



REALIZING THE PROMISE OF THE GREAT LAKES COMPACT:
A POLICY GUIDE FOR STATE IMPLEMENTATION



Midwest Environmental
ADVOCATES
pro bono publico

REALIZING THE PROMISE OF THE GREAT LAKES COMPACT:

A POLICY GUIDE FOR STATE IMPLEMENTATION

Primary Authors

Melissa K. Scanlan, Executive Director, Midwest Environmental Advocates
Jodi Habush Sinykin, Of Counsel, Midwest Environmental Advocates
James Krohelski, Hydrologist, United States Geological Survey*

Reviewers

Steve Born, Professor Emeritus, UW-Madison
Mary Ericson, National Wildlife Federation
Noah Hall, Assistant Professor, Wayne State University Law School
George Kraft, Director, Center for Watershed Science
and Central Wisconsin Groundwater Center*
James Krohelski, USGS
Peter McAvoy, 16th Street Community Health Center and Policy Consultant to Brico Fund
Cheryl Mendoza, Alliance for the Great Lakes
James Olson, Partner, Olson, Bzdok & Howard, P.C.
Leigh Thomson, Polaris Institute
Saul Wolf, Law Clerk, Midwest Environmental Advocates

*Water supply section only

Research Sources

Douglas Cherkauer, Ph.D., Professor of Hydrogeology, UW-Milwaukee
Steven Crandell, City of Waukesha Community Development Director
Dan Duchniak, Waukesha Water Utility
Doug Koehler, City of Waukesha Department of Community Development Planner
Chuck Ledin, DNR, Chief, Great Lakes and Watershed Planning Section

Thanks

Midwest Environmental Advocates thanks the Brico Fund for funding this publication, the Mesa Refuge for providing the initial inspiration, our reviewers for new insights into the subject, and our research sources for filling in the information one cannot find in books.

© 2006 Midwest Environmental Advocates, Inc.
Community organizations, government entities,
and other nonprofit organizations may make and distribute
reproductions of this report for non-commercial purposes.
This notice of copyright must appear on each copy.
All other rights reserved.

Midwest Environmental
A D V O C A T E S
pro bono publico

608.251.5047
www.midwestadvocates.org

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
PART I: THE GREAT LAKES AS A WATER COMMONS AND A PUBLIC TRUST	2
The Great Lakes Commons	2
The Public Trust Doctrine	3
Does the Public Trust Doctrine Apply to Groundwater?	5
Summary	5
PART II: OVERVIEW OF THE LAWS GOVERNING THE WITHDRAWAL OF WATER FROM THE GREAT LAKES	6
Boundary Waters Treaty of 1909	6
The Great Lakes Charter of 1985	6
Water Resources Development Act of 1986, 42 U.S.C. § 1962d-20, Amended 2000	7
The Great Lakes Charter Annex of 2001	8
Great Lakes – St. Lawrence River Basin Water Resources Compact and Agreement	9
Summary	10
PART III: UPHOLDING THE PUBLIC TRUST: STRENGTHENING THE GREAT LAKES COMPACT DURING STATE ENACTMENT	11
States Can and Should Strengthen the Compact	11
State Legislation Should Improve the Compact in Four Areas	11
1. Strengthen the Ban on Diversions.....	11
▪ Set the Boundaries.....	11
▪ Require Return Flow to Point of Initial Withdrawal	11
▪ Require Conservation as a Condition Precedent to a Diversion Application	12
2. Set a Protective Regulatory Trigger for In-Basin Users.....	12
3. Require Strong Water Conservation Standards.....	13
▪ The State Water Conservation Plan Should Require Specific Conservation Goals and then Monitor and Report Progress	14
▪ The State Water Conservation Plan Should Identify Best Available Technologies and Practices.....	15
▪ The State Water Conservation Plan Should Include the Implementation of Water Conservation Measures as an Enforceable Permit Condition.....	15

TABLE OF CONTENTS

▪ The State Water Conservation Plan Should Require Conservation for All Large Water Users and Eliminate Opt Out of Municipal Supply Systems.....	16
▪ State Legislation Should Enable Comprehensive Citizen Enforcement.....	16
4. Eliminate Loopholes that Encourage Privatizing Great Lakes Water.....	16
Summary.....	18
PART IV: UNDERSTANDING GREAT LAKES WATER SUPPLY: THE WISCONSIN EXAMPLE	19
Wisconsin Groundwater.....	19
The Effect of Pumping on Groundwater Levels and Surface Water Flow.....	20
Wisconsin Regional Groundwater Drawdowns.....	21
Groundwater Drawdown Case Study: Southeastern Wisconsin	22
Summary.....	27
PART V: IF SPRING CITY RUNS DRY... ..	28
Analysis of Waukesha, Wisconsin’s Water Woes.....	28
▪ The City of Waukesha’s Water Supply	28
▪ The City’s Water Supply Alternatives and Demand Projections.....	29
▪ Water Rates in the City of Waukesha.....	30
▪ The City’s Population and Land Use Trends.....	30
▪ Conservation in the City of Waukesha	31
Summary.....	32
Legal and Policy Issues Decision Makers Must Resolve Prior to Deciding Whether to Approve a Diversion of Lake Michigan Water to Waukesha	32
▪ Unanimous Consent of Great Lakes Governors.....	32
▪ Milwaukee’s Sewage Treatment Capacity	33
▪ Return Flow	33
▪ The Public Trust Doctrine	33
▪ Who Is the Applicant?.....	33
▪ What Will Suffice for Water Conservation?.....	34
Summary.....	34
PART VI: CONCLUSION	34

EXECUTIVE SUMMARY

The Great Lakes are a world class resource that fuels the economy and quality of life in the Great Lakes states and provinces. Containing about 95 percent of the United States' fresh surface water supply and 20 percent of the earth's fresh surface water supply, the Great Lakes are vast. This water abundance has been a source of economic growth and prosperity, yet with only 1 percent of the Great Lakes water renewed annually and increasing demands on Great Lakes water, the future of this vulnerable and valuable resource is in question.

With water levels in the Great Lakes hitting near record lows at the turn of the millennium¹ and water-intensive communities waiting in the wings for out-of-basin diversions, it is time to ask whether and in what manner water withdrawals from the Great Lakes should be restricted.

Likewise, with the Great Lakes providing the backbone for the communities who use water in the Great Lakes Basin, this shared resource should be managed uniformly by the states and provinces to protect public and private rights to use water.

This Report first provides an overview of the Great Lakes as both a shared commons and a public trust. It outlines the challenges facing management of any commons and highlights the importance of the Public Trust Doctrine as a way to manage shared waters.

This provides a backdrop for understanding and assessing the agreements and laws the Great Lakes states and Canadian provinces have created to manage the Great Lakes Basin. The Report starts with the Boundary Waters Treaty of 1909 and ends with the Great Lakes – St. Lawrence River Basin Water Resources Compact and Agreement of 2005 (“Compact”), identifying progress and gaps.

The signing of the Compact by the Great Lakes governors and premiers on December 13, 2005, marked the beginning, not the end, of a historic process. To become effective law, each of the eight Great Lakes states must pass the Compact into their state laws and then Congress must consent to the Compact. The Compact is a compromise document that represents a floor and not a ceiling with respect to the management of the Great Lakes. To fulfill their duties as trustees of the Great Lakes, each of the Great Lakes states should commit to strengthening the Compact when they pass their respective state legislation.

The Report identifies four areas where states should be improving protections for the Great Lakes and the people who rely on them:

1. **Eliminate loopholes that encourage privatizing Great Lakes water.** Each state and province should eliminate the bottled water loophole that allows the diversion of Great Lakes water in containers 5.7 gallons or less.
2. **Strengthen the ban on diversions.** To ensure that diversions occur only in absolutely necessary situations and will not damage the Great Lakes, the provisions concerning diversions outside of the basin must be strengthened to require conservation prior to allowing new diversions, require water to be returned to its initial point of withdrawal, and set the political boundaries for straddling communities and communities within straddling counties as of December 13, 2005.
3. **Set a meaningful regulatory level for in-basin users of Great Lakes water.** For the first time, the Compact establishes a uniform standard to apply to in-basin uses of water, but allows each jurisdiction to set the withdrawal level at which this standard will apply. States and provinces should set this regulatory level at a place that captures most of the water users within its jurisdiction.
4. **Require strong water conservation standards.** States and provinces need to take steps to safeguard their water wealth by requiring each permit holder to implement water conservation measures, set mandatory statewide and provincial conservation programs with measurable goals, and allow any member of the public to enforce conservation requirements contained in permits.

From Southeastern Wisconsin to northern Ohio, there are communities just outside the Great Lakes Basin that could apply to divert water to fuel growth outside the Basin. By all accounts, the City of Waukesha, Wisconsin, is the community most likely to apply for a diversion first. This Report examines the water supply issues that pertain to perceived water problems in Waukesha, assesses Waukesha's past and present land and water uses, and highlights the policy questions that should be answered prior to acting on an application for a diversion. The Waukesha example is significant because it is likely to serve as an important precedent for diversions in other parts of the Great Lakes region.

PART I: THE GREAT LAKES AS A WATER COMMONS AND A PUBLIC TRUST

The notion of the commons is “the idea that through our public institutions we recognize shared humanity and natural resources to be preserved for future generations.”

- Maude Barlow and Tony Clark²

The Great Lakes are the quintessential shared commons. Bordered by eight Great Lakes states and two Canadian provinces, they sustain the lives of 40 million people. This shared commons is under pressure from within and without. There are no uniform and comprehensive rules for management of water uses within the Great Lakes Basin and there are increasing pressures to export and exploit the Great Lakes by private industries. What will prevent a tragedy of the commons?

One way to shore up protections for the Great Lakes is to reinforce and affirm the historic existence of the Great Lakes Basin as a trust, managed by a variety of governments for the benefit of the public. This section will discuss the Great Lakes as a commons and a public trust.

The Great Lakes Commons

“Water is a commons because it is the ecological basis of all life and because its sustainability and equitable allocation depend on cooperation among community members.”

- Vandana Shiva³

The Public Trust Doctrine is an important tool for protecting the future of the Great Lakes, and is rooted in the notion that the Great Lakes constitute a common resource, or “commons,” to be shared by all.

Commons are resources that are not individually owned, but instead are shared by a community. The commons can include international lakes and rivers, oceans, global climate, the Internet, genetics, and sidewalks. The Great Lakes have been and remain today an economically and ecologically valuable commons. These vast bodies of water and the waters feeding them (both surface and ground) pay no attention to political borders and supply the water needs of people, plants, and wildlife.

Questions abound about who should control the water commons:

- To whom does water belong?
- Who has rights to use water and who does not?

- What are the rights of corporations and commercial interests?
- Is water a human need or a human right?
- Is water a good to be bought and sold or a public trust to be managed for the benefit of the public and future generations?

Like a free flowing river, water law has meandered and changed from the founding of the United States until the present, yet never before have we been poised like we are at the beginning of the 21st Century to disregard fundamental concepts over rights and ownership in water. In dispute are those who argue in favor of thousands of years of precedent throughout the world that water is a commons that is held in trust for the public versus those who argue in favor of a new system that would allow water to be owned and traded as a good or service.

A human need can be supplied in many ways, most often by purchasing a good to supply the need, while a human right need not be purchased and cannot be sold.⁴

According to the World Bank, water is a human need and not a human right.⁵ Others counter that “access to clean water for basic needs is a fundamental human right; this vital resource cannot become a commodity sold to the highest bidder. Each generation must ensure that the abundance and quality of water is not diminished as a result of its activities.”⁶ They further argue that corporate control of water is a threat to the well-being of humans.⁷

This clash over fundamental rights arises amid the backdrop of a world in which access to clean and safe drinking water is growing increasingly scarce; and where a handful of multinational corporations are growing increasingly wealthy by privatizing water.

A multinational corporate push to turn the water commons into a private good that can be bought and sold is gaining momentum. Multinational companies that provide water services are engaged in an over \$1 trillion per year industry, which does not even include revenues generated from bottled water.

[T]here is no choice but to call for the ‘recovery of the commons’—and this in a modern world that doesn’t quite realize what it has lost. Take back, like the night, that which is shared by all of us, that which is our larger being. There will be no ‘tragedy of the commons’ greater than this: if we do not recover the commons—regain personal, local, community, and peoples’ direct involvement in sharing (in *being*) the web of the wild world—that world will keep slipping away.⁸
- Gary Snyder

It is important to see what is driving this push to privatize the water commons. Garrett Hardin, in his well-known essay, “Tragedy of the Commons,” provides a theoretical argument in support of privatizing natural resources. Hardin’s Tragedy Thesis posits that when there is open and unregulated access to a resource, individuals will seek to maximize their individual gain and overexploit the common resource;⁹ things that are not privately owned will be overexploited, resulting in a Tragedy of the Commons.

However, some view this Tragedy Thesis as inherently flawed because historically the commons were not a free for all; instead they were often part of local social institutions that were governed by rules of use and regulated access.¹⁰

A misperception about the commons is that they must be privatized in order to be protected.¹¹ However, privatization is only one of at least three options. The other two are management by local residents, as has historically been the case, or management by a government agency. In most places in the United States, we have lost the strong social fabric that could facilitate management of the commons by local residents without enforceable local ordinances. The privatization option is also untenable. Privatization of the commons carries with it the risk of unjustly enriching the few, while depriving the many; it allows the commons to be taken out of the public domain and given to the few who by fortuity have the ability to enclose the commons and profit off them. This leaves the last option for preserving the commons: management by the government.

For the trust relationship to function well, the following requirements should be present:

- Transparency of the trustees’ actions;
- Adequate regulations governing shared access and use of the trust property; and
- Public participation by the trust beneficiaries, including the ability to enforce and to call for routine accounting of the trust to ensure the government is managing it in the public interest.

One model for government management of the water commons that has deep historic roots is the Public Trust Doctrine, whereby the government holds the common water resource in trust for the public and regulates the commons in the public interest.

The Public Trust Doctrine

“[W]ater is and always has been a public resource.”¹²

In the United States, from entry into the Union to the present, the Public Trust Doctrine has existed to guide decisions about Great Lakes Basin water. Each of the Great Lakes states holds navigable waters in trust and should manage those waters for the benefit of the public.¹³ The Public Trust Doctrine has evolved in the common law in a variety of ways throughout the Basin states. Although a description of these variations is beyond the scope of this Report, we can emphasize common principles from the key judicial decisions.

The Public Trust Doctrine embodies the time-honored concept that the state holds all navigable waters in trust for the public. The state is the trustee, every member of the public is a beneficiary, and the waters are the trust property.¹⁴ Each state in the Northwest Territory of the United States was allowed into the Union on the condition that it incorporate the Public Trust Doctrine into the laws of the newly formed state.¹⁵

Water is not like other types of property; water’s unique legal status militates against defining it as a product or commodity that can be bought and sold. It also carries with it a duty on the states to manage waters in a way that benefits the public’s use consistent with the purposes of the trust.

Surface water rights are generally considered usufructuary—one can use but not own water.

...[P]roperty rights in water have been delineated in very limited terms. Water has been described as merely usufructuary; as belonging to the public; as subject to public servitudes; as incapable of full ownership; as subject to constraints that it be used nonwastefully, reasonably, beneficially, etc.¹⁶

These concepts have long been found in judicial decisions in the Great Lakes states.¹⁷ For example, it is well established in Wisconsin that a riparian landowner may make reasonable use of the water that passes by his or her property; however, the riparian does not possess a property right to “the particles of water flowing in a stream.”¹⁸

The roots of private property in water have simply never been deep enough to vest in water users a compensable right to diminish lakes and rivers or to destroy the marine life within them. Water is not like a pocket watch or a piece of furniture, which an owner may destroy with impunity. The rights of use in water, however long standing, should never be confused with more personal, more fully owned, property.¹⁹

The United States Supreme Court in *Illinois Central Railroad v. Illinois* first observed, as a matter of trust obligation, that “the general control of the State over lands under the navigable waters of an entire harbor or bay, or of a sea or lake” cannot be abdicated, and “cannot be relinquished by a transfer of the property.”²⁰ This case involved Lake Michigan’s lakebed at Chicago and established that the State of Illinois could not abandon its trust responsibilities by granting the lakebed to a railroad.

During the same time period, at the end of the 1800s, a variety of Great Lakes state courts came to the same conclusion. They uniformly discussed water as something that is held by the state that cannot be sold, unless it is clearly for a public benefit.²¹

[T]he rights of the state in navigable waters and their beds are sovereign, and not proprietary, and are held in trust for the public as a highway, and are incapable of alienation.²²

In one of the earliest United States Supreme Court cases to deal with water diversions, the Court in *Hudson County Water Co. v. McCarter* upheld the right of New Jersey to

prohibit the diversion of water from the Passaic River to consumers on Staten Island, New York. This keystone case is as relevant today as it was 100 years ago, and can speak to contemporary questions about diversions and privatizing water.²³

[F]ew public interests are more obvious, indisputable and independent of particular theory than the interest of the public of a State to maintain the rivers that are wholly within it substantially undiminished, except by such drafts upon them as the guardian of the public welfare may permit for the purpose of turning them to a more perfect use. This public interest is omnipresent wherever there is a State, and grows more pressing as [the] population grows. It is fundamental, and we are of opinion that the private property of riparian proprietors cannot be supposed to have deeper roots.

...The private right to appropriate is subject not only to the rights of lower owners but to the initial limitation that it may not substantially diminish one of the great foundations of public welfare and health.²⁴

According to public trust expert, Joseph Sax, “This may be the most important statement the Court has ever made about the constitutional status of water rights.”²⁵ The Court clarified that “the State was warranted in prohibiting the acquisition of the title to water on a larger scale.”²⁶

By the time the Governors and Premiers signed the Great Lakes Charter in 1985, the Public Trust Doctrine was well developed in the common law of the United States.²⁷ The Great Lakes Charter clearly echoes the Public Trust Doctrine by defining the role of the Great Lakes states and provinces as trustees of the Great Lakes.

This public trust orientation is key to understanding the rights and responsibilities of the governments, riparians, and the general public beneficiaries when conflicting uses of Great Lakes water emerge. Consistent with this longstanding legal doctrine, the very first finding in the Great Lakes Charter declares, “The water resources of the Great Lakes Basin are precious public natural resources, shared and held in trust by the Great Lakes States and Provinces.”²⁸

Like the Great Lakes Charter, the Great Lakes Charter Annex 2001 reaffirms the Public Trust Doctrine in its first finding: “The Great Lakes are a bi-national public treasure and are held in trust by the Great Lakes States and Provinces.”²⁹

Similarly, the Great Lakes – St. Lawrence River Basin Water Resources Compact (“Compact”) echoes the finding that Great Lakes Basin waters are “precious public natural resources shared and held in trust” by the states.³⁰ It also explains the Public Trust duty this places on the states and provinces for purposes of the Compact:³¹

As trustees of the Basin's natural resources, the Great Lakes States and Provinces have a shared duty to protect, conserve, and manage the renewable but finite waters of the Great Lakes Basin for the use, benefit, and enjoyment of all their citizens, including generations yet to come.³²

Does the Public Trust Doctrine Apply to Groundwater?

The Public Trust Doctrine has evolved as human uses of water have changed. Originally, it only applied to tidal waters. When the United States adapted the doctrine from England, the U.S. Supreme Court expanded the doctrine to all navigable waters, regardless of whether they were tidal.³³ Some states have expanded the doctrine to waters that directly impact navigable waters, such as non-navigable tributaries,³⁴ wetlands,³⁵ while at least one state has expanded the trust to groundwater irrespective of its impact on navigable waters.³⁶

With little fanfare, the Great Lakes Charter and the Great Lakes Compact both recognized that the Public Trust Doctrine applies to groundwater as well as surface water. This reflects the developments of scientific understanding of the interconnectedness of water. As stated above, the Great Lakes Charter’s very first Finding declares, “The *water resources of the Great Lakes Basin* are...held in trust by the Great Lakes States and Provinces.”³⁷ The Charter defines “Great Lakes Basin water resources” to include “all streams, rivers, lakes, connecting channels, and other bodies of water, including tributary groundwater, within the Great Lakes Basin.”³⁸ Since Great Lakes Basin water resources are defined to include groundwater, the Charter extends the public trust doctrine to “tributary groundwater.”

This is consistent with the governors and premiers’ finding and agreed upon principle that the waters of the Great Lakes Basin are interconnected and part of a single hydrologic system.³⁹ Reaffirming the Great Lakes Charter, the Great Lakes Compact also extends the Public Trust Doctrine to groundwater and all surface waters, regardless of navigability.⁴⁰

Summary

The Public Trust Doctrine is the legal framework that establishes a trust in the public water commons. Historically, it describes a relationship whereby the State is the trustee of all navigable waters with a duty to manage those waters for the public benefit. A few states have expanded this doctrine to include waters that directly impact navigable waters. Consistent with the evolution of scientific understanding of the interconnectedness of surface and groundwater, the Great Lakes Charter and the Compact have extended the Public Trust Doctrine to all waters, including non-navigable surface water and tributary groundwater.

Recognizing the legal existence of the Great Lakes as a public trust could help protect the lakes from global and local pressures. If water is a public trust held by the government for the public benefit, then private ownership of water for primarily a private purpose is precluded and water will need to be managed within the Basin in a way that upholds the public interest and protects the water commons.

PART II: OVERVIEW OF THE LAWS GOVERNING THE WITHDRAWAL OF WATER FROM THE GREAT LAKES

While the idea of the Great Lakes as a commons and a public trust form the theoretical underpinnings for protecting the Great Lakes, there are a variety of laws and policies in place that influence how water withdrawals are regulated. This section provides an overview and highlights the shortcomings of these laws, including the Boundary Waters Treaty, the Great Lakes Charter, the Water Resources Development Act, the Great Lakes Charter Annex 2001, and the Great Lakes – St. Lawrence River Basin Water Resources Compact and Agreement.

These laws set a regional management structure that is crucial for a commons, such as the Great Lakes, that spans a variety of governmental jurisdictions. The Great Lakes can only be effectively managed jointly by all the Great Lakes states and Canadian provinces; otherwise, protections attempted by one could be undermined by the actions of others. While each state and province has the authority to provide protections, regional management is needed and the Public Trust Doctrine should serve as a common basis for these protections.

In assessing whether existing laws are sufficient to govern the management of the shared commons and public trust of the Great Lakes, one should ask whether they set up a management system that provides:

- Transparency of the trustees' actions;
- Adequate regulations governing shared access and use of the trust property; and
- Public participation by the trust beneficiaries, including the ability to enforce and to call for routine accounting of the trust to ensure the government is managing it in the public interest.

