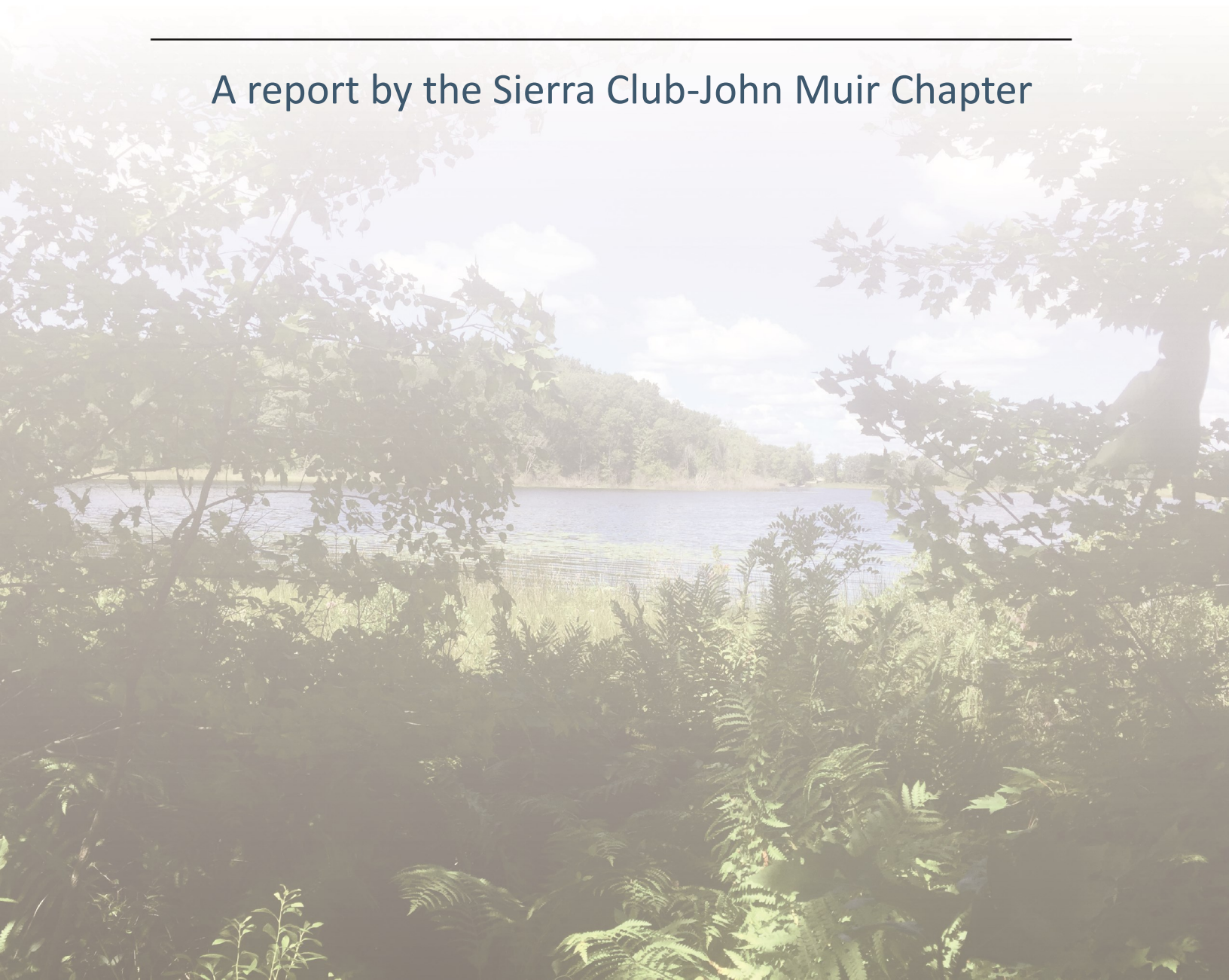
SIERRA CLUB
JOHN MUIR CHAPTER

Water for All, Now and Into the Future:

Water Quantity in Wisconsin

A report by the Sierra Club-John Muir Chapter



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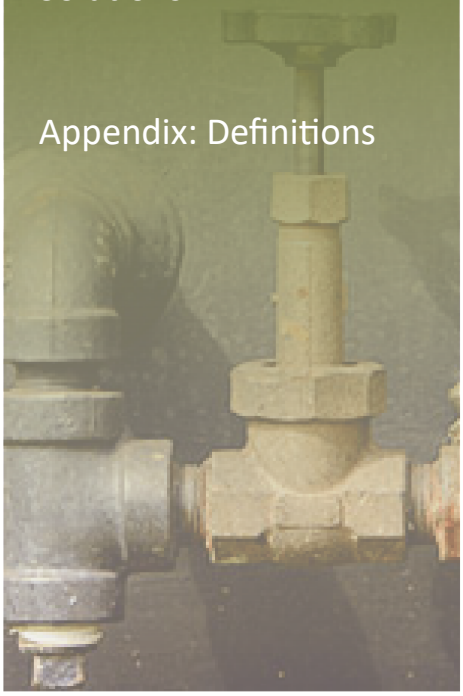


Background

The Wisconsin Department of Natural Resources' (DNR) mission for water conservation and water use reads, "Sustainably manage the quantity and quality of water in the state to ensure that water is available to be used to protect and improve our health, economy and environment now and into the future."[1] To achieve the mission, the Department has the following goals:

1. Ensuring improvement of the waters and water dependent natural resources
2. Protecting and restoring hydrologic and ecosystem integrity
3. Retaining the quantity of surface water and groundwater
4. Ensuring sustainable use of waters
5. Promoting the efficiency of use and reducing losses and waste of water

Further, the DNR Water Conservation and Efficiency fact sheets states that water withdrawals should not "result in harm to the rivers, streams, lakes, wetlands, springs, groundwater or the plants and animals that depend upon them."[2]

Similarly, the Sierra Club's water policy acknowledges the essential role water plays to quality of life: "Water is basic to all life. Water [quality and quantity] are integral to issues such as energy, land use, and maintenance of a healthy environment for plants, wildlife and humanity. Proper management of water is essential so that present and future generations may survive and flourish."[3]

Unfortunately, due to recent changes in policy and agricultural and industrial use trends, Wisconsin is not living up to these water use goals. To support health and industry, there must not only be a sufficient amount of water, but that water must also be clean. From over-pumping to an increased concentration of nitrate and bacteria contaminates in drinking water wells, the current systems are failing to provide the quantity of clean water that is needed across the state.

The Importance of Water Quantity

Wisconsin water resources provide the cornerstone for much of Wisconsin's economic engine and quality of life. Lakes, streams, rivers and wetlands host a broad range of recreational, hunting and fishing opportunities. Groundwater provides drinking water for about 70 percent of all Wisconsinites, while the rest rely on surface waters for drinking water. Commercial, industrial and agricultural activities rely on water as part of their business operations.

