

Securing Illinois' Groundwater Future

A review of the 1983 Water Use Act and
high-capacity well review process



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Introduction

While the State of Illinois has an abundance of water resources, demand can exceed the supply of high-quality water in some locations. The desaturation of the Cambrian-Ordovician aquifer in northeastern Illinois, caused by collective withdrawals over decades, is one of the starkest examples of this challenge.¹ The St. Peter sandstone aquifer, also once a plentiful source of groundwater, is now dewatered in some areas and can no longer be used as a drinking water source.²

As the once vast supplies of groundwater have begun to dry up, communities have turned to Lake Michigan as an alternative source of drinking water. However, Illinois' use of Lake Michigan water is not limitless, and the state is committed to international agreements focused on sound stewardship of Great Lakes water. With increasing pressures to gain access to Lake Michigan in the face of groundwater supply challenges, the concept of stewardship should extend to maintaining long-term groundwater supplies and reducing the need to find alternative sources.

And yet, much like the rest of the nation, the state's structure for groundwater governance is inadequate for today's challenges. These shortcomings are recognized and periodically studied by state agencies and task forces, as well as scientific, planning, and advocacy organizations.

In 2020, the Chicago Metropolitan Agency for Planning (CMAP) and Illinois-Indiana Sea Grant (IISG) assessed the state's existing structure using sustainable governance criteria and found that, while the state has advanced groundwater science, additional legal, institutional, and operational components are needed to maintain a long-term groundwater supply.³

Based on what was learned from the 2020 effort, CMAP now seeks to better understand the Illinois Water Use Act of 1983 and, more specifically, the current notification and review process for high-capacity wells (defined in the act as a well that can withdraw at least 100,000 gallons of water per day). Stakeholders view these existing components as the place to start improving Illinois groundwater governance, and the 2022 update of the State Water Plan specifically recommends updating the act.⁴

Accordingly, this report outlines the Illinois Water Use Act of 1983, describes the well review process as it currently stands, shares groundwater governance practices used in other Great Lakes states, and outlines key findings to guide Illinois towards a sustainable groundwater governance system. These findings highlight opportunities to expand the state's groundwater management objectives to include supply, provide the necessary resources for the high-capacity well review process, and improve water-use reporting mechanisms.

Groundwater: tragedy of the commons

Groundwater is a resource that is vulnerable to the "tragedy of the commons," requiring collective action (governance) for a sustainable outcome. Villholth and others further described it as an invisible underground resource, with relatively slow flow rates, and a distributed occurrence, with open access opportunities. These common-pool resource conditions complicate effective management as groundwater is left vulnerable to overuse, exploitation, and contamination.

Source: N. Beck and M. Schneemann, "Exploring groundwater governance options in Illinois," Memorandum to IDNR, Chicago Metropolitan Agency for Planning and Illinois-Indiana Sea Grant, July 10, 2020.

Illinois groundwater governance assessment

In 2019, CMAP and IISG began reviewing groundwater governance in Illinois with support from the Illinois Department of Natural Resources (IDNR). The first project culminated in a memo to IDNR that reviewed groundwater governance concepts and assessed existing conditions of Illinois' system using a set of groundwater governance benchmarking criteria.⁵ This work was guided by an advisory committee composed of both state and local experts with knowledge and experience in a variety of topics related to groundwater in Illinois.⁶

The benchmarking criteria provided a framework to review Illinois' existing governance system based on technical, legal and institutional, cross-sector policy coordination, and operational components. The review revealed that Illinois has many of the necessary technical components, from hydrogeological maps to advanced pumping scenario models. This reflects previous and recent investments the state has made to advance groundwater science, as well as the contributions of other partners working in this space.

Most other criteria, however, were identified as either developing or non-existent in Illinois. Many of the necessary legal instruments needed for sustainable groundwater governance

simply do not exist in the state. While Illinois does have permitting agencies that issue operating permits for public water suppliers, these components are focused on water quality and do not include water quantity review. Instead, water quantity is addressed retroactively, and conflicts are typically addressed via lawsuits, though as a matter of practice, such disputes typically end up being settled outside of the court system. There is currently no statutory authority in the State of Illinois to set limits on the amount of groundwater that can be withdrawn, no instruments to reduce water use, and no structure for groundwater management plans to build consensus on needed actions for specific aquifers, among others.

CMAP and IISG's initial assessment created a process map for how a sustainable Illinois groundwater governance system could be structured. In support of these efforts, advisory committee members identified the existing or potential relationships between the technical, legal and institutional, and cross-sector policy coordination and operational sections of an ideal groundwater governance system (see Appendix A). Advisory committee evaluated Illinois'

Governance versus management

Groundwater governance generally refers to the overarching framework of not only groundwater regulations and policies, but also the technical, political, and other processes of engaging the public and private sectors and civil society. It is a process through which participants frame groundwater challenges and make decisions on which management and stewardship actions should be taken, when, by whom, and for what purpose.

Groundwater management, on the other hand, is specific day-to-day actions and involve a more limited set of stakeholders — typically agencies and experts, and less inclusive of resource users, residents, environmental organizations, and interest groups.

Source: Beck and Schneemann, "Exploring groundwater governance options in Illinois."

provisions for meeting the overall goal as defined in *Water 2050*⁷ as non-existent, developing, acceptable, or optimal, via a color code.

A critical component of the governance system identified in the process map is a mechanism for allowing groundwater science to inform decisions about new and existing water withdrawals. Under the Illinois Water Use Act, permitting decisions are rendered by the Illinois Environmental Protection Agency (IEPA) and the Illinois Department of Public Health (IDPH) from a well construction and water quality perspective — with no considerations given to quantity.⁸

The advisory committee identified that a permitting agency — whether a state regulatory entity or one designated for a specific aquifer or other geography — could review drilling construction and operating permit applications from both a groundwater quality and quantity standpoint. The committee envisioned a system in which groundwater-use rights are governed by operating permits that consider water quantity through a variety of legal instruments. For example, water-use reporting could verify compliance with operating permits, which could be reviewed periodically (10 to 30 years) and subjected to a renewal process informed by existing conditions. Reductions to groundwater extraction or preventing well construction could, in turn, be achieved through a range of legal and regulatory instruments.

Given the importance of groundwater use rights and regular well review in achieving sustainable groundwater governance in Illinois, CMAP sought to better understand the act and current well notification and review processes. This report outlines the Water Use Act of 1983, describes the current well review process, shares practices in nearby states, and outlines key recommendations for moving forward with a sustainable groundwater governance system.

Water Use Act of 1983

Before the passage of the Water Use Act, Illinois followed the absolute ownership doctrine, which allowed a landowner to pump groundwater from their property and insulated the landowner from any liability to neighboring landowners.⁹ A 1981 Illinois Appellate Court decision reaffirmed the absolute ownership doctrine.