Boundary Waters Treaty of 1909

The Boundary Waters Treaty of 1909 was created at the beginning of the 20th Century when the Great Lakes' importance was dominated by its use to transport goods to market. The Treaty established the International Joint Commission and set out a legal structure for regulating the Great Lakes as boundary waters between Canada and the United States.

The Treaty did not prohibit diversions per se, but required approval for diversions and other water uses that affected the “natural flow or level” of the lake on the other side of

the boundary. Hence, the Treaty reserved to each respective national or state and provincial government, the exclusive jurisdiction over diversions on its side of the boundary, subject to party claims that a diversion would produce a “material injury” to navigation interests.⁴¹

A proposal for any water uses that impacted the natural level or flow of boundary waters was to be reviewed by the International Joint Commission.⁴² Significantly, in the history of the International Joint Commission, the governments have never referred any cases to it for a binding decision.⁴³

While the Treaty clearly articulated a process to review uses of water that changed the natural level or flow of the lake, it set the bar so high that the many water uses that do not rise to the level of impacting the “natural flow or level” of the lake are not reviewed by the Commission. Further, the Treaty only applies to waters through which the international boundary passes, ignoring tributary streams and groundwater in the Great Lakes Basin as well as Lake Michigan. Lastly, the Treaty failed to establish any standards (beyond material harm) for reviewing a water use proposal.

The Great Lakes Charter of 1985

“As pressure for water grows, we will be sending out the message loud and clear to those in business and industry—plan on going where the water is, because it won't be brought to you.”
- Wisconsin Governor Anthony Earl⁴⁴

Recognizing the limits of the Boundary Waters Treaty of 1909, the Governors of the eight Great Lakes states and the Premiers of the Canadian provinces of Quebec and Ontario entered into the Great Lakes Charter in 1985.⁴⁵ Although legally unenforceable, the Charter establishes “good faith” arrangements and sets a policy for managing the Great Lakes.

1909

Boundary Waters Treaty

1986

Water Resources
Development Act

2001

Great Lakes Charter
Annex of 2001

1985

Great Lakes Charter

2000

Amendment to Water
Resources Development Act

2005

Great Lakes – St. Lawrence
River Basin Water Resources
Compact and Agreement

The governors and premiers recognized that the waters of the Great Lakes Basin are interconnected and part of a single hydrologic system.⁴⁶ Thus, any management and regulation of the Great Lakes needs to encompass all tributary groundwater and surface water within the Great Lakes Basin. The signatories were aware of studies showing that diversions and consumptive uses could have “significant adverse impacts on the environment, economy, and welfare of the Great Lakes region,” and used the Charter to establish a process for managing water withdrawals.⁴⁷

The governors and premiers agreed to:

- Disallow “any major new or increased diversion or consumptive use of the water resources of the Great Lakes Basin” exceeding five million gallons per day average in any 30-day period without notifying, consulting, and “seeking the consent” of “all affected Great Lakes States and Provinces.”⁴⁸
- Demonstrate the “authority to manage and regulate water withdrawals involving a total diversion or consumptive use of Great Lakes Basin water resources in excess of 2,000,000 gallons...per day average in any 30-day period.”⁴⁹
- Enact legislation to facilitate the gathering of needed data on “new or increased withdrawal of Great Lakes Basin water resources in excess of 100,000 gallons...per day average in any 30-day period.”⁵⁰
- Provide “accurate and comparable” information on withdrawals over 100,000 gallons per day.⁵¹

Despite these impressive program goals, the Great Lakes Charter has significant limitations and flaws. Although the signatories agreed to implement the Charter policy through state and provincial laws, most failed to do this. The combination of the states and provinces lacking the political will to implement the Charter and the failure to include any mechanism to force the implementation of the Charter, has resulted in the Great Lakes commons not being managed as envisioned by the Charter.

Further, the Charter’s trigger for requiring regional review of consumptive uses of 5 million gallons per day was set so high that only one in-basin consumptive use of water has ever been subject to a regional review.⁵²

Similarly, the Charter’s trigger for requiring management by each state and province (consumptive uses of 2 or more million gallons per day) was set too high to be meaningful. For example, Wisconsin incorporated the entire Charter into its state law and regulates consumptive uses at the 2 million gallon level.⁵³ However, as demonstrated in the Brown County Case Study below, only a handful of projects in Wisconsin have triggered this regulation. In fact, the only applicants that have ever been required to obtain a water loss permit in Wisconsin are those constructing large thermoelectric power plants.

Regrettably, the Great Lakes Charter set the regulatory threshold at a level that fails to cover most of the water uses in the Basin. This failure makes the Charter meaningless as a vehicle for encouraging states to implement regulatory programs that will effectively prevent local water shortages, deal with water conflicts and, ultimately, protect public rights in water. Hence, the Great Lakes Charter fails to require “adequate regulations governing shared access and use of the trust property.”⁵⁴

Water Resources Development Act of 1986, 42 U.S.C. § 1962d-20, Amended 2000

One year after the governors and premiers created the Great Lakes Charter, the United States Congress enacted the Water Resources Development Act of 1986 (WRDA), requiring unanimous consent of the Great Lakes States’ Governors before a state can allow a diversion of any amount of water out of the Great Lakes Basin.⁵⁵

In so doing, Congress declared the Great Lakes as the “most important natural resource” to the Great Lakes states and Canadian provinces.⁵⁶

Congress found that “any new diversions of Great Lakes water for use outside of the Great Lakes basin will have significant economic and environmental impacts, adversely affecting the use of this resource by the Great Lakes States and Canadian provinces.”⁵⁷

In order to avoid these adverse impacts, Congress declared its “purpose and policy” to “prohibit any diversion of Great Lakes water...outside the Great Lakes basin unless such diversion is approved by the Governor of each of the Great Lakes States.”⁵⁸ Unlike the Great Lakes Charter, which used a 5 million gallon a day trigger, WRDA “contains no quantity requirement for triggering a need for member approval.”⁵⁹ Additionally, unlike the Charter, WRDA is legally binding and enforceable.

However, WRDA comes with limitations and flaws. Although the Great Lakes Charter requires unanimous consent for consumptive uses of 5 or more million gallons per day, WRDA is silent on consumptive uses of water. WRDA is also silent on whether it applies to groundwater.

Congress amended WRDA in 2000 after the Nova Group in Canada received a permit (that was subsequently withdrawn) for bulk exports of water to Asia. The company planned to “ship 3 billion liters of water from Lake Superior over 5 years and sell it to Asia.”⁶⁰

During the debates over the 2000 amendment of WRDA, Michigan Senator Carl Levin argued that:

We currently have an effective veto over bulk removals of Great Lakes water outside of the Great Lakes basin. When we passed WRDA in 1986, we acted to make sure that each Great Lakes governor would have a veto over such removals. This protection is legally sufficient and we should do nothing to imply otherwise.⁶¹

Although that Senator thought WRDA was sufficient, currently a question looms about whether WRDA applies to diversions of groundwater. More specifically, it is an open question whether WRDA prohibits the export of groundwater that is being packaged in bottles for sale outside the Basin. Analysts and litigants have identified aspects of WRDA that may make the statute vulnerable to constitutional challenges.⁶² Although many of these arguments have been debunked by legal experts, in 2005 Nestle/Perrier filed a lawsuit challenging the constitutionality of WRDA on numerous grounds, given its concern that WRDA may impede the company’s ability to bottle and export water from the Great Lakes Basin.⁶³

In March of 2006, Nestle voluntarily dismissed this case and is not pursuing the constitutional challenge to WRDA.

Additionally, it is unclear whether WRDA is sufficiently enforceable. Prior to the Nestle/Perrier case challenging WRDA’s constitutionality, water users in Michigan brought the first case that decided whether WRDA provides a private right of action. This case arose out of Nestle/Perrier’s proposal to bottle and divert 576,000 gallons per day of spring water out of the Great Lakes Basin in Michigan.⁶⁴ The Court held in *Little Traverse Bay Bands of Odawa Indians v. Great Spring Waters of America* that WRDA contains no express or implied private right of action to enforce its terms.⁶⁵

In reaching its decision, the court reasoned that the statutory scheme of WRDA endorses “decision making by the Governors”⁶⁶ and places “authority as to these decisions in the hands of the Governors.” Part of the court’s analysis revolved around the fact that WRDA was meant to benefit the public at large, so the court was unable to conclude that Congress intended to imply a private cause of action for the narrow class of riparian plaintiffs.⁶⁷ What the court did not address was whether a private litigant could enforce WRDA based on his or her status as a beneficiary of the public trust. Due to its well-established public trust case law, a similar case initiated in Wisconsin, involving private litigants trying to enforce WRDA based on their status as public trust beneficiaries might turn out differently.⁶⁸

In summary, WRDA creates an absolute prohibition on diversions of Great Lakes water unless there is unanimous consent of the Great Lakes governors, but does not provide any clear decision-making standards for governors to follow. There is some evidence that Congress intended WRDA to be a legally sufficient veto power over exports of Great Lakes water, however it is unclear whether this applies to groundwater. Although one court has held that private litigant riparians cannot enforce WRDA, courts in other states may hold otherwise and ground their decision in the rights of trust beneficiaries to protect public trust waters.

The Great Lakes Charter Annex of 2001

In 2001, the Great Lakes Governors and Premiers again gathered to sign an additional policy statement on the Great Lakes: the Great Lakes Charter Annex of 2001 (“Annex”). The Annex contains directives meant to further the principles of the Great Lakes Charter.⁶⁹

The legally-binding decision making standard upon which decisions concerning water management should be based is, “[p]rotecting, conserving, restoring, and improving the Great Lakes...”⁷⁰

Directive III outlines principles for establishing the decision making standard for new or increased withdrawals from the Great Lakes Basin.

The principles are:

- To prevent or minimize Great Lakes Basin water loss by requiring return flow and conservation measures;
- To have no significant adverse impact on Great Lakes water quality or quantity and water-dependant resources;
- To improve the water and water-dependant resources of the basin; and
- To comply with all applicable laws and treaties.⁷¹

In the interim, before the states and provinces have binding agreements in place to implement the Annex, Directive IV commits the states to consult with the premiers for any diversion covered by WRDA.⁷² Since WRDA prohibits any diversions, even de minimus ones, without the unanimous consent of all of the Great Lakes Governors, the status quo at present dictates that no diversions of Great Lakes’ water shall be allowed without the approval of all of the Great Lakes Governors and consultation with the two Canadian Premiers.⁷³

Great Lakes – St. Lawrence River Basin Water Resources Compact and Agreement

On December 13, 2005, the Great Lakes Governors and the Canadian Premiers gathered in Milwaukee, Wisconsin, and signed the Great Lakes – St. Lawrence River Basin Water Resources Compact and Agreement (“Compact”).⁷⁴ Prior to the Compact becoming effective and enforceable, each Great Lakes state must pass state legislation adopting the Compact, and then Congress must give its consent.

A historic agreement that sets a floor for regulating water withdrawals in the Great Lakes, the Compact recognizes that the waters of the Great Lakes are “precious” and “interconnected.”⁷⁵ The Compact reaffirms the Great Lakes Charter’s vision of an integrated system that looks at ground and surface water as a unified whole.⁷⁶

Although states are free to regulate existing water uses as they see fit, the Great Lakes Compact prohibits *new or*

increased diversions of water out of the Great Lakes Basin, with four exceptions:⁷⁷

1. Diversion of any amount of water by a “straddling community” for a public water supply;⁷⁸
2. Diversion of any amount of water to a community within a straddling county that is used solely for a public water supply, undergoes a Regional Review, and meets other requirements;⁷⁹
3. Diversion of certain intra-basin transfers, e.g., transferring water from Lake Superior to Lake Michigan;⁸⁰ and
4. Diversion of Lake Michigan for Chicago’s use.⁸¹

Additionally, whether bottled water is a prohibited diversion has not been settled. Although the Compact clearly defines removing water in containers greater than 5.7 gallons as a prohibited diversion, it leaves it up to each state to decide whether exports of water in 5.7 gallon or smaller containers will be prohibited diversions.⁸²

Combining riparian and public trust common law and statutory provisions from the Great Lakes states, the Compact takes a significant step forward by creating a uniform minimum standard that applies to **all withdrawals and consumptive uses of Basin water** as follows:⁸³

Uniform Management Standard for In Basin Water Uses

1. All of the water shall be returned to the “Source Watershed” less an allowance for consumptive use;
2. Implementation of the use “shall result in no significant individual or cumulative adverse impacts to the quantity or quality of the Waters and Water Dependent Natural Resources and the applicable Source Watershed;”
3. Implementation of the use shall incorporate “Environmentally Sound and Economically Feasible Water Conservation Measures;”
4. Implementation of the use must comply with all applicable laws; and,
5. The use is “reasonable” based on whether the use is planned in a way that avoids or minimizes wasting water; efficient use is being made of existing water; economic and social development are in balance with environmental protection; the supply potential of the water source; degree and duration of adverse impacts and whether they can be avoided or mitigated; and whether it includes restoration in the source watershed.

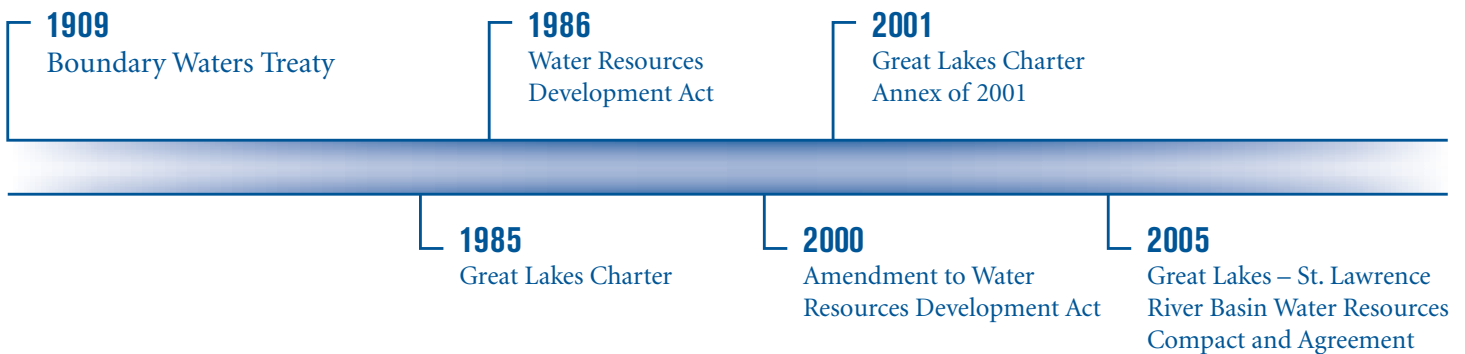
Although the Compact establishes a decision-making standard, it leaves it up to each state to decide which withdrawals must meet the standard.⁸⁴ This decision must be made “through a considered process” and must ensure: an effective and efficient management program; uses overall are reasonable; and withdrawals overall will not result in significant impacts to water and water-dependent natural resources.⁸⁵ If a state fails to set a regulatory trigger to apply the standard, the state will have to meet the default level, which applies the standard to each new or increased withdrawal of 100,000 or more gallons per day averaged over 90 days.⁸⁶

Summary

Due to the fact that most states and provinces did not carry out their promise to implement the Great Lakes Charter in state and provincial laws, withdrawals of water from the Great Lakes are not uniformly regulated throughout the Basin.

The Water Resources Development Act provides an absolute prohibition on diversions of water out of the Basin without the unanimous consent of all of the Great Lakes Governors (and the unenforceable Annex extends this to require consultation with the two Canadian Premiers). However, the Water Resources Development Act lacks a uniform standard on which to base a decision.

The Compact presents an opportunity to shore up protections for the Great Lakes. As the Compact establishes minimum standards, providing a floor, not a ceiling, for the protection of the waters, each state and province should carefully consider its role as trustee of the Great Lakes and its tributary waters and strive to enact implementing legislation that strengthens the Compact’s provisions accordingly.



PART III: UPHOLDING THE PUBLIC TRUST: STRENGTHENING THE GREAT LAKES COMPACT DURING STATE ENACTMENT

States Can and Should Strengthen the Compact

Now more than any time in recent memory, we have a chance to guarantee the long-term protection and sound management of Great Lakes water, ensuring that they are not sold to the highest bidder and that they are protected for generations to come.

When the Great Lakes Governors signed the Great Lakes Compact in 2005, they took the first of many steps on a path to creating enforceable, uniform standards for managing the Great Lakes. The Compact calls for the responsible use and protection of Great Lakes waters.

To make the Compact enforceable, and offer much needed protections for our Great Lakes, the legislatures in each state must pass legislation endorsing the Compact. When enacting this legislation, a state can include additional provisions that strengthen and clarify the Compact.⁸⁷ Thereafter, Congress must give its consent before the Compact will take legal effect.

State Legislation Should Improve the Compact in Four Areas

Consistent with the state's duty under the Public Trust Doctrine, the state legislation implementing the Compact should include provisions to strengthen the rules governing: 1. out-of-basin diversions; 2. in-basin uses; 3. water conservation; and 4. bottled water.

1. Strengthen the Ban on Diversions.

To ensure that diversions occur only in absolutely necessary situations and will not damage the Great Lakes Basin waters (including tributaries and groundwater), the provisions concerning diversions to straddling communities and counties must be strengthened in the following ways:

- Establish the boundaries for “straddling communities” and communities within “straddling counties” as of December 13, 2005. The failure to do so may allow a community to continue to annex land outside the Basin and serve those areas with Great Lakes Basin waters;

- Require all water diverted from a Great Lakes watershed be returned to the point of its initial withdrawal, with consideration for natural flow regimes and prevention of any significant adverse environmental impacts; and
- Require the implementation of measurable water conservation programs, including water recycling and reuse, prior to any application for a diversion of Great Lakes water.

▪ Set the Boundaries

The Compact allows straddling communities and communities within straddling counties to apply for an exception to the prohibition on diversions of water out of the Great Lakes Basin. Although the Compact establishes the boundaries for straddling counties to be fixed as of December 13, 2005, it fails to fix the boundaries for straddling communities and for communities within straddling counties.

This allows a straddling community, for instance, to obtain approval to use Great Lakes water in the part of its community that lies outside the Basin. However, because the boundaries of the community are not fixed as of a date certain, the community will have an incentive to annex water-poor land outside the Basin and expand the use of Basin waters.

This drafting error in the Compact should be corrected in state legislation to fix the boundaries of the straddling communities and communities within straddling counties that exist as of December 13, 2005. This will harmonize the definitions with the one for counties and will uphold the intent of the Compact to prohibit diversions in most situations.

▪ Require Return Flow to Point of Initial Withdrawal

Requiring the return of water diverted out of the Basin has been part of Great Lakes water policy for at least the past 20 years.

Return Flow Under the Great Lakes Charter and Water Resources Development Act

Diversions represent some of the pressures facing the Great Lakes currently and could increase with global and local pressures on the lakes. It is important to understand the scope of the current diversions and how they have been regulated to put future requests for Great Lakes water in perspective.

Since the enactment of the Water Resources Development Act and the Great Lakes Charter in the mid-1980s, two formal diversion requests have been approved and one has been vetoed:

- Pleasant Prairie, Wisconsin. (Approved)
- Akron, Ohio. (Approved)
- Lowell, Indiana. (Vetoed by the Governor of Michigan) Michigan's Governor John Engler vetoed the Lowell diversion because "once one diversion is allowed, it is more difficult to stop others."⁸⁸

Although the diversion requests for Pleasant Prairie, Wisconsin, and Akron, Ohio, were considered well before the law required return flow, the states and provinces recognized the need for return flow. The governors approved these diversions only on the condition that each municipality return an equivalent volume of water to the Great Lakes system.⁸⁹

As the practice of diversion approvals under WRDA shows, the Great Lakes Compact's return flow requirement is merely an articulation of a principle that has been in force since 1985.

However, the Compact's return flow requirement should be refined to protect existing riparian and public water rights. The Compact requires Great Lakes water to be used and then returned to the "source watershed." The definition of source watershed gives a "preference" for returning the water to the "direct tributary stream watershed from which it was withdrawn"⁹⁰ but otherwise defines the watershed broadly so that, for example, a withdrawal from Lake Michigan could be returned to any other part of the Lake Michigan Basin and still be within the "source watershed."

State legislation should turn this "preference" into a requirement that water be returned to the point of initial withdrawal. Without greater clarity, a water user could argue that it should be allowed to take water from one river and return it to another river within the same watershed.

This could result in harm to the existing riparian and public rights in the stream where water was taken but not returned. In Wisconsin, the Supreme Court has already recognized the ability and duty of the state to regulate diversions from even non-navigable streams to protect riparian and public rights because without this regulation "there might be a rather dry riverbed downstream."⁹¹

Similarly, a water user could take groundwater and return it to a trout stream in the same watershed, thus increasing the flow and changing the water quality of the trout stream, and increasing the risk of flooding. To avoid harm to riparians and the public, state law should clarify that water must be returned to the point of initial withdrawal, with consideration for natural flow regimes and prevention of significant adverse environmental impacts.

▪ *Require Conservation as a Condition Precedent to a Diversion Application*

Only by requiring communities to implement conservation measures and programs demonstrating measurable savings *prior* to an application for an exception to the diversion prohibition can a state be assured that the Compact's conservation goals will be realized. In keeping with its core conservation ethic, the Compact requires applicants for an excepted diversion to implement conservation measures.⁹² This clear imperative lies at risk of being compromised, however, by the inclusion of the caveat that conservation measures be "economically feasible." To avoid the costly litigation likely to result from this vague condition and to prevent communities from using it as a way to circumvent the conservation condition precedent, state legislation should remove the feasibility language and simply require that all applications for diversions be evaluated on the *effectiveness* and the *extent* of the water conservation measures implemented prior to the date of application.

2. *Set a Protective Regulatory Trigger for In-Basin Users.*

For the first time, the Great Lakes Compact establishes a uniform standard to apply to in-basin uses of water, but allows each jurisdiction to set the withdrawal level at which this standard will apply. Ensuring the reasonable and efficient use of our water resources by in-basin users allows the state and region to legally defend its restrictions on out of basin users, avoid costly water conflicts, and provide water users with consistency.

Each state has to set this regulatory trigger level to ensure “uses overall are reasonable,” avoid cumulative significant impacts, and achieve all the objectives of the Compact.⁹³

Since signing the Great Lakes Charter in 1985, almost all of the Great Lakes states have enacted legislation requiring the **registration** of all new or increased withdrawals of Great Lakes Basin waters in excess of 100,000 gallons per day averaged over any 30-day period.⁹⁴ Some states have set the threshold for actually requiring **permits** and regulating in-basin uses at a water loss or consumptive use of 2 million or more gallons per day, which is consistent with the Great Lakes Charter.⁹⁵

However, the 2 million gallon per day trigger level is too high to be meaningful in Wisconsin, and other states may have a similar experience.

