

# Waukesha Water Supply

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## *Frequently Asked Questions*



### 1. Why is long-term water supply planning important?

Long-term water supply planning is important because an affordable water supply that is healthy, reliable and sustainable is critical to our families and our community employers.

Because significant financial, environmental and social considerations are associated with water supply planning, this complex process typically is undertaken to address customer needs over 50 years or more. By taking a long-range view, the City can avoid unnecessary costs and invest wisely in the water system infrastructure that serves citizens now and in the future. This helps keep the cost of water down.

Even though uncertainty associated with planning for the future – for example, estimating the number of future customers and how much water they will use – the City developed an effective long-term water supply plan. The plan is based on the scientific, environmental, engineering, and legal knowledge. It is focused on the community’s goal of having a water supply that is adequate, reliable, and sustainable, for both the natural environment and citizens, and that minimizes public health risks and financial costs.

The City’s water supply planning process has been thorough and publicly discussed over many years. The process continues to include many opportunities for public participation and input. Discussion helps the City to provide essential water service in ways that meet citizens’ needs and expectations.

Information on long-range water supply planning is presented in the *Application for Lake Michigan Water Supply, Appendix D – Water Supply Service Area Plan for the City of Waukesha*, posted on the Waukesha Water Utility website at: <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

### 2. Will the City serve more water customers in the future?

It is predicted that the City will serve more customers in the future. In southeastern Wisconsin, population is expected to increase modestly in all counties over the next 20 years.

The City complied with state law for long-term water supply planning, which requires water utility plans to meet the projections of future growth. The City used population and water service area projections prepared by the regional planning commission, along with historic City water use, to estimate future water demand.

For planning purposes, the City’s water service area – recently established by the regional planning commission under state law – is slightly larger than the previous service area. The reason is that regional planning commonly allows for potential future municipal service to nearby citizens currently using private wells. This provision helps to minimize public health and safety risks associated with private well water quality or quantity problems that could develop during the planning period. The City would only serve new areas if requested by the citizens of those areas and subsequently approved by the city leadership. That is, citizens and businesses on private wells must undertake a plan to be served by the City’s municipal water system. If there is no need or local initiative, the residents and businesses served by private wells would not be served by the City and would remain on private wells.

Information on long-range water supply planning is presented in the *Application for Lake Michigan Water Supply, Appendix D – Water Supply Service Area Plan for the City of Waukesha*, posted on the Waukesha Water Utility website at: <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

### 3. Why does the City need a new source of supply for drinking water?

Currently, 87% of the City’s water is supplied by the deep aquifer. The City needs a new source of water supply because the current source is diminished and unable to serve community’s long-term needs.

The groundwater level in the deep aquifer has dropped 500 to 600 feet and is still declining. A layer of rock limits the natural recharge of the aquifer, making it difficult for rainwater to replenish the supply.

Groundwater from the deep aquifer requires treatment to remove radium. Some radium removal facilities have been constructed. Several more would need to be added to meet the City’s radium compliance deadline of 2018 unless the City develops a new water supply. Besides radium, the deep groundwater contains salts. As water is withdrawn from greater

depths, the concentration of salts increases to levels where treatment with desalination is needed. Deep wells are also susceptible to pollution. Two of the City’s deep wells are no longer in service because of contamination.

Continued use of the severely diminished deep aquifer will be progressively more expensive because of increasing levels of contamination, increasing costs of treatment and increasing cost to pump from deeper underground. Future regulations or court decisions might limit or prevent further pumping from this water source. Given the costs associated with pumping and treating deep groundwater, and the risks associated with depletion of the source, the City concluded that continued use of the deep aquifer is neither reliable nor economic, and that a new water supply is needed.

Information on the City’s need for a new water supply is presented in the *Application for Lake Michigan Water Supply* posted on the Waukesha Water Utility website at: <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

### 4. Can the City drill other wells outside the deep aquifer?

Currently 13% of the City’s water is supplied by the shallow aquifer. The shallow aquifer in and around the City is not isolated by a rock layer, so rainwater easily replenishes the supply. The City could drill more wells in the shallow aquifer, but this source of supply will cause more harm to the environment. It is also more susceptible to contamination from surface contaminants and from underground sources such as failing septic systems, making it less protective of public health.