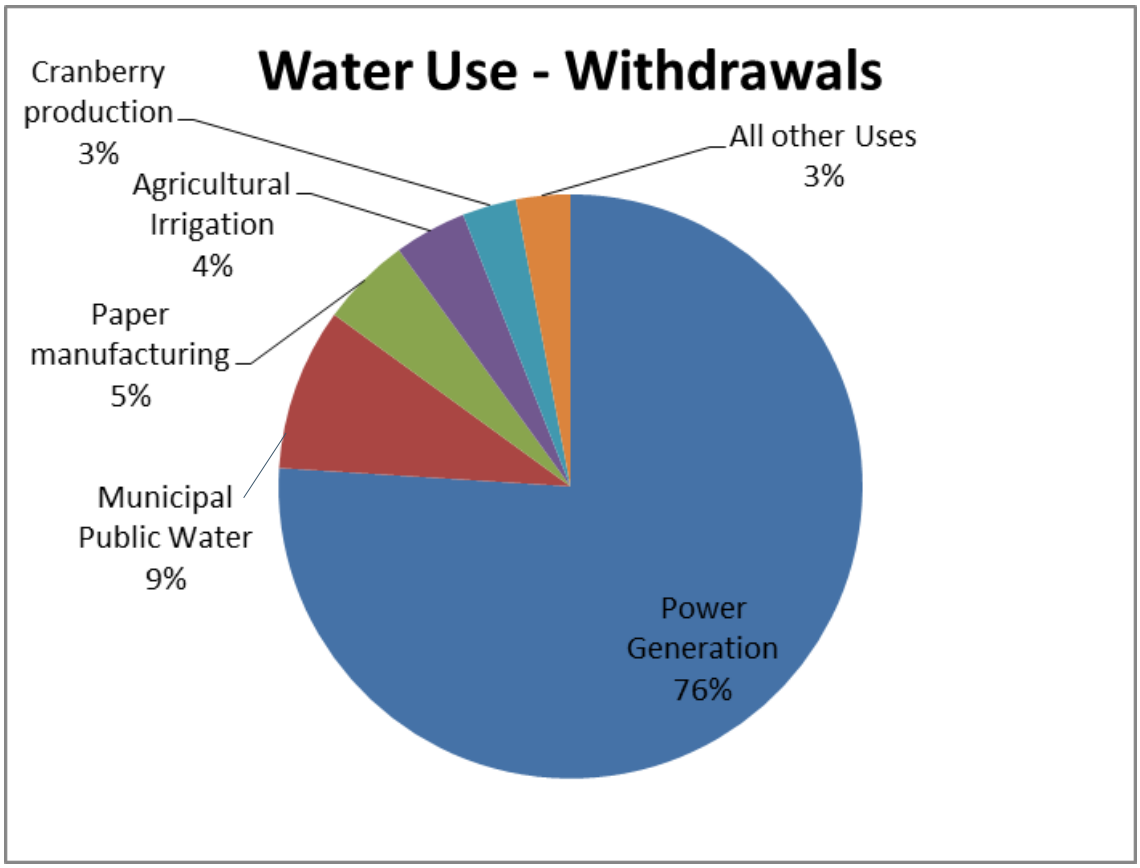
In addition, ecosystems need water to function properly. Lakes, rivers and wetlands support a wide range of life including animals, plants, fish and other species. Decreasing the amount of water available to an ecological system such as a forest or wetland can dramatically change its nature. For example, a wetland may no longer be able to support ducks and other waterfowl or serve as a place for fish spawning.

Adequate water resources support the well-being of Wisconsin's businesses, communities, citizens and broad array of life. Therefore, water is vital to Wisconsin's future.

Water Use in Wisconsin

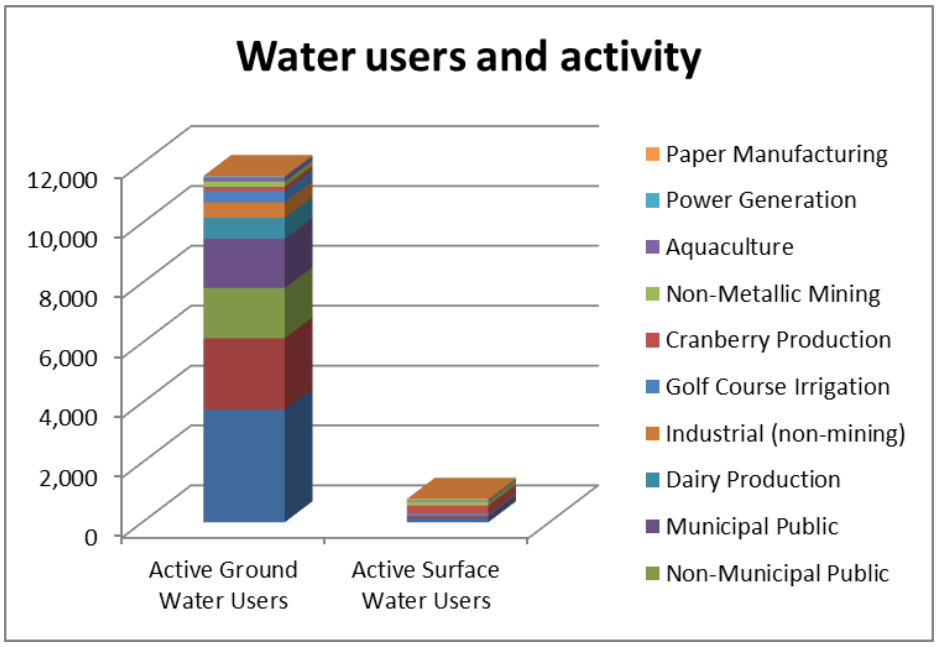
In 2015, total statewide water withdrawals exceeded 2.04 trillion gallons, an increase of four percent compared to 2014. The 2.04 trillion gallons is roughly equal to three times the volume of water in Lake Winnebago or enough water to cover the surface area of Wisconsin in nearly 1.7 inches of water. [5]

These withdrawals include both surface and groundwater. The largest quantity withdrawals are taken from surface waters for power plants.