CASE STUDY: Central Brown County Water Authority Deal to Withdraw up to 30 Million Gallons Per Day from Lake Michigan

The recent request by Manitowoc Public Utilities to increase the utility’s current rate of withdrawal of Lake Michigan water to up to 30 million gallons per day illustrates that the regulatory trigger is not set at a meaningful level. The utility sought the increase in its water withdrawal in order to supply water to the Central Brown County Water Authority, which requested Lake Michigan water to replace its own contaminated groundwater.⁹⁶

Even with a project of this magnitude, the Wisconsin Department of Natural Resources (WDNR) concluded that the 2 million gallon per day water loss threshold was not exceeded.⁹⁷ The WDNR thus informed the utility that it could proceed with the increased withdrawal without the need to obtain a water loss permit.

As a result, with no water loss permit under consideration, neither the utility supplying the water nor the water authority receiving the water was required to comply with any of the public trust or conservation provisions put into Wisconsin’s enactment of the Great Lakes Charter policy. As this was one of the largest intra-basin water transfers Wisconsin had ever seen, this case surely demonstrates that regulating water losses at or above the 2 million gallon per day consumptive use threshold sets a regulatory trigger that is too high to be effective.

Wisconsin law already requires approvals for all withdrawals of 100,000 gallons per day or more of groundwater and requires registration of all water withdrawals (surface and ground) at that level.⁹⁸ Unlike the 2 million gallon per day level, the 100,000 gallon per day level appears to cover a large portion of the state’s water users. Consistent with the Compact’s recognition that surface and ground water are part of an interconnected system, Wisconsin should regulate surface water withdrawals at the same 100,000 gallon per day level that already requires regulation of groundwater withdrawals. Other Great Lakes states may have local conditions that argue in favor of setting the threshold differently.

3. Require Strong Water Conservation Standards.

While the Great Lakes states may be perceived as water rich compared to other parts of the country and world, certain areas are, nonetheless, facing challenges to their water supplies, including drawdown of groundwater aquifers, problems with water quality, and water demands rapidly exceeding available supplies. In order to ensure that water supplies continue to meet each state’s escalating water demands, we must act before it is too late to conserve and protect our waters.

Each state needs to take steps to be responsible stewards of its water wealth. State officials and policymakers would be wise to rectify the existing gaps in state laws and regulatory systems that effectively forestall the implementation of water conservation measures on a local and statewide basis by enacting a statewide mandatory water conservation program that:

- Requires specific conservation goals for each sector (e.g., residential, commercial, agricultural) and then monitor and report progress;
- Identifies best available technologies and practices;
- Includes the implementation of water conservation measures as an enforceable permit condition;
- Documents achieved conservation through permit conditions requiring monitoring and reporting;
- Requires conservation for all large water users and eliminates opt out;
- Includes a provision providing that the conservation requirements and measures are enforceable by any member of the public.

**CONSERVATION CASE STUDY:
Pleasant Prairie, Wisconsin**

In the late 1980s, Pleasant Prairie, Wisconsin, which is partly in the Mississippi River Basin, sought a new source of water in order to replace existing contaminated groundwater supplies contaminated by naturally-occurring radium and to comply with radium standards for drinking water. The City of Kenosha, which is in the Lake Michigan Basin, agreed to allow Pleasant Prairie to tap into Lake Michigan water through its water supply system, and they jointly applied to the DNR to send 3.2 million gallons per day from the Lake Michigan Basin to the Mississippi River Basin.

Although none of the eight Great Lakes states opposed the diversion, there were concerns expressed.⁹⁹ The Canadian Consulate General urged Wisconsin to focus on water conservation:

...[T]here is reason to believe that the problem in Pleasant Prairie stems from overuse of local water systems for development. We are concerned that diversions from the Great Lakes, rather than water conservation and management, should be seen as the answer to local problems of this sort. We would like to encourage the State of Wisconsin to explore all alternative solutions before proceeding with this diversion.¹⁰⁰

However, there were no relevant regulations that required Pleasant Prairie to conserve water prior to applying for a diversion of Great Lakes water. So at the beginning of 1990, the diversion was approved without any requirements for water conservation.¹⁰¹

▪ ***The State Water Conservation Plan
Should Require Specific Conservation Goals
and then Monitor and Report Progress***

State policymakers should be sure to require measurable water conservation goals and objectives that can be monitored and evaluated on an annual basis. In places where this has occurred, the water savings are also fiscal savings, and in places where this has been ignored, conservation has made little progress.

EXAMPLE: Wisconsin's Wellhead Protection Law

Wisconsin law, at present, has no mechanism to require and monitor measurable conservation goals. With the exception of Wisconsin's Wellhead Protection Program, it lacks any specific program to promote water conservation.¹⁰²

The state's Wellhead Protection Program, however, is by no means structured or funded to accomplish far-reaching conservation objectives. Because the state's role is limited to reviewing the "reasonableness" of the community's proposed water conservation program for a new municipal well, beyond that, there are no statewide goals articulated, no financial incentives provided, and no database developed to track implementation of the conservation programs.¹⁰³ Without these components, the conservation element of the state's Wellhead Protection Program has been relegated to merely a paperwork requirement.

By contrast, an instructive model of effective goal-setting and monitoring is the Great Lakes community of Waterloo, Ontario, which is located in the center of a triangle formed by Lakes Ontario, Erie and Huron.

CASE STUDY: Waterloo, Ontario - Setting and Monitoring Conservation Goals

The Regional Municipality of Waterloo has developed an extensive water conservation program, focusing on the residential water consumption of its population of approximately 450,000 people. This has been necessitated by recent drought conditions and projected population increases that have pushed the region's water system at near capacity.¹⁰⁴

In 1998, Waterloo established the goal of reducing its water consumption by 1.5 million gallons of water per day by 2009 through its Water Efficiency Master Plan. In addition to this short term overall reduction goal, the Master Plan provides cumulative efficiency targets for each program on an annual basis. Waterloo then also set long-term goals for water conservation through the year 2041.

(continued on next page)

(continued from previous page)

CASE STUDY: Waterloo, Ontario - Setting and Monitoring Conservation Goals

By setting these short and long-term goals, and following them up with monitoring and reporting, Waterloo's water conservation efforts since 1994 have saved the region over 1 million gallons of water per day.¹⁰⁵ These savings have allowed Waterloo to defer the costs of building and maintaining the infrastructure needed to supply this quantity of water during this time period as well as to treat, pump and distribute it on an ongoing basis. This 1 million gallon per day savings became even more valuable in 2004 when Waterloo lost 2.5 million gallons per day of pumping capacity after five groundwater wells became contaminated and were shut down.¹⁰⁶

▪ *The State Water Conservation Plan Should Identify Best Available Technologies and Practices*

In order to ensure that water supplies continue to meet ever-increasing water demands, each state should work toward the development of an integrated water conservation plan that incorporates conservation measures that have proven both cost-effective and water efficient. In general, water conservation measures aim to preserve quantities of water sufficient to sustain economic and agricultural uses, drinking water supplies, and water-dependent ecosystems within our environment. Water conservation is most commonly associated with strategies aiming to reduce human consumption and demand for water. Another less common, but valuable, approach to water conservation is directed towards the re-use and reclamation of water as an alternative to standard “once-through” water systems to optimize the numerous beneficial uses of treated wastewater or “gray water” for groundwater recharge, irrigation, wetlands restoration and industry.

Because a community's selection of conservation measures and best management practices will comprise the backbone of any successful conservation plan, state policymakers need to determine which measures and practices lend themselves most readily to local and statewide conditions. First, policymakers should create a water use profile for the state and its sub-regions, identifying conservation opportunities statewide and those areas where water quality or quantity issues are or

may become an issue. Understanding both the historic and projected water supplies and demands can help communities develop water budgets and set realistic conservation goals to help balance these budgets. Similarly, understanding how water is being used, and in what quantities, can help decision-makers select conservation measures and incentives that will prove most effective.

For example, data indicate that conservation measures aimed at reducing residential water use, particularly in the bathroom, which accounts for more than half of all indoor water use in some places, have the potential to lead to considerable water savings. Likewise, utility records demonstrating significantly higher water use during the summer months on the part of certain communities or portions of the state indicate that it would be wise to recommend conservation measures and incentives targeting outdoor water use.

Second, policymakers need to explore the array of best management practices and water conservation programs currently implemented in other states—programs that can be used as models for water conservation in Wisconsin. A timely resource for this is *Protecting Wisconsin's Waters: A Conservation Report and Toolkit*, which identifies numerous models of conservation initiatives and practices.¹⁰⁷ The state water conservation plan should incorporate the best management practices that are most likely to have a measurable impact given local and statewide water uses.

▪ *The State Water Conservation Plan Should Include the Implementation of Water Conservation Measures as an Enforceable Permit Condition*

In order to ensure that water conservation is incorporated into the regular practices of a state's large water users, water use permits should include conservation as a permit condition. The permit conditions could take the form of requiring a set percentage reduction that helps the state or locality achieve its overall water conservation goal and allow each permit holder to choose the best practices that would be most effective for reaching the goal. The requirements should involve monitoring, reporting and enforcement to ensure they are implemented.

▪ *The State Water Conservation Plan Should Require Conservation for All Large Water Users and Eliminate Opt Out of Municipal Supply Systems*

Some states, such as Wisconsin, are silent on the subject of requiring all water users within a municipal water system's boundaries to hook up to the system. This opens the door for large water users to opt out of a municipal water system and seek its own water supply (via private high capacity well, for instance) to avoid water conservation requirements. This scenario would result in a smaller pool of utility customers for the same fixed operating costs, thereby creating fiscal difficulties for the municipal water utility.

While it remains unclear to what extent large water users are opting out of municipal systems, the opportunity afforded large water users to opt out of available municipal water systems may serve, in effect, to deter municipal utilities from initiating conservation pricing and undermine implementation of system-wide water conservation initiatives especially in light of the buying power yielded by large industrial users.

To counter this and promote conservation, states and localities should create mandatory conservation programs for all water users, especially targeting large users—irrespective of whether their water source is municipal or private—and, at the same time, enact ordinances and regulations that will effectively prohibit large water users from opting out of the available municipal water supply.

▪ *State Legislation Should Enable Comprehensive Citizen Enforcement*

In order to have a functioning public trust, the public beneficiaries must be able to call for an accounting of the trust to monitor how well the government is carrying out its duty as trustee. Similarly, the beneficiary should be allowed to enforce the rules governing how the trust is managed, when the government fails to take action.

A citizen suit provision, comparable to that provided for under the federal Clean Water Act or the Michigan Environmental Protection Act,¹⁰⁸ is an important component to state legislation implementing the Compact's conservation requirements. While it appears that the Compact already allows any member of the public to initiate proceedings against the state for failure to establish a conservation program or for failure to require conservation as a condition of a permit, the

Compact is silent on the ability of the public to enforce the failure of a permittee to heed the conservation requirements required under its permit. This lapse may serve to undermine the consistent implementation and enforcement of conservation measures.

To fully implement water conservation in the Great Lakes states, each state should create measurable goals, identify best management practices, require monitoring, and provide adequate enforcement mechanisms, including an avenue for any member of the public to enforce permit provisions.

4. Eliminate Loopholes that Encourage Privatizing Great Lakes Water.

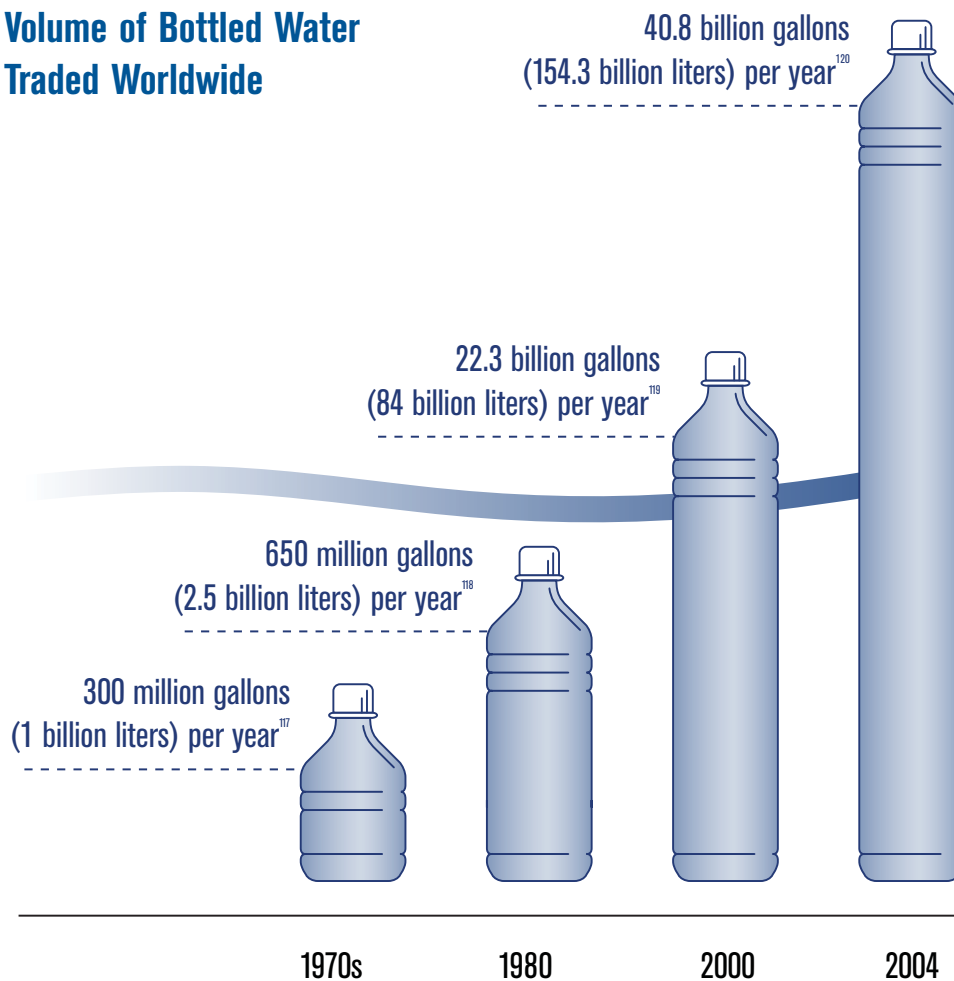
“Water promises to be to the 21st Century what oil was to the 20th Century: the precious commodity that determines the wealth of nations.”¹⁰⁹

The Great Lakes Compact clearly prohibits the bulk transfer of water out of the Basin if it is transferred in a container larger than 5.7 gallons.¹¹⁰ However, it leaves it up to each state to decide whether exporting water in containers less than 5.7 gallons is a prohibited diversion.¹¹¹ States should eliminate the bottled water loophole that allows the diversion of Great Lakes water based on the size of the container being used to transport the water out of the Great Lakes Basin. This would not impact or apply to water that is incorporated into products, such as beer, soda, canned goods, or juice.

Increases in the world's population coupled with increased pollution are straining the world's water resources. Global consumption of water is doubling every 20 years, outpacing population growth.¹¹² Meanwhile, a child dies every eight seconds from drinking contaminated water. In fact, half of the people on Earth lack basic sanitation services, and hence are exposed to water-borne diseases.¹¹³ Billions of people are caught between the “twin realities of water scarcity and water pollution.”¹¹⁴

While some find this unjust, the private sector has increasingly taken advantage of this scarcity as an opportunity to make a profit. A handful of multinational corporations are growing increasingly wealthy by privatizing water through a number of avenues, including the management and control of municipal water distribution systems and the taking of water out of the public trust—at no cost—and bottling it for sale around

Volume of Bottled Water Traded Worldwide



the world. Multinational companies that provide water services are engaged in a more than \$1 trillion per year industry; a total that does not include the more than \$35 billion bottled water industry.¹¹⁵

A small group of companies currently control much of the international water market. Two French-based transnational corporations, Vivendi and Suez, own or have controlling interests in water companies in over 130 countries serving more than 100 million people.¹¹⁶

Private corporations take public water and privatize it for profit in two basic ways: they take over delivering water through municipal water systems or they take water from the public domain and export it in bulk out of its basin of origin.

Bottled water is the most familiar of the bulk exports of water. The industry has grown tremendously since the 1970s, with unprecedented growth in the past decade.

Wisconsin faced a significant privatization threat in 2000 when Nestle/Perrier attempted to obtain permits to bottle the spring waters feeding the Mewan River in Waushara County, Wisconsin. When the public outcry thwarted the company, it turned to the spring waters feeding the Big Springs area of Adams County, Wisconsin. In display of local community concern that combined local organizing, town hall meetings, media outreach, local resolutions, state legislation, and litigation, Wisconsin residents effectively forced Nestle/Perrier to abandon its project. But this episode helped to highlight Wisconsin's lack of legal protections to prevent private companies from taking and privatizing public waters.

Nestle/Perrier then tried to obtain spring water in Michigan. In Michigan, Citizens for Water Conservation filed a lawsuit against Nestle/Perrier, and a Mecosta County trial court shut down four large production wells with a total capacity of 210 million gallons a year for bottled water because the diversion of water for sale violated riparian common law principles restricting water use to watersheds.¹²¹ In a recent decision in late November 2005, the Michigan Court of Appeals affirmed the trial court, finding that the amount of water Nestle was diverting was unreasonable under the common law for groundwater because of its interference with riparian rights.¹²² However, Nestle/Perrier then negotiated an agreement 30 miles from the Mecosta County bottling plant, whereby it acquired part of a municipal well field in Evart, Michigan. Nestle/Perrier is trucking the water from Evart to its bottling plant in Mecosta County.

Although bottled water is the most common form of bulk export, water can also be exported via water bags, tankers, canals and pipelines. Turkey has already used water bags to ship water internationally. In 2000, Nordic Water Supply, a Norwegian corporation, used 5 million gallon bags to export water from Turkey to northern Cyprus.¹²³

Government reaction to attempts to privatize water has been mixed. Some governments are banning bulk water exports, while others are promoting them. In 1993, British Columbia banned bulk water exports.¹²⁴ Prior to the ban, several companies planned to transport water by supertanker along the Pacific Coast. According to one account, “Under one contract, the annual volume to be shipped to California was equivalent to the total annual water consumption of the City of Vancouver in Canada.”¹²⁵

Alaska, on the other hand, is promoting water privatization and export. Although it is unclear whether the project is viable, Global H2O, a Canadian-based company, has a 30 year agreement with Sitka, Alaska, to export 18.2 billion gallons of water per year. According to one account, Global H2O, was working with Signet Shipping Group to obtain supertankers to export this water to China for bottling.¹²⁶

As markets for privately-supplied water grow, so do concerns about whether we will be able to protect and conserve water in its natural state.¹²⁷

The Great Lakes contain about 20 percent of the world’s fresh surface water resources, and as such, could become a source of future wealth for a few private corporations, at the expense of the public.

In the late 1990s, the Nova Group in Canada received a permit (that was subsequently withdrawn) for bulk exports of water to Asia. The company planned to “ship 3 billion liters of water from Lake Superior over 5 years and sell it to Asia.”¹²⁸ In part, this proposal showed the vulnerabilities in the laws governing exports of water from the Great Lakes. Proposals like the Nova Group’s serve as an impetus for articulating a responsible legal structure for the region.

The ongoing push to privatize and allow multinational corporations to control water should be seen as a break from longstanding precedent. Older than the Great Lakes states and Canadian provinces, the Public Trust Doctrine has long held that water cannot be privately owned and is instead a trust held by the government for the public’s use and enjoyment. Each state should eliminate the bottled water loophole when it passes the Great Lakes Compact legislation. By so doing, it will recognize and reaffirm the existence of the Great Lakes and the waters feeding them as a public trust, managed by a variety of governments for the benefit of the trustee public.

Summary

When the Great Lakes Governors signed the Great Lakes Compact in 2005, they took the first of many steps on a path to creating enforceable, uniform standards for managing the Great Lakes. Yet, to make the Compact enforceable, the legislatures in each state must pass legislation endorsing the Compact. When enacting this implementing legislation, the states should strengthen and clarify the Compact in the four key areas set forth above, in order to fulfill the state’s duty under the Public Trust Doctrine and to protect the Great Lakes resource for generations to come.

PART IV: UNDERSTANDING GREAT LAKES WATER SUPPLY: THE WISCONSIN EXAMPLE

Given the vital interplay between science, law and public policy in devising and evaluating water resource management approaches, this next section, contributed by James Krohelski¹²⁹ and reviewed by George Kraft,¹³⁰ presents an overview of the impact that groundwater pumping has had on Wisconsin's ground and surface water systems. With an improved understanding of the state's groundwater systems and the correction of certain misconceptions, policy makers will be far better equipped to address present and future management challenges at the state and local level.

Wisconsin Groundwater

Groundwater is the water beneath the earth's surface that flows freely through the pores between sand grains and cracks in rock. It is the water that can be pumped from wells. The term, aquifer, refers to certain kinds of underground rocks or rock formations that can store and transmit water in usable quantities to wells. Groundwater originates as precipitation that infiltrates past plant roots (recharge). It moves through the subsurface under forces of gravity and pressure, and leaves the aquifer when it discharges to streams and lakes. Groundwater is important because it supplies 70 percent of the water used in Wisconsin households, provides water for industry and agriculture, and serves 608 cities and villages. Groundwater

is also vital to the landscape because it nourishes and sustains the streams, wetlands, and lakes that give Wisconsin its character.

Four aquifer systems exist in Wisconsin: the sandstone aquifer; the Silurian dolomite aquifer; the Precambrian aquifer and the sand and gravel aquifer. In the eastern part of the state, the sandstone aquifer, frequently referred to as the "deep sandstone aquifer," is confined beneath Maquoketa shale and dense Sinnipee dolomite. When other aquifers are present above the sandstone aquifer, they are referred to as shallow aquifers. High capacity municipal or industrial wells that withdraw water from the sandstone aquifer are typically several hundred feet deep and, in fact, in Southeastern Wisconsin, may exceed 2,000 feet in depth. By contrast, domestic wells are generally drilled into the shallow aquifer and reach 100 to 300 feet in depth (Figure 1).¹³¹

Human use of groundwater in Wisconsin totals about 800 million gallons per day (mgd) and is distributed among the aquifer systems as follows:¹³²

- sandstone aquifer - 380 mgd,
- sand and gravel - 360 mgd,
- Silurian Dolomite - 50 mgd, and
- Precambrian – 10 mgd.

