



THE GREAT MIAMI GROUNDWATER OBSERVATORY

 The University of Cincinnati
Foundation





University of Cincinnati's Commitment to Water Research and Education

The University of Cincinnati has identified expanding its strengths as a national and global leader in water research, education and outreach as a top priority. UC's Water Cluster Initiative seeks to hire six new tenure-track faculty over the next two years to strengthen interdisciplinary programs in water research, education and outreach.

The Water Cluster hires represent a joint initiative between the College of Engineering and Applied Science (CEAS), McMicken College of Arts & Sciences (A&S) and the College of Design, Architecture, Art, and Planning (DAAP). The new faculty members will have appointments in geology, geography, environmental and civil engineering, with expertise in areas that include integrated water resources management within and across natural and engineered systems.

The creation of a Groundwater Observatory near the Miami Whitewater River and close to UC's Center for Field Studies, has been a priority of UC's Geology Department for the past decade. Thanks to a leadership gift from the Duke Energy Foundation, a detailed planning process for constructing a groundwater observatory is now underway, led by the UC's Office of Planning, Design and Construction.

The Need for a Groundwater Observatory

Clean, healthy water is a vital natural resource that is becoming increasingly scarce. The Great Miami Buried Valley Aquifer System is an important aquifer located just west of Cincinnati, Ohio. The Great Miami drainage basin encompasses a 3,930-square mile area that is experiencing major population growth. The aquifer system is the sole source of public drinking water for approximately 2.3 million residents in southwest Ohio including the metropolitan areas of Cincinnati, Dayton, Springfield, Middletown, Fairfield, Hamilton and Oxford. While many other regions around the country are experiencing serious shortages, water from the Great Miami Buried Aquifer System is plentiful and, with conscientious stewardship, will remain so for the foreseeable future.

Currently, the aquifer is supplied partly by the discharge of treated wastewater. The quality of the

treated wastewater has improved markedly over the last several decades resulting in a dramatic improvement in surface- and groundwater quality. Despite this improvement, there is concern about the impact of emerging contaminants (pharmaceuticals, personal care products, hormones and miscellaneous chemicals such as caffeine, cleaners, insect repellants, perfumes and fire retardants). In addition, there are numerous potential sources of contamination including 15 USEPA Superfund sites and nearly 600 EPA Toxic Release Inventory sites located in the Great Miami drainage basin. Ongoing urbanization and changing precipitation patterns may lead to periods of both greater storm runoff as well as droughts, with unknown impacts on water quantity and quality in the aquifer. Continuous observation of water quality is now essential.



The Great Miami Groundwater Observatory (GMGWO)

The University of Cincinnati's Great Miami Groundwater Observatory (GMGWO) will be located in Hamilton County Park District's Miami-Whitewater Forest Park. GMGWO would provide timely, consistent, and long-term observations of groundwater flow in the Great Miami Buried Valley Aquifer System including the velocity and direction of flow, water temperature and water-specific conductivity. These data would provide water managers and researchers a means to study and assess the buffering effects as water interacts with riverbed and aquifer materials. It would also provide a compelling centerpiece for regional groundwater awareness and conservation education. Although the GMGWO is significantly more ambitious in its scope and mission, the concept of a groundwater observatory has been successfully demonstrated by the GetWET Observatory constructed by Colorado State University. When completed, the UC-GMGWO will be unique in:

- *Its ability to monitor physical hydrology of a glacial-alluvial aquifer, similar to aquifers throughout the Midwestern United States.*
- *Its design to provide real-time observation of the critical interaction between the aquifer and adjacent stream.*
- *Its location in the eastern United States.*



The primary goals of GMGWO are to:

- 1. Provide infrastructure and resources** for basic research on topics including surface-water/groundwater interaction, the interaction of biological and chemical contaminants with aquifer material and the dynamics of aquifer flow.
- 2. Provide data** necessary for the stewardship and management of groundwater resources provided by the Great Miami Buried Valley Aquifer System. All data would be transmitted to a website that could inform public water authority decisions about pumping scenarios to minimize contamination from the Great Miami River. The observatory could be used to enhance the missions and to support environmental research conducted by regional organizations including Great Parks of Hamilton County; the Miami Conservancy District; the Andrew W. Breidenbach Environmental Research Center; Greater Cincinnati Water Works; Ohio's State Coordinating Committee on Ground Water; and the Ground Water Consortium. An administrative board would oversee the GMGWO, consisting of representatives from academic institutions, regulatory agencies, public water suppliers, farmers, industrial wastewater users and other stakeholders.
- 3. Raise public awareness** of the importance of conservation of the Great Miami Buried Valley Aquifer System through educational outreach to Butler and Hamilton counties, Cincinnati Public Schools, Hamilton County Parks, Ground Water Consortium and ProjectWET (Water Education for Teachers). UC will involve undergraduate and graduate students in the GMGWO through groundwater geology, geology for engineers and hydrology courses and research connected with the observatory. The UC Center for Field Studies is located within two miles of GMGWO and can provide research facilities, infrastructure and classroom space.



