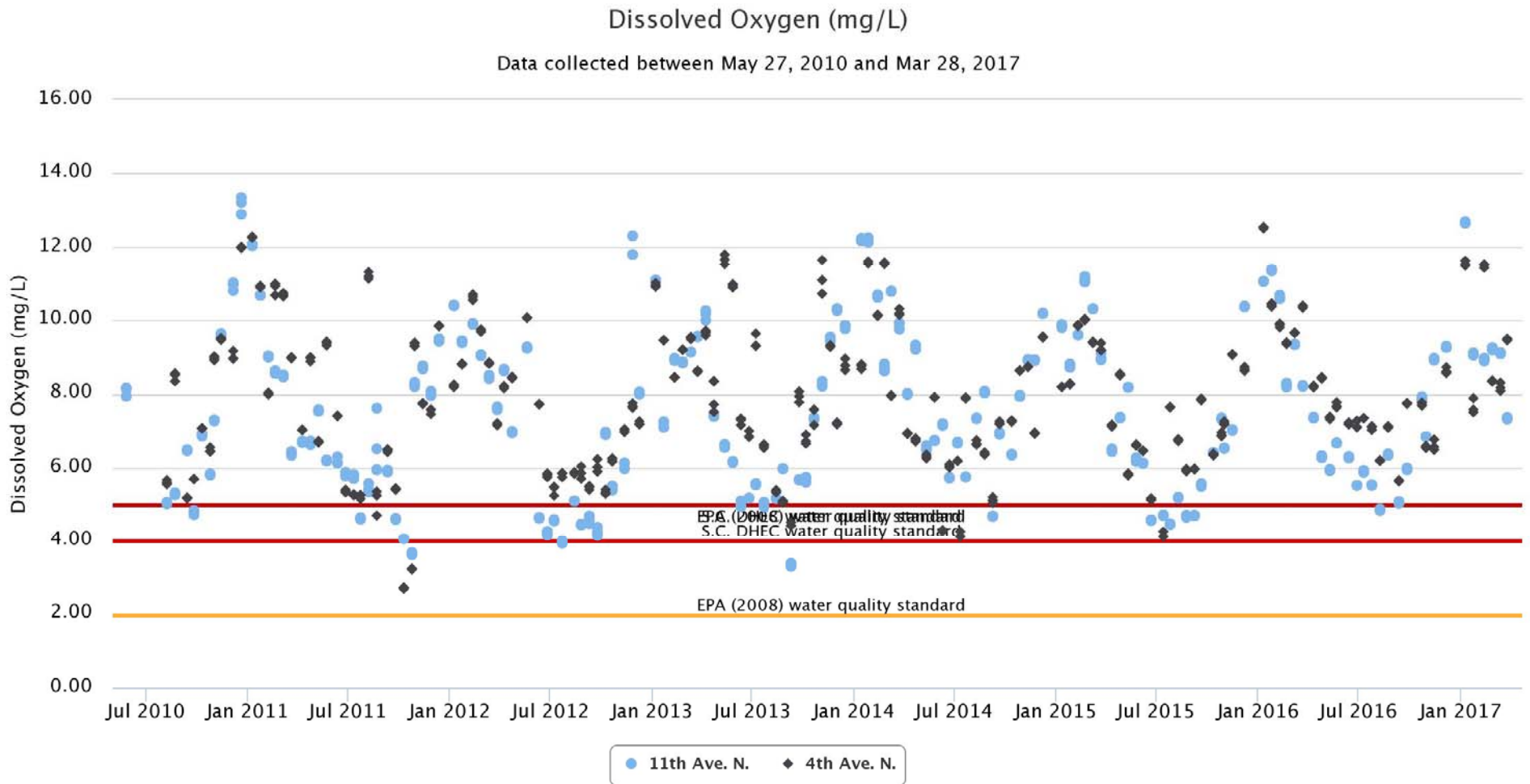


Highcharts.com

Myrtle Lake: Frequency of ammonia detections increased after 9/8/15



Fewer contraventions of oxygen water quality criteria due to increasing levels of oxygen during warm weather.



Highcharts.com

