



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

Rely on us.

TO: Commissioners Brown, Carlson, Mital, Simpson and Helgeson
FROM: Mel Damewood, Chief Water Engineering & Operations Officer;
Karl Morgenstern, Water Quality & Source Protection Supervisor; and,
Ray Leipold, Water Supply & Treatment Supervisor
DATE: June 26, 2018
SUBJECT: Update on Harmful Algal Blooms in the McKenzie Watershed
OBJECTIVE: Information Only

Issue

Harmful algal blooms are present in Cougar and Blue River Reservoirs and have been producing cyanotoxins. Cyanotoxins have been detected in the McKenzie River, but not in EWEB's treated drinking water. The following is an update on harmful algal blooms and what EWEB is doing to monitor for cyanotoxins and address this threat to drinking water.

Background

Blue-green algae are found naturally in surface waters. Algal blooms occur in Oregon reservoirs on a somewhat regular basis under favorable conditions for growth, which include light intensity and total sunlight duration, nutrient availability (especially phosphorus), warmer water temperatures, higher pH, precipitation events, and slow moving water. Some species of blue-green algae can produce cyanotoxins. The conditions that produce cyanotoxins are not well understood, in fact, even when toxin-producing algae are present, they may not actually produce toxins. Oregon Health Authority (OHA) has established health advisory levels for toxins if they are detected in drinking water.

In late May 2018, the City of Salem detected one of the cyanotoxins, cylindrospermopsin, (syl-indro-spur-mop-sin) in their drinking water at a level above OHA health advisory levels for children under 6 years old and other vulnerable populations. These health-based advisory levels for two cyanotoxins, cylindrospermopsin and microcystin, assume a 10-day exposure period. As a result, Salem issued a do not drink notice for those affected populations and has been under this notice for about the last 4 weeks.