Groundwater withdrawals are 43 percent public water supplies and 37 percent agricultural irrigation. As economic activity becomes more water-intensive and as population increases, there will be growing demand on Wisconsin's water resources. For example, since 2000 there has been a six-fold increase in the number of Concentrated Animal Feeding Operations in Wisconsin.[6] Unlike other forms of animal agriculture, these facilities often require multiple high capacity wells.

Consumptive Uses



While the DNR's Water Use Reports cover both surface and groundwater withdrawals, they do not distinguish between consumptive and non-consumptive uses of water nor do they assess the water balance for each resource. Consumptive uses of water include evaporation, incorporation into a product (bottled water or other product), agricultural crop production or transfer from one water resource to another. For example, most large municipal drinking water systems that use groundwater discharge wastewater to surface water. Consumptive uses of water are a concern as the water is removed from a resource without any return or replenishment.

Using water balance planning will improve the ability to look at the long term viability of a resource and focus on uses where no or little water is returned back to the resource. The Great Lakes Compact begins to address this by creating a high bar for withdrawing and using water from the Great Lakes Basin. The new rules require consideration of water conservation, water return and the availability of other water resources.

Public Water Supplies

There are approximately 79 public water supply systems in the state that serve a population of 10,000 or more. For those who do not get their water from a public water supply, their water likely comes from a private well tapping groundwater. Roughly 940,000 Wisconsin households rely on private wells for their water, which drives the need concern for abundant, clean water across the state.

Excessive Groundwater Withdrawals

When several high capacity wells are pumping from the same resource, the water table is drawn down. Excessive water withdrawal can be simply defined as the rate of withdrawal exceeds the rate of replenishment. In places like the Central Sands where drops in the water table have impacted wells and surface water, Wisconsin does not meet its water management goal that water withdrawals "do not result in harm to the rivers, streams, lakes, wetlands, springs, groundwater or the plants and animals that depend upon them."

Places in Wisconsin are beginning to experience the impacts of water withdrawal. Here are several examples:

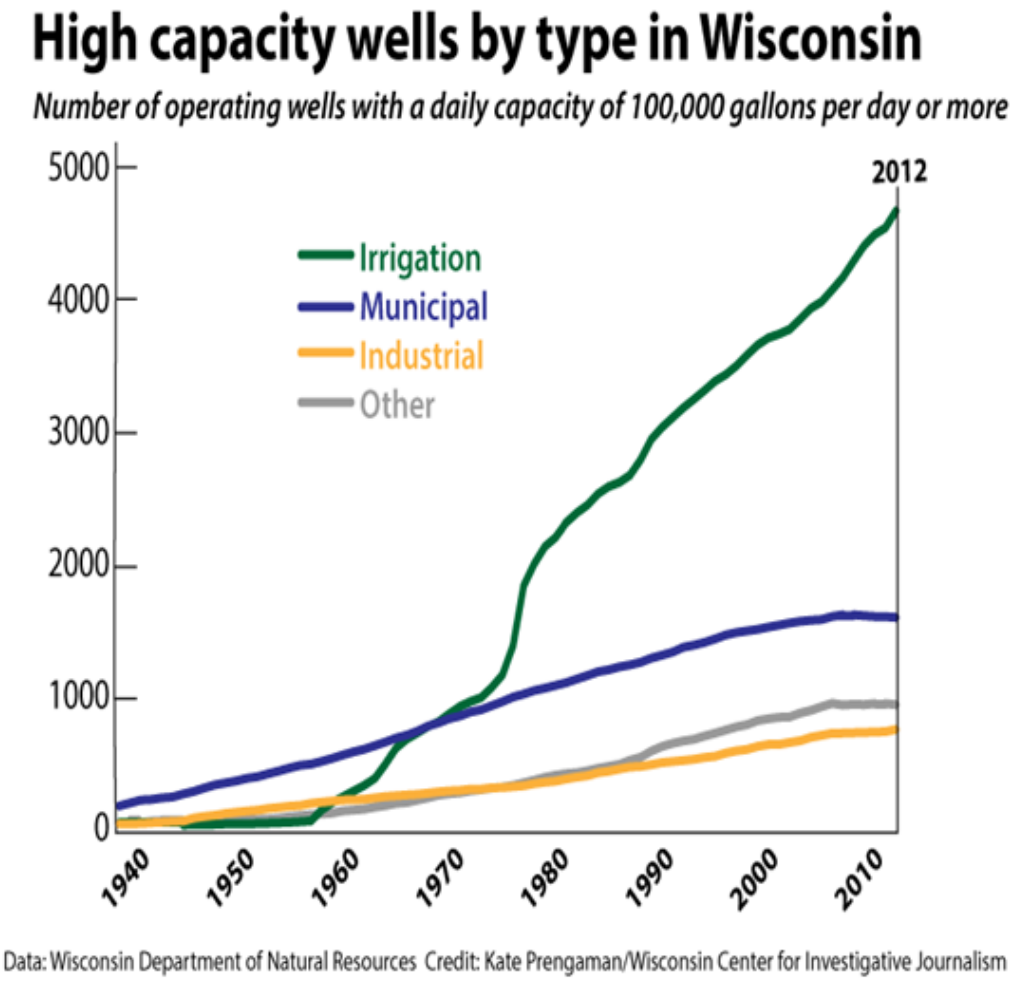
- Long Lake in the Central Sands Region used to be a "lake owners' delight," with fishing right out the door. Over the years, this 12-feet deep lake has declined to a mere three feet deep, negatively impacting the ecosystem and property values in the area.
- The Little Plover River, a cold water trout stream that is fed by groundwater, was listed in 2013 as one of America's 10 most endangered rivers because groundwater pumping in the area has reduced or eliminated the flow of the river.
- Recent studies show that the cumulative effects of pumping in central Dane County has reduced, and sometimes reversed, groundwater flow to the Yahara chain of lakes.

Additionally, the decrease in water quantity has resulted in higher concentrations of pollutants, putting the drinking water of tens of thousands of Wisconsin households at risk.

- Ninety-four thousand households in Wisconsin have unsafe levels of nitrate in their drinking water.[9] The highest nitrate contamination areas overlap with the areas of highest groundwater withdrawal.
- Waukesha County found increasing levels of radium in well water as wells were drilled deeper into the aquifer and as the water level declined. [10]

Area of Concern:
The Central Sands

The Central Sands area encompasses parts of Adams, Marathon, Marquette, Portage, Shawano, Waupaca, Waushara and Wood counties. It is characterized by deposits of sand and gravel that form an aquifer that can both store and transfer water underground. The 800 miles of trout streams and 300 lakes in the region depend on this groundwater. In the early 1950s the central sands area had less than 100 high capacity wells. Now there are more than 3000.[7] This enormous increase in water withdrawal has consequences. In recent years, these surface waters have experienced documented declines. The recently released report, *A Groundwater Flow Model for the Little Plover River Basin in Wisconsin's Central Sands*, confirmed the negative impact of too many high capacity wells on the Little Plover.[8]
If withdrawals continue to increase, problems are likely to as well.



Solutions: Local and State Elected Officials Must Protect Water Quantity

Water should be managed sustainably and with consideration for all uses and users. Policy makers must act as stewards ensuring adequate water supply now and into the future for Wisconsin.

There are many things that must be taken into account when making decisions about Wisconsin's current and future water supplies.

- Multiple uses of the same water resource have a cumulative effect.
- Cross contamination often occur through connections between bodies of water. For example, wells that are drilled to access groundwater may allow surface contaminants like road salt to infiltrate.
- High capacity well permitting needs to be reviewable in order to consider the changing status of groundwater resources.
- In addition to human uses of water, there are ecological water needs to maintain ecosystems, wetlands, riparian areas and streams that must be considered.
- Recharge areas for groundwater are necessary to the water balance, in addition to drinking water well heads.
- In most areas of Wisconsin, groundwater and surface water are connected. Management of water resources needs to take into account the interconnected nature of the resource in order to ensure an abundant supply of clean and potable water.

