Educating Elected Officials About Drinking Water: a new resource

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10 Actions

1. Create a guide for elected officials on managing local water services
2. Improve state funding stream for water infrastructure improvements
3. Explore opportunities for cost savings in water services
4. Analyze and test equitable rate structures
5. Drive adoption of best practices in water reporting and sensible salting
6. Develop and implement a coordinated plan for Fox River water use
7. Research strategies and opportunities for matching the right water to the right use
8. Update the Illinois Plumbing Code
9. Establish dedicated revenue stream for regional water supply planning
10. Require infrastructure condition reporting

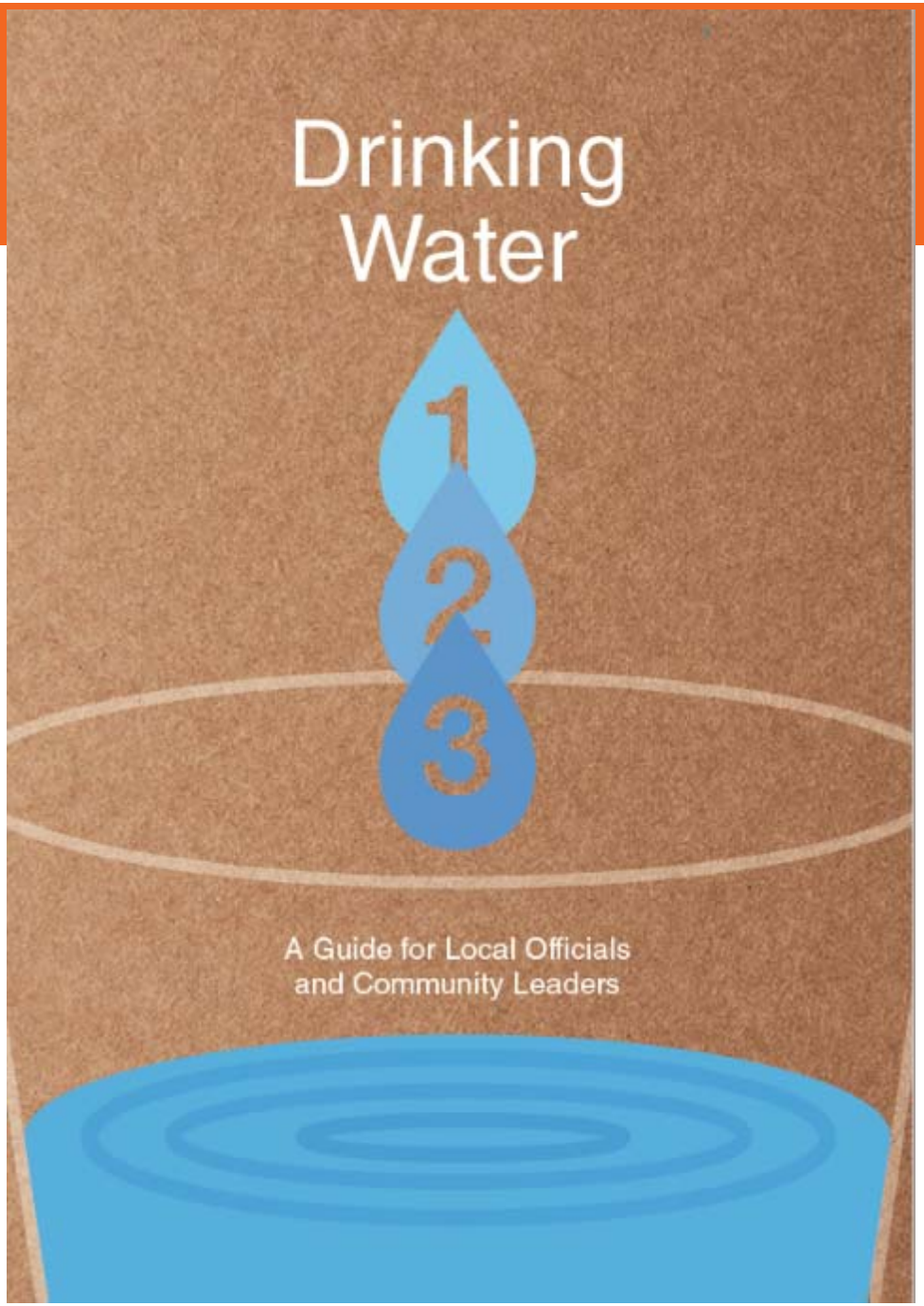
Collaborators + Advisors

American Water Works Association
Illinois Section

Chicago Metropolitan
Agency for Planning

Metropolitan
Mayors
Caucus

NORTHWEST
WATER PLANNING
ALLIANCE


Drinking
Water
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A Guide for Local Officials
and Community Leaders

1

Meet Your Water: An Introduction

Understanding Drinking Water in Northeastern Illinois

Where does our water come from?

Northeastern Illinois' drinking water comes from surface water sources—like Lake Michigan and the Fox and Kankakee Rivers—as well as groundwater from aquifers. About 20 percent of Northeastern Illinois' population relies on a water source other than Lake Michigan, and about 78 percent of that population relies solely on groundwater.

Surface Water Sources

Lake Michigan

Surface Water
Surface water includes lakes, ponds, rivers and reservoirs.

The Great Lakes system is the largest source (approximately 22%) of available fresh surface water in the world, and Lake Michigan is the second largest of the Great Lakes by volume. Northeastern Illinois borders the shores of this Great Lake, which is the largest public drinking water supply in the state, serving approximately 6.6 million residents[1]. However, Illinois' use of Lake Michigan water is limited. Since the reversal of the Calumet and Chicago Rivers away from Lake Michigan, most of Illinois is no longer in the Great Lakes watershed. The water we pump out of the lake now flows west and south and ultimately to the Gulf of Mexico.

Lake Michigan Water Diversion