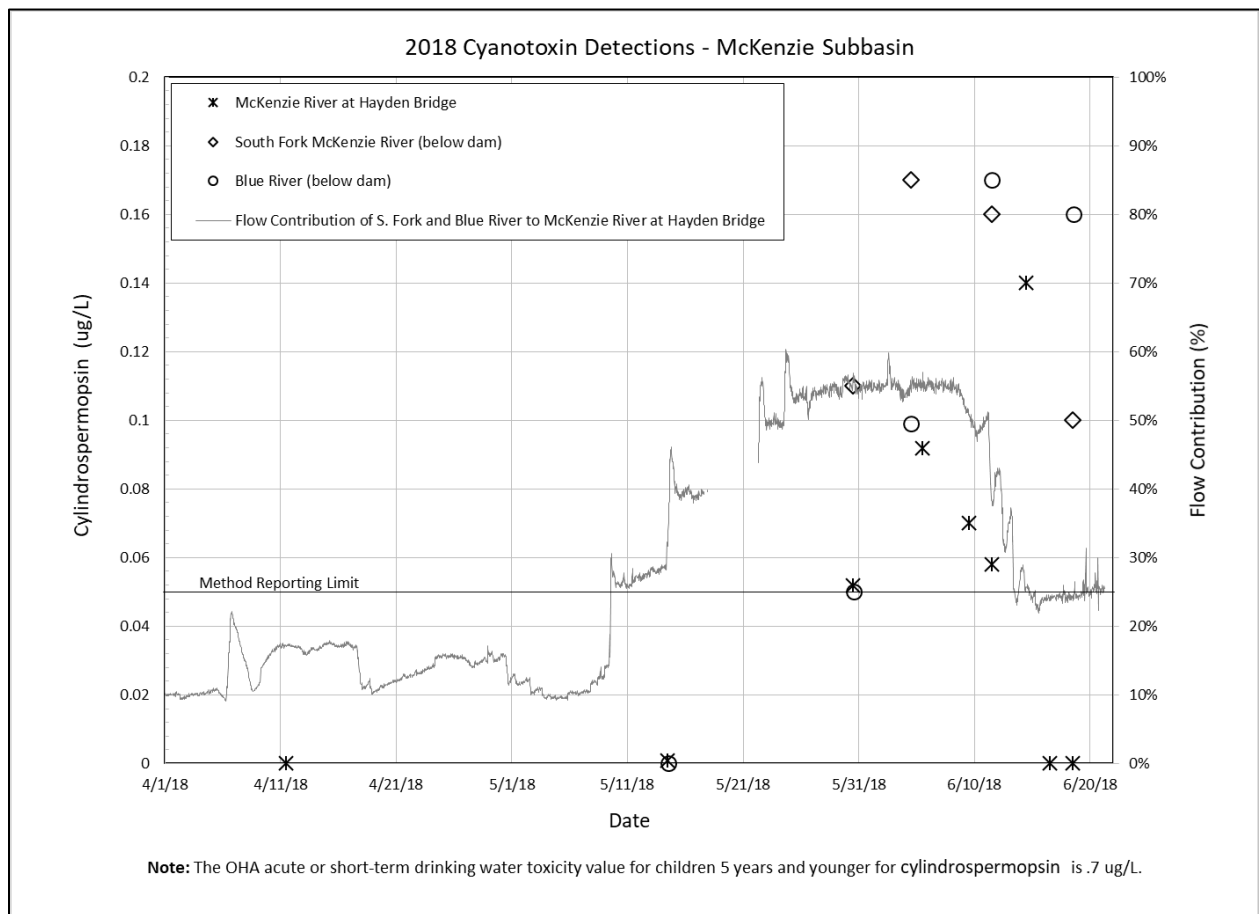
Discussion

Since 2011, EWEB has been actively monitoring reservoirs and reservoir outlets for harmful algal blooms (HABs), and raw water at the intake for effects of HABs on water quality, including the presence of cyanotoxins. Since monitoring started in 2011, no cyanotoxins have been detected in the McKenzie River until recently. On May 30, 2018, EWEB detected cylindrospermopsin in the raw water at the intake at low levels (see <http://www.eweb.org/outages-and-safety/water-safety-in-your-home-or-business/drinking-water-quality/algae-blooms>). Once laboratory results were received, EWEB staff notified the Oregon Health Authority and initiated increased sampling intervals to every

2-3 days for raw and finished water (we requested a rush, or 2-day turnaround on these samples). Analytical results were published on EWEB’s website to provide our customers direct access to this information and avoid any potential confusion given the situation with Salem’s water supply. No detections of cyanotoxins were found in the treated drinking water and toxins ceased being detected in the raw water on June 16, 2018.

Staff were also monitoring harmful algal bloom conditions and toxin levels in Cougar and Blue River reservoirs, as well as reservoir operations. Apparently, Army COE operations at Cougar and Blue River Reservoirs may have been the main reason for cyanotoxin detections in the McKenzie River. As indicated in Figure 1, Cougar and Blue River accounted for over 50% of the flow in the McKenzie River during the time of the toxin-producing algal blooms (normal reservoir contributions at this time of year range from 20-30%). This appears to have caused toxin levels in the river to be significant enough for detection in raw water samples at Hayden Bridge. Once the Army COE reduced flows from these reservoirs, toxin levels in the river decreased significantly and were not detected above laboratory reporting limits in raw water samples. It appears the Army COE was releasing large amounts of water from Cougar Reservoir and Blue River Reservoir to meet minimum National Marine Fisheries Service (NMFS) BiOp flow requirements in the Willamette River at both Albany and Salem.

FIGURE 1: Summary of Flows from Cougar and Blue River Reservoirs and Cyanotoxin Detections



EWEB did two things in response to this event: 1) set up monitoring regiment and tools that alert water quality staff and Hayden Bridge operators when future similar conditions are occurring in the watershed to trigger increased monitoring and an appropriate treatment response; and 2) shared data with the Army COE and began conversations on the observed impact and whether there can be flexibility in reservoir operations during times of toxic algal blooms. Although algal blooms are common in lower McKenzie reservoirs, cyanotoxins have not been observed until recently in the McKenzie River. Given that the expected impacts of climate change directly affect the conditions that favor algal blooms, reservoir operations will play a bigger role in downstream water quality during these blooms.

Analytical results of finished water confirmed that EWEB's treatment process at Hayden Bridge effectively removed low level toxins from the raw water. As a proactive measure, Hayden Bridge changed its treatment process to protect against cyanotoxins found in the McKenzie River by adding activated carbon, eliminating pre-chlorination before filters, and increasing chlorine following filtration. These adjustments to EWEB's treatment process stayed in place until June 25, 2018 following confirmation of three consecutive non-detections of toxins in the raw water at the intake.

Now that cyanotoxins have been detected in the McKenzie River, EWEB is increasing its analytical capabilities at its Water Quality Lab to include an ability to test for cyanotoxins. Having to depend on shipping samples to an out-of-state analytical laboratory to conduct rush cyanotoxin analysis created delays in decision making and significantly increased costs. EWEB has placed an order for analytical equipment that will allow its Water Quality Lab to run an EPA-approved method for the specific cyanotoxins. This will provide EWEB with the ability to get same day results 7 days a week and conduct more extensive testing during harmful algal blooms at a fraction of the cost.

In response to Salem's do not drink notice for toxin levels above OHA advisory levels, OHA is in the process of drafting new cyanotoxin rules. EWEB and other water utilities have been involved in reviewing these new rules and providing comments to OHA to make sure the rules are focused and effective in protecting public health. Based on a review of the draft rules, it appears that EWEB is well positioned to be in compliance with these new requirements. Once EWEB's Water Quality Lab is set up for the specific cyanotoxin analysis using the EPA-approved method and accredited through the Oregon Laboratory Accreditation Program (ORELAP), these results can potentially be used for compliance with the new OHA cyanotoxin rules.

Recommendation and Requested Board Action

No action requested, information only.