The shallow aquifer is closely connected to rare and sensitive local environmental resources, including the Vernon Marsh Wildlife Area, Pebble Brook and Pebble Creek. Groundwater modeling predicts that continued and expanded pumping of the shallow aquifer near the City would cause significant groundwater drawdowns and environmental harm to wetlands and cold water trout streams. Environmental damage would mean that use of the aquifer could be restricted due to regulations by the state or lawsuits.

The shallow aquifer supply is also not located within the Waukesha City limits, making wellhead protection against contamination and facility security difficult. Because shallow wells would be located outside the City, they would be subject to damage claims from other communities and land owners whose beneficial use of local water resources is reduced. Town of Waukesha officials are challenging City test wells in the Town because of such concerns.

The shallow aquifer is also susceptible to contamination, and given its proximity to potential sources of pollution, it may require extensive treatment to protect public health. The City could drill more wells in the shallow aquifer, but the supply is not environmentally sustainable and faces legal challenges.

Information on local groundwater resources is presented in the *Application for Lake Michigan Water Supply and Application Appendix C – Future Water Supply Study*, posted on the Waukesha Water Utility website at: <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

### 5. What drinking water supply alternatives did the City consider

The City and others have extensively studied the water resources in the Waukesha area. The broad range of water supply alternatives was identified, including the following, alone or in combination:

Deep confined aquifer near the City	Fox River
Deep unconfined aquifer west of the City	Rock River
Shallow aquifer south of the City	Dam on the Fox or Rock River
Shallow aquifer west of the City	Pewaukee Lake
Dolomite aquifer	Lake Michigan
Waukesha area quarries	Milwaukee River
Waukesha springs	Recycled wastewater
Rainwater capture and infiltration	Water conservation

The alternatives were evaluated openly, using the following criteria:

- Environmental impact
- Long-term sustainability to provide the public with adequate supplies of drinking water
- Protection of public health
- Implementability

The estimated costs of alternatives were also considered.

As a result of this analysis, the City concluded that Great Lakes water is the only reasonable long-term water supply alternative for Waukesha. The City is confident in the strength of its analysis and the work conducted by leading water resources experts that supports this conclusion.

Information on water supply alternatives is presented in the *Application for Lake Michigan Water Supply, Application Appendix C – Future Water Supply Study*, and *Application Appendix I – a Regional Water Supply Plan for Southeastern Wisconsin* posted on the Waukesha Water Utility website at:

<http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

## 6. Why is a Great Lakes water supply the only reasonable alternative for the City?

The Great Lakes Compact requires a community in a straddling county – like the City of Waukesha – to show in its application for a Great Lakes diversion that it has no reasonable alternative to Great Lakes water. Wisconsin Statute § 281.346(ps), enacted as part of the implementation legislation for the Great Lakes Compact, explains what that means:

A reasonable water supply alternative means a water supply alternative that is similar in cost to, and as environmentally sustainable and protective of public health as, the proposed new or increased diversion and that does not have greater negative environmental impacts than the proposed new or increased diversion.

Using the above definition and a rigorous screening to identify the most promising long-term water sources, the City conducted a detailed evaluation of the leading water supply alternatives. A side-by-side comparison of the alternatives in terms of evaluation criteria defined by law is presented below.

Comparison of Water Supply Alternatives

Water Supply Alternative	Environmental Impact	Long-Term Sustainability	Public Health	Implementability
Deep and shallow aquifers	●	●	○	●
Shallow aquifer and Fox River alluvium	●	●	○	●
Lake Michigan, deep and shallow aquifers	●	○	○	●
<b>Lake Michigan</b>	○	○	○	○
Deep, shallow aquifers, Fox River, quarries	●	●	●	●

○ No negative impact      ● Moderate negative impact

○ Minor negative impact      ● Significant negative impact

The analysis of water supply alternatives found a Great Lakes supply to be the only reasonable solution. It provides the most reliable, cost-effective and high quality drinking water for the future and it protects and preserves the waters and water dependent natural resources of the Great Lakes Basin.