Population increases and development patterns at the time created increased demands on and conflicts among interconnected groundwater systems. This was a concern for farmers and the Illinois Farm Bureau. The IDNR (which was then a division of the Illinois Department of Transportation) also sought to formalize a process for informing the public about the potential impacts of high-capacity wells.¹⁰

The Illinois legislature weighed in by passing the Water Use Act of 1983. The act replaced the absolute ownership doctrine with a reasonable use doctrine. As defined, reasonable use is, “the use of water to meet natural wants and a fair share for artificial wants. It does not include water used wastefully or maliciously.”¹¹ Informed by the Illinois Supreme Court decision in *Evans v. Merriweather*, the rule of reasonable use in Illinois is slightly different from other applications as it identifies groundwater rights as usufructuary — meaning one has the right to use the resource, but is legally obligated to use it responsibly and for its intended purposes — and distinguishes between natural and artificial wants.¹²

Other key components of the act established a way to restrict groundwater withdrawals during emergencies in limited areas of the state¹³ and to provide public notice and review of new withdrawals that are both planned and deemed substantial (i.e., greater 100,000 gallons of water per day).¹⁴ In 2010, the act was amended to require water use reporting among commercial, industrial, and irrigation high-capacity well users.

The act’s well review process served to inform regulatory agencies (and the public) about how new wells could impact existing water levels (or water pressure) which could result in costs to deepen, reconstruct, or add wells to maintain withdrawal volumes.

To inform the act’s high-capacity well review, the state responded with administrative rules that require landowners to notify the local soil and water conservation district (SWCD) and other local governments prior to the construction of any new well capable of withdrawing at a rate of 100,000 gallons per day or greater.¹⁵ The SWCD must request the assistance of the Illinois State Water Survey (ISWS) and Illinois State Geological Survey (ISGS) in reviewing the proposed withdrawal’s effects on other users of water. The SWCD is required to distribute information regarding any potential impacts via local newspapers and notify relevant local governments.¹⁶ No further steps are outlined for addressing and resolving potential conflicts identified by the SWCD.

The act’s regulation of Illinois groundwater supplements other rules and regulations, such as the Illinois Groundwater Protection Act of 1987 and the Illinois Water Well Construction Code, which are primarily focused on water quality. The Groundwater Protection Act established a series of programs to prevent pollution, including wellhead protection programs, maximum setback zones, groundwater monitoring, and others. The well construction code governs the

siting, construction, and modification of water wells for the protection of public health (415 ILCS 30). The code established a permit system and prescribed well design factors (such as location and construction) primarily from a water quality standpoint. This process is bifurcated based on who the well is serving. The Illinois Pollution Control Board reviews well construction permits for all community water suppliers,¹⁷ while the IDPH, in partnership with local health departments, reviews all non-community water suppliers (schools, businesses, residences, etc.).¹⁸ Notably, while the code states that “the well shall be capable of producing as much of the desired water quantity as the aquifer or aquifers can safely furnish,” no further definition or process is provided.¹⁹

The Water Use Act’s high-capacity well review process is entirely unrelated to either of these two permitting processes. Permitting and well construction can proceed once notice has been provided and is not contingent upon receipt of the SWCD analysis.

Current state of high-capacity well review

CMAP sought to better understand the current state of high-capacity well review to inform its comprehensive assessment of the Water Use Act. In doing so, CMAP identified critical stakeholders who either have a key role in implementing the act or have background knowledge of the process. The project team interviewed county SWCDs, county public health departments, and state agencies involved in groundwater science and water resources management. In total, CMAP conducted 10 interviews and spoke with a total of 16 people about the high-capacity well review process in northeastern Illinois. The interviews focused on confirming the interpretation of the review process, learning how the processes are carried out today, and identifying both barriers to implementation and potential opportunities for improved, more effective processes. CMAP was able to piece together a history of the process, its current status, and areas where the act could be amended to further water management and conservation goals.

Among the challenges the act faces is that it did not establish a dedicated revenue stream to perform the high-capacity well review process.²⁰ Shortly after the law was passed, the ISWS lobbied for and successfully received funding to conduct the work for a short period of time. However, this funding was not renewed and, since 1992, the review of new high-capacity wells pursuant to the act has not occurred.

Despite insufficient funding for the well review process, some administrative processes created by the act continue. Some of the SWCDs still receive notices of new wells from various sources, including the Illinois Department of Agriculture (IDA), IEPA, municipalities, and private landowners (via well drillers). In turn, the SWCDs continue to send proposed high-capacity well review information to the ISWS. However, without dedicated staff and funding, the ISWS simply logs and files high-capacity well review requests received from the SWCDs, along with any final construction permits received from the IEPA or public health departments. Aside from email correspondences that confirm receipt, the ISWS has little interaction with the SWCDs.

The exact number of wells that should have gone through the high-capacity well review process since ISWS funding dried up is not clear. As reported in *Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan* (2010), the ISWS stated that they had received 939 SWCD notifications for high-capacity wells from 1992 to 2008, with 21 percent (196) of those wells located in the six-county region of northeastern Illinois.²¹ However, the ISWS' current data reveals only 54 records in roughly the last 10 years, with only 9 located in northeastern Illinois and the vast majority of them from McHenry County.²² CMAP's own analysis of water use reporting data from the Illinois Water Inventory Program found that 9 facilities and 95 wells or intakes (associated with new facilities or existing facilities) started reporting water withdrawals for the first time after 2014. While compliance with water use reporting requirements is difficult to assess, this data may indicate the potential number of wells that have been both constructed within the last ten years and not subjected to the ISWS review.

During the interviews, SWCD staff in northeastern Illinois reported seeing approximately one or two applications every couple of years. Other SWCDs reported having seen only one proposal since the legislation was enacted. It is unclear if this sharp decrease stems from a lack of

knowledge or confusion about the well review process or simply because fewer wells are being proposed since the early 2000s housing boom.

Notably, the high-capacity well review process is nearly identical to that required for water quality purposes. The information that accompanies a SWCD notice of a proposed high-capacity well is very similar, if not the same, as that which is submitted to either the IEPA or local department of public health for a well construction permit. Some of the SWCDs suspect that the duplicative nature of these forms is causing confusion among applicants, which may influence the number of proposals that the districts receive.²³

Further, while the act identified the actors involved in an assessment of a proposed well, little guidance is provided to define the scope of the review.²⁴ As a result, the early years of this program saw the ISWS and ISGS encountering notices lacking critical (yet non-obligatory) information, such as detailed aquifer surveys needed to fully understand water supply and well interactions. In many ways, these information gaps sparked the need to develop the ISWS' comprehensive groundwater flow model, which continued to be improved after the act's effective date.

