J. Edward Roush Lake (2017)

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

J. Edward Roush Lake (HTR) is located in Huntington and Wells counties in Indiana (IN). The dam was built by the Louisville District of the US Army Corps of Engineers (LRL) for the primary purpose of flood control. The drainage area above the dam is 707 square miles, and at summer pool, the surface area of HTR is 900 acres. Note: The term "lake" is substituted for the technically correct "reservoir" throughout this document for consistency.
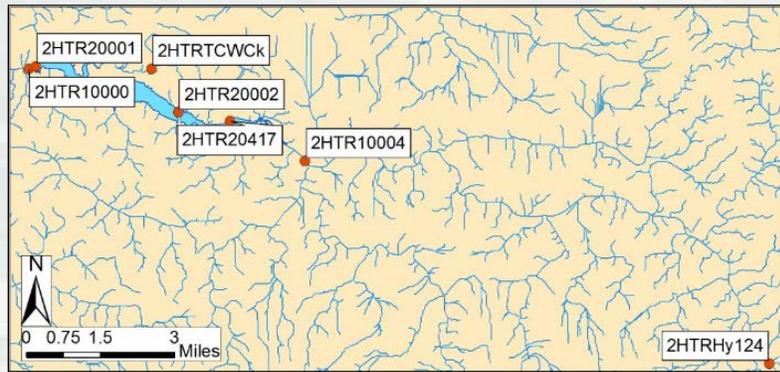
Water Quality (WQ) in the Tailwater is assessed by analyzing exceedances of WQ criteria established by the IN Department of Environmental Management (IDEM). **No criteria were exceeded in the tailwater (2HTR10000; Figure 1). However, HTR exceeded the USEPA's recommended criteria for total phosphorus (Criteria: 76.25 ug/L; Measurement: 166.0 ug/L), total nitrogen (Criteria: 2.18 mg/L; Measurement: 6.65 mg/L), and turbidity (Criteria: 6.36 FTU; Measurement: 31.2 NTU). All exceedances have been reported to IDEM.**
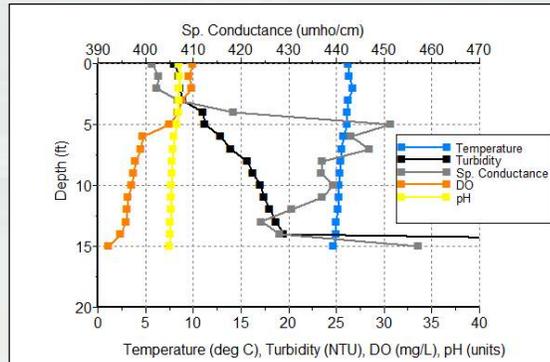

Figure 2. Field data taken at the dam site (2HTR20001; Figure 1) on 7/19/2017 at 08:00.

Phytoplankton (Algae) and green plants are the base of the food chain in aquatic food webs and convert nutrients and CO_2 through photosynthesis into biomass for all aquatic life. The LRL WQ Program sampled the phytoplankton community at HTR in July 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 4 illustrates the relative abundance and species richness for the entire phytoplankton community at HTR. 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 species found at HTR during the July sampling event.
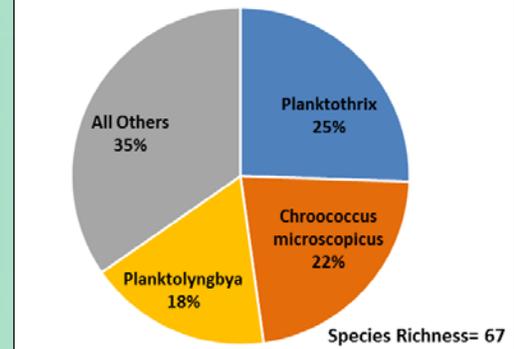

Figure 4. 2017 relative abundance of the entire phytoplankton community at HTR.

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 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 applicable state criteria (blue line).
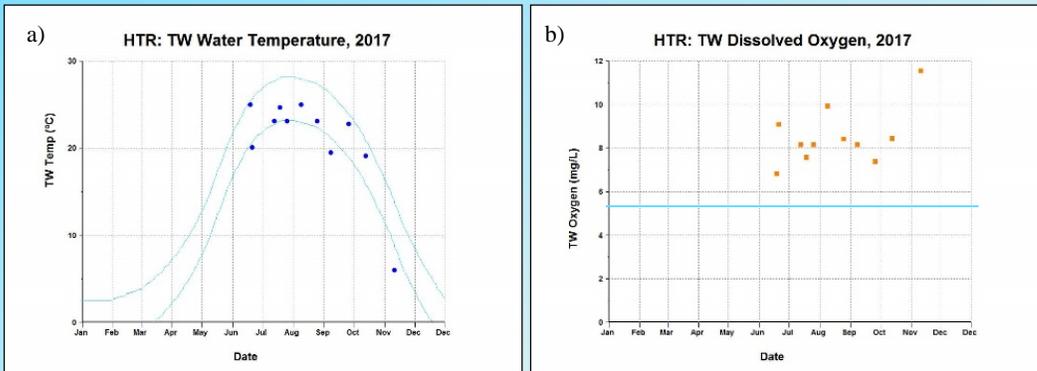
Harmful Algal Blooms (HABs) in IN are addressed by the IN Department of Natural Resources (IDNR) and the IN Department of Environmental Management (IDEM) in the IDNR HAB Response Standard Operating Procedure. The agencies sample and post appropriate recreational advisories for select lakes May through September of each year. The LRL WQ Program supports the state agencies efforts by reporting visual HAB indicators via the IN State Department of Health Algal Bloom Notification Form. LRL also supports the state agencies in HAB response by communicating HAB-related recreational advisories to the public.

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 (2HTR20001; Figure 1) using a Wisconsin net pull of 20 vertical feet. Figure 5 illustrates the relative abundance for the zooplankton community and species richness at HTR. Species richness is an indicator of community health, with greater community health as species richness increases. The top 3 dominant zooplankton were *Daphnia retrocurva*, *Asplanchna priodonta*, and *Diaphanosoma brachyurum*.
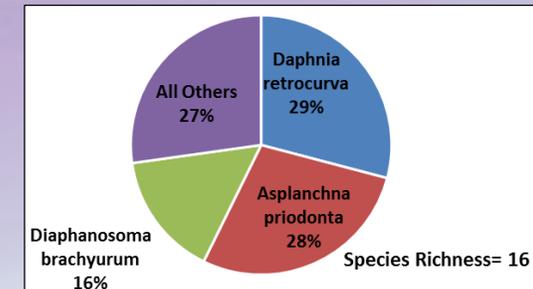

Figure 5. 2017 relative abundance of the zooplankton community at HTR.

Figure 3. HTR time series data collected from the tailwater (2HTR10000; Figure 1): a) water temperature; and b) dissolved oxygen.