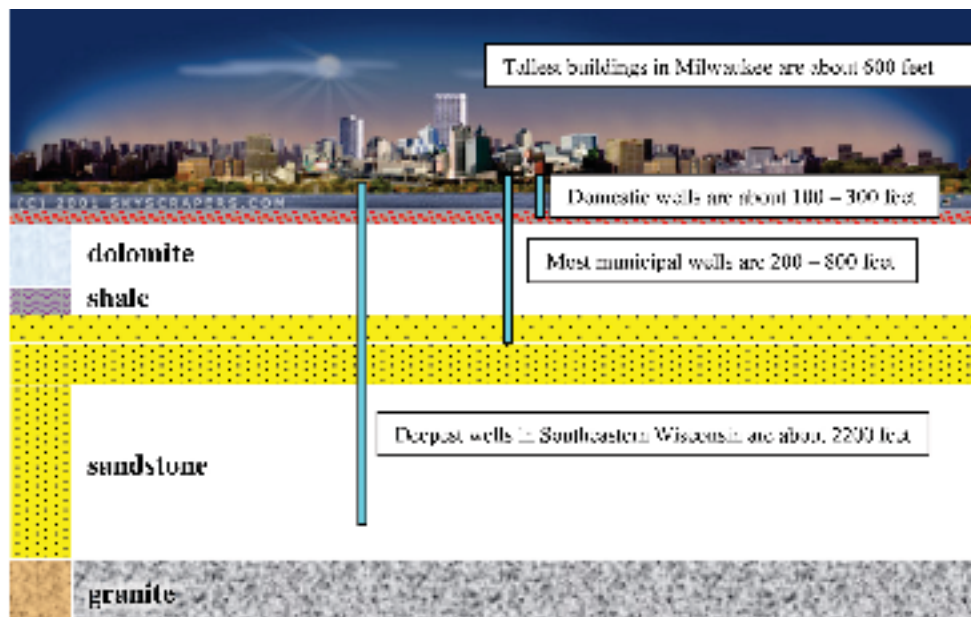


Figure 1. Wells depths relative to the Milwaukee skyline.

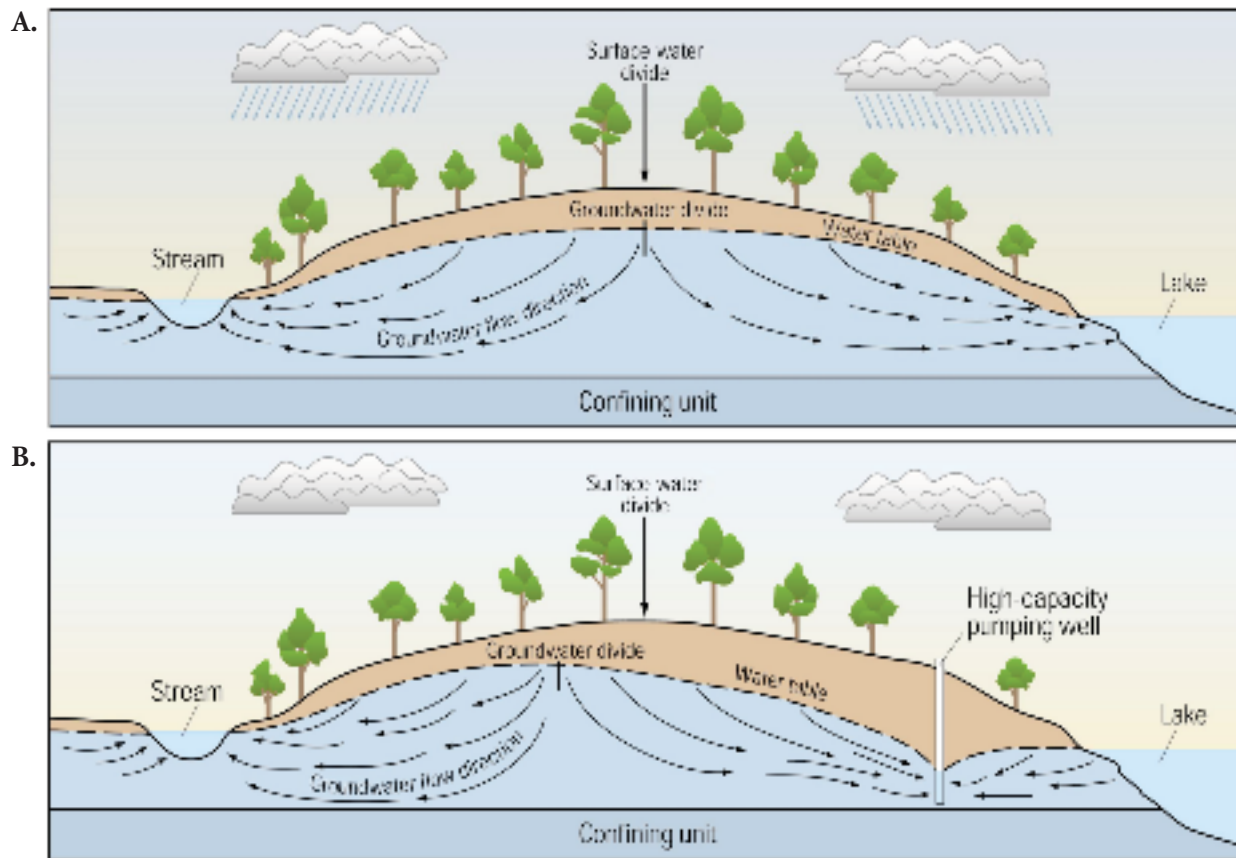


Figure 2. Generalized groundwater flow (A) under natural conditions and (B) affected by pumping.

Forty percent of the estimated 800 mgd is pumped from municipal wells and 60 percent is pumped from private supply wells. Approximate percentages of groundwater use by category are:¹³³

- agricultural - 35 percent (22 percent is irrigation),
- domestic - 25 percent,
- industrial - 20 percent,
- commercial - 20 percent, and
- energy production and other miscellaneous uses – less than 1 percent.

The Effect of Pumping on Groundwater Levels and Surface Water Flow

In a pre-development or natural condition, in which there are no water wells pumping groundwater, a groundwater system is in equilibrium. The amount of water entering the system (recharge) is equal to the amount of water leaving (discharge). Groundwater discharge is responsible for sustaining streams, springs and wetlands during periods of little or no rainfall.

When a groundwater system is disrupted by a pumping well, a non-equilibrium condition occurs. The water level

in a well, referred to as the hydraulic head, declines as water is pumped from the well. Groundwater flows down gradient from high to low head. As pumping continues the water level in the well falls below that of the surrounding aquifer, which causes water to move from the aquifer to the well. This eventually causes a decline or drawdown in the aquifer, which will continue until the rate of flow into the well equals the amount of water supplied from the larger groundwater system. Water flows to the well from the aquifer in all directions. The hydraulic gradient, that is, the change in water level over a specified distance in a given direction, is steeper close to the well than farther away from the well, thereby forming a cone of depression.

As groundwater is removed from storage, where it had collected in aquifer pores and openings, the cone of depression spreads until the amount of water pumped is equal to the amount of water captured. In most cases the captured water is groundwater that would have discharged to surface water under natural conditions. In extreme cases, high pumping rates will induce the gradient in the vicinity of a surface water body to reverse and the surface water body will recharge the groundwater system.

Wisconsin Regional Groundwater Drawdowns

Figure 2 illustrates the effects of development on a natural groundwater system.¹³⁴ In Figure 2A a stream and a lake bound a symmetrical cross-section of land in which land surface is highest in the middle. A portion of precipitation falling on the land surface infiltrates to the water table and recharges the groundwater system. A groundwater divide forms coincident with the highest elevation of land surface and the water table. Groundwater flows toward the stream on one side of the divide and toward the lake on the other (as indicated by the arrows). This natural system is in equilibrium because the amount of water recharging the groundwater system is equal to the amount of groundwater discharging to the stream and lake.

In Figure 2B, a pumping well is added close to the lake, causing groundwater to flow toward the well and groundwater levels to be drawn down in the vicinity of the well. At first, the source of pumped groundwater is from storage and then, after a period of time, a new equilibrium is reached and captured water supplies the well. If pumping is at a high enough rate the surface water, here, the lake in Figure 2B, can recharge the groundwater system and supply water to the well. This example demonstrates the manner in which a pumping well can cause less groundwater to flow to a stream, can induce lake water to recharge the groundwater system, and can cause the groundwater divide to shift toward the stream.

Even though the statewide recharge rate is about 30 times the usage rate,¹³⁵ groundwater quantity issues present an increasing concern for many communities in Wisconsin. Some of Wisconsin's major metropolitan areas have developed extensive groundwater withdrawal systems, whose closely spaced high-capacity wells have caused excessive drawdown of the deep sandstone aquifer and shifted groundwater divides. This, in turn, has reduced individual well yields and induced poor water quality in certain municipal well systems. Moreover, due to the hydraulic connection between surface water and groundwater, an additional concern raised by drawdown is the risk of surface water depletion in nearby streams, springs and lakes and surrounding wetlands.

As shown in Figure 3, results from three groundwater flow models show extensive water level declines from pre-development conditions.¹³⁶ Large groundwater withdrawals from Central Brown County (green) and the Waukesha (red) areas have resulted in extensive cones of depression that have coalesced and extend past the Illinois border (not shown). The declines are large, with a maximum of about 350 feet in Central Brown County and 450 feet in the Waukesha area, because the aquifer is confined and water is obtained from leakage from overlying rock units, lateral flow from distant sources, and aquifer storage. The Dane County cone of depression (blue) is smaller in extent because withdrawals are primarily being fed by local sources of water (such as lakes, streams and wetlands) that are in direct contact with the aquifer.

Simulated Drawdown in the Sandstone Aquifer
Time period is 1998 - 2000

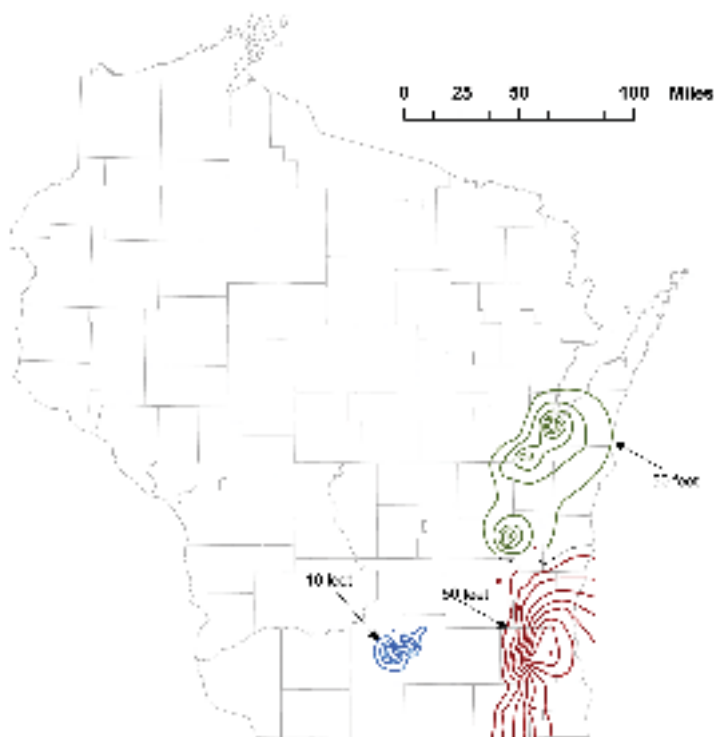


Figure 3. Results from three groundwater flow models show extensive water level declines from pre-development conditions. Large groundwater withdrawals from Central Brown County (green) and the Milwaukee/Waukesha (red) areas have resulted in extensive cones of depression that have coalesced and extend past the Illinois border (not shown). The declines are large because the aquifer is confined and water is obtained from leakage from overlying rock units, lateral flow from distant sources, and aquifer storage. The Dane County cone of depression (blue) is smaller in extent because withdrawals are primarily being fed by local sources of water (such as lakes, streams and wetlands) that are in direct contact with the aquifer.

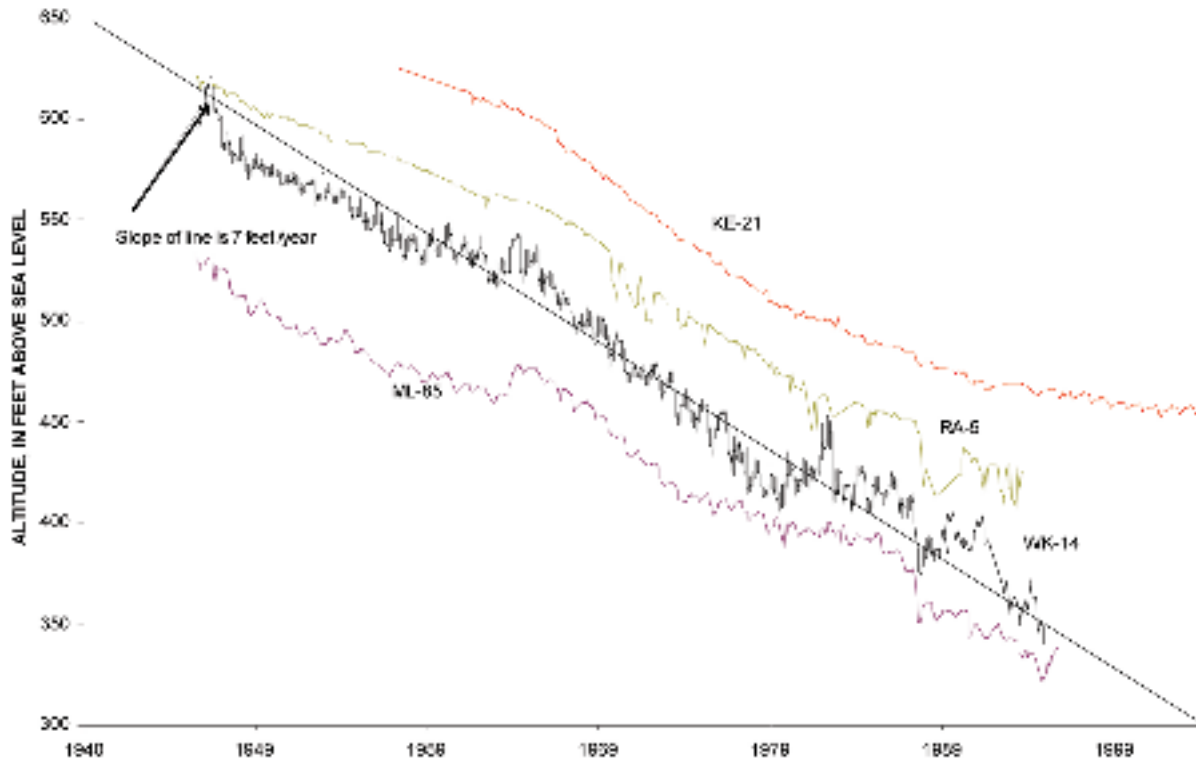


Figure 4. Groundwater levels measured in observation wells in Southeastern Wisconsin.

Groundwater Drawdown Case Study: Southeastern Wisconsin

Southeastern Wisconsin, which encompasses Washington, Ozaukee, Waukesha, Milwaukee, Racine, Kenosha and Walworth counties, is one of the fastest growing regions in the state. About 37 percent of the resident population of southeast Wisconsin, approximately about 700,000 people, use groundwater. The remaining 63 percent of the population uses water withdrawn directly from Lake Michigan and reside mainly in the lakeshore counties of Ozaukee, Milwaukee, Racine and Kenosha, located principally within the Great Lakes Basin.¹³⁷

The counties of Washington, Waukesha, and Walworth, located principally within the Mississippi River Basin, have long relied on groundwater to meet their domestic and agricultural needs due to the fact that they formerly had easy and “cheap” access to plentiful groundwater sources directly below their municipal or political boundaries. Despite the rising water quality problems in this area, they have continued to rely on groundwater to

meet their needs in part, due largely to longstanding legal constraints on the transfer of water from the Great Lakes Basin to the Mississippi River Basin.

Early researchers conceptualized the deep groundwater system in Southeastern Wisconsin as a sandstone aquifer comprised of sedimentary rock confined by the Maquoketa shale.¹³⁸ Recent research supports a groundwater flow model of the sandstone aquifer, which divides the aquifer into multiple shallow and deep aquifers and depicts their interaction with surface water bodies.¹³⁹

Over the past 50 years, water levels in the deep sandstone aquifer have declined from five to ten feet per year, as shown in Figure 4. Cones of depression centered on Waukesha and Chicago have intersected so that pumping in one area can affect water levels in the other area. With a projected increase in pumping,¹⁴⁰ simulations indicate that there could be an additional 150 feet of drawdown at the center of the cone of depression in the sandstone aquifer by the year 2020.¹⁴¹

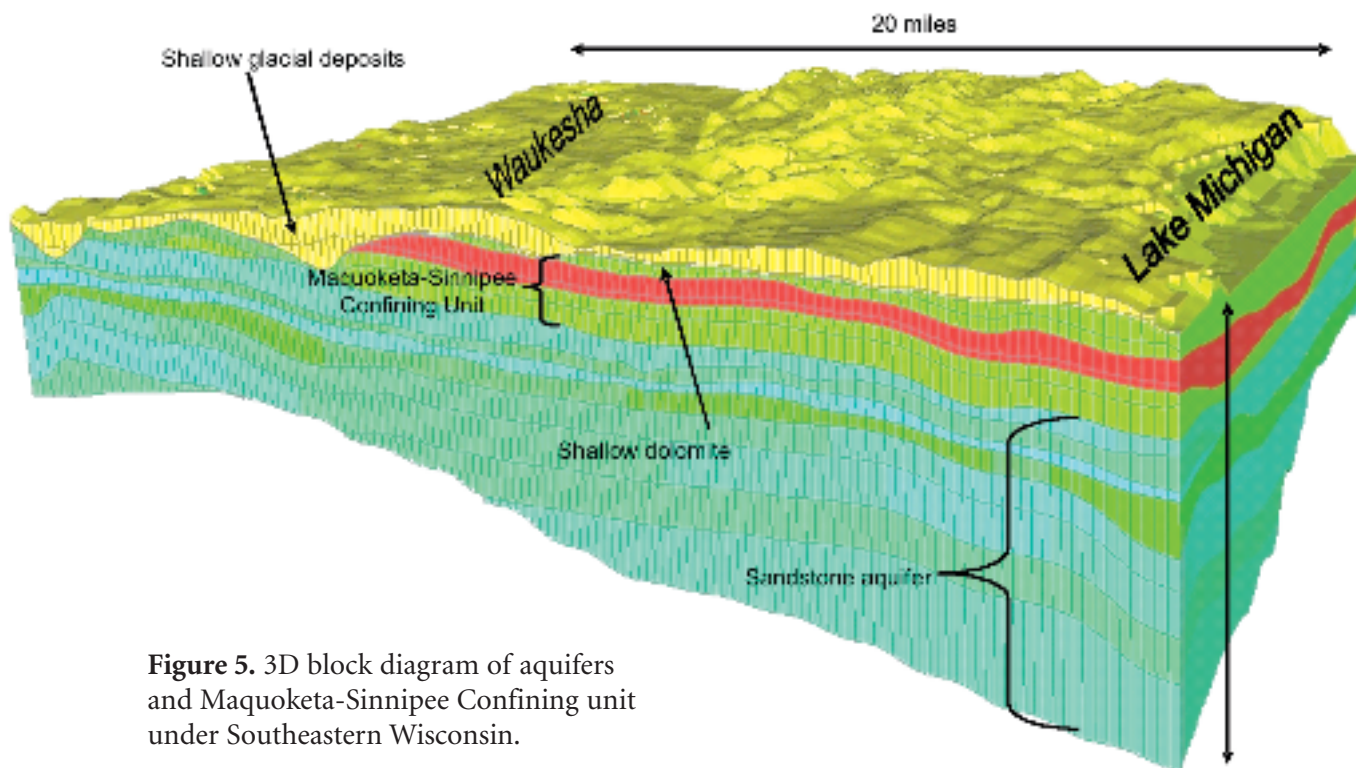


Figure 5. 3D block diagram of aquifers and Maquoketa-Sinnipee Confining unit under Southeastern Wisconsin.

As earlier stated, an important factor in southeast Wisconsin is the presence of the Maquoketa-Sinnipee confining unit, which is a layer of shale and dolomite with very low permeability. The Sinnipee is part of the confining unit only when the shale overlies it. The confining unit is thin or absent in much of western Waukesha County but thickens to the east until, in the vicinity of the western Lake Michigan shoreline, it reaches about 400 feet in thickness. Continuing eastward, the confining unit becomes progressively thicker as it plunges under Lake Michigan. Importantly, the confining unit functionally serves to separate the sandstone aquifer from the shallow groundwater system above it in the sense that very little groundwater can permeate through the confining unit, either up into the surface waters of Lake Michigan or, downward out of the surface waters of lake Michigan. Thus, in this manner, the Maquoketa-Sinnipee confining unit, depicted in Figure 5, not only influences

the extent of sandstone aquifer drawdown but also influences the position of the groundwater divide's western boundary.¹⁴²

As another important consideration in Southeastern Wisconsin, groundwater pumping in the region has moved groundwater divides in the sandstone aquifer. As shown in Figure 6, both the predevelopment and current groundwater divides of the sandstone aquifer occur west of the Lake Michigan water table divide in Southeastern Wisconsin.¹⁴³ The water table divide is generally coincident with the surface water divide, also known as the subcontinental divide. In Southeastern Wisconsin water table divides generally dictate divides in the shallow groundwater system. By contrast, the sandstone aquifer divide in Southeastern Wisconsin occurs much farther west than the water table divide due to the presence and effect of the Maquoketa-Sinnipee confining unit.