When the act was enacted in the mid-1980s, water use reporting was still voluntary. Businesses would regularly cite the information as proprietary despite water use reporting being common practice elsewhere. With the development of the groundwater flow model, consistent data were needed to maintain the model and conduct groundwater supply and demand analysis. Since the Water Use Act's 2010 amendment which required water use reporting among commercial, industrial, and irrigation high-capacity well users, increased reporting has helped the ISWS develop its groundwater flow model and better understand the potential impacts of high-capacity wells on nearby groundwater users. Counties or municipalities have funded the ISWS to conduct further analysis where groundwater supply issues are of growing concern.

Comparing Illinois to Minnesota and Wisconsin

Groundwater governance issues persist throughout the United States, and many states are taking steps to improve systems to maintain long-term water supplies. Previous work by CMAP and the IISG reviewed governance systems in California, Minnesota, and Texas as their recent process updates could guide future governance steps in Illinois.²⁵ As more adequately addressed in the 2022 CMAP-IISG memo *Exploring case studies and priority groundwater governance options in Illinois*, the three states all have groundwater management goals that strive toward sustainability, while Illinois' current law is focused more on preventing direct conflicts statewide and establishing emergency provisions in a small number of counties. In addition, the three states have either empowered the state or a local unit of government to issue water quantity permits and to collect fees which could fund the agency operations.

Northeastern Illinois' sandstone aquifers extend into both Wisconsin and Minnesota. Because of the negative impacts that the Illinois aquifers have experienced from unregulated withdrawal, CMAP has revisited and supplemented the previous case study to consider how the same aquifers are being managed in these nearby states. Table 1 provides information on groundwater goals, water rights, responsible agencies, and specific details about well review and permitting processes for Minnesota, Wisconsin, and Illinois.

There is a lot to learn from comparing governance components across these three states. Illinois' goal is derived simply from the act. Minnesota's goals can be derived from sections of its statute governing water supply (Minn. Stat § 103G.265) which direct the state's department of natural resources (DNR) commissioner to "develop and manage water resources to assure an adequate supply to meet long-range seasonal requirements for domestic, municipal, industrial, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes from waters of the state."²⁶ In addition, the DNR commissioner may issue water use permits for appropriation from groundwater only if they determine that the "groundwater use is sustainable to supply the needs of future generations and the proposed use will not harm ecosystems, degrade water, or reduce water levels beyond the reach of public water supply and private domestic wells constructed according to Minnesota Rules."²⁷

Similarly, Wisconsin has broad groundwater management goals which were expanded to include groundwater quantity with the passage of 2003's Wisconsin Act 310.²⁸ The act reformed the state's water management laws to address concerns about groundwater depletion and its impacts on surface waters. This act also requires the Wisconsin DNR to consider the cumulative impacts of high-capacity wells on surface waters, not just individual wells. Through the adoption of the Great Lakes Compact provisions via 2007's Wisconsin Act 227, a statewide water withdrawal permitting system was established to ensure sustainable water use.²⁹ Combined, these acts expanded the state's authority to consider environmental impacts of high-capacity wells and established a framework for addressing water quantity issues in rapidly growing areas of the state and within the Great Lakes basin.

Wisconsin designates groundwater management areas, multijurisdictional areas where the groundwater potentiometric surface³⁰ in any of its underlying aquifers has been reduced by 150 feet or more from the level had no groundwater withdrawals occurred.³¹ These areas

require more stringent well review and permitting processes, and planning is encouraged across municipalities, water utilities, and other stakeholders to address groundwater depletion and overuse. Similarly, Minnesota gives its DNR authority to establish groundwater management areas and limit total annual water appropriations and uses to sustainably manage the resources.³² To date, Minnesota's DNR has identified three pilot groundwater management areas and two other areas of concern due to challenges in those locations.³³ Illinois lacks similar mechanisms, choosing instead to assign each county to one of 10 water supply planning areas whose boundaries do not necessarily correspond to geologic boundaries or specific management concerns.³⁴

Table 1: Case study comparison

State	Minnesota	Wisconsin	Illinois
Supply goals	<p>Derived from Minnesota Statutes § 103G.287, which articulates a sustainability standard:</p> <p>“Supply the needs of future generations and [uses] will not harm ecosystems, degrade water, or reduce water levels beyond the reach of public water supply and private domestic wells.”³⁵</p>	<p>Derived from the 2003 Wisconsin Act 310:</p> <ul style="list-style-type: none"> • Consider environmental impacts from high-capacity wells, especially in groundwater protection areas with specific water resources • Maintain water supplies of public utilities 	<p>Derived from the Water Use Act of 1983:</p> <p>Prevent water conflicts and mitigate water shortage conflicts in limited areas of the state</p>
Water rights	Reasonable use ³⁶	Modified reasonable use ³⁷ and potentially the public trust doctrine depending on court interpretation ³⁸	Reasonable use
Groundwater management planning	<p>Minnesota DNR has designated three areas to address difficult groundwater-related resource challenges:</p> <ul style="list-style-type: none"> • Bonanza Valley Groundwater Management Area • North and East Metro Groundwater Management Area • Straight River Groundwater Management Area 	<p>Designates areas in which impacts from groundwater drawdown and pumpage are such that regional planning and management is necessary to avoid, minimize and manage future impacts. Two areas:</p> <ul style="list-style-type: none"> • Southeast Wisconsin: Milwaukee area. 5 full counties, plus portions of 2 counties • Northeast Wisconsin: Green Bay area. 1 full county, plus portions of 2 counties 	<p>IDNR has identified 10 water supply planning areas with no direct authorities via executive order. All counties are assigned to a planning area; geographies are not based on water resources.</p>

Responsible agency	Minnesota DNR, Minnesota Department of Health	Wisconsin DNR	IDPH and IEPA for well construction IDA (via local SWCD and ISWS, ISGS) for impact review
Well construction permit with quantity considerations	Yes, preliminary assessment indicates potential of allocation permit	Yes. Assessment required for high-capacity wells (100,000 gpd), excluding residential and fire protection wells. ³⁹	No, quantity review is separate from well construction decision-making process
Operating permit (appropriation)	Yes, appropriations based on modeled safe yield estimates, and in line with groundwater management plan, where available. Conflict or collective withdrawals can lead to changes to individual allocations	Registration required for high-capacity wells. Water use permit inside Great Lakes basin (regardless of source water) for withdrawals above a threshold.	No operating permit
Operating permit evaluation criteria	Operating permit issued if judged to be sustainable, limited to safe yield, protective of surface water flows, water conservation, and allocation priorities	Well construction permit, based on environmental review of impacts if (1) located in groundwater protection areas (designated as an outstanding or exceptional resource), (2) could impact springs, or (3) wells that would transfer more than 95% of withdrawn water outside of basin. No criteria for wells outside of these conditions but may be subject to public trust doctrine.	No operating permit Well review process does not include established criteria