Partners

Progress on making UC's Great Miami Groundwater Observatory (GMGWO) a reality has been made possible by partnerships with a number of government agencies, private corporations and organizations. The GMGWO will be located in the **Great Parks of Hamilton County's Miami-Whitewater Forest Park** and they are providing a virtually no cost, long-term lease on the land where the Observatory will be located. **Duke Energy Foundation** has provided more than half the funds necessary to construct the GMGWO. Additional cash and in-kind gifts to the project have been made by UC Office of Research, Office of the University Architect, Miami Conservancy District, Terracon, The Kleingers Group, Scherzinger Drilling Company and THP Limited. In addition, a number of community and governmental

organizations have been consulted about the project and the Observatory's design including Ohio EPA; U.S. EPA; ProjectWET; Groundwater Consortium; Ohio's State Coordinating Committee on Ground Water; the Ohio District of the US Geological Survey Water Resources Division; Hamilton County Soil and Water Conservation District; Greater Cincinnati Water Works, and Confluence. When the GMGWO is completed it will be overseen by an Advisory Board with representation from stakeholders in the region. We envision the Advisory Board will give input into research conducted, data shared through the project website, educational programming around conservation and water quality and fundraising efforts to insure maintenance and utilization of the facility.

Project Needs

With the increasing number of potential water contaminants today combined with the pressing need to monitor and protect the region's primary source of public water supply, completing the GMGWO is more important now than ever before.

To complete this vital groundwater observatory, we seek \$150,000 to cover the remaining costs of facility construction and maintenance. Such funding would finalize the project that has been more than a decade in the making.

Your investment will provide for research, infrastructure and education that will be paramount in the future. Thank you for your consideration.

By the Numbers



Initial site work

\$22,000

Vent pipe and instrumentation conduit

\$18,000

Pylon for monitoring and transmission equipment

\$88,000

University of Cincinnati Planning, Design, & Construction oversight

\$22,000

Contact

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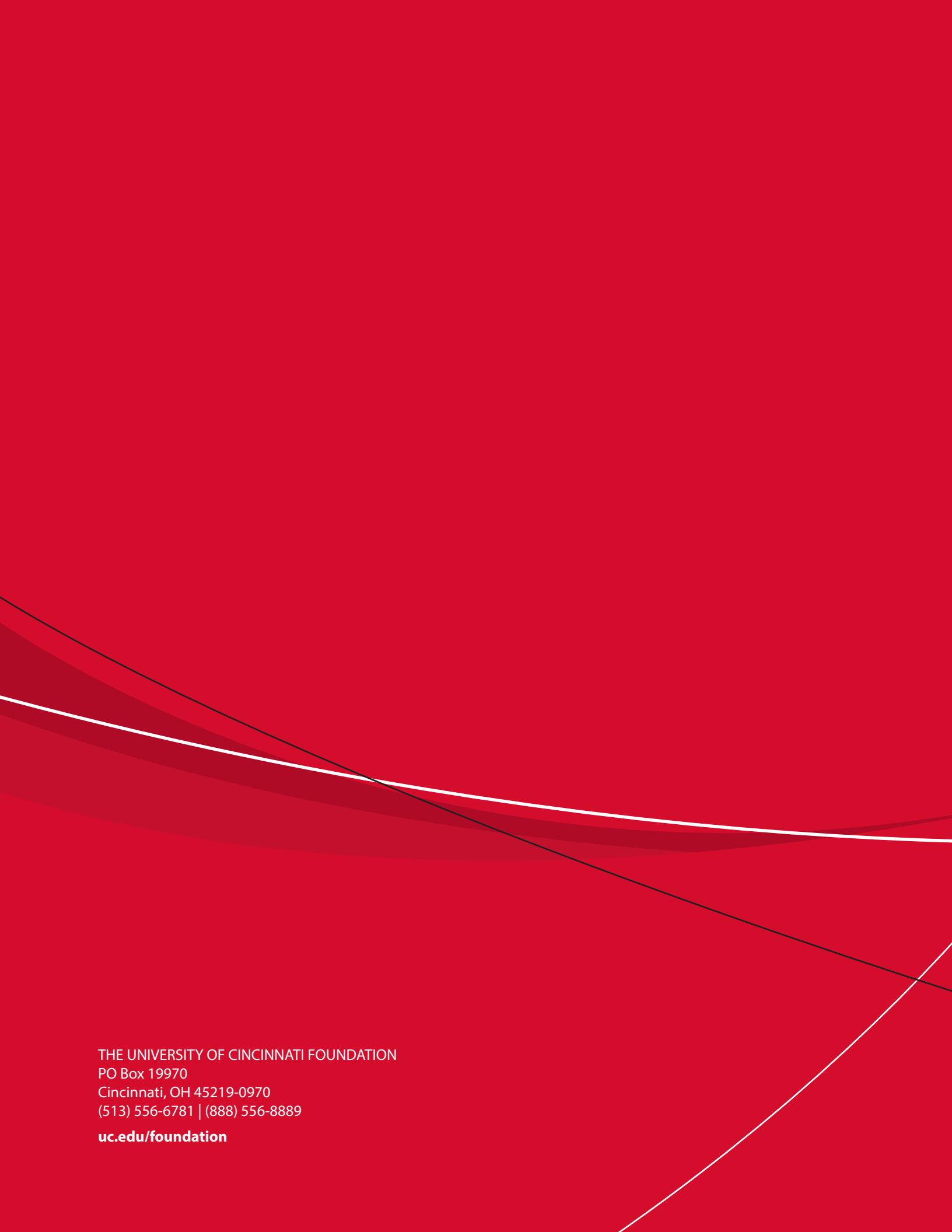
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