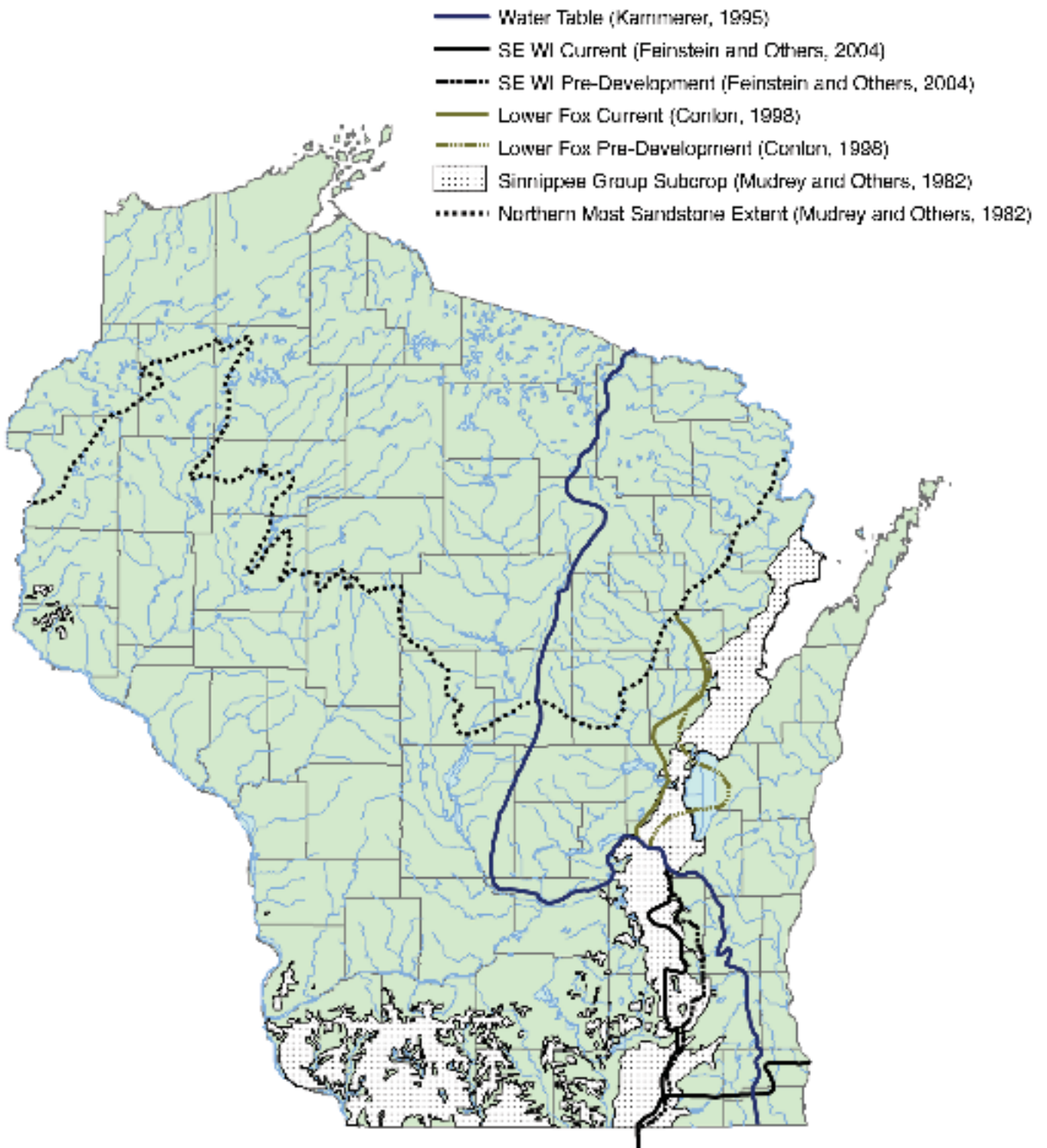
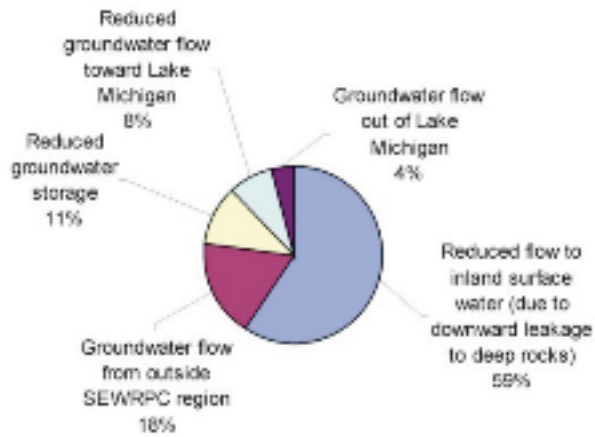


Figure 6.

A. Deep Pumping in 7 Counties of SE Wisconsin = 33.33 mgd



B. Shallow Pumping in 7 Counties of SE Wisconsin = 32.50 mgd

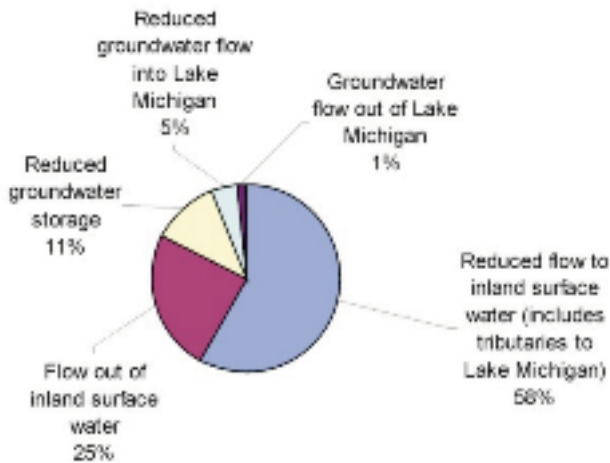


Figure 7. Sources of water to pumping wells in Southeastern Wisconsin for the (A) deep and (B) shallow groundwater systems (source D.T. Feinstein, U.S. Geological Survey).

As an additional consideration, mounting evidence has shown that over-pumping by high-capacity wells drawing from the sandstone aquifer has adversely affected groundwater quality in portions of Southeastern Wisconsin. For example, analyses of groundwater from the three highest producing Waukesha Water Utility wells (Wells 5, 9 and 10) indicate that total dissolved solids (TDS) concentration has been increasing since the mid-1980s.¹⁴⁴ In addition to increases in TDS, naturally occurring radium exceeds EPA drinking water standards in some sandstone aquifer wells.

Due in large part to these groundwater quantity and quality issues, groundwater has been a frequent subject

both in the media and in the remarks of public officials, especially with regard to the City of Waukesha’s current endeavor to replace the City’s deep sandstone aquifer water source with water taken from Lake Michigan. Given the complexity of the subject in the eyes of the general public, as well as the emerging science, it is no surprise that a number of misconceptions have emerged with regard to groundwater and surface water systems in Southeastern Wisconsin. These shall be identified and corrected below:

Misconception #1: The draining of the deep sandstone aquifer has created a cone of depression under Waukesha that is pulling water out of the Great Lakes like a black hole.

The Fact Is: Southeastern Wisconsin wells are primarily withdrawing water from Mississippi River Basin sources.

Based on results from the groundwater flow model, the sources of water pumped by deep and shallow system wells in the Southeastern counties of Racine, Kenosha, Walworth, Milwaukee, Waukesha, Ozaukee and Washington in 2000 (33.33 mgd from the deep sandstone and 32.5 mgd from the shallow system) are shown in Figures 7A and 7B.¹⁴⁵ The source of groundwater to sandstone aquifer wells located in Southeastern Wisconsin is largely groundwater that would have circulated through the shallow flow system to streams but is now being diverted downward toward the deep wells.

Water Sources Captured by Sandstone Aquifer Wells in Southeastern Wisconsin

Captured Base Flow (i.e., groundwater diverted from streams) within the Mississippi River Basin	71%
Water released from storage below Lake Michigan	8%
Captured water once flowing toward rocks under Lake Michigan	8%
Captured base flow within the Great Lakes Basin	6%
Water leaking through the confining unit directly from Lake Michigan	4%
Water released from storage below SE WI	3%

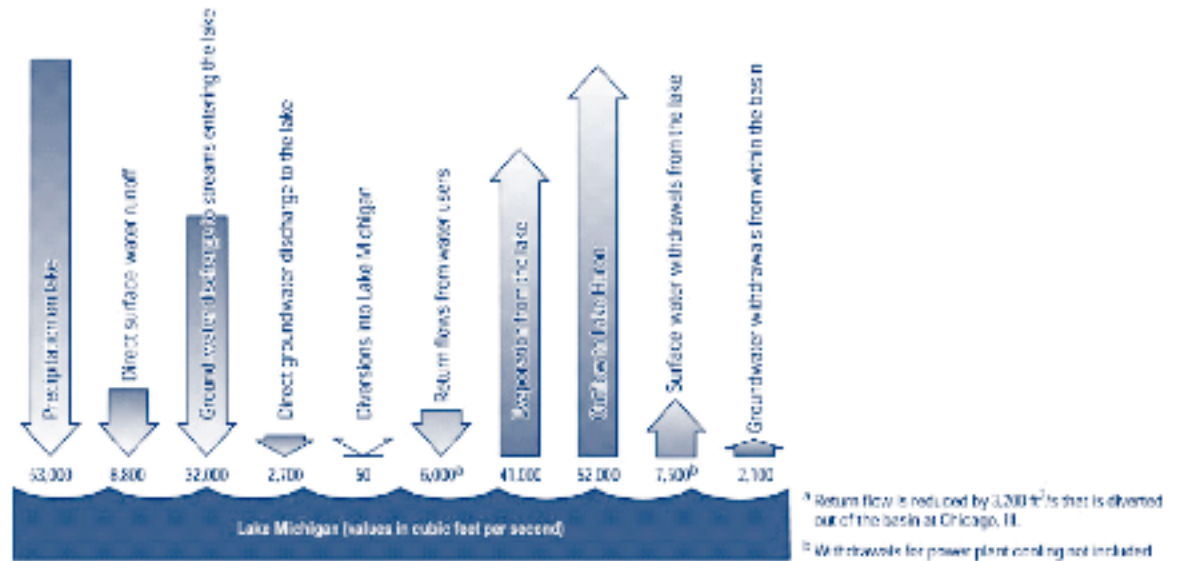


Figure 8. Water budget for Lake Michigan.

Unlike pre-development conditions, where groundwater in the sandstone aquifer east of the sandstone aquifer divide ultimately discharged to Lake Michigan, current groundwater conditions have led to the situation where groundwater east of the sandstone aquifer divide is captured by Waukesha County wells that tap the sandstone aquifer. However, the amount of groundwater captured east of the sandstone aquifer divide is very minor compared to the amount of groundwater captured west of the sandstone aquifer divide.

Simulation of the groundwater flow system indicates that 71 percent of the water that replenishes discharge from deep wells in Southeastern Wisconsin is groundwater diverted from streams (captured base flow) within the Mississippi River Basin even though the wells themselves are located in the Lake Michigan groundwater basin.¹⁴⁶ As set forth in the preceding chart, the remaining sources of groundwater to sandstone aquifer wells includes storage release below Lake Michigan (8 percent), water that once flowed toward rocks under Lake Michigan (8 percent), captured base flow within the Great Lakes Basin (6 percent), water flowing out of Lake Michigan itself (4 percent), and storage release below Southeastern Wisconsin (3 percent).¹⁴⁷ Thus, water originating from the Mississippi River Basin and from storage release within the sandstone aquifer provides the primary sources of water for Southeastern Wisconsin sandstone aquifer wells.

Misconception #2: The deep sandstone aquifer wells of the City of Waukesha and other Waukesha County communities are already withdrawing Lake Michigan water.

The Fact Is: The Lake Michigan Water Budget is only nominally affected by pumping from the sandstone aquifer system.

Important sources of groundwater to the water budget for Lake Michigan include direct groundwater discharge to the lake and groundwater discharge to streams entering the lake. Figure 8 lists estimated inputs and outputs of water to the entire lake and shows that groundwater that discharges directly to the lake comprise about 3 percent of the total input while groundwater discharge to streams entering the lake comprise about 31 percent.¹⁴⁸

The amount of groundwater that enters a stream or a lake depends on the degree of hydraulic connection between the aquifer and the lake. In southeast Wisconsin, Lake Michigan is separated from the sandstone aquifer by the Maquoketa-Sinnipee confining unit, which causes an extremely poor hydraulic connection between the sandstone aquifer and Lake Michigan. Even without pumping the sandstone aquifer, only a small amount of groundwater would discharge from the sandstone aquifer into Lake Michigan or the streams tributary to the lake because groundwater first would have to flow through a 400 feet thick sequence of shale and dolomite that forms the Maquoketa-Sinnipee confining unit.

As such, groundwater contributions to Lake Michigan generally originate from the shallow aquifers. At predevelopment (non-pumping) conditions, the recent groundwater flow model of southeast Wisconsin indicates that the shallow system contributes about 158 mgd of groundwater to Lake Michigan while the deep sandstone aquifer contributes only about 1.9 mgd.¹⁴⁹ Moreover, streams, lakes and wetlands located west of the confining unit (where it is absent in the Mississippi River Basin) probably have a much better hydraulic connection to the sandstone aquifer than areas where the confining unit is present, which permits water that would normally discharge to these streams to be captured by sandstone aquifer wells located in Waukesha. Consequently, pumping groundwater from the sandstone aquifer, as is the case with the City of Waukesha, has a nominal effect on the Lake Michigan water budget. Likewise, in accordance with the groundwater simulation model discussed immediately above, only 4 percent of the water sources captured by sandstone aquifer wells comprise water that has leaked through the Maquoketa shale from Lake Michigan. It is estimated that the amount of time that this Lake Michigan water would take to reach Waukesha sandstone aquifer wells ranges anywhere from 100 to 500 years.¹⁵⁰

Misconception #3: It makes no difference what kinds of wells are being utilized by communities in eastern Waukesha County, both shallow aquifer systems and sandstone aquifer systems fall within the Mississippi River Basin.

The Fact Is: The sandstone aquifer wells of communities in eastern Waukesha County are within the Lake Michigan Basin, whereas most of Waukesha County's shallow wells are in the Mississippi River Basin.

As explained above, in Southeastern Wisconsin, the “sandstone aquifer divide” defines the boundary in the sandstone aquifer between groundwater flowing toward Lake Michigan and groundwater flowing toward the Mississippi River. The “water table divide” or “subcontinental divide” defines the boundary for both shallow groundwater and surface water either flowing toward Lake Michigan or the Mississippi River. As also noted, in Southeastern Wisconsin, the sandstone aquifer divide occurs farther west than the water table divide due to the presence of the Maquoketa-Sinnipee confining unit. Accordingly, existing City of Waukesha wells reaching down into the sandstone aquifer are within the Lake Michigan basin as defined by the sandstone aquifer divide. If these same wells, however, were to tap the shallow aquifer system above the deep sandstone aquifer, they would be located

within the Mississippi River Basin as defined by the water table divide. It follows, then, that while the sandstone aquifer wells located in eastern Waukesha County are within the Lake Michigan Basin, most of the county's shallow wells are in the Mississippi River Basin, with the exception of those along the county's far eastern edge.

Summary

Understanding groundwater systems and awareness of water budgets is vital to the sound management of our ground and surface waters. In order to achieve an intelligent and sustainable groundwater management approach in Wisconsin, especially in those areas like Southeastern Wisconsin which are beginning to experience groundwater quality and supply issues, it is imperative that decisions be based on sound science to the maximum extent possible. With this basis in mind, together with the preceding overview of Wisconsin water rights and diversions, we will move the focus of inquiry closer to the City of Waukesha, Wisconsin. Given its well publicized water quality problems and desire for a diversion of Lake Michigan water, this Southeastern Wisconsin community provides an instructive example of the difficulties and unresolved issues certain to face state and local policy makers in the immediate future.

PART V: IF SPRING CITY RUNS DRY...

The Great Lakes Compact allows diversions of Great Lakes water to straddling counties that meet certain requirements.¹⁵¹ While there may be similar proposals for diversions on the horizon from other parts of southeastern Wisconsin, northern Illinois, Indiana, New York and Ohio, this section of the Report examines the City of Waukesha, Wisconsin, as an example of a population center lying outside the Great Lakes Basin that will likely be the first “straddling county” community to apply to divert Great Lakes Water.¹⁵² The handling of Waukesha’s request for Lake Michigan water will set a precedent for all future diversion requests from the Great Lakes Basin.

In order to appreciate the extent and complexity of the issues involved, this part of the Report will first explain how Waukesha’s water use fits into Wisconsin’s overall water supply, followed by an overview of Waukesha’s water and land use trends, water supply alternatives, demand projections, and conservation initiative. Next, the Report will identify the policy questions that must be decided prior to approving any prospective request on the part of Waukesha for a diversion of Great Lakes water.

Analysis of Waukesha, Wisconsin’s Water Woes

The City of Waukesha’s Water Supply

Waukesha is about 16 miles from the Lake Michigan shore, but despite its relative proximity, it lies outside the surface water divide of the Great Lakes Basin, as explained in the preceding section. Precipitation in Waukesha eventually ends up in the Fox River and ultimately flows into the Mississippi River and not into the Great Lakes. Similarly, water in the shallow aquifer in the vicinity of Waukesha generally discharges into rivers and streams that ultimately flow into the Mississippi River.

Historically, Waukesha, once known as “Spring City,” benefited from a wealth of natural springs that supplied the City’s drinking water and supported a health resort industry. However, as the City grew, surface water sources were replaced by shallow wells to produce more water. Thereafter, following the first deep sandstone well drilled in 1935, the City transitioned to the deep sandstone aquifer to supply its municipal water needs with wells ranging from 1,660 to 2,266 feet deep.¹⁵³ To give that depth some perspective, the tallest building in Milwaukee reaches 600 feet, or about one-third the distance of these municipal wells.¹⁵⁴ See Figure 1 on page 19.

The Waukesha Water Utility (“Utility”) serves the City of Waukesha and currently has a distribution system with 17 million gallons of ground and elevated storage capacity.¹⁵⁵

The Utility supplies the City of Waukesha with water obtained from eight deep sandstone wells. Together, these wells have a combined capacity of nearly 15 million gallons per day.¹⁵⁶ At the present time, the Utility is developing two shallow wells south of the City along the Fox River.¹⁵⁷ This will bring the Utility’s total combined capacity up to 16.6 mgd.¹⁵⁸ Additionally, plans to develop up to four more shallow aquifer wells are under consideration.¹⁵⁹

Once water is used, it is discharged to the City’s sanitary sewer system where it is treated at the City’s wastewater treatment facilities. The treatment facility processes 10 to 12 million gallons per day, which it then discharges to the Fox River, in the Mississippi River Basin.¹⁶⁰

As discussed in greater detail in the preceding Wisconsin water supply section, the deep sandstone aquifer underlying the City of Waukesha is covered by a low-permeability shale unit known as the Maquoketa shale, which serves to isolate the deep sandstone aquifer from the shallow aquifer above.¹⁶¹ As a result of the confined nature of the aquifer in this vicinity, decades of heavy pumping in and around the City for municipal and industrial uses have resulted in the formation of an underlying cone of depression, which has continued to deepen and expand over recent years.¹⁶² Currently, the center of the regional cone of depression lies in eastern Waukesha County, just a few miles east of the City.¹⁶³

With water levels in the deep aquifer dropping 5 to 10 feet per year, the Utility’s withdrawal of water has exceeded aquifer recharge rates for decades.¹⁶⁴ Not surprisingly, the declining water levels have been a focus of increasing public concern. The groundwater level in the sandstone aquifer near Waukesha is currently about 450 feet below the ground surface and declining.¹⁶⁵

A major consequence of the declining head of the deep sandstone aquifer has been the presence of radium and total dissolved solids (TDS) in the Utility’s water supplies in violation of state and federal standards. As acknowledged by the Utility in 2003, “the water quality isn’t getting better as the water table gets lower; it’s getting worse and worse.”¹⁶⁶

Indeed, tests of the City’s water confirmed levels of radium at twice the legal limit.¹⁶⁷ Radium, which is a naturally occurring radioactive substance, has been linked to increased rates of bone cancer. Under the terms of a federal consent decree, the City, along with 53 other Wisconsin communities, must reduce radium levels in their public water supply in compliance with the EPA limit of five picocuries per liter by December 8, 2006 or else face potential fines of up to \$5,000 per day.¹⁶⁸ While the City steadfastly challenged the radium standard over the course of many years at a legal expense of over \$1 million, the City was ultimately unsuccessful and has since been pursuing treatment alternatives necessary to meet the radium standard.¹⁶⁹ While efforts in this respect are underway, compliance by December 8, 2006 is unlikely.¹⁷⁰

The City’s Water Supply Alternatives and Demand Projections

In response to the foregoing water quality problems and declining deep aquifer water levels, the City underwent an evaluation of its current water supply sources, culminating in the Utility’s *Future Water Supply Report* released in March 2002, co-authored by CH2M Hill and Ruckert-Milke.¹⁷¹ Over the course of one hundred plus pages, the report identified and assessed potential water source alternatives to the Utility’s then exclusive use of the confined deep sandstone aquifer. Beginning with over 14 potential water sources, these alternatives were screened and combined to form seven new alternatives, which after consideration of capital and operating costs, were thereafter winnowed down to two: Lake Michigan water and shallow aquifer water.

As set forth in the report and, in fact, underpinning much of its findings, were the Utility’s water demand projections.¹⁷² In fact, an August of 2003 CH2M Hill case study and draft diversion application for the City plainly acknowledged that along with water supply and conservation, “Waukesha’s water need is *defined* by their water quantity demand (emphasis added).”¹⁷³ The City’s average daily demand has been identified as approximately 8 million gallons per day (mgd). The City’s maximum daily demand has been stated as 13 mgd.¹⁷⁴ Anticipated increases in water needs have been estimated to reach an average daily demand of 13 mgd, with a maximum daily demand of 22 mgd over the next 50 years.¹⁷⁵

These projected water demand figures, especially the maximum daily demand figures of 13 mgd and 22 mgd, respectively, are what the City has consistently communicated to the public at large, as demonstrated by Waukesha’s draft diversion application.¹⁷⁶ Interestingly,

the City recently increased its “water source goal” for a prospective diversion of Great Lakes water to 24 mgd.¹⁷⁷

These numbers, however, call for a closer look. As explained by the Utility, it appears that the currently operative 13 mgd maximum daily demand figure likely originated from “the highest demand day on record in Waukesha.”¹⁷⁸ And, yet, upon further inquiry, it appears that the last day on record where water demand exceeded 13 mgd was on June 11, 1992, nearly 14 years ago.¹⁷⁹ The Utility’s records dating back to 2000 indicate that not one day during the height of summer, including the drought in the summer of 2005, required a 13 mgd water demand.¹⁸⁰ In fact, as set forth in the chart below, only eight days in the last six years even registered a 12 mgd maximum daily demand.¹⁸¹

Thus, these data suggest that the projected maximum daily demand of 22 mgd for the year 2050, as well as the 13 mgd demand amount, have been overstated and, moreover, could be significantly reduced through the implementation of conservation measures, such as seasonal limitations on water use for lawns and inclining or seasonal water rate structures.¹⁸²

In addition, while most of the public’s attention has been directed to the Lake Michigan option, the Utility’s *Future Water Supply* report effectively identified a number of other viable water source alternatives that warrant consideration. For one, the report found that the shallow sand and gravel aquifer could provide many strong advantages, with several areas near the City identified as having the potential to produce sufficient water quantities to meet water supply needs.¹⁸³

Number of Days City of Waukesha’s Water Demand Reached 9–13 mgd

Year	9 mgd	10 mgd	11 mgd	12 mgd	13 mgd
2000	18	1	0	0	0
2001	16	15	2	4	0
2002	27	17	14	1	0
2003	22	18	5	0	0
2004	19	5	0	0	0

Moreover, at least two promising areas were identified as “particularly suitable” in the Waukesha area for the development of an alluvial wellfield along the Fox River.¹⁸⁴ The Fox River was also found to comprise a suitable water source, or supplemental contributing source to the Utility, so long as a reservoir such as a large lake, quarry, or aquifer storage is constructed to bridge the dry weather period and related seasonal variations in flow.¹⁸⁵

From a cost perspective, the shallow sand and gravel aquifer alternatives were found to have the lowest total costs notwithstanding their low-to-high range from the \$62 million shallow aquifer wellfield south of Waukesha to the \$83 million Fox River alluvium-south Waukesha wellfield combination.¹⁸⁶ By comparison, the Lake Michigan alternative was determined to have an estimated total cost of \$90 million, with the stated assumption that a permit would be issued that would allow the use of Lake Michigan water *without* its return to the Great Lakes Basin.¹⁸⁷

The Utility’s literature and public officials’ statements consistently challenge the feasibility of the City’s use of Lake Michigan water with a return flow requirement.¹⁸⁸ Cost is identified repeatedly as the determinative consideration, with pipe construction costs and user fees seemingly of greatest concern. The *Future Water Supply* report provided a rough guess that if Waukesha is required to return water to the Lake Michigan Basin it will cost “double” the \$90 million amount (or \$180 million).¹⁸⁹ More recent estimates place the costs associated with a diversion of Great Lakes water, depending upon return flow specifications, in the hundreds of millions of dollars.¹⁹⁰

Consideration of these prospective costs, together with the Compact’s clear return flow requirement for communities, like Waukesha, within straddling counties, suggests that Waukesha may be best served by aggressively investing in water conservation, limiting future growth, and managing local water supplies through recharge protection and recycling.