Notification	n/a	Wisconsin DNR maintains a water quantity data viewer that identifies well applications pending review, approved wells not yet drilled, and wells approved within 30 days of current date. ⁴⁰	General newspaper notification of proposed high-capacity well. If well will impact supplies, direct notification of impacted local governments.
Use reporting	Condition of permit. Annual, of monthly values via flow meter. ⁴¹	Condition of registration. Annual, of monthly withdrawal values.	Not a condition of permit. Self-reporting required of high-capacity wells. No meters.
Use charging	Annual fee based on user type	For users inside Great Lake basin, annual fee based on withdrawal amounts	No
Instrument to reduce water use	Water efficiency and conservation best practices required for large public water suppliers; can be a condition of permit for others if deemed needed	<ul style="list-style-type: none"> • Water conservation plan⁴² • Public water systems must have a water supply service area plan that forecasts demand and assesses availability of supply⁴³ • Conditions of use can be placed on high-capacity wells if the well triggers environmental review (see operating permit evaluation criteria above) 	No

Source: Based on initial analysis of Minnesota, Illinois by CMAP & IISG analysis, 2020-22; Assistance from Freshwater on Wisconsin and Minnesota provisions.

Illinois State Water Plan

The State of Illinois has articulated a clear need to update the act, as reflected in its 2022 update to the State Water Plan.⁴⁴ In the plan, the state called for the act to be assessed by the IDA with help from IDNR, including a review of the implementation of existing requirements and both the identification and advancement of any needed modifications.⁴⁵

Relatedly, the plan recommends amending the act to enable groundwater management districts, but does not articulate the authorities that the districts should exercise.⁴⁶ Creating the districts could build upon the voluntary regional water supply areas the IDNR has established across the state. The plan also recommends advancing the state's water-use-reporting system by amending the act to include metering requirements to advance the data quality of reported water withdrawals.

The plan continues to advance groundwater science by calling for the creation of the Illinois Integrated Water Information Center. The center would consolidate all the state's water information in one place, including water-use reporting and groundwater and well data. The effort would be supported by the University of Illinois and the Prairie Research Institute with the goal of creating a library of water-based information, programs, and technology to connect resources to stakeholders. In addition, the plan calls for the ISWS to determine sustainable water yield for all water-supply sources and update them every five years with the goal of evaluating water shortages annually.

Applying findings to Illinois

In alignment with the Illinois State Water Plan, CMAP recommends that the Water Use Act update broadens groundwater management objectives to include water supply; equips the high-capacity well review process with needed resources; and improves the water use reporting process. Regardless of the path chosen, the state should seek and consider both stakeholder input and lessons learned from other Great Lakes states.

Groundwater management objectives should include supply

The Water Use Act of 1983 recognizes the importance of groundwater but does not outline broader objectives for managing collective water withdrawals to maintain a long-term supply. While the Illinois Groundwater Protection Act does provide overarching objectives recognizing the socioeconomic importance of protecting groundwater, it is focused on water quality — not supply. As a result, the state lacks explicit management goals for groundwater quantity. The dangers of this approach are particularly apparent in northeastern Illinois, where decades of unchecked withdrawals have produced up to a 1,000-foot drop in water levels and desaturated portions of the St. Peter aquifer, forcing communities and businesses to switch potable water sources, oftentimes at great cost.⁴⁷ As such, the state's management goals need to focus less on preventing individual well conflicts and more on understanding and managing the collective impact of wells on a given groundwater resource.

Any objectives focused on sustainable water use would require other updates to the act — all of which have been identified in the Illinois State Water Plan and by other stakeholders.⁴⁸ These include improvements to the high-capacity well review process, the creation of groundwater management districts, and continued work to advance groundwater science. Minnesota provides a potential model as it broadly sets the goal for sustainable water use and defines sustainable water use directly in the act.⁴⁹ As Foster notes, “...managing groundwater is as much about managing water and land users (the socio-economic dimension), as it is about scientific understanding of resource behaviour under stress (the hydrogeological dimension).”⁵⁰ Ideally, any management objectives Illinois seeks to adopt would be derived through a stakeholder process and tailored to specific aquifers through a groundwater management planning process. For example, *Water 2050* used a stakeholder process to establish its mission statement and goals.

Resource the high-capacity well review process

The high-capacity well review process requires resources to inform decision making and respond to updates of the state groundwater management goals.

The review process must coordinate with other well construction review processes, be funded fully, and use established review criteria that connect back to broader management goals.

Harness synergies and improve available information

Multiple state agencies — IEPA, IDPH via counties, ISWS, and IDA via SWCDs — collect similar water information from residents, businesses, and water utilities in and outside of a permitting process. Stakeholders have said that multiple duplicative steps involving similar information

Water 2050 Regional Water Supply/Demand Plan for Northeastern Illinois

The Northeastern Illinois Regional Water Supply Planning Group advised the development of *Water 2050* and included 35 delegates representing 9 different interest groups. Together, they drafted the following mission statement and goals.

Mission statement

To consider the future water supply needs of northeastern Illinois and develop plans and programs to guide future use that provide adequate and affordable water for all users, including support for economic development, agriculture, and the protection of our natural ecosystems.

Goals

1. Ensure water demand and supply result in equitable availability through drought and non-drought conditions alike.
2. Protect the quality of ground- and surface-water supplies.
3. Provide sufficient water availability to sustain aquatic ecosystems and economic development.
4. Inform the people of northeastern Illinois about the importance of water-resource stewardship.
5. Manage withdrawals from water sources to protect long-term productive yields.
6. Foster intergovernmental communication for water conservation and planning.
7. Meet data collection needs so as to continue informed and effective water supply planning.
8. Improve integration of land use and water use planning and management.

cause confusion among applicants. Steps to create a central well-permitting process regardless of the underlying goal (quantity, public health, or well conflict) would not only create efficiencies but also reduce state and county administrative costs and increase state awareness as to where wells are being considered and constructed.

In revisiting the act, the state could also rethink the role of the SWCDs in the review process. The involvement of both IDA and the SWCDs reflects the legislation's origins. However, most of the SWCDs acknowledge they step through the high capacity well review process blindly, functioning merely as a pass-through agency, given both their lack of expertise in evaluating well impacts and the requirement that the ISWS conduct the reviews. In fact, some SWCD staff have asked why all involved agencies do not discuss proposals collectively. Staff see benefits from a single application process that enables review on multiple fronts, including construction standards, water quality, and water quantity considerations. A single state agency could be responsible for the application process and oversee the review needed to assuage water quality and quantity concerns.

