



Groundwater Protection

NGWA Position Statement

It is the position of the National Ground Water Association (NGWA) that the aquifers of the nation containing fresh and brackish groundwater should be protected from water quality degradation and depletion. Increased awareness of the importance of groundwater to the wellbeing of communities and the nation is vital to ensuring support for domestic water supply, industry, and food production into the future.

Audience

Legislators, governmental officials, environmental organizations, water industry professionals, community leaders, general public.

Issue: How do we protect the nation's groundwater from contamination and depletion for present use and future generations?

Background

Groundwater occurrence, including its vulnerability to contamination and its value and use as a resource, varies from place to place, with climate variability impacting its availability. States have exclusive authority over the allocation and administration of rights to the use of groundwater within their borders. States also administer state groundwater monitoring and quality controls as well as federal water quality standards when receiving delegated authority for them. Groundwater degradation has been documented in every region and state of the nation. It is recognized that a wide variety of human activities can adversely impact groundwater, from water quality degradation to depletion, reducing groundwater availability. Once degraded, it is often very costly, time-consuming, and sometimes technically infeasible to restore aquifers to their original potential.

Once depleted, it may take decades to centuries to replenish aquifers from overpumping, and it may require a combination of demand management and managed aquifer recharge (MAR) to do so.

About 90 percent of our freshwater supplies lie underground, but about 30 percent of the water Americans use comes from underground sources (USGS 2018; Evans 2023).

Nearly 41 percent of the U.S. population uses groundwater for their domestic water supply, including virtually all rural residents (USGS 2019; USEPA 2024; NGS 2024). In most cases, groundwater needs little or no treatment prior to beneficial use. However, in some instances, natural groundwater quality is unsuitable for specified beneficial uses without treatment. Conversely, water-short communities are increasing use of brackish and saline water with treatment for potability to satisfy their domestic water needs (TWDB 2022).

Agricultural irrigation accounts for 70 percent of fresh groundwater use and 48 percent of all irrigated agricultural use in the United States. Additionally, groundwater is used across all major industrial sectors (USGS 2018).

The U.S. Geological Survey estimates that more than 50 percent of U.S. streamflow is from groundwater, although it is higher in some locations, and less in others (USGS 2016).

Position

General. It is the position of the National Ground Water Association (NGWA) that the aquifers of the nation containing fresh and brackish groundwater should be protected from water quality degradation and depletion. States' authority to administer the rights to groundwater use, and to manage and protect groundwater quality, should be maintained. It is understood, while the goals of nondegradation of quality and replenishment of quantity are often very challenging and may be impractical in some circumstances, groundwater protection programs should address both existing and potential future beneficial water uses and recognize aquifers as essential natural water infrastructure. Increased awareness of the importance of groundwater to the wellbeing of communities and the nation is vital to ensuring support for local water supply and food production.

Quality. Groundwater quality protection can be addressed in multiple ways. Among these are land-use controls, treatment of waste streams, and containment or isolation of contaminant sources. Waste reduction, outreach and education of well owners and water users, and technology transfer are important features of the effort to protect our valuable groundwater. A combination of measures is needed for an adequate groundwater protection program, and improved groundwater monitoring is critical. NGWA recommends an increased level of scientific research to provide the basis for land-use control decisions and to address emerging constituents of concern such as per- and polyfluoroalkyl substances (PFAS). The Environmental Protection Agency (EPA) should continue to work with state regulatory agencies and the private sector in having responsible parties apply best practices and effective remedial technology to return contaminated groundwater to beneficial use to support communities reliant on groundwater sources. Groundwater, particularly in shallow aquifers, should not be left indefinitely in a degraded state given the increased demand for water. Groundwater remediation should consider the local beneficial uses to which groundwater is put. The cost of rehabilitating aquifers impacted by groundwater degradation should be considered.

Quantity. Adequate long-term groundwater level monitoring and proactive groundwater management are essential to understand and address declining trends in aquifer system storage. In some cases, increasing groundwater depletion can be reversed with state-approved managed aquifer recharge (MAR) approaches, which have advanced significantly (Parker et al. 2022). Caution should be applied to ensure that recharge water does not carry contaminants into aquifer storage and that recharge water is compatible with groundwater and subsurface conditions. Sources of water for recharge include surplus surface water, storm and flood water, treated wastewater, and desalinated water. Advanced treatment of potential recharge water may be necessary to remove emerging contaminants such as PFAS, as well as other contaminants not currently recognized. Advanced treatment of recharge water can protect human health and the environment (for example, USEPA 2023). In many cases, a portfolio of planning options will be required to address groundwater depletion, including demand management. The cost of well deepening or replacement due to groundwater depletion should also be considered.

Interconnections. More attention to groundwater and surface water as a single resource will positively affect both quantity and quality and support human health and ecosystems. Groundwater is often the primary source of streamflow, referred to as baseflow, particularly during dry periods. Likewise, surface water can be a primary source of water replenishing aquifer systems and affecting water quality. Understanding these interactions and how they are affected by pumping is essential to comprehensive, effective water management and governance.

Brackish Groundwater. Given the large volume of brackish water, generally classified as having 1,000 to 10,000 milligrams per liter total dissolved solids content (USGS 2021a and b), NGWA supports protection of brackish waters where other water sources are insufficient to provide for municipal and industrial water demand. These waters typically require desalination that removes salt and other minerals to be suitable for beneficial uses. If subsurface disposal of desalination waste residuals is determined necessary, underground injection control permit requirements should protect other groundwater sources, including other brackish waters.

Statutory and Regulatory Factors. NGWA supports states' authority and continued management of groundwater for beneficial uses and of delineated groundwater protection areas (including recharge zones). While many states have practiced groundwater planning for over 30 years, the complexity of the subsurface and its hydrogeologic systems as well as the interactions with extensive unplanned groundwater depletion have made long-range groundwater planning challenging (Milman et al. 2024). Effective groundwater planning requires adequate knowledge of the aquifer system and demands on it, through comprehensive monitoring that provides an ability to analyze, predict, and manage human impacts to groundwater. Drinking water standards administered by states, or by regional federal offices in some instances, under the Safe Drinking Water Act as well as the programs of the Clean Water Act, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act, should guide both groundwater protection and recharge to protect human health and the environment. Concentrated stormwater infiltration regulated under either the Underground Injection Control or National Pollutant Discharge Elimination System programs should incorporate locally groundwater-protective design, pretreatment (where needed), installation, and maintenance. Rigorous groundwater testing and assessment is important to monitor aquifers receiving injected waste fluid or infiltrated degraded water.

Financial Support. Financial support to all levels of government according to the program priorities of the funding source should include protection of groundwater as an investment in essential natural

infrastructure. Control and monitoring of potential and active sources of contamination should be a national objective implemented at state and local levels, thereby reducing future costs for remediation and replenishment of groundwater. Government financial investment also ensures that MAR and other water supply measures achieve resilient domestic water supplies, and sustainable agricultural and industrial production. Federal funding for research into minimization of health and environmental impacts due to groundwater degradation and to improve groundwater management is essential to maintain groundwater systems that are stable, reliable, and safe into the future. The federal government should support interagency-interstate groundwater monitoring data sharing, including administrative support for the National Ground-Water Monitoring Network (USGS n.d.). Funding for community education through state and local governments to enhance public understanding of groundwater and its role locally and nationally will increase awareness of the importance of sustainable groundwater resources to the health of the people and economy of the nation.

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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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