Illinois' Lake Michigan diversion amount can change significantly based on the amount of rainfall our region has each year. If the amount of rain increases substantially in any given year, less drinking water is available since it is counted as part of our diversion.

Due to this diversion of water out of the Great Lakes, the State of Illinois is under a U.S. Supreme Court Decree that limits the amount of water it can use. Communities in Illinois that seek to use Lake Michigan as a drinking water source must apply to the Illinois Department of Natural Resources (IDNR), which is the state agency that governs permits for Lake Michigan water and oversees the state's compliance with the decree. Recent Illinois usage of its water allocation from Lake Michigan has reached about 76 percent of the allowed total[2]. While we may think our region enjoys an unlimited amount of freshwater, that is not true.

One of Chicago's water cribs, where water is pumped from Lake Michigan to supply parts of our region with drinking water.
Photo Credit Eric Allix Rogers

Infrastructure: Delivering water to the tap

It is important to understand the extensive infrastructure that delivers drinking water to our homes, businesses and schools. Wells or intake pipes collect water, treatment plants acquire and purify water, water mains, pumps and pipes transport water and towers and reservoirs store and pressurize water.

Collect the water

First, water is collected from the source, either groundwater or surface water. Water from groundwater aquifers is pumped using wells. Surface water is obtained through an intake pipe. This source water is then piped into a water treatment facility.

Water utilities require high-capacity wells or intakes, powerful pumps, large pipes, as well as a power source (electricity) to drive the pumps and obtain source water. Groundwater sources generally require more electricity due to the increased need for pumping the water up from the wells to the treatment plant.

Filter and treat the water

Once source water is collected, treatment processes produce potable water. Treatment plant infrastructure—such as the facility itself, which includes a lab for testing—requires chemicals, screens, tanks and settling ponds, which are designed to meet the specific needs of the water source conditions and quality.

