

## Guardians of our Waters: Annis Water Resources Institute

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[www.gvsu.edu/wri](http://www.gvsu.edu/wri)

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Although not superheroes in the comic book sense, the researchers at the Robert B. Annis Water Resources Institute (AWRI) are certainly environmental champions. With a mission to integrate research, education, and outreach to enhance and preserve freshwater resources, they are dedicated guardians of water—our planet's most precious and life sustaining resource. AWRI is a multidisciplinary research organization within Grand Valley State University, and is located in Muskegon, Michigan, on the shore of Muskegon Lake. The 3 programmatic areas of AWRI offer exciting research and education opportunities to undergraduate and graduate students, postdoctoral research fellows, and sabbatical visitors:

- The **Ecological Research Program** explores questions about aquatic ecology, chemistry and toxicology, fisheries ecology, hydrology, microbial ecology, aquatic molecular ecology, ecosystem restoration, and ecological modeling.
- The **Information Services Center** uses state-of-the-art geospatial technology to collect and analyze data, and condense them into useful information for those who make critical decisions about natural resource management.
- The **Education and Outreach Program** utilizes AWRI's two research vessels and the Annis Educational Foundation

Classroom to provide scientific information to K-12 students, policymakers, educators, college students, and community groups. Exciting examples of how AWRI is fulfilling its mission can be found in three ongoing research projects that are under the direction of Dr. Alan Steinman, AWRI Director.

As residents on Muskegon Lake, AWRI feels both a responsibility and an obligation to monitor and research the ecological health of this water body. The Muskegon Lake Long-Term Monitoring Project began in 2003 and will continue into the future thanks to the generosity of the greater Muskegon community, which donated resources to establish an endowment fund to support this work. Our project provides consistent, scientifically rigorous information that has been used to:

- 1) Track the restoration and recovery of this historically disturbed ecosystem.
- 2) Inform the community on the lake's status.
- 3) Serve as the foundation for student and faculty research projects.
- 4) Leverage over \$10 million in additional funding.

The monitoring program consists of chemical, physical, and biological measurements made 3 times per year at 6 locations throughout the lake. More in-depth information about this effort can be found [here](#) and on the AWRI website.

Bear Lake is a highly degraded system that flows into Muskegon Lake and is subject to excessive nutrients and nuisance algal blooms. Abandoned muck farms used for celery production, but now existing as shallow ponds, are adjacent to Bear Creek just before it enters Bear Lake. Given their location and past land use, these muck fields contain very high levels of phosphorus and are a plausible source of phosphorus to Bear Lake. Restoration is planned for these fields, which involves their hydrologic reconnection to Bear Creek, as well as improved wetland habitat. AWRI is assisting with the restoration effort by characterizing existing conditions, providing recommendations about restoration strategies that are protective of water quality, and monitoring the water quality effects of the restoration effort.

More information about this project can be found on the [AWRI website](#).

Project Clarity is a large-scale watershed restoration, education, and public-private initiative aimed at dramatically improving water quality in Lake Macatawa and the Macatawa watershed, located near Holland in west Michigan. The project involves a multi-phased approach, providing solutions focused on land restoration, Best Management Practices (BMPs), community education, and long-term sustainability. This major endeavor will take an estimated 10 years and \$12 million to complete. As a legacy project, it will have a lasting and profound impact on the economy, environment, and community as a whole. AWRI is serving as technical advisors and scientific consultants by conducting on-going field research, assisting with the development and implementation of restoration initiatives, developing and running watershed models, and building a restoration database. More information about Project Clarity can be found on the [AWRI website](#) and the [Project Clarity website](#).