Water Rates in the City of Waukesha

“[Water costs] less than you pay for cable TV, and you don’t need cable TV to live. You need water.”
- Brown County Water Authority President
Ron Simonson¹⁹¹

Regardless of which water supply alternatives are ultimately pursued by the Utility in the upcoming years,

the attendant costs will necessitate rate increases for City residents. At present, the City’s average net water bill amounts to \$48 per quarter or \$194 per year.¹⁹² However, as stated by the Utility, if the City is forced to treat existing water supplies, “In eight or ten years from now, we’re looking at doubling or tripling the rates.”¹⁹³

That level of rate increase would bring Waukesha in line with many other Wisconsin communities’ current rates. Surprisingly, even with its current water quantity and quality problems, Waukesha’s water rates remain lower than over half of the state’s 72 entries for Class A/B water utilities.¹⁹⁴

Similarly, from a national perspective, Waukesha’s water rates remain some of the lowest in the country. As such, even if the City’s average net quarterly water bill were to double, as suggested above, the Utility’s rates would still fall in the range of those paid by Wisconsin residents served by the Appleton Water Department or the Superior Water Light and Power Company and fall far beneath those paid by residents of states in the Northeast and Western United States.¹⁹⁵

To put this in perspective, the average annual residential Utility water bill of \$194 would have to triple, and then some, to even approach the \$707 that the average American household spends per year on carbonated and non-carbonated beverages.¹⁹⁶

In any event, the extensive and costly efforts previously and currently undertaken by the City to develop water demand projections and ascertain water supply alternatives naturally lead one to inquire whether comparable efforts have been made in recent years to limit demand for water through the pursuit of land use planning and water conservation measures.

The City’s Population and Land Use Trends

Located in the center of Waukesha County, the City of Waukesha is both the county seat of Waukesha and the county’s largest city.¹⁹⁷ According to the 2000 Census, the City of Waukesha has reached a population of 64,825 people, making it the state’s seventh-largest city. The City’s growth over recent decades has been dramatic and shows no signs of abating. According to data published by the Wisconsin Department of Administration, the City experienced population growth of nearly 13 percent between 1980 and 1990, and nearly 14 percent between 1990 and 2000.¹⁹⁸

Projections based on City of Waukesha Community Development data demonstrate additional estimated growth of 7.7 percent for the period from 2000 to 2010.¹⁹⁹ By the year 2030, the city's population is estimated to reach 85,000 people, a 27 percent increase of more than 20,000 people since 2000.²⁰⁰

In pace with these population projections, the amount of land within the City of Waukesha has grown significantly through annexation in recent years. Data provided from the City of Waukesha Department of Community Development's Planning Division demonstrates that the City, over the past 20 years, has increased in size from 15.5 square miles to 23.6 square miles, reflecting a 52 percent expansion. At the same time, demand trends assessed by the Waukesha Water Utility have demonstrated the steady growth of residential, institutional and commercial demand for water.²⁰¹

Is this trend expected to continue? The answer is a resounding yes. In fact, over the next 25 years, the total residential acreage in the City of Waukesha is expected to grow by over 130 percent.²⁰² Low-density residential development, consisting of one to two homes per acre,²⁰³ is predicted to experience the most explosive growth within the residential sector, with projected acreage at build-out greater than 1,000 percent of the acreage in 2004.²⁰⁴

Likewise, major expansions are planned for the water service boundaries of the Waukesha Water Utility consistent with the areas demarcated for "urban growth" or sprawl.²⁰⁵ Indeed, rather than seeking to limit expansion of the service area in consideration of the City's growing water problems, the Utility's Master Plan provides for the expansion of the City's service boundaries both south and west of the City's current corporate limits to provide for an additional 13 square miles of developable land to facilitate the City's population growth and expansion.²⁰⁶

Absent coordinated efforts on the part of the Utility and the city's economic planners, the City of Waukesha's expansion will certainly continue in upcoming years. For one, land-use planning that establishes open space goals, identifies groundwater recharge opportunities or advances other conservation-minded objectives has yet to become a priority for the City. To the contrary, City economic planners concede that consideration of such land use ordinances is still, at best, in the "infant stages," notwithstanding their recognition of the sheer number of residential developments to be constructed in upcoming years.²⁰⁷

Moreover, City planners concede that annexations of property bordering the City occur on a regular basis, as developers continue to buy up farmland and then petition the City for annexation. In the last five years alone, over 1,300 total acres have been annexed by the City of Waukesha, with over 4,413 total acres annexed in the past 15 years.²⁰⁸

Unlike other cities whose expansion is limited by the existence of other neighboring cities, there exists no immediate impediments to the City of Waukesha's expansion.²⁰⁹ Rather, the annexation process is simple and driven by land developers, who after buying up neighboring farmland,²¹⁰ initiate the process by petitioning the City Clerk for annexation. Thereafter, following State Department of Administration review and approval by the City Plan commission, the City's Common Council invariably accepts the petition for annexation.²¹¹ While talk of a Waukesha annexation moratorium has been circulated, to date, no such policy directive has been formally or publicly announced. Until such time as the City undertakes appropriate containment measures, the City's outward sprawl will continue unabated, property by property, acre by acre, development by development. The result—an ever growing demand for water at odds with an ever declining supply.

Conservation in the City of Waukesha

The Vision Statement of the Utility sets forth the wish to be a utility that "applies conscientious stewardship of area groundwater resources."²¹² Until last year, the Utility had shown very little interest in the pursuit of conservation measures beyond its compliance with federally mandated plumbing codes, a leak detection program, and outreach to 5th grade schoolchildren.²¹³

However, on April 20, 2005, the Utility announced a conservation initiative, which states as its goal a 20 percent reduction of the City's water use over the next 15 years.²¹⁴ The plan is to include a number of water use restrictions and incentives to meet this goal. The Utility identified the following objectives: (1) review of source water protection plans in coordination with surrounding Waukesha County communities; (2) pursuit of storm-water management practices to maximize infiltration; and (3) revision of planning and zoning ordinances to require that new developments have minimal impact on the groundwater infiltration through low-impact design, open space goals, and conservation planning.²¹⁵

Under the leadership of Waukesha Water Utility Manager Dan Duchniak and Mayor Carol Lombardi, these and other conservation measures are being actively pursued. In 2005, the Utility sought, albeit without success, the Wisconsin Public Service Commission's approval to institute conservation water rates for the utility's service area.²¹⁶ More recently, in an effort to illustrate the conservation gains that would be reaped if owners of single-family homes in the city of Waukesha updated their toilets to "low-flow" models—estimated as a savings of a half-million gallons of water per day—Waukesha has been working with the Wisconsin-based Kohler Company, through a grant from the firm, to replace Waukesha City Hall fixtures.²¹⁷ Moreover, as recently announced, the Waukesha Water Utility Board of Commissioners has asked and received the approval of the city attorney's office to draft a water restriction ordinance to be in effect from May to October that would restrict water sprinkling to early morning and evenings on specified days of the week.²¹⁸

Further, on March 16, 2006, the Waukesha Water Utility Commission approved adoption of a water conservation plan that outlines short, medium and long-range goals for a list of conservation measures, which include a public education campaign, elimination of sewer credit meters,²¹⁹ and organization of a stakeholder group.²²⁰

While these initiatives are certainly praiseworthy, Waukesha's conservation initiative will need continued public support and commitment on the part of city officials, together with Waukesha County officials, to realize its objectives. As detailed in the conservation toolkit custom-fit for Waukesha included in *Protecting Wisconsin's Water: A Conservation Report and Toolkit*,²²¹ another conservation opportunity regards the development of systems promoting increased use of reclaimed water for industrial, irrigation or landscape uses in Waukesha.²²² Moreover, in view of the high rate of development and near maximal build-out discussed above, it will be important for Waukesha to make meaningful headway with respect to the development and enactment of land use ordinances mindful of shallow aquifer groundwater recharge concerns, especially in consideration of the Utility's plans to develop a number of additional shallow aquifer wellfields.

Summary

Under the Great Lakes Compact, diversions of Great Lakes water will be permitted to communities within straddling counties that meet certain requirements.

As a community likely to be one of the first "straddling county" communities to apply to divert Great Lakes Water, the City of Waukesha, Wisconsin provides an informative case study. The preceding examination of Waukesha provided the range of historic and present day water and land use issues shaping this community's water supply situation. Next, the Report will identify the policy questions that must be decided prior to approving any request on the part of Waukesha for a diversion of Great Lakes water.

Legal and Policy Issues Decision Makers Must Resolve Prior to Deciding Whether to Approve a Diversion of Lake Michigan Water to Waukesha

If Waukesha applies for a diversion exception under the Great Lakes Compact, there are key policy issues that should be thoroughly discussed and resolved prior to acting on the City's request. Some of these issues are outlined below.

Unanimous Consent of Great Lakes Governors

Although the governors signed the Great Lakes Compact in late 2005, before it is effective it needs to be passed by the legislature of each of the Great Lakes states and then approved by Congress. During this approval process, the Great Lakes governors and Canadian premiers have agreed (in a legally unenforceable document) that the governors will consult with the premiers for any diversion covered by the Water Resources Development Act ("WRDA").²²³ WRDA prohibits diversions of any amount of water without the unanimous consent of all eight Great Lakes governors.²²⁴

Under both current law and the Great Lakes Compact, the City of Waukesha's proposed diversion of any amount of water would require the unanimous consent of all of the Great Lakes governors.

- How will Waukesha obtain the unanimous consent of the Great Lakes governors?
- What precedent would be set if the governors allow Waukesha access to Lake Michigan?
- How might this impact Chicago requesting an increase in its diversion from Lake Michigan?

Milwaukee's Sewage Treatment Capacity

Waukesha may propose to obtain Lake Michigan water from Milwaukee and has highlighted Milwaukee's excess water capacity in its earlier draft application. Yet, under Wisconsin's state law, communities situated within the Great Lakes Basin may withdraw Great Lakes waters necessary for securing an adequate supply of water for the utility on the condition that they "treat completely all sewage of the municipality."²²⁵ Milwaukee is already having problems completely treating all of its sewage. Its problems have been well publicized in recent years and, in fact, are the underlying cause of ongoing litigation.²²⁶

- Does Milwaukee lose the ability to utilize its excess water capacity where it has demonstrated an inability to treat the sewage associated with it in violation of both state law and the Clean Water Act?

Return Flow

The two previous diversions approved by the Great Lakes governors were granted on the condition that water is returned to the watershed of origin. When the Great Lakes Compact becomes binding law, it too will require water to be returned.

- How will Waukesha justify to its ratepayers the costs of returning water to the Great Lakes (with some estimates in the hundreds of millions of dollars) over instituting water conservation, land use measures, and developing Mississippi River Basin water supplies?
- Where will the water be returned?
- Without a requirement that it be returned to the point of initial withdrawal, will Waukesha be allowed to take water from Lake Michigan but return it to a tributary stream that eventually flows into the Lake? What would the environmental impacts be from increasing the flow and changing the water quality of the stream?
- If the water is returned directly into Lake Michigan, how deep will the pipes need to be constructed (estimates range from 250–300 feet in depth)? Will the system be comparable to another "deep tunnel project"?
- If water is returned via Milwaukee's treatment system, how will Milwaukee treat the additional water given its current problems with sewage overflows during wet weather?

The Public Trust Doctrine

Under Wisconsin's law, before Waukesha could divert Lake Michigan water, it may need to demonstrate that the diversion would not be contrary to the public trust.²²⁷

- Will the diversion harm public rights to use and enjoy Lake Michigan or any of its tributaries?
- If Waukesha doubles its water use to up to 20 mgd and the other communities in southern Wisconsin, northeastern Illinois and northwestern Indiana similarly expand their water demand and request Lake Michigan water, how will this impact public rights in Lake Michigan and its tributaries?

Who Is the Applicant?

Identifying the applicant for a water withdrawal is a key question because the applicant is the entity that has the burden of demonstrating the proposal meets all of the legal requirements. It also places the responsibility for permit compliance on the applicant, along with any enforcement and penalties that could be accrued from violating a withdrawal permit. For example, when Pleasant Prairie sought a diversion, both Pleasant Prairie and Kenosha (the entity supplying Great Lakes water) applied to the DNR.

- Would the City of Waukesha be the applicant or, rather, the City of Milwaukee?
- What liabilities would the City of Milwaukee be taking on by applying to divert water to Waukesha?
- Why would Milwaukee incur these additional liabilities to facilitate growth in a neighboring city?
- What type of growth will Milwaukee be supporting by sending water to Waukesha?
- Will Milwaukee lose jobs by facilitating growth in another city?
- What could the environmental justice impacts be of the water diversion?

The Great Lakes Compact requires an applicant for a straddling county diversion exception to show that it will implement conservation to minimize withdrawals and consumptive uses.²²⁸ An applicant must demonstrate that its water need cannot be reasonably met by conserving water.²²⁹ Similarly, the Compact requires that there be no “reasonable water supply alternative” including conservation.²³⁰

- What level of reduced water demand resulting from conservation will suffice to meet this requirement?
- Will prospective conservation plans suffice or will decision-makers require the implementation of a measurable conservation program, prior to application, in order to gauge the real water need?

Summary

Moving water from one place to another has inherent tradeoffs. Will the water diversion spur development in one area at the expense of the other? Will jobs be lost in the community where the water originated? Who bears the liability for such a water transfer?

Additionally, sustainable water supplies necessarily involve ensuring that proper land use controls are in place to maximize protections for the water supply, as well as ensuring that all reasonable efforts to conserve existing water supplies have been fully implemented. Although the City of Waukesha released a conservation plan in 2005, which has set in motion a number of valuable conservation measures in recent months, the City, together with Waukesha County, has far to go to implement the plan and to offset the development and water use choices it has made in previous decades.

PART VI: CONCLUSION

The Great Lakes have long provided a vital source of economic growth and prosperity to the people within its Basin and continue to play an undeniably critical role in sustaining the communities, industries and wildlife dependent upon its fresh water supply. In an increasingly thirsty world, with water shortages and droughts an ever growing problem, this world class resource, which contains nearly 20 percent of the earth’s fresh surface water supply, must be protected.

In view of the recent signing of the Great Lakes Compact on December 13, 2005, and the numbers of communities waiting in the wings for out-of-Basin diversions, now is the critical time to focus on how to manage this shared resource to protect public and private rights in water and to ask whether, and in what manner, water withdrawals from the Great Lakes should be restricted.

By laying the foundation of the Great Lakes as both a shared commons and a public trust, this Report first demonstrated the historical and present day importance of the Public Trust Doctrine. As articulated by the United States Supreme Court in its keystone *Illinois Central* ruling, and echoed in 1985 within the Great Lakes Charter and, again, within the Great Lakes Compact twenty years later, the Great Lakes states and provinces have been deemed the trustees of the Great Lakes waters. As trustees of this vital resource for the public benefit, governments are duty bound to manage Great Lakes waters in a manner that upholds the public interest, an undeniably challenging task in the face of ever-increasing private demands for Great Lakes water.

Starting with the Boundary Waters Treaty of 1909 and ending with the Great Lakes Compact of 2005, the Report next provided an overview of the agreements and laws that the Great Lakes states and Canadian provinces have created to manage the Great Lakes Basin over the past century. Gaps within these laws and agreements have been identified and assessed, laying the groundwork for the Report’s examination thereafter of the opportunities and correctible shortfalls of Great Lakes Compact of 2005.

Before the Compact can become effective law, each Great Lakes state must pass the Compact into state law and then the United States Congress must consent to the Compact. As this process moves forward, the legislatures of the eight Great Lakes states should recognize that the Compact, as a compromise document, represents a floor and not a ceiling pertaining to the management of the Great Lakes.

As such, in order to appropriately carry out their duties as trustees of the shared resource, the Great Lakes states would be wise to strengthen the Compact when they pass their respective state legislation implementing the Compact. The Report identifies four areas where state legislatures should enact changes to the Compact floor, namely, provisions that improve the rules governing: (1) out-of-basin diversions; (2) in-basin uses; (3) water conservation; and (4) bottled water. Through implementing legislation of this kind, the Great Lakes states will be in a better position to ensure the protection of the Great Lakes for the benefit of the people relying on them at present and into the future.

From Southeastern Wisconsin to northern Ohio, there are communities lying just outside the Great Lakes Basin eligible under the Compact to apply for the diversion of Great Lakes water outside the Basin. How to respond appropriately to the demand for out-of-basin water diversions and to concerns relating to the fueling of out-of-basin growth remains an important consideration that will need to be addressed.

The City of Waukesha, Wisconsin, appears to be the “straddling county” community most likely to apply for the next diversion of Great Lakes water. Given its well publicized water quality problems and interest in obtaining Lake Michigan water, this Southeastern Wisconsin community provides an instructive example of the difficulties and unresolved issues certain to face state and local policy makers in the immediate future. Yet, with an eye to the precedent-setting potential of Waukesha’s diversion request, a number of critical policy questions must be answered prior to acting on any prospective application for a diversion.

Given the incredible value and vulnerability of the Great Lakes, the legal responsibility under the Public Trust Doctrine, and the promise of the Great Lakes Compact, the Great Lakes states must act now to enact legislation strong enough to manage and preserve this shared resource for generations to come.

Midwest Environmental
ADVOCATES

pro bono publico

608.251.5047

www.midwestadvocates.org

ENDNOTES

¹⁴In 2001, the water was more than a meter below its seasonal average in the Port of Montreal, and Lakes Michigan and Huron were down 57 centimeters (22 inches).” MAUDE BARLOW & TONY CLARK, *BLUE GOLD: THE FIGHT TO STOP THE CORPORATE THEFT OF THE WORLD’S WATER* 9 (The New Press 2002).

³MAUDE BARLOW & TONY CLARK, *BLUE GOLD* xiv (The New Press 2002).

³VANDANA SHIVA, *PRIVATIZATION, POLLUTION, and PROFIT* 24 (Southend Press 2002).

⁴MAUDE BARLOW & TONY CLARK, *BLUE GOLD* xii (The New Press 2002).

⁵*Id.*

⁶*Id.* at xiv.

⁷*Id.* at 4.

⁸GARY SNYDER, *THE GARY SNYDER READER* 191 (Counterpoint 1999).

⁹Garrett Hardin, *Tragedy of the Commons*, 162 *SCIENCE* 1243-1248 (1968).

¹⁰ERIC T. FREYFOGLE, *THE LAND WE SHARE, PRIVATE PROPERTY and the COMMON GOOD* (Island Press 2003).

¹¹FREDRIK SEGERFELDT, *WATER FOR SALE* (Cato Institute 2005).

¹²Joseph L. Sax, *Symposium on the Public Trust and the Waters of the American West: Yesterday, Today and Tomorrow* 19 *Envtl. L.* 473, 475 (1989).

¹³*E.g.*, *Illinois Central Railroad v. Illinois*, 146 U.S. 387 (1892).

¹⁴For a history of the evolution of this doctrine in Wisconsin, see Melissa K. Scanlan, *The Evolution of the Public Trust Doctrine and the Degradation of Trust Resources*, 27 *ECOLOGY L.Q.* 135 (2000).

¹⁵*See, e.g.*, WIS. CONST., Art. IX, § 1.

¹⁶Joseph L. Sax, *Rights that ‘Inhere in the Title Itself’: The Impact of the Lucas Case on Western Water Law*, 26 *LOY. L.A. L. REV.* 943, 944 (1993).

¹⁷*E.g.*, *Bradshaw vs. Duluth Imperial Mill Co.* 53 N.W.1066, 1068, 52 Minn. 59, 66 (1892); *People ex rel. Moloney v. Kirk*, 45 N.E. 830, 833, 162 Ill. 138, 146 (1896); *Scranton v. Wheeler*, 57 F. 803, 813 (6th Cir. 1893); *Bodi v. Winous Point Shooting Club*, 48 N.E. 944, 944, 57 Ohio St. 226, 226 (1897); *Coxe v. State*, 39 N.E. 400, 400, 144 N.Y. 396, 400 (Ct. App. 1895).

¹⁸*Willow River Club v. Wade*, 76 N.W. 273, 278, 100 Wis. 86, 102 (1898).

¹⁹Joseph L. Sax, *Symposium on the Public Trust and the Waters of the American West: Yesterday, Today and Tomorrow* 19 *Envtl. L.* 473, 482 (1989).

²⁰*Illinois Central R.R. v. Illinois*, 146 U.S. 387, 452-453 (1892).

²¹*E.g.*, *Bradshaw vs. Duluth Imperial Mill Co.* 53 N.W.1066, 1068, 52 Minn. 59, 66 (1892); *People ex rel. Moloney v. Kirk*, 45 N.E. 830, 833, 162 Ill. 138, 146 (1896); *Scranton v. Wheeler*, 57 F. 803, 813 (6th Cir. 1893); *Bodi v. Winous Point Shooting Club*, 48 N.E. 944, 944, 57 Ohio St. 226, 226 (1897); *Coxe v. State*, 39 N.E. 400, 400, 144 N.Y. 396, 400 (Ct. App. 1895).

²²*Bradshaw vs. Duluth Imperial Mill Co.*, 53 N.W.1066, 1069, 52 Minn. 59, 66 (1892).