Store the water

After water leaves the treatment plant, it must be safely stored until it is needed. The water distribution system should have enough storage capacity to meet all expected needs. Storing treated water serves multiple purposes:

- Provides a reserve of treated water that will minimize interruptions in supply due to failures of mains, pumps or other plant equipment
- Helps maintain uniform pressure
- Ensures a reserve of water for firefighting and other emergencies
- Allows pumping at an average rate

We have all seen the municipal water towers throughout our communities. A water tower is an elevated structure supporting a water tank constructed at a height sufficient to pressurize a drinking water system in order to distribute drinking water, meet peak demands and provide emergency storage for fire protection.

Deliver the water

Once needed, potable water is pumped to users via a complex network of underground pipes. Pressurized pipes deliver water to schools, homes, commercial buildings and industry. The pipe networks also contain many valves throughout the system to control location, pressure and water flow. These materials deteriorate over time. Old pipes require replacement to avoid unnecessary leakage (waste of drinking water) or corrosion, which can release harmful or unwanted chemicals into the water.

Consume the water

Water is delivered to our homes, businesses, schools and organizations for us to use and enjoy through a complex web of pipes. The main line pipes are owned and maintained by our water utilities. However, often times the water pipes that run from under the street to individual buildings are the responsibility of the property owner. Maintaining this infrastructure is important for public health, so that we can continue to consume safe water, which is then sent down another set of pipes to be treated by our wastewater utilities.

Questions for your staff: Drinking water service

- What is our municipality's drinking water source(s)—where does our drinking water come from?
- Do we produce (treat) our drinking water, or do we purchase drinking water from another community?
  - If you produce: what treatment processes do we employ at our plant to ensure our water meets regulated potable (drinking water) standards?
  - If you purchase: who do we purchase our drinking water from?
- How are we storing or otherwise ensuring we have enough drinking water supply for peak demand in our community?

Daily use of stored water varies
Generally, peak water demand occurs in the mid-morning and early-evening hours. To accommodate the fluctuations in demand, stored water is often withdrawn and used during these peak demand hours and the water tower is replenished during minimum-demand times in the late-night and early-morning hours.

2

Your Water's Keeper: Utilities and Regulators

Understand Drinking Water Management and Laws

How does operation and regulation Work?

Water is an ordinary and everyday part of our lives, yet it requires much effort to deliver it to us. Understanding the systems, operations and regulations required to provide community's with safe, drinkable water is part of your responsibility as a community official.

Utilities: The managers behind your water[5]

In the United States, there are over 151,000 public water systems in operation[5]. The U.S. Environmental Protection Agency (EPA) classifies these systems according to the number of people they serve, the source of their water and whether they serve the same customers year-round or on an occasional basis.

Most public water systems are owned by the municipality they serve or a regional consortium of communities such as a Water Commission or Joint Action Water Authority (JAWA), but they can also be owned by private companies, nonprofit corporations or individuals.

Public water systems deliver a public service and charge a fee for this service in much the same way as energy or telecommunication utilities. They are responsible for operating the necessary treatment and distribution systems to reliably deliver safe drinking water.

Public Water Systems
Local officials must account for everything from ensuring enough supply, to water-quality monitoring and treatment, to service operations and infrastructure maintenance, to ensuring regulatory compliance.

A public water system is so named because water is delivered to the public, however, this utility may be publicly or privately owned. There are two forms of private sector participation in public water systems: if a water system is fully privatized, assets are owned and operated by a private company. The company charges fees to water consumers to recoup capital and operational expenses. If there is a public-private partnership, ownership of assets remains public and certain functions (e.g., operation of the drinking water treatment plant) are assigned to a private company for a specific period. In Illinois the majority of public water systems are publicly owned.

Public water systems consist of three elements:

1. The source water (surface water or groundwater)
2. The drinking water treatment plant (treatment facilities and labs)
3. The distribution system (mains, pumps and storage)

3

Murky Waters: The Challenges We Face

Understand Drinking Water Issues in Our Region

What are the issues we face?

