

Northeastern Wisconsin Airborne Electromagnetic (AEM) Survey Project



Photo courtesy of U.S. Geological Survey

Frequently Asked Questions

The U.S. Geological Survey (USGS) is conducting this scientific research project in partnership with the Wisconsin Department of Agricultural, Trade and Consumer Protection (DATCP), Wisconsin Department of Natural Resources (DNR), and Wisconsin State Geological and Natural History Survey (WGNHS).

What is this project?

Starting in January 2021, a helicopter will fly over parts of northeastern Wisconsin using airborne electromagnetic (AEM) technology to map bedrock depth. This technology provides accurate science-based data about below ground properties that are otherwise difficult to assess over large areas. This project is in response to public feedback on groundwater quality, limited data on bedrock depth, and to better understand how surface activities impact water quality.

What are airborne electromagnetics (AEM)?

AEM is a geophysical technology originally developed for use in the mining industry to locate and map minerals. In the past decade, the method has been increasingly used to map groundwater resources throughout the world. It works by measuring variations in the electrical conductivity of the ground. Electrical resistance of rocks and soils is a property that depends on composition and water content. AEM is able to detect and map geological changes and groundwater variations beneath the earth's surface.

Are airborne electromagnetics safe?

The electromagnetic sensor will not harm plants, animals, or humans. The technology causes no ill effects to horses and other livestock. Due to the helicopter flying low, there is the potential for livestock to be alarmed or otherwise disturbed.

Does AEM affect electronic or communications equipment?

No. The electromagnetic field generated by the equipment is too weak to interfere with electronic or communications equipment.

How is below ground information collected?

A helicopter will fly about 200 feet high carrying an electromagnetic instrument (that looks like a hula hoop) suspended about 100 feet below it. The instrument measures tiny electromagnetic signals that can be used to map properties below ground. The helicopter travels an average of 65-70 miles per hour in closely spaced parallel lines across a mapped area.

Why does the helicopter fly so low?

Surveying bedrock requires flying in a grid pattern low to the ground. Flight lines are half-mile apart, so the helicopter will only be visible from any particular location for a short period of time. The helicopter will not fly within 500 feet of buildings, and will make efforts to fly around people or large equipment on the ground.

Will the helicopter fly at night?

No. Based at nearby airfields, the helicopter typically departs in the morning and operates during much of the day; weather and flying conditions permitting. It may land during the day to refuel, but it does not fly at night.

Where will the helicopter be flying?

The survey will cover sections of the following counties:

- Brown
- Calumet
- Door
- Fond du Lac
- Kewaunee
- Manitowoc
- Sheboygan's northwest corner

A map showing the flight area is available at https://datcp.wi.gov/Pages/Programs_Services/AEMSurvey.aspx. Flight path information will be updated daily on the website.

How long will the flights last?

Flights will begin in early January and are expected to take 7-10 days depending on weather and flight conditions. Plans can change at the last minute.

Is it noisy and is there any wind on the ground created when the helicopter passes over?

The helicopter will be traveling at an average speed of 65-70 miles per hour and at 200 feet high, so it should not create a loud noise disturbance. The helicopter stays high enough that there is no rotor downwash (wind) felt on the ground. Downwash is felt only when the helicopter hovers and that only occurs when the system is taking off or landing at an airport.

Who will conduct the survey?

USGS is contracting with SkyTEM ApS, a specialty airborne geophysical company to conduct the survey. Experienced pilots from Expedition Helicopters, who are specially trained for the low-level flying required for geophysical surveys will operate the helicopter. The company works with the U.S. Federal Aviation Administration to ensure flights comply with the law.

How will information from the survey be used?

DATCP will use survey data to implement the technical standard for measuring bedrock depth. To learn more about this, visit <https://socwisconsin.org/current-work/full-process/01-verification-of-land-features/>.

Will information from the survey be available to the public?

Yes. Once the survey is complete, all data, maps, and analyses will be publicly available at no cost.

Where can I find more information?

To learn more about this project, visit https://datcp.wi.gov/Pages/Programs_Services/AEMSurvey.aspx. If you have questions, please email datcpaemsurvey@wisconsin.gov.