Information on local groundwater resources is presented in the *Application for Lake Michigan Water Supply* posted on the Waukesha Water Utility website at:

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## 7. Can we use water from area quarries?

Stone quarries, owned by Payne and Dolan, Vulcan Materials Company, and Halquist Stone Company, were evaluated as potential sources of water supply. Excess water collected in the quarries is normally pumped to the Fox River. Recent quarry pumping data reported to the Wisconsin Department of Natural Resources indicates only limited amounts of water are consistently available from the quarries for water supply. The estimated combined supply from the three quarries is between 2 and 3 million-gallons per day. The amount of available quarry water would be reduced during drought because some of the water comes from rainfall.

The quarries are active commercial operations, not planned for future public drinking supply. If Waukesha were able to purchase the quarries or to obtain use of their water, there would be significant water quality and public health concerns. Quarry operations use fuels and solvents that could contaminate water. Numerous other contamination sources near the quarries could pollute the water supply. Also, urban runoff from stormwater can carry contaminants into the quarries.

Supplementing quarry water with water directly from the Fox River could increase the water supply, but the water quality, public health, and regulatory concerns would increase. Storing river water in a quarry would cause stagnation and adverse water quality impacts such as algae growth, lack of oxygen and release of undesirable compounds such as iron, manganese and hydrogen sulfide that can cause “rotten egg” odors in the water. Significant regulatory and environmental issues are associated with injecting surface water into a groundwater source.

Developing this limited water supply source would require an extensive permitting process because there are no quarries used for drinking water supplies in the state.

The evaluation of the potential use of quarry water, in combination with other area supplies, showed that it is not as reliable, protective of public health, implementable, or as cost-effective as other alternatives.

## 8. Can we use the Fox River for drinking water supply?

The Fox River is an alternative source for drinking water supply. The Fox River alluvium (the aquifer near the Fox River, where wells can extract both groundwater and Fox River water) was examined as a water supply alternative. The Fox River alluvium is part of the shallow aquifer and pumping this source has similar adverse environmental impacts, public health contamination and legal concerns. (See Question #4.) This water source was modeled and evaluated, along with the shallow aquifer supply alternative.

Water could be obtained directly from the Fox River, but this source is limited during drought periods, and a high percentage of the river flow would be wastewater plant discharge. This causes both water quantity and water quality concerns. There are no drinking water supplies from the Fox River in the state. Using the Fox River as a drinking water source could increase wastewater treatment requirements and costs for all the wastewater plants discharging into the Fox River, including the City’s plant.

Information on local groundwater resources is presented in the *Application for Lake Michigan Water Supply* and *Application Appendix C – Future Water Supply Study*, posted on the Waukesha Water Utility website at:

<http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

## 9. Can we capture rainwater and replenish our aquifer supply?

Land in Waukesha County can be modified to attempt to increase rainwater infiltration and supplement shallow aquifers. The regional planning commission evaluated this in detail as part of the multi-year study that resulted in the Regional Water Supply Plan. Study findings indicate that modifying more than 260 acres in Waukesha County would increase infiltration by less than 300,000 gallons per day. Although enhanced infiltration may be part of a larger scale water resources management program, it would be costly and difficult to implement. The benefits, in terms of water supply, are very limited.

Information on local groundwater resources is presented in the *Application for Lake Michigan Water Supply, Application Appendix C – Future Water Supply Study*, and *Application Appendix I – A Regional Water Supply Plan for Southeastern Wisconsin* posted on the Waukesha Water Utility website at:

<http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

### 10. Can we avoid a new water supply by conserving more water?

Water conservation is a key water supply component for the City both now and in the future. Conservation helps reduce the amount of water needed, but the combination of more aggressive water conservation along with the City’s current water supply does not provide enough water to meet future demands.

