

Harmful Algal Bloom Monitoring Guidance

For Colorado drinking water providers with surface water sources
From the Colorado Harmful Algal Bloom Workgroup

Step 1: Observe and prepare	<p>Visually inspect source waters for algae blooms at least weekly during bloom season (typically late summer through early fall). Taste and odor events, shorter filter runs, and changes in source water quality may indicate the presence of a bloom. Before bloom season starts, be prepared and order cyanotoxin (microcystins and cylindrospermopsin) field tests, evaluate source and treatment options, and develop a monitoring, response, and communication plan.</p> <p><i>*If bloom observed continue to step 2</i></p>
Step 2: Field screen for blue-green algae	<p>Immediately after observing bloom use microscopic examination or phycocyanin analyzers if available or use <i>jar and stick tests</i>¹ and field identification guide² for presence of blue-green algae which could produce cyanotoxins. Continue examinations at least weekly during presence of bloom.</p> <p><i>*If blue-green algae are present continue to step 3</i></p>
Step 3: Field screen for toxin presence in raw water	<p>Monitor raw water intake for presence of cyanotoxins using a field test for source drinking water (e.g., Abraxis Strip Test) immediately after identifying blue-green algae and then at least weekly during presence of blue-green algae. You can use a field test for finished drinking water if you freeze then thaw sample 3 times to release toxins within cells prior to analysis. Evaluate source and treatment options. Identify and contact lab³ in advance about sampling procedures and sample turnaround time in case toxins are detected in finished water.</p> <p><i>*If microcystins and/or cylindrospermopsin are present in raw water continue to step 4</i></p>
Step 4: Field screen for toxin presence in finished water	<p>Monitor finished water at entry point for presence of the cyanotoxin(s) detected in raw water using a field test for finished drinking water (e.g., Abraxis Strip Test) immediately after detecting cyanotoxin presence in raw water and then at least weekly during cyanotoxin presence in raw water. Evaluate source and treatment options. Notify utility management about a response and communication plan in case cyanotoxins are present in the finished water above EPA's health advisory values.</p> <p><i>*If microcystins and/or cylindrospermopsin are present in finished water continue to step 5</i></p>
Step 5: Quantitative lab analysis for toxin in finished water	<p>Send finished water sample (after quenching chlorine residual) to lab for quantification of the cyanotoxin(s) detected in finished water immediately after detecting cyanotoxin presence in finished water and then at least weekly during cyanotoxin presence in finished water. Evaluate source and treatment options.</p> <p><i>*If microcystin values are above 0.3 µg/L and/or cylindrospermopsin values are above 0.7 µg/L (EPA's health advisory values), consult CDPHE (1-877-518-5608) so they can assist. Take a confirmation sample of the finished water within 24 hours and send to lab. If confirmation sample results are above health advisory values, follow utility response and communication plan and notify consumers. Consider monitoring for toxins at various points throughout distribution to look for toxin degradation and extent of impacted area using a field test for finished drinking water. Notify consumers that water has returned to acceptable levels after at least 2 consecutive finished water samples are below EPA's health advisory levels.</i></p>

¹ Jar and stick test procedures developed by Kansas Department of Health and Environment to identify blue-green algae: www.kdheks.gov/algae-illness/download/Jar_Test.pdf

² Field and Laboratory Guide to Freshwater Cyanobacteria developed by USGS: <https://pubs.er.usgs.gov/publication/ofr20151164>

³ List of laboratories for toxin analysis developed by Oregon Health Authority: <http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Operations/Treatment/Pages/algaelabs.aspx>

Resources:

- Colorado Harmful Algal Bloom Workgroup (303-692-3605) can assist with toxin sampling and evaluating source and treatment options.
- Colorado Lake and Reservoir Management Association (www.clrma.org) can assist with bloom and algae identification.
- Colorado's Water and Wastewater Agency Response Network (www.cowarn.org) can assist with resources to respond to a cyanotoxin health advisory exceedance.
- Colorado Water Quality Control Division's Local Assistance Unit (303-692-3665) can assist with harmful algal bloom training, toxin sampling and evaluating source and treatment options.