



THE ROLE OF AIRBORNE ELECTROMAGNETIC SURVEYS IN NORTH DAKOTA

In recent years, managing groundwater resources has become increasingly vital, especially in regions prone to water scarcity. One innovative technology that has emerged to address this challenge is Airborne Electromagnetic (AEM) surveying. In this article, we will delve into the history, mechanics, and future prospects of AEM surveys, with a special focus on their application with the Department of Water Resources (DWR) in North Dakota.

History of AEM

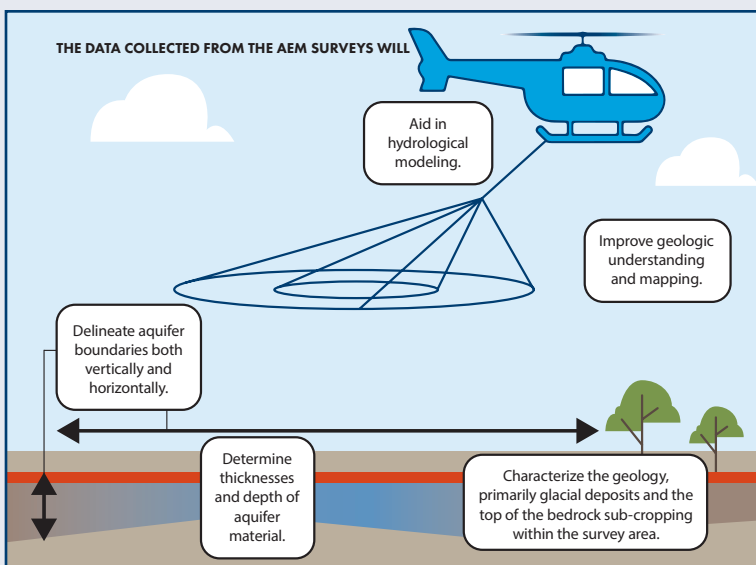
AEM surveys were first used in the 1950s in the mining industry. In recent decades, AEM has become more popular in mapping of groundwater resources. States that have used AEM extensively to map groundwater resources are Nebraska, California, and North Dakota.

Why does the DWR collect AEM data?

AEM surveys assist in the mapping of aquifers that help water managers identify and optimize local sources of groundwater.

How does AEM work?

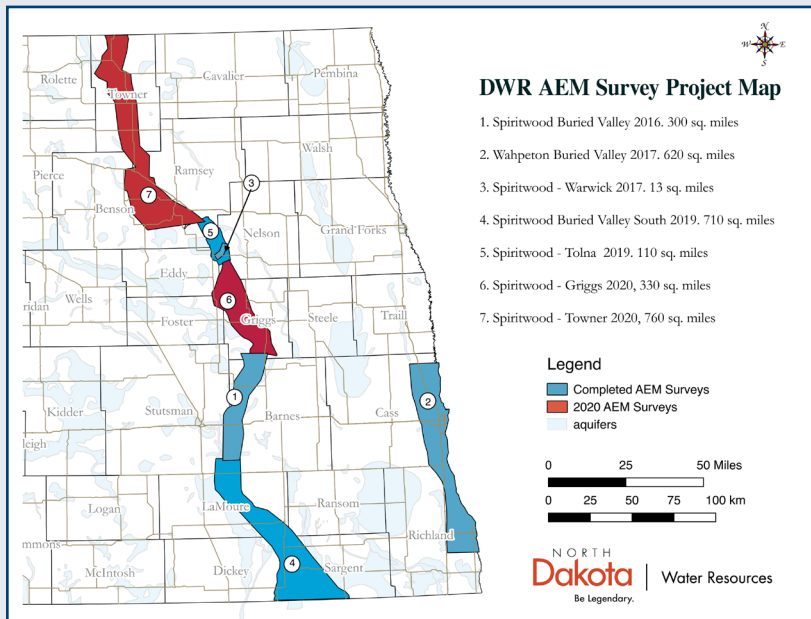
Electrical conductivity is measured with a helicopter carrying a large, suspended wire loop that houses sensors and an instrument package. The loop is flown 100 feet above land surface. The system transmits weak low frequency radio waves into the ground 1,000 feet deep and measures the response that returns from the ground. The surveys are conducted in a grid pattern in order to cover the entire survey area.



The AEM survey can provide insight into the composition of the earth within the survey area. Clays are typically conductors and aquifer materials such as sand and gravels are resistors.

Where have AEM surveys been conducted in ND?

From 2016-2020, multiple AEM surveys were completed over the Spiritwood, West Fargo, and Wahpeton Valley aquifers.



Where will future AEM surveys be conducted?

In June 2024, DWR entered into a contract with an AEM provider to complete an AEM Survey in two proposed areas. One of the proposed survey areas is in central North Dakota (Kidder and Stutsman counties) and the other is in southeast North Dakota (area encompassing portions of Cass, Ransom, Sargent, and Richland Counties). The work is expected to take place in the summer and fall of 2024.



Future AEM Prospects

States and countries facing similar challenges with groundwater resources as North Dakota are adopting AEM technology. As the technology continues to advance, with improvements in sensor accuracy and data processing, its applications are likely to expand further. We are proud to say that North Dakota has led the way in innovation to identify groundwater resources with the development of a dedicated AEM program.

For more information on AEM and other related topics, please visit: https://www.dwr.nd.gov/info_edu/know_your_water_resources/



Photo Credit: Alexander Parshin