Waukesha leads the state in the implementation of environmentally sound and economically feasible water conservation measures. These measures include outdoor sprinkling restrictions, water rates that encourage conservation, a high efficiency toilet rebate program, water conservation education in schools, and a variety of public education and outreach activities across Waukesha County and the state.

Water conservation will continue into the future and is projected to save another 1 million gallons per day, or an additional 10%. These savings in water use have already been factored into the future water demand projections in the Application.

Information on local groundwater resources is presented in the *Application for Lake Michigan Water Supply, Application Appendix A – Waukesha Water Utility: Water Conservation and Protection Plan*, and *Application Appendix I – A Regional Water Supply Plan for Southeastern Wisconsin* posted on the Waukesha Water Utility website at:

<http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

### 11. Can we use a combination of multiple water sources?

Several water supply alternatives include multiple water sources, but a combination of multiple water supply sources is more expensive and not as environmentally sustainable nor cost-effective.

An established principle of public drinking water supply planning is to obtain the source with the highest quality and most reliability. If the highest quality water supply does not have adequate quantity, the next highest quality water supply source is obtained. Using multiple sources of water is possible when necessary, but increases costs along with complexity of operation and maintenance. Water utilities rarely have more than two primary water supply sources. Impacts to the environment can increase if unsustainable sources are used, and public health protection can decrease if lower quality water sources are used.

During the City’s Great Lakes application process, several water supply alternatives consisting of multiple sources were evaluated. One water supply alternative included continued use of the deep aquifer (30 percent of average day demand) and other sources outside Waukesha including; shallow aquifer and Fox River (25 percent), the unconfined deep aquifer west of Waukesha (20 percent), and quarry water (25 percent). This alternative assumed that it is possible to reduce future water demand by 2 million gallons per day on average days through very aggressive conservation efforts.

The cost to obtain and treat water from multiple sources was compared to the other water supply alternatives. The water supply alternative consisting of several sources proved to be significantly more expensive to construct, operate and maintain. Part of the additional cost is due to the blending facilities that are needed with multiple water sources in order to provide consistent water quality to all customers.

Water Supply Alternative Cost Estimates

Water Supply Alternative	Capital Cost <sup>a</sup> (\$ million)	Annual Operation/Maintenance Cost (\$ million)	20 yr. Present Worth Cost (\$ million, 6%)	50 yr. Present Worth Cost (\$ million, 6%)
Deep and shallow aquifers	189	7.2	272	302
Shallow aquifer and Fox River alluvium	184	7.4	269	301
Lake Michigan and Shallow Aquifer	238	7.5	324	356
Lake Michigan with return flow to Underwood Creek	164	6.2	235	262
Deep, shallow aquifers, Fox River, quarries, greater conservation	286	7.6	373	406

<sup>a</sup>Includes direct construction cost, contractor administrative costs (insurance, bonds, supervision etc), 25% contingency, and costs for permitting, legal, engineering, administrative.

Information on the water supply alternatives is presented in the *Application for Lake Michigan Water Supply and Application Appendix M – Cost Estimates Update* posted to the Waukesha Water Utility website at: <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

### 12. If we buy drinking water from a Great Lakes utility, does the City lose its sovereignty or control over the cost of water?

If the City becomes a wholesale water customer of another water utility, it will not lose its sovereignty or control over the cost of water.

Fifteen municipalities currently obtain water from Milwaukee Water Works; four from the Oak Creek Water and Sewer Utility; and three from the Racine Water Utility. None of these area wholesale water customers have sacrificed their sovereignty.

Waukesha will negotiate with Milwaukee, Oak Creek and Racine as potential suppliers of Great Lakes water. Negotiations have not yet begun. The City’s priority in these negotiations will be to strike an agreement that provides it with reliable, high-quality water at a reasonable cost. Any agreement proposed will be considered in a public process and must be approved by the Waukesha City Council.