While our region generally enjoys an ample amount of freshwater, we are not without critical challenges–issues that need to be addressed today. These challenges include increasing pollution, old infrastructure, fragmented service and, yes, some communities face wells running dry.

Do we have enough?

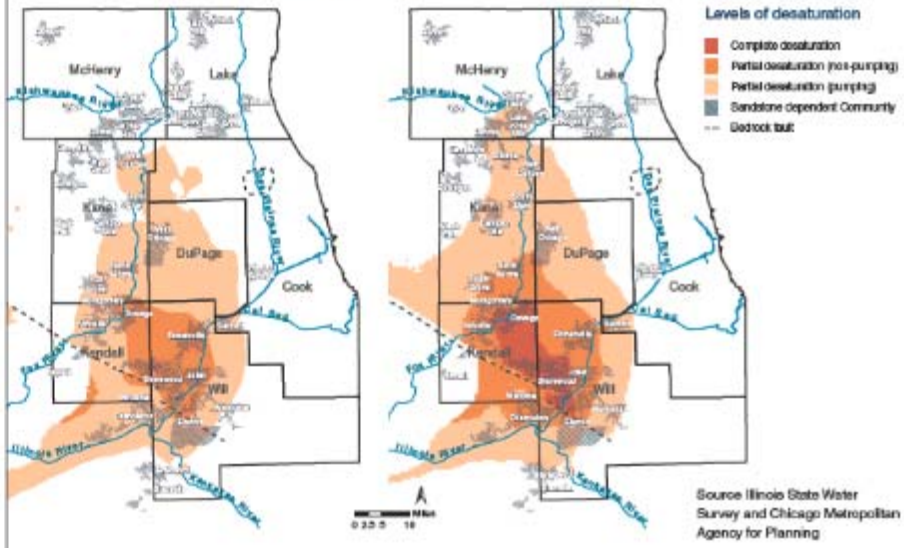
In 2015, the Illinois State Water Survey, which has been monitoring and modeling our water resources for more than a century, released a seminal report about the groundwater levels in wells. The report sounded an alarm about how much groundwater we really have:

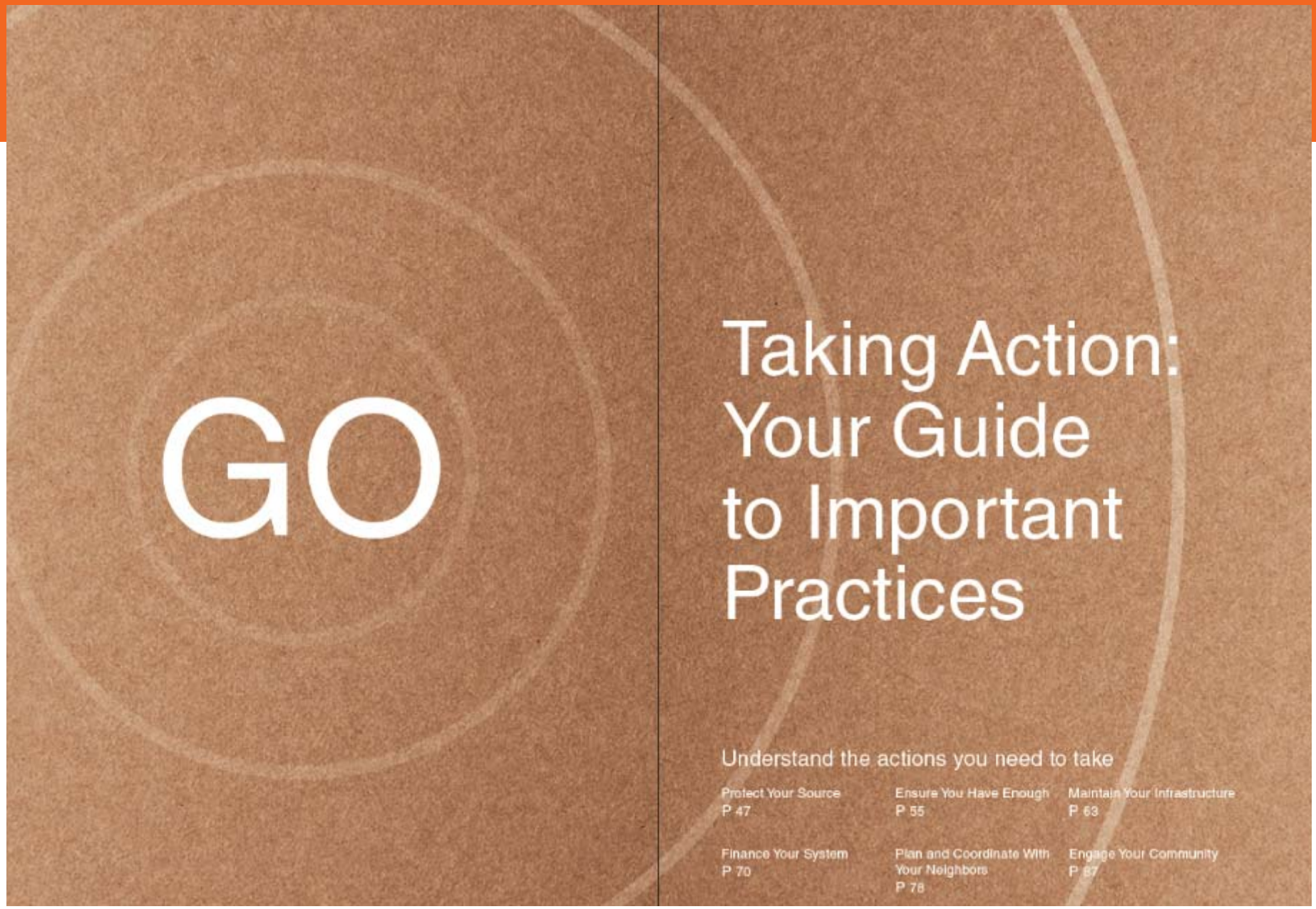
- Our deep sandstone aquifers are being depleted unsustainably.
- High-capacity wells could be unusable in as little as 15 years.
- Many more wells could be dry by 2050[1].

If current practices continue, some groundwater-dependent community and industrial wells could be unusable within 15 years, and even more will be at risk by 2050.

Why does this matter? About 20 percent of Northeastern Illinois' population—including people in the outer-ring suburbs of Chicago—rely on water sources other than Lake Michigan, and about 78 percent of that population relies solely on groundwater. To serve those communites, some 90 million gallons per day are being withdrawn from the deep sandstone aquifers—a withdrawal rate at least twice as high as what experts say is sustainable. Some areas are already experiencing significant depletion and some shallower, private wells are already going dry.

Progression of groundwater depletion over time with continued well pumping

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Taking Action: Your Guide to Important Practices
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Protect Your Source

- Conduct source water assessments
- Support regulatory compliance + utility staff
- Practice sensible salting
- Encourage sensible fertilizing + landscaping
- Improve hazardous waste + pharmaceutical disposal

Ensure You Have Enough

- Track water usage
- Conduct annual water loss audits
- Analyze supply + demand
- Designate groundwater recharge areas
- Reduce drinking water demand
  - Capture and reuse water
  - Adopt WaterSense + other ways to conserve water

Maintain Your Infrastructure

- Practice asset management
- Be smart about planning for capital improvement projects
- Support replacement of old, crumbling infrastructure

Finance Your System

- Set appropriate water rates based on cost of service
- Finance your capital improvement needs
  - Municipal Bonds
  - SRF
  - P3s