Improve administrative funding and capacity

Funding the well review analysis has always been a core issue and a shortcoming of the act. Of the state entities responsible for complying with the act, the ISWS has never been given a dedicated revenue stream to perform its statutorily mandated work. Shortly after the law was passed, the ISWS lobbied for and successfully received funding to conduct the work for a short period of time. However, this funding was not renewed and by the 1990s, the ISWS saw funding cuts across the agency, further straining staff capacity.

In 2008, the ISWS merged with the Prairie Research Institute, which is comprised of five state scientific surveys and hosts the Illinois Water Resources Center.⁵¹ In the same year, the Prairie Research Institute funded a study that assessed the ISWS' role and responsibilities under Illinois Compiled Statutes. The study identified the Water Use Act of 1983 — and the high-capacity well review process — as a directory statute, meaning there are no penalties for noncompliance.⁵² While the study recommended that the ISWS carry out its directory statutes, there was a caveat that they do so “to the extent practicable given the legislative directives and budget constraints and priorities.” Given that the legislation did not provide the ISWS with funding to carry out the legislative responsibilities, compliance with the law was deprioritized.

Under the Prairie Research Institute umbrella, the ISWS underwent a new funding structure that left few staff on state salaries and most on grant contracts focused on research. This has made it difficult for the ISWS to respond to high-capacity well reviews and other requests related to municipal wells. Together, these constraints have limited the agency's ability to conduct reviews over the last few decades. However, the ISWS has built relationships with counties and municipalities, and some of them have paid for this evaluation directly through larger scale studies.⁵³

More analysis is needed on appropriate water quantity review funding resources, the steps needed to streamline the administrative process, and how to better integrate well review with decision making. Both Minnesota and Wisconsin have application fees, water use fees, and penalties for non-compliance. In Wisconsin, the DNR collects an application fee of \$500 to

cover the administrative costs of reviewing and processing a high-capacity well permit application. In addition, high-capacity well owners may be subject to annual water use fees, depending on the volume of water withdrawn. These fees support water use monitoring, data collection, and groundwater management programs. There are additional fees for failure to report water use annually or comply with other permit conditions.⁵⁴ Minnesota's system is set up in a similar fashion. More information is needed to understand to what extent the fees support their programs.

Connect well review process to decision making

The act can be credited with establishing a process of notification and review. However, well construction decisions can proceed without regard to review findings (if any). Further, even when the ISWS was funded to perform reviews, they often occurred retroactively, robbing the act of any role in informing the construction of high-capacity wells. Where disputes do arise over groundwater withdrawals, the act provides no remedy, leaving impacted parties to resort to litigation.

Ideally, groundwater science should inform both well construction and the amount of water that can be safely withdrawn to meet or maintain established management goals for our water sources. This could be done in several ways. In 2013, Minnesota's legislature gave their DNR new authority to review requests before, rather than after, high-capacity wells are drilled. The permit system covers the use and appropriation of water, including permit application requirements, factors considered in the permit application review, and criteria for denying the permit. Permit volumes are set after the DNR determines whether the proposed groundwater use is sustainable (e.g., it protects ecosystems, water quality, and the ability of future generations to meet their needs). When adequate groundwater hydrologic data are not available, conditional appropriation is allowed, to be revisited when sufficient hydrologic data are available. Permits can be modified by the state if permit holders are afforded due process.

Illinois has a precedent for establishing an operating permit and regularly reviewing the withdrawal amount. The Level of Lake Michigan Act established this process for Lake Michigan water users.⁵⁵ Lake Michigan permittees have a set allocation and permit conditions are reviewed every 10 years by the IDNR. This existing framework could be adapted to create a high-capacity well permitting process like Minnesota or Wisconsin.

Align review criteria with groundwater management goals

Should the state expand its groundwater management goals to maintain long-term supplies, the high-capacity well review process would benefit from review criteria. In addition to accounting for well interference,⁵⁶ the review could also consider how the well may contribute to certain management issues, such as continued desaturation of an aquifer and inter-aquifer flow. Review criteria will streamline the process and make it more transparent.

Both Minnesota and Wisconsin have established review criteria for operating permits. In Wisconsin, specific provisions are connected to the existing status of a given aquifer, allowing for more conservative approaches in ecologically sensitive or desaturated aquifers. The

Minnesota review includes special protection for calcareous fens and cold-water streams. Minnesota also includes an assessment of safe yield, which is defined in state administrative rules in two distinct ways. A safe yield when referring to water levels is “the amount of groundwater that can be withdrawn from an aquifer system without degrading the quality of water in the aquifer and without allowing the long-term average withdrawal to exceed the available long term average recharge to the aquifer system based on representative climatic conditions.”⁵⁷ A complementary definition exists for artesian pressure.⁵⁸

The ISWS developed sustainable yield estimates, using a unique definition, for each major water source by county. While these definitions are based on a simplified set of assumptions more closely tied to modeling capabilities and constraints associated with statewide estimation, there is interest in further refining the definitions to better reflect regional groundwater management goals, which could inform this process. If the state empowers local groundwater management districts to develop groundwater management plans, the resulting local goals could inform review criteria.

The state should also explore the level of technical analysis needed to inform decision making and carefully balance the technical rigor with budgetary constraints and scientific limitations. With our scientific understanding of our groundwater resources constantly evolving, waiting for perfect data and information may prevent sound management practices. The review methodology will need to be responsive to these issues. Wisconsin has partnered with the U.S. Geological Survey to develop a decision support tool for reviewing the impacts of high-capacity wells; something similar could be explored in Illinois.⁵⁹

Improve the water use reporting process

CMAQ uses water withdrawal data collected and reported in accordance with the Water Use Act to develop and maintain a regional water demand forecast. Much time is spent processing water data into a format usable for this type of analysis. Such data processing requirements could present a barrier to other regions or entities tasked with water supply planning or creating local groundwater management plans.

Given CMAQ’s perspective as a current consumer of water use data, it has identified the following steps to maximize the accessibility of reported water use data:

- Create a common set of facility identification numbers across the Illinois Water Inventory Program, IDNR Lake Michigan Allocation office, and IEPA.
- Add standardized sector codes directly to facility files, instead of embedded in well type codes.
- Integrate amounts of purchased and sold water to other water utilities into annual reporting requirements.
- Delineate public water supply service areas by, or connect them to, a municipal geography if they are run by or for a municipality.

- Improve data governance, including measures to reduce errors in self-reported data (adherence to standard units, temporal and spatial elements, completeness) and established and documented processes for reviewed and shared data.
- Streamline and consolidate reporting requirements, especially for facilities that need to report to the Illinois Water Inventory Program, IEPA, and IDNR's Lake Michigan Allocation program.
- Coordinate data on well-sealing and closure with water use reporting.
- For facilities using surface water, identify the specific source waterway.
- Consider collecting additional data from public water systems and other higher volume users.
- Monthly data reports to better understand impacts of weather and climate.
- Water loss to understand system needs and improve demand forecasting.
 - Standardized customer class data from public water systems to improve demand forecasting and provide insights on conservation program resources.