Policies that Ensure an Adequate Supply of Water

In the 2017 legislative session, Sierra Club has taken a formal stance on two bills that will directly impact water quantity. Sierra Club opposed 2017 SB 76, which does not allow the evaluation of cumulative impacts of water uses both at the time of permitting or into the future as circumstances change. This unsustainable approach virtually guarantees excessive use of groundwater resources in some areas of the state.

Sierra Club supports SB 22, the Water Sustainability Act, which would create groundwater management areas and consider the cumulative impacts of water withdrawals within these areas.

In addition to the Water Sustainability Act, there are several water quantity protections and solutions that Sierra Club recommends:

- **Ensure water fairness by taking into account multiple uses and cumulative impacts of water withdrawals from both surface and groundwater resources.** Water withdrawals for any single use should not be allowed to compromise the supply of water for other users, especially if it puts water supplies and the survival of an ecosystem such as a lake or stream at risk.
- **Expand protections for groundwater recharge areas.** Recharge areas are critical to ensuring the long term viability of groundwater resources. Local development decisions, whether urban, industrial, or agricultural, should take into account the critical areas where water seeps back to groundwater resources.
- **Consider the future costs of consumptive uses of water**, including how many consumptive uses should be allowed that do not result in a recharge to the source.
- **Apply Watershed-Scale Strategies.** As an investment in Wisconsin's long-term health and natural assets, Wisconsin should commit to wetland, shoreline, and streamside conservation practices and work with local communities and watershed organizations to develop strategies to restore and sustain hydrological and ecological functions that enhance water quality, groundwater recharge, and habitat for native aquatic species.
- **Create a statewide water quantity management system** that uses sound information to determine how much water in any area may be pumped sustainably from an aquifer or surface water.
- **Plan for climate change related water extremes** including droughts and floods.
- **Safeguard Drinking Water.** Wisconsin must take steps to reinvigorate water quality protections for drinking water and the healthy ecosystems that provide it.

Appendix: Definitions

For purposes of this paper, the terms below mean the following:

Aquifer: An aquifer is a geologic formation that contains or conducts water. The water feeds wells, springs, or surface waters. Aquifers, when confined by impermeable layers, can also overlap or stack on top of one another. Some of these water deposits have been created over thousands of years and have very slow recharge rates. Others with very porous soils can recharge very quickly.

Cone of depression: Aquifers are influenced by the pumping of a well which usually manifests as a dip in the water table surrounding the well. The characteristic shape is a "cone." Water can also be drawn in from surface waters such as streams. These drawdowns can also cause pollutants including nitrates, arsenic and radium to concentrate.

Groundwater is a water resource that lies beneath the surface of the ground and can be accessed by wells or naturally by springs. These water bodies are segmented by geologic formations into discrete aquifers that may overlap one another under the ground or may be interconnected. Where overlying soils are permeable, these water deposits may be recharged from the surface by waters that seep down. The rate that the water is recharged depends on the balance between new water reaching the groundwater and the rate at which the water is being withdrawn. Wells are one of the common ways that water is withdrawn.

High capacity well: Wisconsin Administrative Code defines a high capacity well system as one or more wells, drillholes or mine shafts on a property that have a combined approved pump capacity of 70 or more gallons per minute or 100,800 gallons per day.[4] Withdrawals, particularly high volume ones, may cause a draw down in the water table, or cones of depression.

Surface water: These water resources are directly accessible from land. Examples include lakes, rivers, streams, ponds and wetlands. Interconnected surface waters are often described by "watersheds," which serve as topographic descriptions for the waters that feed into the dominant water body, like the Wisconsin River or Lake Michigan for example.

Water balance is an assessment of the flow into and out of a water resource, including the water's availability and stability over a time period.

Water table: The depth under the surface at which the ground is saturated and the ground above is not saturated with water is the water table. The water table can fluctuate depending on water withdrawals and recharge. It may be uneven due to topographic features or active withdrawals.

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