Plan + Coordinate With Your Neighbors

- Include water in your community comprehensive plans
- Plan for droughts
- Be prepared for emergencies
- Embrace regional water supply coordination + service sharing

Engage Your Community

- Implement water conservation + demand management
- Provide community education + engagement programs

Case Studies In Each Section

Case Study

Benefits of Sensible Salting

The Villages of Montgomery and Oswego in Chicago's southwest suburbs have partnered together to implement a sensible salting program. In 2014, the Village of Oswego began investing in a sophisticated brine-making system capable of mixing different anti-icing agents that could be applied to the roadways both before and during a snow storm to reduce the department's dependency on calcium chloride (rock salt). In 2015, the Village of Montgomery built its own homemade brine maker and truck-mounted sprayer skid for applying product to roadways. The application's success propelled Montgomery's village board to invest in a new truck capable of applying product at a more efficient rate.

The two communities then began working together to maximize the strongest parts of both programs—Oswego's brine making system and Montgomery's application ability. During 2016-2017, Oswego produced product for both communities, which Montgomery picked up with its new truck, and apply to major roads in both communities. The communities have discovered that applying the liquids to the rock salt prior to salting the roads activates the rock salt for quicker results, and that pre-treatment of roadways can be accomplished up to 48 hours in advance of a storm, which has reduced overtime costs for staff.

These efforts combined with other changes in Montgomery's policies—such as only salting the center of the road on streets with lower traffic volumes and speeds and only salting cul-de-sacs after the storm is over—have earned the village savings of 30-50% of its historical annual salt consumption. This alone can save the village's road budget $75,000-$150,000 annually, depending on the current cost-per-ton for salt. Additionally, this new shared services program has reduced staff needs from 5-6 down to 2-3, which allows village leaders to reassign employees to other priority areas. The staff deploy the new tools in their arsenal, and many of them enjoy more rest and time with loved ones as well as fewer laps around the block.

Photo Credit Todd Hoppenstedt, Village of Montgomery

Case Study

Monitoring Groundwater Levels

The Barrington Area Council of Governments (BACOG) operates a groundwater monitoring program that measures, maps and analyzes water levels and conditions in the region's shallow aquifer system on a long-term basis. With regular data collection and analysis every five years, the program identifies trends in groundwater levels and describes where and how much water levels are changing.

To achieve ongoing monitoring, BACOG collaborates with the Illinois State Geological Survey (ISGS), U.S. Geological Survey (USGS), the Flint Creek Watershed Partnership and 13 municipalities to obtain data from their respective wells and gauges on an ongoing basis. The BACOG office also relies on both the Illinois State Water Survey (ISWS) and ISGS for guidance and technical support.

While dire conditions are not predicted, water levels in the BACOG area are expected to decline over the next few decades. This monitoring program will determine changes and produce data and reports to inform local government officials, providing the rationale and facts to enable action. The monitoring program and other groundwater efforts at BACOG are also expected to generate community awareness and support for groundwater protection. This proactive initiative for a small region of highly cooperative governments recognizes the critical value of data for addressing any future water supply challenges.

Photo Credit BACOG

Checklist For Each Section

Questions for your staff: Protecting your water

- What are our community's risks for source water contamination?
- Have we developed a source water assessment and plan?
- Do we have any current or recent drinking water violations we need to attend to?
- If on deep aquifer water: What treatment practices do we use to eliminate any naturally occurring barium or radium? How are we communicating these practices to our customers to build public trust?
- What is the classification of our drinking water treatment facility?
- Are our operators appropriately certified?
- Are we involved in the American Water Works Association?
- What is our policy and practice regarding sensible salting?
- How are we making sure to not over-salt in order to protect our water supplies?
- Do we have any programs, policies or educational materials available for our community members on best practices in lawn care to reduce nutrients in water sources?
- Do we have a pharmaceutical drop-off program?
- Have we ever sponsored a household hazardous waste collection event in partnership with the IEPA?

Questions?

Thank you.

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