²³*Hudson Water Co. v. McCarter*, 209 U.S. 349, 28 S. Ct. 529 (1908). *r Co.*, 209 U.S. at 356.

²⁵Joseph L. Sax, *Symposium on the Public Trust and the Waters of the American West: Yesterday, Today and Tomorrow* 19 *Envtl. L.* 473, 480 (1989).

²⁶*Hudson Water Co.*, 209 U.S. at 354; Some have argued that water has already been defined as a “commodity” in the United States Supreme Court case of *Sporhase v. Nebraska*. *Sporhase v. Nebraska*, 458 U.S. 941, 945, 102 S. Ct. 3456, 3459 (1982). However, that holding is limited to groundwater, which has historically (for better and for worse) not been widely recognized as a public trust water. Moreover, *Sporhase v. Nebraska* did not overrule *Hudson County Water Co. v. McCarter*, which upheld a surface water diversion prohibition. The importance of *Sporhase* is that it clarified that management of water needed to be done in a way that was even-handed and treated in and out of state users similarly. Regulatory controls should apply to both in basin consumptive uses and out of basin (and out of state) diversions. *See also*, James Olson, *Conference on the National Groundwater Water Crisis, The Future Gradient of Water Law*, Toledo College of Law (2003).

²⁷Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention* 68 *MICH. L. REV.* 471 (1970); James Olson, *Decision Time: Water Diversion Policy in the Great Lakes Basin*, WOODROW WILSON INT’L CENTER (2004).

²⁸Great Lakes Charter, Feb. 11th, 1985, Findings, at 1, available at <<http://www.cglg.org/pub/charter/>>.

²⁹Great Lakes Charter Annex, June 18, 2001, Findings, at 1, available at <<http://www.cglg.org/projects/water/docs/GreatLakesCharterAnnex.pdf>>.

³⁰Great Lakes—St. Lawrence River Basin Water Resources Compact, Dec. 13, 2005, § 1.3(1)(a), available at <http://www.cglg.org/projects/water/docs/12-13-05/Great_Lakes-St_Lawrence_River_Basin_Water_Resources_Compact.pdf>.

³¹*Id.*

³²Great Lakes Compact at §1.3(1)(a).

³³In 1871, the United States Supreme Court clarified that the public trust doctrine is applicable to all navigable waters, tidal or fresh. Previously, in English common law and states that followed it, the trust had only applied to tidal waters. However, in *The Daniel Ball*, the Court held that the test for navigability is whether the waters are “navigable in fact.” 77 U.S. 557, 563-564, 19 L. Ed. 999, 1001 (1871).

³⁴*Nat’l Audubon Soc’y v. Superior Court of Alpine County*, 658 P.2d 709, 721, 33 Cal. 3d 419, 437 (1983); *Omernik v. State*, 218 N.W.2d 734, 739, 64 Wis. 2d 6, 12-13 (1974).

³⁵*Just v. Marinette County*, 201 N.W.2d 761, 769, 56 Wis. 2d 7, 19-20 (1972).

³⁶Haw. Const. Art. XI, § 7; *Robinson v. Ariyoshi*, 658 P.2d 287, 310, 65 Haw. 641, 674 (1982). Hawaii may go even further and apply the Public Trust Doctrine to groundwater regardless of any connection or direct impact on navigable waters.

³⁷Great Lakes Charter, available at: <<http://www.cglg.org/pub/charter/>>.

³⁸*Id.* at Definitions.

³⁹*Id.* at Findings & Principle.

⁴⁰Great Lakes Compact at §1.3(1)(a) (applying Compact to the “waters of the Great Lakes Basin,” which are defined as, “the Great Lakes and all streams, rivers, lakes, connecting channels and other bodies of Water, including tributary groundwater, within the Basin.”).

⁴¹Treaty Relating to Border Waters Between the United States & Canada, Jan. 11, 1909, U.S.-Gr. Brit., 36 Stat. 2448, at Article II.

⁴²Treaty Relating to Border Waters Between the United States & Canada, Jan. 11, 1909, U.S.-Gr. Brit., 36 Stat. 2448, at Rules of Procedure of the International Joint Commission, Part II – Applications, 15(2).

⁴³Mark Dinsmore, Comment, *Like a Mirage in the Desert: Great Lakes Water Quantity Preservation Efforts and Their Punitive Effects*, 24 U. TOL. L. REV. 449, 456 (1993).

⁴⁴Press Release from the office of the Governor of Wisconsin, “Earl Backs Bill To Fight Water Diversion,” Sept. 19, 1985.

⁴⁵Great Lakes Charter, available at <<http://www.cglg.org/pub/charter>>.

⁴⁶The purposes of the Great Lakes Charter are: to conserve the levels and flows of the Great Lakes and their tributary and connecting waters; to protect and conserve the environmental balance of the Great Lakes Basin ecosystem; to provide for cooperative programs and management of the water resources of the Great Lakes Basin by the signatory States and Provinces; to make secure and protect present developments within the region; and, to provide a secure foundation for future investment and development within the region. *Id.* at Principle & Findings 1.

⁴⁷*Id.*, Findings at 1.

⁴⁸Great Lakes Charter at Principle IV & Implementation of Principles, Consultation Procedures, at 2 & 4. The Charter created a decision-making standard to apply to diversions of five million or more gallons per day: “diversions of Basin water resources will not be allowed if individually or cumulatively they would have any significant adverse impacts on lake levels, in-basin uses, and the Great Lakes Ecosystem.” *Id.* Principle III at 2. The Charter standard applies broadly to assess harm not only to lake levels but to the ecosystem as a whole, which is defined as “air, land, water, and living organisms, including humankind...” *Id.* Definitions at 7. The Charter also envisioned creating a Water Resources Management Committee to design formal procedures to carry out the notice and consultation requirement. *Id.* Implementation of Principles at 3.

⁴⁹*Id.*, Progress Toward Implementation at 6.

⁵⁰*Id.*

⁵¹A signatory had to provide information on withdrawals of over 100,000 gallons per day and of regulating withdrawals of more than 2 million gallons per day in order to participate in the notice and consultation process. *Id.*

⁵²Letter from John Engler, Governor of Michigan, to George Voinovich, Chair of the Council of Great Lakes Governors (Jan. 20, 1993).

⁵³WIS. STAT. § 281.35 (2006); WIS. ADMIN. CODE § NR 142.01 (2006).

⁵⁴See public trust text, *Infra*, at 4.

⁵⁵42 U.S.C. §§ 1962d-20(b)(2) (2006); see also §§ 42 U.S.C. at §1962d-20(d).

⁵⁶42 U.S.C. §1962d-20(a)(1). Going beyond the uses recognized in the 1909 Treaty, Congress recognized several important uses of Great Lakes water, including: water supply for domestic and industrial use, hydropower, transportation for commerce, and recreation. *Id.*

⁵⁷42 U.S.C. §1962d-20(a)(3).

⁵⁸42 U.S.C. §1962d-20(b)(2); see also, 42 U.S.C. §1962d-20(d).

⁵⁹*Little Traverse Bay Bands of Odawa Indians v. Great Spring Waters of America*, 203 F. Supp.2d 853, 858 (W.D. Mich. 2002).

⁶⁰*Little Traverse Bay Bands of Odawa Indians*, 203 F. Supp.2d at 859.

⁶¹*Id.* (quoting from the legislative history).

⁶²For example, some commentators argue that WRDA’s focus on diversions from the Basin as opposed to from the state that is riparian to the Great Lakes departed from both the Charter and the original bills introduced into Congress. WRDA, so the argument goes, is counter to the common law doctrine of Equitable Apportionment. Still others focus on due process and commerce clause concerns. Mark Dinsmore, Comment, *Like a Mirage in the Desert: Great Lakes Water Quantity Preservation Efforts and Their Punitive Effects* 24 U. TOL. L. REV. 449, 467 (1993).

⁶³Moreover, due to natural geography there is one state that lies entirely within the Great Lakes Basin: the State of Michigan. Unlike all the other Great Lakes states, Michigan’s governor may “unilaterally prohibit any other Great Lakes state from diverting water within its own borders, but outside the basin, for any purpose, without fear of suffering any reciprocal consequences.” Dinsmore, 24 U. TOL. L. REV. at 468.

⁶⁴*Little Traverse Bay Bands of Odawa Indians*, 203 F. Supp.2d at 854.

⁶⁵*Id.*, 203 F. Supp.2d at 856 & 865.

⁶⁶*Id.*, 203 F. Supp.2d at 864. Clearly, a Governor can enforce the provisions of WRDA. However, this enforcement measure may prove to be inadequate when states fail to take action to enforce WRDA against a wayward governor, such as the situation in Michigan. When Governor Engler of Michigan refused to submit the Nestle/Perrier proposal to all of the Great Lakes Governors for approval, the other Great Lakes Governors failed to act, which is what led to the private litigants filing suit in *Little Traverse Bay Bands of Odawa Indians*.

⁶⁷*Traverse Bay Bands of Odawa Indians*, 203 F. Supp.2d at 863.

⁶⁸“The public trust doctrine allows a person to sue on behalf of, and in the name of, the State ‘for the purpose of vindicating the public trust.’” *Gillen, et al. v. City of Neenah, et al.*, 219 Wis. 2d 806, 821; 580 N.W.2d 628, 633 (WI 1998), citing, *State v. Deetz*, 66 Wis. 2d 1, 13, 224 N.W.2d 407 (1974). This holding is limited, however, to enforcing the public trust doctrine as it has been codified in Wisconsin’s Chapter 30. *Id.*, 219 Wis. 2d at 831. So even under Wisconsin’s public trust law, it would be very difficult to prevail when asserting a private right of action under WRDA.

⁶⁹Great Lakes Charter Annex, June 18, 2001, Directives at 2-3, available at: <http://www.cglg.org/projects/water/docs/GreatLakesCharterAnnex.pdf>.

⁷⁰*Id.*, Findings, at 1.

⁷¹*Id.*, Directive 3, at 2.

⁷²*Id.* Directive 4, at 3.

⁷³*Little Traverse Bay Bands of Odawa Indians*, 203 F. Supp.2d at 858.

⁷⁴Only two of the Great Lakes governors appeared in person, Governor Taft (Ohio) and Governor Doyle (Wisconsin), and the others sent delegates. The two documents that were created and signed are the Compact and the Agreement. The Compact is intended to be legally binding between the eight Great Lakes states. The Agreement is a commitment by the Canadian provinces to develop similar laws.

⁷⁵Great Lakes—St. Lawrence River Basin Water Resources Compact, Dec. 13, 2005, §§ 1.3(1)(a) & (b), available at: http://www.cglg.org/projects/water/docs/12-13-05/Great_Lakes-St_Lawrence_River_Basin_Water_Resources_Compact.pdf.

⁷⁶“Water means ground or surface water contained within the Basin. Waters of the Basin or Basin Water means the Great Lakes and all streams, rivers, lakes, connecting channels and other bodies of water, including tributary groundwater, within the Basin.” *Great Lakes Compact*, at Definition of Water and Waters of the Basin or Basin Water.

⁷⁷*Id.* at § 4.8.

⁷⁸*Id.* at § 4.9(1). A “straddling community is “any incorporated city, town or the equivalent thereof, wholly within any County that lies partly or completely within the Basin, whose corporate boundary existing as of the effective date of this Compact, is partly within the Basin or partly within two Great Lakes watersheds.” *Id.* at § 1.2.

⁷⁹*Id.* at § 4.9(3).

⁸⁰*Id.* at § 4.9(2).

⁸¹*Id.* at § 4.14 (applying United States Supreme Court decree in *Wisconsin v. Illinois* instead of Compact to withdrawals, consumptive uses, and diversions by the State of Illinois).

⁸²*Id.* at § 4.12.

⁸³*Id.* at § 4.11.

⁸⁴*Id.* at § 4.10(1).

⁸⁵*Id.*

⁸⁶*Id.* at § 4.10(2).

⁸⁷Great Lakes Compact, at §§ 8.4 & 4.12(1).

⁸⁸Mark Dinsmore, Comment, *Like a Mirage in the Desert: Great Lakes Water Quantity Preservation Efforts and Their Punitive Effects*, 24 U. TOL. L. REV. at 469.

⁸⁹INTERNATIONAL JOINT COMMISSION, BOUNDARY WATERS TREATY, PROTECTION OF THE WATER OF THE GREAT LAKES 12 (2000); Letter from Darryl E. Gerlat, DNR, to Mr. Michael Pollocoff, President, Village of Pleasant Prairie, (January 8, 1990).

⁹⁰Great Lakes Compact, at Definition of Source Watershed.

⁹¹*Omernik v. State*, 218 N.W.2d 734, 739, 64 Wis.2d 6, 14 (1974).

⁹²Great Lakes Compact, at §§ 4.9(4)(e) & 4.11(3).

⁹³Great Lakes Compact, at § 4.10(1).

⁹⁴Great Lakes Compact, Progress Toward Implementation, at 6.

⁹⁵*Id.* Progress Toward Implementation, at 6.

⁹⁶Central Brown County’s groundwater problems are both water quantity and quality problems. The groundwater aquifer has been drawn down to the point that the water is increasingly contaminated with naturally-occurring radium.

⁹⁷WISCONSIN DNR, MANITOWOC WATER WITHDRAWAL EVALUATION, (Nov. 3, 2004).

⁹⁸Wis. Stats. §§ 281.34(5)(e)(2)(requiring location and annual pumping report for all high capacity wells pumping 100,000 gallons per day or more) & 281.35(3)(requiring registration for all withdrawals of 100,000 gallons per day or more in a 30 day period). Although the registration requirement exists in state statute, Wisconsin stopped collecting data in the mid-1990s. Email communication from Todd Ambs, WI DNR, to Melissa Scanlan, Midwest Env’tl Advocates, (Jan. 23, 2006). Under a separate law, Act 310, otherwise known as Wisconsin’s Groundwater Protection Act, Wisconsin once again started collecting usage data for those pumping 100,000 or more gallons per day from groundwater supplies. *Id.*; Wis. Stat. § 281.34(5)(e)(2).

⁹⁹Minnesota, Illinois, Ohio, Indiana and Michigan submitted written responses. Donna McGee interview with Chuck Ledin, (July 28, 2005). Michigan, New York and Pennsylvania insisted that the diversion be a temporary one; the other five states did not object to a permanent diversion. Although not required under WRDA, Quebec approved the diversion. Memorandum from Claude Pesanting, Directeur de L’hydraulique, Gouvernement du Quebec, Ministère de L’Environnement, to Bonnie Koenig, Executive Director, Council of Great Lakes Governors, (June 2, 1989); Letter from Rudy Perpich, Governor of the State of Minnesota to Bonnie Koenig, Executive Director, Council of Great Lakes Governors, (May 30, 1989) (Minnesota letter); Letter from James R. Thompson, Governor of the State of Illinois to Bonnie Koenig, Executive Director, Council of the Great Lakes Governors, (June 26, 1989) (Illinois letter); Letter from Richard F. Celeste, Governor of the State of Ohio to Bonnie Koenig, Executive Director, Council of Great Lakes Governors, (June 26, 1989) (Ohio letter); Letter from Evan Bayh, Governor of the State of Indiana to Governor Richard F. Celeste, Chairman, Council of Great Lakes Governors, (July 27, 1989) (Indiana letter); Letter from David F. Hales, Director, Department of Natural Resources, State of Michigan to the Honorable Tommy G. Thompson, Governor of the State of Wisconsin, (December 12, 1989) (Michigan letter); Letter from C. D. Besadny, Secretary, WI DNR to the Hon. Brian Burke, Wisconsin Senator, (undated reply to Senator Burke’s March 13, 1992 letter to the WI DNR, stating that New York and Pennsylvania verbally approved the diversion and that Michigan, New York and Pennsylvania insisted that the diversion be only temporary). Ontario opposed the diversion in writing, as did Great Lakes United, a coalition of 180 groups, and the Canadian Consulate General, G. Douglas Valentine. Letter from M.G. Lewis, Director, Conservation Authorities and Water Management Branch, Ministry of Nat. Res., Province of Ontario, Canada, to Mr. Van Esser, Council of Great Lakes Governors, (June 1, 1989); Letter from G. Douglas Valentine, Canadian Consulate General to the Hon. Tommy Thompson, Governor of the State of Wisconsin, (Mar. 7, 1990).

¹⁰⁰Letter from G. Douglas Valentine, Canadian Consulate General to Governor Tommy Thompson (Mar. 7, 1990).

¹⁰¹Interview between Chuck Ledin, Bureau Director, Office of the Great Lakes, WI DNR, and Donna McGee, Midwest Environmental Advocates, (July 28, 2005). Mr. Ledin did not believe that any conservation requirements were in place at the time of this approval.

¹⁰²Designed to protect public water supply wells, Wisconsin’s Wellhead Protection Program requires that all communities installing a new municipal water supply well after May 1, 1992, must complete a Wellhead Protection Plan containing nine elements, including the development of a “water conservation program.” WIS. ADMIN. CODE § NR 811.16(5) (2006).

¹⁰³Email from, Jill Jonas, Bureau Director, Drinking Water and Groundwater, WI DNR, to Jodi Habush Sinykin, Midwest Environmental Advocates (May 3, 2005); Email from, Jill Jonas to Jodi Habush Sinykin (April 20, 2005).

¹⁰⁴REBECCA LAMEKA, GREAT LAKES COMMISSION, REGIONAL CASE STUDIES: BEST PRACTICES FOR WATER CONSERVATION IN THE GREAT LAKES – ST. LAWRENCE REGION 17-19 (2004).

¹⁰⁵Email from, Steve Gombos, Region of Waterloo, to Donna McGee, Midwest Environmental Advocates (July 12, 2005).

¹⁰⁶*Id.*

¹⁰⁷MIDWEST ENVIRONMENTAL ADVOCATES, PROTECTING WISCONSIN'S WATERS: A CONSERVATION REPORT AND TOOLKIT (2005).

¹⁰⁸Clean Water Act, 33 U.S.C. § 505(g); Michigan Compiled Laws § 324.1701, et seq.

¹⁰⁹VANDANA SHIVA, PRIVATIZATION, POLLUTION, and PROFIT, at 88 (citing Fortune Magazine, May 2000).

¹¹⁰Great Lakes Compact at § 4.12(10).

¹¹¹*Id.*

¹¹²MAUDE BARLOW & TONY CLARK, BLUE GOLD, at 7.

¹¹³*Id.* Barlow & Clark, at 52.

¹¹⁴*Id.* Barlow & Clark, at 51.

¹¹⁵TONY CLARKE, INSIDE THE BOTTLE, at 9 (2005) (citing Beverage Marketing Corp).

¹¹⁶MAUDE BARLOW & TONY CLARK, BLUE GOLD, at 85.

¹¹⁷*Id.* Barlow & Clark, at 143.

¹¹⁸*Id.*

¹¹⁹*Id.*

¹²⁰EARTH POLICY INSTITUTE, ECO-ECONOMY REPORT ON BOTTLED WATER 2006 (citing Beverage Marketing Corporation, cited in John G. Rodwan, Jr., "Bottled Water 2004: U.S. and International Statistics and Developments," Bottled Water Reporter, April/May 2005).

¹²¹*Michigan Citizens for Water Conservation v Nestlé Waters North America Inc.*, No. 01-014563-CE (Mecosta County MI) (Opinion and Judgment/Order Nov. 25, 2003).

¹²²*Michigan Citizens for Water Conservation v Nestlé Waters North America Inc.*, 709 N.W.2d 174, 269 Mich. App. 25 (2005).

¹²³Mark Clayton, *Forget OPEC. The Next Cartel May Export Drinking Water*, THE CHRISTIAN SCIENCE MONITOR, Dec. 30, 2004, available at <http://www.csmonitor.com/2004/1230/p13s01-sten.htm>

¹²⁴MAUDE BARLOW & TONY CLARK, BLUE GOLD, at 134.

¹²⁵*Id.* Barlow & Clark, at 135.

¹²⁶*Id.*

¹²⁷Memorandum from West Coast Environmental Law, at 20 – 24, (Aug. 17, 1999), available at <http://www.canadians.org>.

¹²⁸*Little Traverse Bay Bands of Odawa Indians v. Great Spring Waters of America*, 203 F. Supp.2d at 859.

¹²⁹James Krohelski is a USGS hydrologist who has for the past 25 years worked to increase the understanding of Wisconsin's regional groundwater flow systems through development of groundwater flow models and field studies.

¹³⁰George Kraft, a professor of water resources at the University of Wisconsin-Stevens Point College of Natural Resources, is both the director of the Center for Watershed Science and Education and the Director of the Central Wisconsin Groundwater Center.

¹³¹Presentation, K.R. BRADBURY, Wisconsin Geological and Natural History Survey, GROUNDWATER USE AND ITS CONSEQUENCES IN WISCONSIN, (Apr. 1, 2005); K.R. BRADBURY, G. KRAFT, J.T. KROHELSKI, UNCOVERING THE QUALITY AND QUANTITY ISSUES OF WISCONSIN'S BURIED TREASURE, presented at Wisconsin's Groundwater Summit, October 30, 1991, available at <http://www.dnr.state.wi.us/org/water/dwg/gcc.GW-Summit>.

¹³²B.R. ELLEFSON, G.D. MUELLER & C.A. BUCHWALD, WATER USE IN WISCONSIN, US Geological Survey Open-File Report 01-445 (2000).

¹³³Email from Cheryl A Buchwald, U.S. Geological Survey, to James T. Krohelski USGS, (Sept. 2, 2005).

¹³⁴N.G GRANNEMANN, R.J. HUNT, J.R. NICHOLAS, T.E. REILLY & T.C. WINTER, THE IMPORTANCE OF GROUND WATER IN THE GREAT LAKES REGION: U.S. Geological Survey Water Resources Investigations Report 00-4008, at 14 (2000).

¹³⁵A long-term statewide water budget consists of average inputs and outputs to the hydrologic system. In Wisconsin, precipitation averages 32 inches per year (in/yr); however, because the evapotranspiration rate is about 20 in/yr, only 12 in/yr remain to recharge the groundwater system or flow into surface water bodies. In eastern Wisconsin, where surficial deposits are clayey, recharge rates may be less than 1 in/yr, while in the sandy surficial deposits of central Wisconsin, recharge rates may exceed 10 in/yr. As such, a reasonable statewide recharge average is about 6 to 10 in/yr and is supported by statewide long-term base flow measurements. If a 10 in/yr recharge rate is applied to the land-surface area of Wisconsin, the annual recharge rate is about 25,000 mgd, which is approximately 30 times the groundwater use rate.

