

Cropping Agreements to Reduce Nitrates in Drinking Water



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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.

Issue: Decrease of water 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 cropping agreements which are discussed here, and well remediation and water conservation (see separate case study).

Since approximately 55% of Waupaca County is agricultural land, which often uses nitrogen based fertilizers, the presence of nitrate has been an issue in city wells. Furthermore, some of the City of Waupaca's wells are located in rural areas outside of the city near agricultural land. In some wells the city was still struggling with nitrate levels close to ten parts per million (ppm) during the early to mid 1990s. Ten ppm is the Maximum Contaminant Level for human health.

The city adopted a wellhead protection ordinance in 1992 and at the advice of the wellhead protection commission, 24 monitoring wells were installed around wells five and six, the two most productive wells.

Why worry about Nitrates?

- Nitrates form in groundwater because of nearby fertilizer use, barnyard runoff, and septic systems.
- Nitrates are especially harmful to infants who can develop "blue baby syndrome" after drinking water high in nitrates.
- Pregnant women who drink nitrate-contaminated water during pregnancy are more likely to have babies with birth defects.¹
- A high nitrate level can indicate that your water also contains bacteria or farm chemicals.²

Approach: Cropping Agreements

The city needed to go beyond monitoring and try to alleviate the nitrate contamination. One way they decided to do this was to reward farmers for growing crops that require less nitrogen fertilizer.

"The less nitrogen fertilizer put on the ground, the less nitrate will form" – John Edlebeck, Waupaca Public Works

Agricultural properties, notably irrigated cornfields, in the recharge areas of wells five and six were identified (see map below). A cropping agreement with a farmer who owns 208 acres in the recharge area began in 1997. This farmer was paid to switch for one year from irrigated corn to any crop requiring low amounts of nitrogen. The city reimbursed this farmer \$20 dollars per acre for harvesting soybeans, which require about three to four times less nitrogen fertilizer than corn. This agreement cost the city \$4,160 the first year; the farmer has been rotating corn and soybeans each year since. This farmer currently receives \$22.50 per acre. Additional parcels have been enrolled in cropping agreements and there are now three agricultural parcels totaling over 550 acres being rotated with less nitrogen-demanding crops.

Waupaca County cropping agreements

| <u>Parcel</u> | <u>Acres</u> | <u>Payment</u> |
|---------------|--------------|----------------|
| Parcel 1 | 208 acres | \$4680 |
| Parcel 2 | 230 acres | \$5175 |
| Parcel 3 | 114 acres | \$2565 |

Parcels 1 and 2 are rotated every year. A portion of parcel 3 is included every year. Parcel 3 is also paid \$25 per load per year of manure hauled out of the recharge area.

Reflections on Cropping Agreement

The City of Waupaca still struggles with nitrates, which is normal considering the prominence of agriculture and the sandy soils in the county. Well number six was taken off-line for one year because of high nitrates in 2003.

The cropping agreements are voluntary agreements that do have a positive affect on groundwater while allowing farmers to continue their livelihood. They may not be as aggressive as a regulatory program, but overall less nitrogen on the ground equals fewer nitrates in groundwater. Even though nitrates are still a concern, the city is well within compliance of standards now. They take nitrates seriously and are working to keep the level of nitrate low.

The cropping agreements are ongoing and take less time to monitor now that they have been implemented. More farmers have become interested in cropping agreements as they see their neighbors participating; some of these farmers will likely enroll in cropping agreements in the future.

Waupaca's cropping agreements show respect for an important local industry and creativeness in approaching a public health issue. These agreements demonstrate a compromise as well; cities and towns can work together to fulfill economic and ecological needs. Cropping agreements could be applicable to any community that depends on groundwater for drinking, and farming for its local economy.

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Sources:

1. Wisconsin Department of Natural Resources. 2003 Jan. Nitrate. <http://www.dnr.state.wi.us/org/water/dwg/nitrate.htm> Accessed 2005 May.
2. Wisconsin Dept of Health and Family Services. 2004 Nov. Drinking Water. <http://dhfs.wisconsin.gov/hometips/dhp/water.htm> Accessed 2005 May.

