Remote-Sensing Software Tools for HAB Monitoring, Tool Refinement, and Improved Technical Transfer

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USACE Harmful Algal Bloom Research & Development Initiative

Delivering scalable freshwater HAB prevention, detection, and management technologies through collaboration, partnership, and cutting-edge science.

Problem Supporting documentation, technical training, and marketing is needed for USACE water quality managers to better utilize new remote-sensing software tools to assist with water quality monitoring.

Objective To better facilitate technical transfer of newly developed remote-sensing software tools for HAB monitoring, as well as add functionality to the HAB Explorer web app viewer.

Approach This work has the following goals: (1) update and add functionality to the HAB Explorer web app viewer in partnership with Esri and subsequently make the web app publicly available, and (2) produce supporting documentation, technical training, and marketing to better facilitate technical transfer (e.g., tool summary document and presentations, quick-guide tool matrix, tool maintenance updates, finalized publication of ArcGIS Pro user-guide technical report, and recorded/in-person technical tool demonstrations).
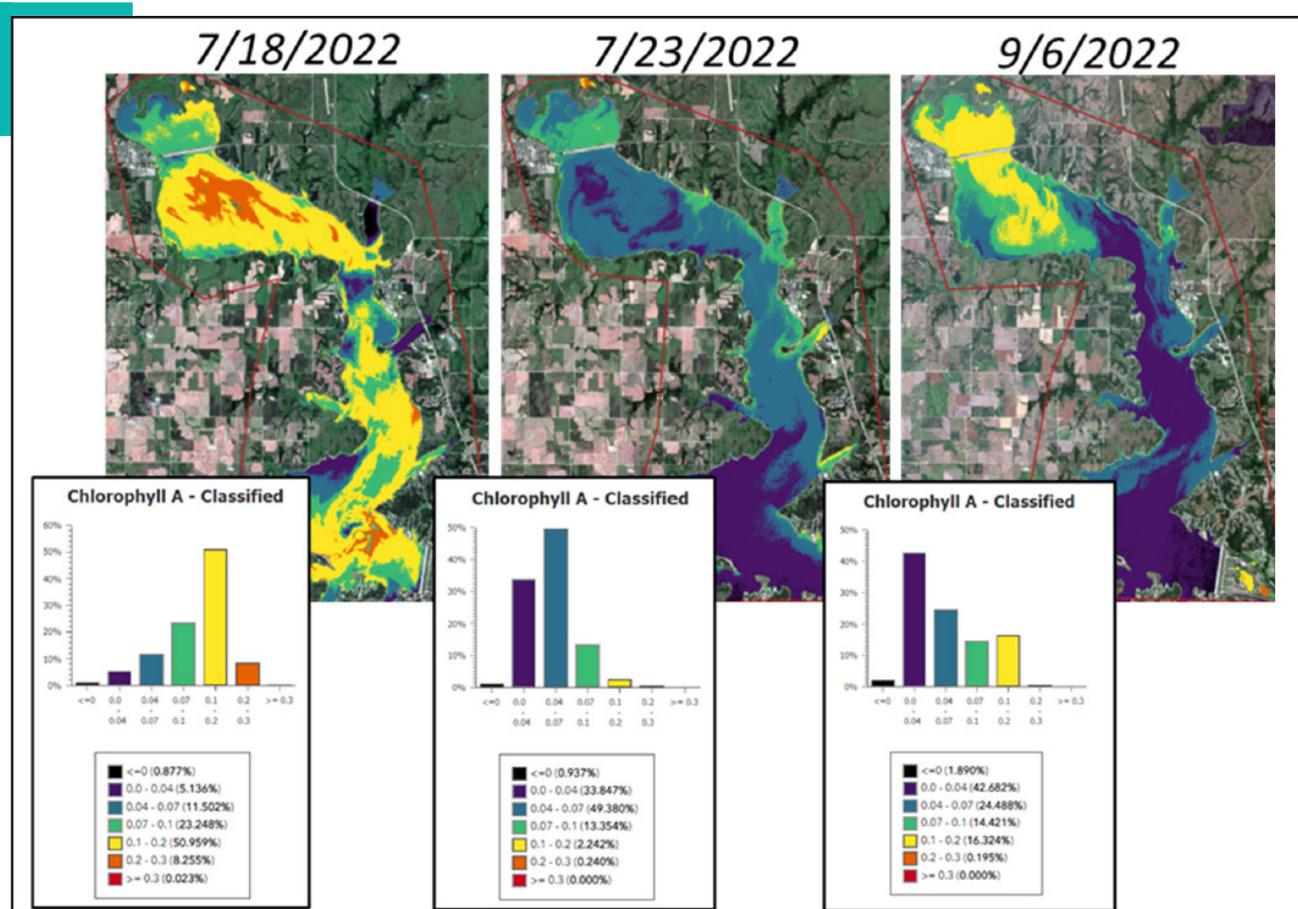

Figure 1. *HAB Explorer web app showing dynamic HAB conditions at Milford Lake, Kansas, Summer 2022.*

ENVIRONMENTAL LABORATORY

ERDC ENGINEER RESEARCH & DEVELOPMENT CENTER

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Major Milestones

Deliverable	Description
Publications	**Tech Report:** Saltus, C. L., M. K. Reif, and R. A. Johansen. 2022. *Waterquality for ArcGIS Pro Toolbox: User's Guide*. ERDC/EL SR-22-6. Vicksburg, MS: US Army Engineer Research and Development Center. http://dx.doi.org/10.21079/11681/45362.
Documents	**Brochure:** Engineer Research and Development Center. 2022. "Remote Sensing Tools to Assist USACE Water Quality Monitoring." In *Civil Works R&D Value to the Nation: 2022 Edition*. ERDC B-22-2. http://dx.doi.org/10.21079/11681/43465.
	Brochure: Engineer Research and Development Center. 2023. "Remote Sensing Tools for Water Quality and HAB Monitoring." In *Civil Works R&D Value to the Nation: 2023 Edition*. ERDC B-23-1. http://dx.doi.org/10.21079/11681/46532.
	News Article: Kuzmitski, H. 2023. "Remote Sensing Gives USACE an Edge at Detecting Harmful Algal Blooms." USACE Headquarters Website. https://www.usace.army.mil/Media/News/NewsSearch/Article/3277031/remote-sensing-gives-usace-an-edge-at-detecting-harmful-algal-blooms/.
Products	**Software Tool:** ArcGIS Pro Waterquality Toolbox v1.1 Update. http://dx.doi.org/10.21079/11681/42240.
	Software Tool: HAB Explorer Phase 2 Update. https://arcportal-ucop-corps.usace.army.mil/hab/.
Tech Transfer	**Virtual training** to USACE water managers, re: ArcGIS Pro for waterquality and HAB Explorer. Webinar, February 2022. https://corpslakes.erdc.dren.mil/employees/invasive/exchange.cfm?Option=Webinar&Type=Past&CoP=nrm&Id=660&ICS=No.
	Software Demo to USACE water managers, re: software tool series. WQ Workshop, February 2023.

Partnership/Leveraging Opportunities

In FY22, funding was received from the Great Lakes and Ohio River Division initiate technical transfer ($22,000).

Value to USACE Mission

The software tools will provide improved capabilities for HAB monitoring and management (proactive versus reactive) and can help reduce costs through minimizing and prioritizing field sampling efforts. In addition, the tools have widespread applicability to USACE projects, and they transform and leverage years of USACE-funded remote-sensing investigative analyses into tools.