Positioning water use reporting as a condition of a permit that is subject to penalties for non-compliance may also help to provide more recent data and reduce the need to make extended assumptions about whether a facility is open or closed due to data gaps. In Minnesota, water use reporting is a permit condition and permittees are required to use flow meters and submit monthly water use records on an annual basis. Minnesota DNR has an online reporting system⁶⁰ and failure to keep and report water withdrawal records may result in the termination of the permit and/or administrative penalties.

Going forward

Illinois faces pressing challenges in its efforts to manage groundwater resources sustainably. The shortcomings of the Water Use Act of 1983 and its high-capacity well review process illustrate the need for a governance system that is proactive, comprehensive, and adequately resourced. Groundwater depletion, particularly in northeastern Illinois, has underscored the consequences of unregulated withdrawals and highlighted the limitations of the state's current approach, which focuses narrowly on conflict resolution rather than on long-term sustainability.

To address these challenges, Illinois must update its legal and administrative frameworks, drawing on lessons from neighboring states such as Minnesota and Wisconsin. Both have implemented permitting systems that seek to integrate groundwater and surface water management, assess cumulative impacts, and align with broader sustainability goals. While no state has fully addressed the complicated issue of groundwater governance, Illinois can learn from these existing examples. Adopting similar practices would enable Illinois to begin to establish a governance system that balances economic development with resource stewardship.

This report provides a starting point for the update of the Water Use Act of 1983. By expanding groundwater management objectives, resourcing the high-capacity well review process, and improving water use reporting, Illinois can build a governance system that prioritizes the sustainable use of groundwater. Such a system would protect aquifers, support economic growth, and uphold the state's commitments to environmental stewardship. Groundwater is a shared resource, and its effective governance demands collective action to ensure its availability for future generations.

Endnotes

¹ H.L. Young and D.I. Siegel, "Hydrogeology of the Cambrian-Ordovician Aquifer system in the northern Midwest, United States with a section on ground-water quality," U.S. Geological Survey, 1992, <https://pubs.usgs.gov/publication/pp1405B>.

² Daniel B. Abrams and Cecilia Cullen, "Analysis of Risk to Sandstone Water Supply in the Southwest Suburbs of Chicago," Illinois State Water Survey, 2020, <https://experts.illinois.edu/en/publications/analysis-of-risk-to-sandstone-water-supply-in-the-southwest-subur>.

³ Nora Beck and Margaret Schneemann, "Exploring groundwater governance options in Illinois," Memorandum to IDNR, Chicago Metropolitan Agency for Planning, and Illinois-Indiana Sea Grant, July 10, 2020.

⁴ Illinois State Water Plan Task Force, "2022 Illinois State Water Plan," DNR-OWR-230047, December 2022. The plan identifies recommendations for state agencies and programs to advance 13 key water issues across the state, including integrated water management, water sustainability, and water use laws and regulations. Several recommendations within the plan touch on aspects of groundwater governance.

⁵ Beck and Schneemann, "Exploring groundwater governance options in Illinois" and Stephen Foster, et al, "Groundwater Governance: Conceptual Framework for Assessment of Provisions and Needs," *Sustainable Groundwater Management: Contributions to Policy Promotion*, GW-Mate Strategic Overview Series, no. 1, World Bank's Water Partnership Program, 2009.

⁶ The advisory committee included the following members: Wes Cattoor, acting chief of engineering studies, Illinois Department of Natural Resources Office of Water Resources; Gary Clark, former director of Illinois Department of Natural Resources Office of Water Resources; Rick Cobb, deputy division manager, Division of Drinking Water Groundwater at Illinois Environmental Protection Agency; Tom Copenhaver, environmental health program coordinator, onsite wastewater and water wells, Lake County Health Department and Community Health Center; Amy Gahala, hydrologist, Central Midwest Water Science Center, U.S. Geological Survey; Kyla Jacobsen, former public services director, City of Elgin; Walt Kelly, head, Groundwater Science Section, Illinois State Water Survey; Cindy Skrukrud, clean water program director, Illinois Chapter, Sierra Club; James E. Mann, water resources committee, Metropolitan Planning Council; Francine Van den Brandeler, associate water lead, Greenleaf Advisors, LLC; Pete Wallers, chairman of the board, Engineering Enterprises, Inc. and Technical Advisory Committee chair, Northwest Water Planning Alliance; Ryan Wilson, manager of water resources, Metropolitan Planning Council; Jodie Wollnik, assistant director, Kane County Water Resources Division.

⁷ CMAP, "Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan," CMAP, 2010. Includes the goal: "To consider the future water supply needs of northeastern Illinois and develop plans and programs to guide future use that provide adequate and affordable water for all users, including support for economic development, agriculture, and the protection of our natural ecosystems."

⁸ Beck and Schneemann, "Exploring groundwater governance options in Illinois." Summarizes system by which federal laws delegate direct groundwater protection authority to states and Illinois' response to same.

⁹ Catherine Janasie, "An Overview of Water Law in Illinois," National Sea Grant Law Center, NSGLC-20-04-02, 2020, <https://nsglc.olemiss.edu/Advisory/pdfs/il-water-law.pdf>.

¹⁰ Historically, many of the one-off requests the IDNR was receiving were related to domestic self-supply concerns in rural agricultural areas. Well owners, or public officials on their behalf, were seeking additional information on wells experiencing well interference from or having the potential to be impacted pending the construction of a nearby high-capacity well. When responding to these requests, state officials found that many of the existing issues were a result of poorly constructed wells rather than direct well interference.

¹¹ *Illinois Compiled Statutes*, 525 ILCS 45/4. Reasonable use definition.

¹² *Evans v. Merriweather*, 4 Ill. 492 (1842). 8 IL Admin Code § 675.10. Natural wants mean, “the use of water that is necessary for existence of man or beast. Natural wants include, but are not limited to, quenching thirst; household uses of cooking, washing, bathing, and sanitation purposes; watering animals or livestock; and fire protection.” Artificial wants mean, “a use of water that may increase comfort, aesthetic, and propriety, but is not essential for existence. Artificial wants include, but are not limited to, street cleaning, washing vehicles, and watering lawns.”

¹³ The emergency restriction section of the act applies to each soil and water conservation district (SWCD) within the two counties (Kankakee and Iroquois) through which the Iroquois River flows and each SWCD within the two counties (Tazewell and McLean) with a population greater than 100,000 through which the Mackinaw River flows. This area is outside of the northeastern Illinois.

¹⁴ CMAP, “Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan.”

¹⁵ 8 IL Admin Code § 675.40.

