

ENVIRONMENTAL MONITORING AND MODELING SITE

Miami Conservancy District

Water Stewardship

Understanding groundwater

Imagine if we could peer into the ground and watch water move from the river into the aquifer and vice versa. The Theis Environmental Monitoring and Modeling Site (THEMMS), a field laboratory for studying water, lets scientists do just that. This University of Cincinnati research facility is situated on the bank of the Great Miami River in western Hamilton County and is well equipped to monitor how the aquifer responds to changes in river flow. This research can lead to better understanding of:

- How water movement into and out of the aquifer changes as the river rises and falls.
- The impact of floods on water quality in the aquifer.
- How contaminants from the river are filtered by the aquifer.
- How bacterial processes degrade contaminants in the aquifer.

In 2018, the observatory was designated as part of The Worldwide Hydrobiogeochemical Observatory Network for Dynamic River Systems (WHONDORS). WHONDORS is a consortium of researchers and other interested parties that aims to understand how rivers and aquifers interact and how the interactions impact water quality and aquatic life.

Both undergraduate and graduate students have started working on projects at the site. In addition, water professionals from regional universities and businesses are discussing the possibility of collaborative research projects. Data and information is available at: <https://homepages.uc.edu/~nashdb/GMGWO/GMGWO.htm>

"Our region is ready to be the hub of water knowledge and know-how. Initiatives are under way in southwest Ohio to position our region as a leader in water research and technology development to help deal with world water challenges such as scarcity and contamination."

- Mike Ekberg, MCD Manager of Water Resources



Installing a pylon to store and transmit groundwater data collected at THEMMS.

Buried Valley Aquifer

- Porous geology
- Prolific water supply
- Along and under river
- Strong interaction of water, moving between groundwater and river

Partners

The Theis Environmental Monitoring and Modeling Site, dedicated in 2017, is a partnership of Miami Conservancy District, University of Cincinnati, and Duke Energy.

It is located in the Great Parks of Hamilton County Miami-Whitewater Forest Soccer Complex.



Dr. Charles V. Theis (third from left) preparing to conduct groundwater tests in New Mexico.

Who was Charles Vernon Theis?

Dr. Charles Vernon Theis, Ph.D., is considered one of the most influential hydrogeologists of the past century. He studied at the University of Cincinnati and was the first person to earn a Ph.D. in geology from the institution, awarded in 1929.

During his education, Dr. Theis held summer jobs in 1918 and 1919 at the Miami Conservancy District (MCD). MCD was building its integrated flood protection system at the time, and Dr. Theis was employed as part of the survey crew and as a carpenter's helper.

Following graduation, Dr. Theis was employed at the Kentucky Geological Survey, US Army Corps of Engineers, and the United States Geological Survey (USGS). He was affiliated with several universities as a faculty researcher; and at the National Academy of Sciences, where he contributed to the understanding of hydrologic aspects of nuclear energy research and development.

Dr. Theis worked tirelessly into his mid-80s and published many papers. Many other scholarly works and academic conferences were dedicated to him and his contributions to groundwater study.

“(Dr. Theis was) a senior scientist, having an international reputation for excellence in his chosen field of science and recognized by all of his associates as having no peers,” stated E. L. Henricks, USGS Chief Hydrologist (1968).

Dr. Theis was born in Newport, Kentucky in 1900 and died in 1987 in Albuquerque, New Mexico.