Wisconsin Geological
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Supplemental report on the Central Sands nitrate and neonicotinoids database

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Summary

Nitrate and neonicotinoids are two pollutants that can be found in groundwater. Nitrate contamination can occur naturally or because of human activities such as agricultural practices and waste disposal. Neonicotinoids, on the other hand, are a type of pesticide that is widely used in agriculture to protect crops from insects. Both nitrate and neonicotinoids have been linked to negative impacts on the environment and human health.

The Central Sands region of Wisconsin is an area with high groundwater susceptibility to contamination and a high percentage of land use devoted to agricultural procedures. Since many residents of the Central Sands rely on groundwater resources for their drinking water, it is a priority for federal and state agencies and local governments to assess the state of groundwater contamination and reduce the levels of nitrate and neonicotinoids in groundwater.

To better coordinate efforts, six counties in the Central Sands region of Wisconsin (Adams, Juneau, Marquette, Portage, Waushara, and Wood) established the Central Sands Groundwater County Collaborative (CSGCC) in 2018. While nitrate and neonicotinoids data have been continuously collected for decades in the CSGCC region, no compilation of such data had been attempted before. Hence, we aimed to assemble all the available nitrate and neonicotinoids data and create a single, unique database for visualization and analysis. We gathered over 100,000 nitrate data points and over 2,000 neonicotinoids (clothianidin, imidacloprid, and thiamethoxam) data points collected in the groundwater of the CSGCC region. Each data point carries information on sampling location, sampling location resolution and sampling date.

In addition to the contaminants' concentrations, we also retrieved information on the properties of the wells from which the samples were collected. Through a process of data comparison, we assigned an accuracy level to each well characteristic. We merged the multiple datasets only after a thorough process of duplicate check, and after discarding data collected after water treatment systems. This GIS database also includes data on neonicotinoids concentrations in surface water, addresses, biosolid spreading, manure storage locations, spills, soil properties, land use, septic system locations, and wells of the CSGCC region. For the majority of the data points, their exact location is limited to the resolution of a Public Land Survey System section (referred as section hereafter). For more details on data merging, and data analysis please refer to the final report of this project, titled *Advancing the Use of Nitrate and Neonicotinoids Findings to Inform Groundwater Protection and Improvement Strategies* (Romano and others, 2023). The report is included in the Groundwater Project Repository of the Wisconsin Groundwater Research and Monitoring Program (WGRMP), and it is available for download at this link: https://digital.library.wisc.edu/1711.dl/ASRUSPUU5VR4Q9E.

Data Contents

The data and accompanying materials for this publication are available for download from the WGNHS Publication catalog at: https://doi.org/10.48358/dwhy7257

Dataset 1: Central sands nitrate and neonitotinoids database

A file geodatabase (.gdb format) that includes 40 data layers and tables including nitrate and neonicotinoid concentrations, municipal boundaries, land use and soil classifications, and well and sample information.

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