

Drinking Water Pollution Leads to Water Conservation



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Waupaca County is a rural county in central Wisconsin. 100 percent of its drinking water is from groundwater. The dominant soil type is well drained to excessively drained sand, which allows contaminants to move quickly through the soil into groundwater.¹

Issue: Decrease of water quantity and quality

The city of Waupaca experienced water quality and quantity issues during the late 1980s and early 1990s. It has since implemented a variety of strategies to protect and conserve groundwater including well remediation and water conservation, which are discussed here, as well as cropping agreements (see separate case study).

Approach: Water Quality

Well remediation

City well number four is down gradient from the former site of a dry cleaning business. A chemical called tetrachloroethylene (PCE) leaked from an underground tank at the cleaners and was found in the drinking water pumped from the well in the mid 1980s. The Department of Natural Resources (DNR) and dry cleaner settled the case, which designated the DNR responsible for cleanup. Residents were still using backyard wells in the area to water lawns at this time.

The contaminated water was pumped out of the well number four and discharged over a rock channel so the PCE could volatilize. The water then ran into the Waupaca River. This did not reduce the amount of PCE in the drinking water and it was costly to pump continually, burning up motors in the process.

The city considered putting in a treatment facility to remove PCE, but it would have cost too much. The Waupaca Public Works director wrote a letter to the secretary of DNR who finally arranged for an extraction well to be placed over the plume of PCE. Within two weeks, the level of PCE in the water coming from the extraction well fell. They continued pumping the extraction well for a couple of months.

The present level of PCE is one to two parts per billion (ppb) compared to a Maximum Contaminant Level (MCL) to protect human health of ten ppb. The well now provides 10-15% of the city of Waupaca's water.

The city adopted a wellhead protection ordinance in 1992. As with other Wisconsin communities, the ordinance was adopted after they experienced drinking water contamination (see Chippewa Falls case study for more on wellhead protection).

*“Conserving water is the right thing to do” - John Edlebeck,
Waupaca Public Works*

Approach: Water quantity

While well number four was off line, the city realized that if any other city well went off line they would not be able to meet the average daily demand for water. They decided to drill two new wells, but also try reducing water consumption.

Industrial water use

The city first worked with the local foundry, which used approximately sixty percent of the city's water. The foundry reduced their water use by about thirty five percent by developing a way to recycle their cupola's cooling water. A cupola is used for molten metal and was the foundry's largest water use. The capital costs for recycling the water were not recovered quickly, but the foundry wanted to be a good neighbor to the city and set an example for residential water users.

Residential water use

Residential watering restrictions were also implemented as a way to reduce water consumption. This was partly at the suggestion of farmers who were not too enthusiastic about having city wells in their backyard that they did not receive water from. Furthermore, the city felt that residents should not take water for granted; conserving water is the right thing to do and they should not depend solely on industry to conserve

water. The city persisted with this view even after the two new wells were in use.

The watering restrictions state that every day between noon and seven p.m. there cannot be unattended watering. The city does a small amount of policing, but focuses on educational outreach. They have not issued any ordinance violations, which would impose a \$200 fine.

The city also tried to reduce water consumption by tracking high residential water users and offering the 25 highest users a free water use audit of their homes. The audits identified leaks and other areas where water could be conserved and homeowners were given free low flow showerheads, toilet tank bags and low flow aerators to help them reduce their water use. This program is ongoing.

Reflections on water quality and quantity strategies

Weaknesses

Time and money were not utilized effectively in the beginning stages of well remediation, but this was not because of decisions made by the city.

Groundwater is dynamic, so it is difficult to say that groundwater levels have risen directly because of water use restrictions or industrial water conservation.

Strengths

The PCE from the dry cleaners was reduced to below the drinking water standard in a time and cost efficient manner once the extraction well was installed.

The water conservation measures were implemented community wide including both industry and residential customers. Water consumption has decreased and groundwater levels have increased. Water levels in two wells have come up; originally well five was sucking air because the water table was so low. **The city has decreased water consumption overall by twenty five percent since 1994.** All of these efforts took foresight by the Public Works Department and collaboration with adjacent towns and the county.

Conclusion

Waupaca will continue their groundwater protection efforts discussed above and several other strategies including future land acquisition, replacing fuel tanks, reclaimed water recycling and more. Now that well number four has been cleaned up the city is more cautious

about locations of certain industries. The water conservation activities are ongoing and do not take much time to monitor now that they have been implemented.

The city of Waupaca has taken some important measures, many of them proactive, to protect its groundwater. These can serve as a model for all Wisconsin communities that do not want to take their groundwater for granted.



City of Waupaca water tower

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Source

1. Albert, Dennis A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <<http://www.npwrc.usgs.gov/resource/habitat/rlandscp/s5-1-4.htm>> Accessed 2005 May.