¹⁶ 8 IL Admin Code § 675.50.

¹⁷ 35 IL Admin Code § 602.

¹⁸ 77 IL Admin Code § 920, IDPH, in partnership with local health departments regulates all non-community water suppliers to assure that all persons served by water supplies receive water that is safe and adequate in quantity.

¹⁹ 77 IL Admin Code § 920.40.

²⁰ It also did not provide funding for the water-use reporting system that would be needed to collect and organize water use reports required through the act.

²¹ CMAP, “Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan.” Personal communication with H. Allen Wehrmann, head, Center for Groundwater Science, Illinois State Water Survey, January 2009.

²² Personal communication with Walt Kelly, head, Center for Groundwater Science, Illinois State Water Survey, December 2023.

²³ For example, county health departments have a permit application for the construction, modification, or abandonment of a well. The form requests applicants to provide much of the same information that is requested through the form the SWCDs use. This is the case in Kendall County, where the county’s [well permit application form](#) specifies that the applicant needs to contact the county’s SWCD if the estimated daily pumping capacity is greater than 100,000 gallons per day.

²⁴ 8 IL Admin Code § 675.40.

²⁵ Nora Beck and Margaret Schneemann, “Exploring case studies and priority groundwater governance options in Illinois,” Memorandum to IDNR, CMAP, and IISG, June 23, 2022.

²⁶ Minnesota Statutes § 103G.265 (2024).

²⁷ Minnesota Statutes § 103G.287 (2024).

²⁸ Wisconsin Legislature, *2003 Wis. Act 310*, Accessed November 27, 2024, <https://docs.legis.wisconsin.gov/2003/related/acts/310>.

²⁹ Wisconsin Legislature, *2007 Wis. Act 227*, Accessed November 27, 2024, <https://docs.legis.wisconsin.gov/2007/related/acts/227>.

³⁰ The potentiometric surface is an imaginary surface representing the total head of groundwater and is the level to which water will rise in a well. Wisconsin Admin. Code NR 141.05(31).

³¹ Wisconsin Legislature, 2003 Wis. Act 310.

³² Minnesota Statutes § 103G.287.

³³ Minnesota Statutes § 103G.287. “Groundwater management areas. (a) The commissioner may designate groundwater management areas and limit total annual water appropriations and uses within a designated area to ensure sustainable use of groundwater that protects ecosystems, water quality, and the ability of future generations to meet their own needs...”

³⁴ Illinois Department of Natural Resources, Water Supply website, Accessed on December 16, 2024, <https://dnr.illinois.gov/waterresources/watersupply.html>. The IEPA has established 4 groundwater protection planning regions that do not align with the 10 areas IDNR established. Illinois Environmental Protection Agency, Groundwater Protection Planning Regions website, Accessed on December 16, 2024, <https://epa.illinois.gov/topics/water-quality/groundwater/gw-planning.html>.

³⁵ Minnesota Statutes § 103G.287.

³⁶ Joyce Foundation, “Groundwater Governance in EPA Region 5, Minnesota Legal Appendix,” 2024, Accessed December 3, 2024, <https://assets.joycefdn.org/content/uploads/MINNESOTA-STATE-APPENDIX-May-2024.pdf>.

³⁷ State v. Michels Pipeline Constr., Inc., 63 Wis.2d 278 (1974). This decision clarified that Wisconsin’s groundwater law departs from the traditional “absolute ownership” doctrine and instead uses a modified reasonable use approach. The 2003 Wisconsin Act 310 reinforced this approach.

³⁸ Joyce Foundation, “Groundwater Governance in EPA Region 5, Minnesota Legal Appendix.”

³⁹ Wisconsin Department of Natural Resources, High-capacity Well Application Review Process website, Accessed on November 19, 2024, <https://dnr.wisconsin.gov/topic/Wells/HighCap/Review.html>.

⁴⁰ Wisconsin Department of Natural Resources, Wisconsin Water Quantity Data Viewer, Accessed on November 19, 2024, https://dnrmaps.wi.gov/H5/?viewer=Water_Use.

⁴¹ Minnesota Statutes § 103G.281. Subdivision 2 states that measuring equipment is required and that an “installation for appropriating or using water must be equipped with a flow meter to measure the quantity of water appropriated within the degree of accuracy required by rule. The commissioner can determine other methods to be used for measuring water quantity based on the quantity of water appropriated or used, the source of water, the method of appropriating or using water, and any other facts supplied to the commissioner.” Guidance from DNR indicates several situations where flow meters would not be required, https://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf.

⁴² Wisconsin Administrative Code, Chapter NR 852, Accessed November 27, 2024, https://docs.legis.wisconsin.gov/code/admin_code/nr/800/852.

⁴³ Wisconsin Administrative Code, Chapter NR 854, Accessed November 27, 2024, https://docs.legis.wisconsin.gov/code/admin_code/nr/800/854/06/1.

⁴⁴ Illinois State Water Plan Task Force, “2022 Illinois State Water Plan.”

⁴⁵ Illinois State Water Plan Task Force, “2022 Illinois State Water Plan,” page 13-4.

⁴⁶ Illinois State Water Plan Task Force, “2022 Illinois State Water Plan,” page 13-4.

⁴⁷ Illinois State Water Survey, “Synoptic Measurement of Deep Sandstone Wells in 2021 Throughout Northern Illinois,” 2023, <https://storymaps.arcgis.com/stories/6a8ff45c39134e168da93b45626fef36>.

⁴⁸ Other stakeholders include some of the soil and water conservation districts in northeastern Illinois, and various members of the Northwest Water Planning Alliance.

⁴⁹ Minnesota Statutes § 103G.287. Subdivision 3 states the “commissioner may establish water appropriation limits to protect groundwater resources. When establishing water appropriation limits to protect groundwater resources, the commissioner must consider the sustainability of the groundwater resource, including the current and projected water levels, water quality, whether the use protects ecosystems, and the ability of future generations to meet their own needs.”

⁵⁰ Stephen Foster and John Chilton, "Groundwater Management: Policy Principles and Planning Practices," *Advances in Groundwater Governance*, edited by Karen G. Villholth et al., 100. Leiden: CRC Press, 2018.

⁵¹ The five state scientific surveys are the Illinois State Water Survey, Illinois State Geological Survey, Illinois State Archaeological Survey, Illinois National History Survey, and Illinois Sustainable Technological Center.

⁵² Prairie Research Institute, “State Mandates: Before and after the University of Illinois Scientific Surveys Act of 2008,” Winkel, Richard J., Jr., 2008, <http://hdl.handle.net/2142/102190>.

⁵³ Examples include Kane County sponsoring a three-part study to understand current shallow aquifer resources: groundwater sustainability modeling, a county-wide groundwater quality study, and establishing a groundwater monitoring network. Communities, industries, and water specialists in Will, Kendall, and Grundy Counties formed a coalition, the Southwest Water Planning Group, funded a three-year study by the ISWS to understand current and future risk to their water supply.

