

William H. Harsha Lake (2017)

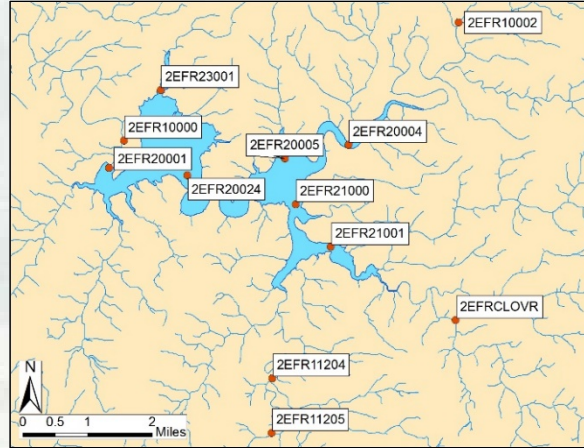


Figure 1. EFR sample sites in 2017 for field and chemical data.

William H. Harsha Lake (EFR) is located in Clermont County, 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 and became operational in May 1978. The drainage area above the dam is 342 square miles, and at summer pool, the surface area of EFR is 2,160 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.

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 EFR in June and July 2017. The distribution and identification of phytoplankton was measured throughout the water column at depths of 0,5,10, and 20 feet at multiple locations across the lake body on each date.

Figure 4 illustrates the relative abundance and species richness for the entire phytoplankton community at EFR during each sampling event. The relative abundance percentage was calculated using the density of phytoplankton species from all sample sites, at all depths. *Chroococcus microscopicus* was the dominant species in June and *Planktolyngbya* was the dominant genera in July. Both dominant taxa are genera of cyanobacteria.

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 2a shows a time series graph of the 2017 tailwater water temperature compared with the guide curve from the lake’s WCP. Figure 2b shows a 2017 time series graph of the lake’s tailwater dissolved oxygen data with the applicable state criteria (blue line).

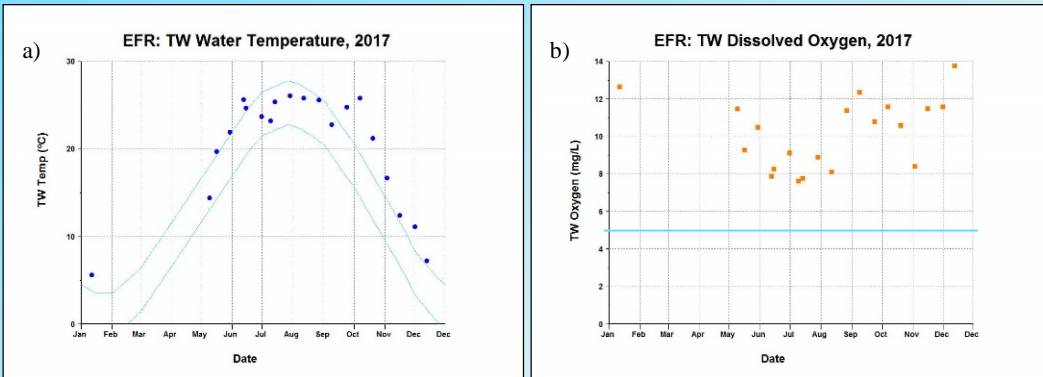


Figure 2. EFR time series data collected from the tailwater (2EFR10000; Figure 1): a) water temperature; and b) dissolved oxygen.

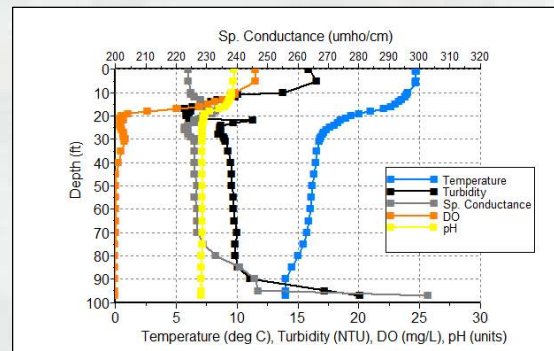


Figure 3. Field data taken at the dam site (2EFR20001; Figure 1) on 6/12/2017 at 06:00.

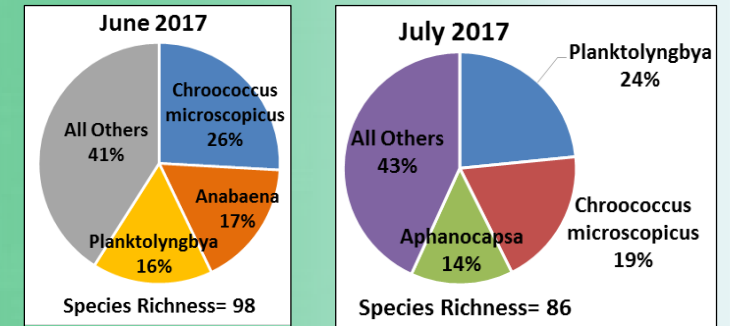


Figure 4. 2017 relative abundance of the entire phytoplankton community at EFR.

WQ in the Tailwater is assessed by analyzing exceedances of WQ criteria established by the OH Environmental Protection Agency (Ohio EPA). The tailwater (2EFR10000; Figure 1) exceeded the outside mixing zone maximum criteria for water temperature (OMZM Criteria: 24.4° C for Oct. 1-15 and 21.1° C for Oct. 16-31; Measurements: 25.8° C on 10/7/2017 and 21.2° C on 10/20/2017) and the exceptional warm water habitat outside mixing zone average criteria for pH (EWH OMZA Criteria: 6.5-9.0; Measurement: 9.66 on 6/13/2017 – note that our measurement, not an average over time). Also, EFR exceeded the USEPA’s recommended criteria for total phosphorus (Criteria: 76.25 ug/L; Measurements: 190.0 and 190.0 ug/L (measured twice)) and turbidity (Criteria: 6.36 FTU; Measurement: 8.5 NTU). All exceedances have been reported to Ohio EPA and operational changes recommended.

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 (2EFR20001; Figure 1) twice in 2017 using a Wisconsin net pull of 20 vertical feet. Figure 5 illustrates the relative abundance for the zooplankton community and species richness at EFR during each sampling event. Species richness is an indicator of community health, with greater community health as species richness increases. Dominant taxa included *Leptodiatomus siciloides*, *Mesocyclops edax*, sub-adult Calanoida, and sub-adult Cyclopoida.

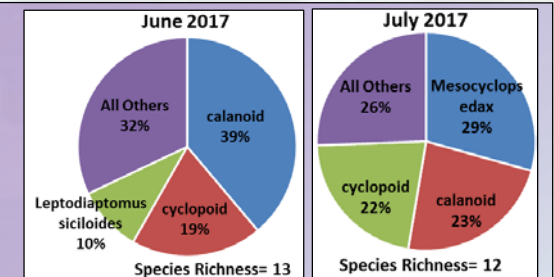


Figure 5. 2017 relative abundance of the zooplankton community at EFR.