If the City becomes a wholesale water customer, the City’s water supplier cannot threaten to cut off or restrict water supply once an agreement is in place. The cost of water, or what a wholesale water supplier can charge, is regulated by the state Public Service Commission. Under the law, the Public Service Commission must set water rates based on the actual costs of providing the water.

Current requests for rate increases by the City of Milwaukee are included in Waukesha’s comparisons of the costs of different alternatives.

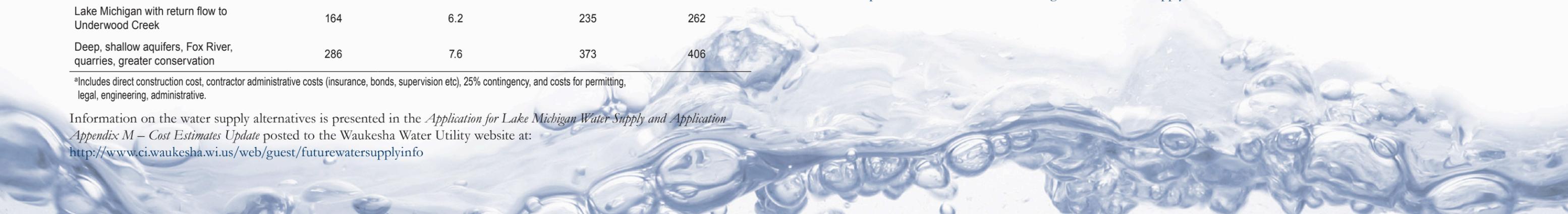
### 13. Why does the City plan to discharge treated wastewater to Underwood Creek?

If the City obtains a Great Lakes water supply, then it must return the water it has used (in the form of treated wastewater) to the Great Lakes watershed in order to meet the requirements of the Great Lakes Compact. With return flow, water is recycled back to Lake Michigan, maintaining a water balance in the Great Lakes. Waukesha’s existing groundwater supply cannot be recycled this way and is discharged after use to the Mississippi River and ultimately the Gulf of Mexico. Recycling treated water back to Lake Michigan is much more environmentally sustainable.

Following environmental, scientific, and engineering studies, the City is proposing to return treated wastewater to Underwood Creek, a tributary to the Menomonee River and Lake Michigan. The treated wastewater flow would be environmental resource that improves the aquatic habitat in the receiving creek and river. The return flow would improve some water quality characteristics in the creek, such as reducing the levels of suspended solids and bacteria. During rain storms, return flow will be managed so as not to cause any additional flooding and to protect property in the Great Lakes watershed.

Returning flow to other locations in the Great Lakes watershed was considered in the preparation of the City’s Application; however, those alternatives cost more money, have greater environmental impacts during construction, and are not as environmentally beneficial to the Great Lakes watershed.

Information on return flow is presented in the *Application for Lake Michigan Water Supply, Application Appendix H – Water Quality Model of Proposed Discharge to Underwood Creek* and *Appendix L – Return flow Effects on habitat in Underwood Creek and Menomonee River* posted on the Waukesha Water Utility website at: <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>



## 14. *What is the process for obtaining Great Lakes water?*

The Great Lakes – St. Lawrence River Basin Water Resources Compact (the Compact) and the Wisconsin Compact implementing statute (Wis. Stat. § 281.346 and 281.348) establish the following process for a community to apply for a Great Lakes diversion with return flow:

1. Conduct water supply studies and long-range planning
2. Implement water conservation for Great Lakes Compact compliance
3. Submit Great Lakes Application to Wisconsin DNR for review
4. Gain DNR approval of Application
5. Submit DNR-approved Application to the Council of Great Lakes Governors for review
6. Gain Council of Great Lakes Governors approval of Application

As a part of this process, the City will perform the following:

- Negotiate a water purchase agreement with a Great Lakes water supplier
- Approve development of a Great Lakes water supply by vote of the Waukesha City Council
- Design, construct, and operate a Great Lakes water delivery system

Information about this process and the anticipated schedule is posted on the Waukesha Water Utility website at: <http://www.ci.waukesha.wi.us/web/guest/futurewatersupplyinfo>

### Contact Us



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