

Data Centers and Groundwater Resources

Position Statement

The position of the National Ground Water Association (NGWA) is that data center development must protect groundwater quality and quantity, be transparent in water and energy use, and incorporate best available technologies to minimize or eliminate consumptive water use while supporting reliable and sustainable infrastructure growth.

Issue Overview

Data centers are a fundamental part of modern life and national security. Artificial intelligence and cloud computing are expected to advance and expand. Data centers have significant power demands, and many rely on water for cooling, often using large quantities of groundwater. As power and groundwater are finite, data center development must consider infrastructure needs and best available science and engineering practices to limit the consumptive use of groundwater and impacts to the environment.

Groundwater Protection Principles

NGWA supports data center development that embraces the best available technologies to improve efficiency and minimize or eliminate consumptive groundwater use. Development should include monitoring of water withdrawals and other potential impacts to groundwater and surface water quality and quantity, while respecting the existing water users in the region and maintaining or improving existing environmental conditions. These developments will be site-specific with each location requiring study to evaluate the resources available and the potential capacity of the environment to assimilate the demands placed on it. Proper research and design practices must be engaged to ensure resiliency through the cumulative effects of groundwater withdrawal and other potential impacts, as well as the potential effects of drought and a changing climate on the assimilation capacity of the environment.

Transparency in Water and Energy Use

NGWA believes transparency is essential to responsible data center development and community trust. At a minimum, data center operators should clearly disclose:

- Sources of water used (groundwater, surface water, reclaimed water)
- Annual and peak water withdrawal and discharge volumes
- Consumptive versus non-consumptive use
- Relationship between cooling systems, energy demand, and water use.

Transparency should occur during planning, permitting, and ongoing operation.

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Minimum Planning and Reporting Criteria

Few regulations exist to manage new data center impacts on sometimes limited water resources. These resources need to be protected and sustained for all locally designated beneficial uses. Development of data centers generally fall under local agency (city and county) land use planning authorities that may not be prepared to manage these new demands on local resources. NGWA recommends that data centers proposing the use of groundwater integrate a data-center-specific hydrogeologic assessment into planning efforts that provides at a minimum:

- Planned data center water uses
- Information on the proposed source and its resiliency
- Information on the proposed receiving water body or aquifer, its quality, and the volume and rate of discharge
- Identify and evaluate potential impacts to nearby users and resources and appropriate monitoring procedures.

Geothermal Systems

The NGWA has identified several geothermal heat exchange systems that can either reduce or eliminate water use for conditioning data centers. Through the institution of proper site research and design methodology, geothermal technologies such as conventional closed-loop geothermal, pump and injection systems, and submerged closed-loop heat exchangers are scalable solutions that can satisfy a wide range of data center cooling needs.

Leveraging the commercial geothermal tax credits that are already in place, this technology can provide shovel-ready solutions to reduce water use and power consumption. We recommend that robust efforts be made to improve research, development, training, and implementation. It is critical that geologists, hydrogeologists, engineers, and water well contractors have access to cutting-edge research and training to further improve the viability of these solutions.

Conclusions

Data centers represent critical infrastructure, and their continued growth must be planned and managed in a manner that protects groundwater resources that are relied upon by communities and ecosystems. As the number and scale of data centers expand and concentrate in many regions, the potential for cumulative groundwater impacts increases. NGWA affirms that groundwater protection, transparency in water use, and early, science-based planning are essential components of responsible data center development.

NGWA urges policymakers, regulators, and data center developers to incorporate groundwater sustainability into siting, permitting, and operational decisions. This includes clear disclosure of water sources and use, application of minimum planning criteria, potential impacts to receiving water bodies, and prioritization of best available technologies that reduce groundwater withdrawals. NGWA strongly supports the evaluation and use of geothermal systems and other low water use solutions as scalable approaches that can significantly reduce or eliminate consumptive water use. Aligning data center growth with long-term groundwater protection is not only achievable—it is necessary to ensure the responsible use of groundwater resources now and in the future.

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Dates

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The National Ground Water Association is a not-for-profit professional society and trade association for the global groundwater industry. Our members around the world include leading public and private sector groundwater scientists, engineers, water well system professionals, manufacturers, and suppliers of groundwater-related products and services. The Association's vision is to be the leading groundwater association advocating for responsible development, management, and use of water.

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