⁵⁴ Wisconsin Administrative Code, Chapter NR 820, Accessed December 2, 2024, https://docs.legis.wisconsin.gov/code/admin_code/nr/800/820/.

⁵⁵ Passed in response to the 1967 U.S. Supreme Court Consent Decree, the Level of Lake Michigan Act, 615 Illinois Compiled Statutes (ILCS) 50/1 et seq., is the Illinois law that governs Lake Michigan water use for those communities with an allocation for lake water. The rules for implementing the law define a use-permit system that is unique to the state. The permit system and allocation of Lake Michigan water is administered by the IDNR Office of Water Resources Lake Michigan Management Section.

⁵⁶ Well interference occurs when one well causes the water level in the surrounding aquifer to go down to the point where the water level falls below the reach of other, shallower wells and those wells are no longer able to produce as much water as before or are no longer operable. See Minnesota Department of Natural Resources, Well interference resolution process, accessed on December 16, 2024, https://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/interference.html.

⁵⁷ Minnesota Rules 6115.0630, "Standards and Criteria for Approving the Appropriation and Use of Waters of the State," subp. 15 (2023), <https://www.revisor.mn.gov/rules/6115.0630/#rule.6115.0630.15>.

⁵⁸ "Safe yield for artesian condition" means the amount of groundwater that can be withdrawn from an aquifer system without degrading the quality of water in the aquifer and without the progressive decline in water pressures and levels to a degree which will result in a change from artesian condition to water table condition. Minnesota Rules 6115.0630, "Standards and Criteria for Approving the Appropriation and Use of Waters of the State," subp. 16 (2023), <https://www.revisor.mn.gov/rules/6115.0630/#rule.6115.0630.16>.

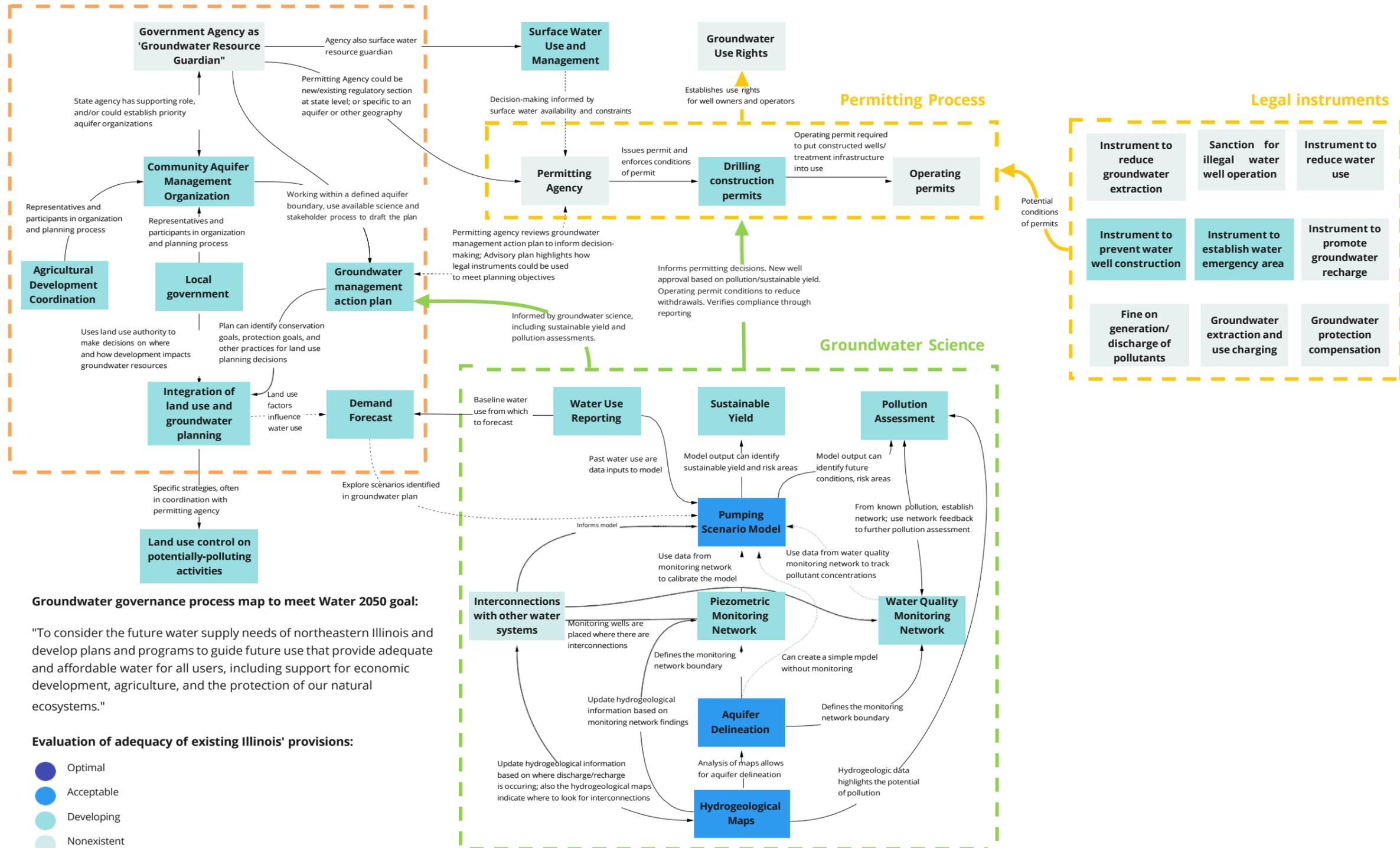
⁵⁹ Wisconsin Groundwater Coordinating Council, Water Use Research and Management Tools, Report to the Legislature, 2024, <https://dnr.wisconsin.gov/sites/default/files/topic/Groundwater/GCCGWQuantity/ResearchAndManagementTools.pdf>.

⁶⁰ Minnesota Department of Natural Resources, Measuring Water Use & Flow Meter Requirements, 2018, https://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/flowmeter.pdf.

Appendix A

Groundwater governance process map, 2020

Stakeholder participation



Source: CMAP and IISG, 2020.

NOTE: Arrows represent the connections between the system components, sometimes signifying data inputs, regulatory actions, or input or review processes based on the type of provision.

The Chicago Metropolitan Agency for Planning (CMAP) is our region's comprehensive planning organization. The agency and its partners developed and are now implementing ON TO 2050, a new long-range plan to help the seven counties and 284 communities of northeastern Illinois implement strategies that address transportation, housing, economic development, open space, the environment, and other quality-of-life issues.

See cmap.illinois.gov for more information.