¹³⁶T.D. CONLON, Hydrogeology and simulation of ground-water flow in the sandstone aquifer, northeastern Wisconsin: U.S. Geological Survey Water-Resources Investigations Report 97-4096 (2000); J.T. KROHELSKI, K.R. BRADBURY, R.J. HUNT & S.K. SWANSON, Numerical simulation of ground water flow in Dane County, Wisconsin: Wisconsin Geological and Natural History Survey Bulletin 98 (2000); D.T. FEINSTEIN, D.J. HART, T.T. EATON, J.T. KROHELSKI & K.R. BRADBURY, Simulation of regional ground-water flow in southeastern Wisconsin: Wisconsin Geological and Natural History Survey Open-File Report 2004-01 (2004).

¹³⁷SE WIS. REGIONAL PLANNING COMM'N, Groundwater resources of Southeastern Wisconsin: Southeastern Wisconsin Regional Planning Commission Technical Report No 37 (2000).

¹³⁸W.J. DRESCHER, Results of pumping tests on artesian wells in the Milwaukee-Waukesha area, Wisconsin: U.S. Geological Survey Open-File Report (1948); F.C.FOLEY, W.D. WALTON & W.J. DRESCHER, Groundwater conditions in the Milwaukee-Waukesha area, Wisconsin: U.S. Geological Survey Water-Supply Paper 1229 (1953); H.L.YOUNG, DIGITAL-computer model of the sandstone aquifer in southeastern Wisconsin: Southeastern Wisconsin Regional Planning Commission Technical Report 16 (1976); H.L.YOUNG, Hydrogeology of the Cambrian-Ordovician Aquifer System in the Northern Midwest, United States, U.S. Geological Survey Professional Paper 1405-B, 1992b; H.L.YOUNG, Summary of Ground-Water Hydrology of the Cambrian-Ordovician Aquifer System in the Northern Midwest, United States, U.S. Geological Survey Professional Paper 1405-A, 1992a.

¹³⁹Feinstein, *supra*, note 135.

¹⁴⁰Assuming an increase in groundwater usage proportional to increases in population levels, groundwater usage in Southeastern Wisconsin could be expected to increase from about 90 mgd (about 70 mgd from high-capacity wells) in 1995 to about 140 mgd by the year 2020 (Feinstein, *supra*, note 135). These current projections are based on current trends continuing unabated (i.e., no change in land use patterns, little or no conservation, and no reuse or recycling).

¹⁴¹D.T. FEINSTEIN, D.J. HART, T.T. EATON, J.T. KROHELSKI & K.R. BRADBURY, Simulation of regional ground-water flow in southeastern Wisconsin: Wisconsin Geological and Natural History Survey Open-File Report 2004-01 (2004).

¹⁴²Modified from: K.R. Bradbury, Wisconsin Geological and Natural History Survey.

¹⁴³sources: T.D. CONLON, Hydrogeology and simulation of ground-water flow in the sandstone aquifer, northeastern Wisconsin: U.S. Geological Survey Water-Resources Investigations Report 97-4096 (1998); P.A. Kammerer, Jr. 1995, Ground-water flow and quality in Wisconsin's shallow aquifer system: U.S. Geological Survey Water-Resources Investigations Report 90-4171 (1995); M.G. Mudrey, B.A. Brown & J.K. Greenburg, Bedrock geologic map of Wisconsin: Wisconsin Geological and Natural History Survey, scale 1:1000000 (1982); D.T. FEINSTEIN, D.J. HART, T.T. EATON, J.T. KROHELSKI & K.R. BRADBURY, Simulation of regional ground-water flow in southeastern Wisconsin: Wisconsin Geological and Natural History Survey Open-File Report 2004-01 (2004).

¹⁴⁴Based on a geophysical survey it appears likely that high TDS water occurs at depth in the sandstone aquifer and is being induced to flow to high capacity wells as increased groundwater development takes place. J. JANSEN & R. TAYLOR, 2001. Time Domain Electromagnetic induction survey of eastern Waukesha County and selected locations. WRI GRR 01-05. WATER RESOURCES INST., UW-MADISON.

¹⁴⁵"Groundwater in the Great Lakes Basin: the case of southeastern Wisconsin," available at <http://wi.water.usgs.gov/glpf>.

¹⁴⁶USGS, GROUNDWATER IN THE GREAT LAKES BASIN: THE CASE OF SOUTHEASTERN WISCONSIN, available at <http://wi.water.usgs.gov/glpf/im.html>.

¹⁴⁷*Id.*

¹⁴⁸N.G. GRANNEMANN, R.J. HUNT, J.R. NICHOLAS, T.E. REILLY & T.C. WINTER, The importance of groundwater in the Great Lakes Region: U.S. Geological Survey Water Resources Investigations Report 00-4008 (2000).

¹⁴⁹See USGS, GROUNDWATER IN THE GREAT LAKES BASIN: THE CASE OF SOUTHEASTERN WISCONSIN, available at <http://wi.water.usgs.gov/glpf>.

¹⁵⁰D.T. FEINSTEIN, D.J. HART, T.T. EATON, J.T. KROHELSKI & K.R. BRADBURY, Simulation of regional groundwater flow in southeastern Wisconsin: Wisconsin Geological and Natural History Survey Open-File Report 2004-01 (2004).

¹⁵¹Great Lakes Compact, at § 4.9.

¹⁵²See, e.g., CH2M HILL, *Making a Decision on Improvement: Annex 2001 Case Study Demonstration Involving Waukesha Water Supply*, Volume 2-Case Study Appendixes, "Sample 2001 Annex Application," August 2003.

¹⁵³Waukesha Water Utility 2004 Consumer Confidence Report, available at <http://www.ci.waukesha.wi.us/WaterUtility/Documents/cCR2004pg1.pdf>; see also, CH2M HILL & Ruckert-Mielke, *Waukesha Water Utility: Future Water Supply*, (Mar. 2002); Dennis Shook, *Water, Water Everywhere, But None to Drink*, WAUKESHA FREEMAN, (Feb. 22, 2005).

¹⁵⁴Presentation, K.R. BRADBURY, Wisconsin Geological and Natural History Survey, GROUNDWATER USE AND ITS CONSEQUENCES IN WISCONSIN, (Apr. 1, 2005).

¹⁵⁵CH2M HILL at 1-1, 1-5.

¹⁵⁶*Id.*

¹⁵⁷*Id.* Until recently, all ten of the WWU wells produced water exclusively drawn from the deep sandstone aquifer, and the City of Waukesha is by no means alone. Fifty or so other communities and 200 industries in Southeastern Wisconsin rely on the sandstone aquifer for at least a portion of their water supply and this aquifer further provides 95 percent of Waukesha County's municipal supply. CH2M HILL, at 2-4.

¹⁵⁸Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (June 6, 2005).

¹⁵⁹Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (Feb. 14, 2006). As a result, Waukesha Water Utility's total water capacity may increase to 24 mgd. Telephone message by Dan Duchniak, Waukesha Water Utility Manager, to Jodi Habush Sinykin, Midwest Environmental Advocates (April 5, 2006).

¹⁶⁰City of Waukesha, Wastewater Treatment, available at <http://www.ci.waukesha.wi.us/wastewater/mission.html>.

¹⁶¹The recharge area for the deep sandstone aquifer is located west of the City of Waukesha where the Maquoketa shale is absent. Presentation, John Janesen, Groundwater Issues in Southeastern Wisconsin, June 3, 2005, Madison, Wisconsin.

¹⁶²Daniel Feinstein, David Hart, and James Krohelski, THE VALUE OF LONG-TERM MONITORING IN THE DEVELOPMENT OF GROUNDWATER FLOW-MODELS, U.S. Geological Survey Fact Sheet 116-03, Figure 8 (Feb. 2004), available at <http://water.usgs.gov/pubs/fs/fs-116-03>.

¹⁶³*Id.* at 12, Figure 7.

¹⁶⁴Waukesha Water Utility 2004 Consumer Confidence Report, available at www.ci.waukesha.wi.us/WaterUtility/Documents/ccr2004pg1.pdf; see also, CH2M HILL at 2-9.

¹⁶⁵*Id.*

¹⁶⁶Dan Egan, *Weighing Unsavory Options to Clean Water Supply*, MILWAUKEE JOURNAL SENTINEL (Nov. 22, 2003).

¹⁶⁷Per the EPA requirement, the Waukesha Water Utility has been required to provide a public notice to its customers informing them of the Waukesha water supply's violation of the state and federal contaminant levels for gross alpha and radium. See, Waukesha Water Utility Public Notice (Feb. 25, 2004), available at <http://www.ci.waukesha.wi.us/WaterUtility/Documents/publicNoticeLetterhead.pdf>.

¹⁶⁸Dan Egan, *Weighing Unsavory Options to Clean Water Supply*, MILWAUKEE JOURNAL SENTINEL (Nov. 22, 2003); see also, U.S. Water News Online, *Radium Rules May Raise Water Costs*, Dec. 2003, available at: <http://www.uswaternews.com/archives/arcquality/3wiscom12.html>; see also, Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (Feb. 14, 2006).

¹⁶⁹Colleen Krantz, *Communities Prepare to Battle the Radium Standard*, MILWAUKEE JOURNAL SENTINEL, Jan. 5, 1999. The city is presently engaged in the development of two new shallow aquifer wells in order to blend that radium-free water with its municipal supply from the deep aquifer in order to meet the EPA standard. See Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (Feb. 14, 2006); Dennis Shook, *Water, Water Everywhere, But None to Drink*, WAUKESHA FREEMAN, (Feb. 22, 2005); Dan Egan, *Weighing Unsavory Options to Clean Water Supply*, MILWAUKEE JOURNAL SENTINEL (Nov. 22, 2003).

¹⁷⁰Telephone Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (Feb. 14, 2006).

¹⁷¹CH2M HILL & Ruckert-Mielke, *Waukesha Water Utility: Future Water Supply*, (Mar. 2002).

¹⁷²Waukesha population projections and SEWRPC service area forecasts were also taken into account. The WWU's 2000 Water Utility Master Plan Update established a 2000 population of 64,000 and forecasted a 2020 Utility Service Area Boundary and population of 78,000 based upon a 1993 SEWRPC land use plan and a 1999 SEWRPC sewer service area plan. *Id.* at 1-6. The WWU Future Water Supply report extended these projections to the year 2050 in reaching its 104,950 City of Waukesha population estimate. *Id.*

¹⁷³CH2M HILL, MAKING A DECISION ON IMPROVEMENT: AN ANNEX 2001 CASE STUDY DEMONSTRATION INVOLVING WAUKESHA WATER SUPPLY (Aug. 2003).

¹⁷⁴As for Waukesha County, total estimated water use has jumped from an average rate of under 28 mgd in 1985 to 40 mgd more recently. Dan Egan, *Water Pressures Divide a Great Lake State*, MILWAUKEE JOURNAL SENTINEL, Nov. 23, 2003; see also, CH2M HILL, MAKING A DECISION ON IMPROVEMENT: AN ANNEX 2001 CASE STUDY DEMONSTRATION INVOLVING WAUKESHA WATER SUPPLY (Aug. 2003).

¹⁷⁵CH2MHILL, Table titled: "Historic and Projected Waukesha Water Pumpage," 1-7; see also, Interview between John Meland, SEWRPC Chief Economic Development Planner, and Jodi Habush Sinykin, Midwest Environmental Advocates (June 1, 2005).

¹⁷⁶Email from Dan Duchniak, Waukesha Water Utility Manager, to Jodi Habush Sinykin, Midwest Environmental Advocates (June 7, 2005); see also, CH2M HILL, 1-7 (which indicates a factor of 1.65 times the average daily pumpage was applied to establish maximum daily pumpage for reasons unexplained).

¹⁷⁷Telephone message by Dan Duchniak, Waukesha Water Utility, to Jodi Habush Sinykin, Midwest Environmental Advocates (April 5, 2006).

¹⁷⁸Email from Dan Duchniak, Waukesha Water Utility, to Jodi Habush Sinykin, Midwest Environmental Advocates (June 9, 2005).

¹⁷⁹Waukesha Water Utility Records documenting Daily Flows Exceeding 9, 10, 11, 12, 13 mgd for 2000, 2001, 2002, 2003, 2004, and 2005; see also, email from Dan Duchniak, Waukesha Water Utility, to Jodi Habush Sinykin, Midwest Environmental Advocates (March 29, 2006).

¹⁸⁰*Id.*

¹⁸¹*Id.*

¹⁸²In fact, an analysis provided to the Waukesha Water Utility by Earth Tech identifies the reductions in maximum daily demand based on 10% Conservation and 20% Conservation objectives through the year 2015. Earth Tech Chart, "Required Reliable Supply and Conservation."

¹⁸³CH2M HILL, at 2-3.

¹⁸⁴Alluvial wellfields, also called riverbank filtration systems, common in much of the U.S., are located in the permeable river sands immediately adjacent to a river, which induces higher recharge rates and enables the storage of large volumes of water without the necessity of a reservoir. CH2M HILL, 2 -11 and 2-12.

¹⁸⁵CH2M HILL, 2-13 and 2-14.

¹⁸⁶CH2M HILL, at 6-1.

¹⁸⁷*Id.*

¹⁸⁸*Id.*

¹⁸⁹*Id.* More recent estimates place the costs associated with a diversion of Great Lakes water, depending upon return flow specifications, in the hundreds of millions of dollars. Telephone Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (Feb. 14, 2006).

¹⁹⁰Telephone Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (Feb. 14, 2006).

¹⁹¹Associated Press, *Radium Rules May Raise Water Costs* (Nov. 28, 2003), available at http://www.greatlakesdirectory.org/wi/112803_great_lakes.htm.

¹⁹²Comparison of Net Quarterly Bills of Wisconsin Water Utilities Using Rates in Effect as of February 13, 2006, Public Service Commission of Wisconsin Division of Water, Compliance and Consumer Affairs, Bulletin 25, February 2006, available at <http://www.psc.wi.gov/apps/waterbill/bulletin25/bulletin.asp>. These rate amounts do not include sewer or public fire protection. Email from Dan Duchniak, Waukesha Water Utility, to Jodi Habush Sinykin, Midwest Environmental Advocates (March 20, 2006).

¹⁹³Shook, *Water, Water Everywhere but None to Drink*, WAUKESHA FREEMAN (Feb. 22, 2005).

¹⁹⁴Water utilities are broken down into three classes: Class AB (4,000 or more customers); Class C (between 4,000 and 1,000 customers); and Class D (1,000 customers). Available at <http://psc.wi.gov>. The comparison is of net quarterly bills of Class AB water utilities for 5/8 meter connections per 18,750 gallons of water, for residential and small commercial services. Utilities charging more than one rate for Class AB meter connections are listed as multiple entries. These comparisons are based on the PSC's "Water Bill Comparison" available at http://psc.wi.gov/a_wtrtrf/Content/bull25/Bull25.asp; see also, Interview between Bruce Schmidt, Wisconsin Public Service Commission Cost Engineer, and Jodi Habush Sinykin, Midwest Environmental Advocates (July 29, 2005).

¹⁹⁵AMERICAN WATER WORKS ASSOCIATION (AWWA), US WATER RATES BY REGION-MEDIAN 103 (2004); see also, Interview between Bruce Schmidt, Wisconsin Public Service Commission Cost Engineer and Jodi Habush Sinykin, Midwest Environmental Advocates (July 29, 2005).

¹⁹⁶U.S. EPA, WATER AND WASTE WATER PRICING, available at <http://www.epa.gov/water/infrastructure/pricing/index.htm> (citing RAFTELIS FINANCIAL CONSULTING, 2002 Water and Wastewater Rate Survey, available online at: <http://www.raftelis.com/ratessurvey.html>).

¹⁹⁷Corissa Jansen, *Waukesha County Population Booms*, MILWAUKEE JOURNAL SENTINEL, March 8, 2001.

¹⁹⁸WAUKESHA, WISCONSIN WATER SYSTEM MASTER PLAN, § 2.1 (June 2005).

¹⁹⁹*Id.*

²⁰⁰*Id.*

²⁰¹Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (Apr. 25, 2005). Notwithstanding rising water needs overall, Mr. Duchniak did point out the significant decline in industrial demand experienced by the Waukesha Water Utility in recent years. *Id.*; CH2M HILL 1-6.

²⁰²Waukesha, Wisconsin Water System Master Plan at §2.3.

²⁰³These homes are expected to range in costs between \$400,000 and \$700,000. Interview between Steve Crandel & Doug Koehler, City of Waukesha Economic Planners, and Jodi Habush Sinykin, Midwest Environmental Advocates (July 20, 2005).

²⁰⁴WAUKESHA, WISCONSIN WATER SYSTEM MASTER PLAN, § 2.3 (June 2005).

²⁰⁵The service area is defined as the area that is expected to require Waukesha Water Utility water services over the planning period. Waukesha, Wisconsin Water System Master Plan, June 2005, at § 2.4.

²⁰⁶CH2M HILL, at 1-6.

²⁰⁷Interview between Steven Crandell, City of Waukesha Community Development Director, and Doug Koehler, City of Waukesha Department of Community Development Planner, and Jodi Habush Sinykin, Midwest Environmental Advocates (July 20, 2005).

²⁰⁸Email from Doug Koehler, City of Waukesha Planner, with chart attachment “City of Waukesha-Area: Year End totals From Annexations” (July 26, 2005). Telephone Interview between Doug Koehler and Jodi Habush Sinykin, Midwest Environmental Advocates (July 27, 2005).

²⁰⁹Indeed, other than a DNR sewer service allocation, which can be modified and expanded upon request, no barriers exist to Waukesha’s expansion until such time as its growth brings it into proximity to other growing municipalities like the Town of Genesee and Delafield. Interview between City Planner Doug Koehler and Jodi Habush Sinykin, Midwest Environmental Advocates (July 25, 2005).

²¹⁰This is consistent with the observation of Rod Nilsestuen, Secretary of the Wisconsin Department of Agriculture, Trade and Consumer Protection, that the triangle between Madison, Milwaukee and Chicago is losing prime farmland, some of the nation’s best, at the third fastest rate in the country. According to the US Department of Agriculture, the amount of farmland in the state has dropped 14% over the last 20 years. Jason Stein, *Keeping Farms from Vanishing*, WISCONSIN STATE JOURNAL, June 4, 2005, at A1, available at <http://www.madison.com/archives/read.php?ref=wsj:2005:06:04:425765>.

²¹¹To the best of their recollection, neither City planner could recall of an instance when a petition for annexation was refused, either by the City Common Council or the Department of Administration. Interview between Steve Crandel & Doug Koehler, City of Waukesha Department of Community Development, and Jodi Habush Sinykin, Midwest Environmental Advocates (July 20, 2005).

²¹²See Waukesha Water Utility Vision Statement, available at www.ci.waukesha.wi.us/WaterUtility/about.html.

²¹³The Waukesha Water Utility’s website’s Conservation Page is limited to a sole link to lawn watering tips. See, Waukesha Water Utility Conservation Topics, available at www.ci.waukesha.wi.us/WaterUtility/conservation_table.htm.

²¹⁴Kollin Kosmicki, *City Strives to Cut Water Use by 20 Percent*, WAUKESHA FREEMAN, Apr. 20, 2005.

²¹⁵*Id.*

²¹⁶Interview between Dan Duchniak, Waukesha Water Utility Manager, and Jodi Habush Sinykin, Midwest Environmental Advocates (Apr. 25, 2005).

²¹⁷Daryl Enriquez, *Updated Toilets Would Save 500,000 Gallons of Water*, MILWAUKEE JOURNAL SENTINEL, Jan. 25, 2006.

²¹⁸Daryl Enriquez, *Council Considers Water Conservation Options*, MILWAUKEE JOURNAL SENTINEL, Feb. 6, 2006. Under the proposed ordinance, violating the proposed regulations would cost \$50 for the first violation, \$100 and \$500 for the second and third offenses, and each subsequent violation at a cost of \$1,000. One exemption to the proposed restrictions that has raised concerns from a conservation perspective applies to that afforded hand-held watering devices like garden hoses and watering cans. After review by the city attorney, the draft ordinance must return back to the Water Commission and the License and Ordinance Committee for revisions before obtaining final approval from the Common Council.

²¹⁹Sewer credit meters represent a means by which Utility customers can avoid charges for water that is used that does not go down the wastewater system, for example, water used to irrigate lawns or wash cars from outside spigots. Elimination of sewer credit meters would remove this exemption.

²²⁰GeoSyntec Consultants, Waukesha Water Utility Water Conservation and Protection Plan (March 2006). As recommended in the plan’s executive summary, “[r]egardless of the source [i.e. Lake Michigan or local groundwater], the conservation program should be comprehensive in protecting water resources throughout the water cycle.”

²²¹See, MIDWEST ENVIRONMENTAL ADVOCATES, PROTECTING WISCONSIN’S WATER: A CONSERVATION REPORT AND TOOLKIT, at 28-29.

²²²As stated in the Waukesha Water Utility Water Conservation and Protection Plan, presented to the Waukesha Common Council for adoption on February 3, 2006, the Utility plans to investigate the feasibility of wastewater reuse and has retained the services of GeoSyntec to gather data, conduct tests, and prepare a wastewater reuse proposal for review by the WDNR.

²²³Great Lakes Charter Annex, Directive 4, at 3, available at: <http://www.cglg.org/projects/water/docs/GreatLakesCharterAnnex.pdf>.

²²⁴WRDA, 42 U.S.C. § 1962d-20(b)(2); see also §1962d-20(d); *Little Traverse Bay Bands of Odawa Indians v. Great Spring Waters of America*, 203 F. Supp.2d at 858. Moreover, the governors will use the notice and consultation process established in the Charter. Annex 2001, Directive 4.

²²⁵Wis. Stat. § 30.21(1) (2006) (setting forth requirements for water intake facilities).

²²⁶In March of 2002, Friends of Milwaukee’s Rivers and Lake Michigan Federation filed a citizen suit against MMSD for repeated violations of the federal Clean Water Act. The suit alleges that, since 1994, MMSD has dumped more than 900 million gallons of sanitary sewage overflows (SSOs) into area rivers and Lake Michigan. *Friends of Milwaukee Rivers and Lake Michigan Federation v. MMSD*, 382 F.3d 743 (7th Cir. 2004).

²²⁷Wis. Stat. § 281.35(1) (2006) (requiring applicant to show that “no public water rights in navigable waters will be adversely affected.”)

²²⁸Great Lakes Compact at § 4.9(4)(e).

²²⁹Great Lakes Compact, at § 4.9(3)(d).

²³⁰Great Lakes Compact, at § 4.9(4)(e).

Midwest Environmental Advocates is a non-profit environmental law center that provides legal and technical assistance to communities working for clean air, clean water, and a clean government. Our mission is to provide high-quality legal services that support a multicultural, grassroots social movement; build local leadership; and develop innovative solutions to environmental problems.

Midwest Environmental
A D V O C A T E S
pro bono publico

608.251.5047

www.midwestadvocates.org