

Caesar Creek Lake (2017)

Caesar Creek Lake (CCK) is located in Warren, Clinton, and Greene counties in Ohio (OH). The dam was built by the Louisville District of the US Army Corps of Engineers (LRL) for the primary purpose of flood control. The dam site is located at river mile 3 of Caesar Creek. At summer pool, the surface area of CCK is 2,830 acres. Note: The term “lake” is substituted for the technically correct “reservoir” throughout this document for consistency.

Harmful Algal Blooms (HABs) in OH are addressed by the OH Department of Natural Resources (ODNR) as they are the lead agency for HAB response in the state. The ODNR works with the Ohio EPA and OH Department of Health to sample for cyanobacteria and cyanotoxins at designated swimming beaches and to post any required recreational advisories. LRL supports the state agencies by reporting any visual HAB indicators and by participating in a Sign Posting & Communication Plan to communicate HAB potential to the visiting public.



Figure 1. CCK sample sites in 2017 for field and chemical data.

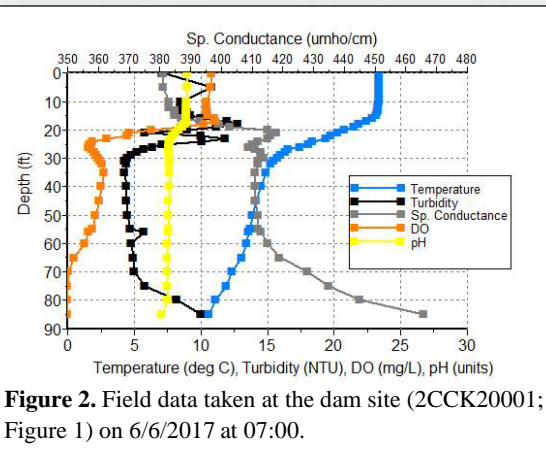


Figure 2. Field data taken at the dam site (2CCK20001; Figure 1) on 6/6/2017 at 07:00.



Figure 4. CCK dam construction, 1975.

Temperature and dissolved oxygen (DO) profile data are regularly collected from LRL lakes. This data informs water control engineers on how to best use existing selective withdrawal capabilities to meet downstream water quality (WQ) targets established by each lake’s Water Control Plan (WCP) and state criteria. Figure 3a shows a time series graph of the 2017 tailwater water temperature compared with the guide curve from the lake’s WCP. Figure 3b shows a 2017 time series graph of the lake’s tailwater dissolved oxygen data with the applicable state criteria (blue line).

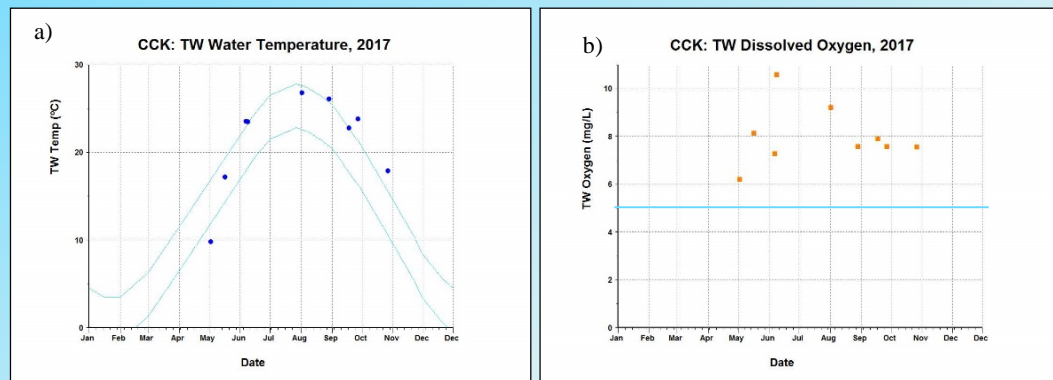


Figure 3. CCK time series data collected from the tailwater (2CCK10000; Figure 1): a) water temperature; and b) dissolved oxygen.

WQ in the Tailwater is assessed by analyzing exceedances of WQ criteria established by the Ohio Environmental Protection Agency (Ohio EPA). The tailwater (2CCK10000; Figure 1) exceeded the exceptional warm water habitat outside mixing zone average criteria for pH (EWH OMZA Criteria: 6.5-9.0; Measurement: 9.01 on 6/7/2017 – note that our measurement was a single measurement, not an average over time). Also, CCK exceeded the USEPA’s recommended criteria for total nitrogen (Criteria: 2.18 mg/L; Measurement: 2.90 mg/L). All exceedances have been reported to Ohio EPA and operational changes recommended.

Phytoplankton (Algae) and green plants are the base of the food chain in aquatic food webs and convert nutrients and CO₂ through photosynthesis into biomass for all aquatic life. The LRL WQ Program sampled the phytoplankton community at CCK in June 2017. The distribution and identification of phytoplankton is measured throughout the water column at depths of 0.5, 10, and 20 feet at multiple locations across the lake body.

Figure 5 illustrates the relative abundance and species richness for the entire phytoplankton community at CCK. The relative abundance percentage was calculated using the density of phytoplankton species from all sample sites, at all depths. *Planktothrix*, a genera of cyanobacteria, was the dominant genera found at CCK during the June sampling event.

FY17 Routine Phytoplankton Top 3 Dominant

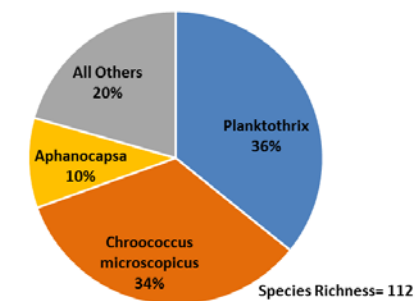


Figure 5. 2017 relative abundance of the entire phytoplankton community at CCK.

Zooplankton are microscopic animals that live in the water column and are an important part of the food chain. The LRL WQ Program sampled the zooplankton community at the dam site (2BHR20001; Figure 1) using a Wisconsin net pull of 20 vertical feet. Figure 6 illustrates the relative abundance for the zooplankton community and species richness at CCK. Species richness is an indicator of community health, with greater community health as species richness increases. The top 3 dominant zooplankton are *Daphnia galeata*, *Daphnia retrocurva*, and *Leptodiatomus siciloides*.

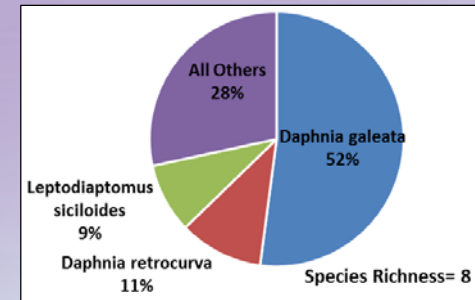


Figure 6. 2017 relative abundance of the zooplankton community at CCK.

