

New Projects to Protect Drinking Water with Kernza® Perennial Grain

What's the problem?

- Nitrogen fertilizers and other agrochemicals used to grow annual crops like corn, soybeans, potatoes, beets, and wheat can pollute aquatic ecosystems and rural drinking water when runoff leaches into groundwater. **Nitrate is one of the most prevalent contaminants of public and private water systems in rural agricultural areas of the U.S. Upper Midwest.**
- In Minnesota, about **75% of residents get their drinking water from groundwater.**
- Contaminated groundwater is often not safe to drink, and it's very expensive to remove pollutants from it. Consuming too much nitrate can be very harmful, especially for babies.
- According to the Minnesota Pollution Control Agency, about **40% of the shallow wells in Minnesota's central region have nitrate concentrations that are higher than the EPA allows for drinking water.** In the state's southwest region, about 20% of shallow wells that are monitored have nitrate levels that are beyond what the EPA considers safe.
- **Wellhead protection areas are lands managed to prevent contamination of public water systems.** Wellhead protection areas cover 1.2 million acres in Minnesota. 360,000 of these acres are considered highly vulnerable, and there are 115,000 acres of row crops grown in highly vulnerable wellhead protection areas.
- **Nitrate contamination of drinking water costs taxpayers millions.** The problem of nitrates and agrochemicals in rural water systems has been around for decades, with **few practical solutions—until now.**

What's Kernza® Perennial Grain?

- Intermediate wheatgrass (scientific name *Thinopyrum intermedium*) is a perennial grass species related to wheat. While it is commonly planted in the U.S. as a forage grass, **breeding programs at The Land Institute and the University of Minnesota's Forever Green Initiative have used the species to develop a promising new perennial grain crop.** Selection for grain size, disease resistance, and other traits have advanced to the point that early-adopter farmers are now beginning to experiment with planting the crop, and the grain is making its way into some beers, cereals, and bakery items. Patagonia Provisions sells a beer made with Kernza® and General Mills is committed to a new product launch.

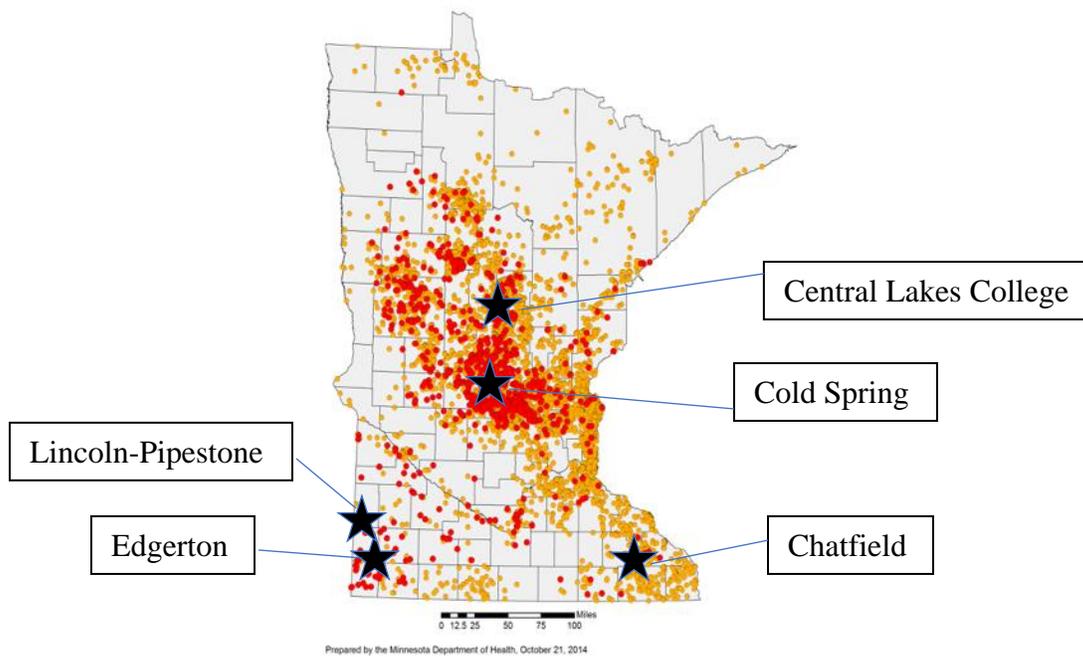
- **Kernza® is the trademarked name of the edible perennial grain harvested from the intermediate wheatgrass plant.** The trademark is held by The Land Institute, a research-based non-profit organization in Salina, Kansas. Additional history can be found at kernza.org and forevergreen.umn.edu.
- Compared to annual crops, **perennial crops like Kernza® can leach less nitrogen to groundwater, sequester more carbon in soils, and prevent soil erosion.**

How Can Kernza® Protect Our Drinking Water?

- Kernza® intermediate wheatgrass may prevent groundwater contamination in wellhead protection areas. **Early experiments with Kernza® have shown basically no nitrogen leaching out of Kernza® fields, which means the crop is very good at using nitrogen that is applied.**
- **Kernza® is an emerging economic alternative to annual crops;** early markets are developing for human consumption (food & drink), livestock grazing, and forage production.

Five New Minnesota Projects to Protect Water Using Kernza®

- 54 acres planted in the southwestern region on **Lincoln-Pipestone Rural Water** land in a highly vulnerable wellhead protection area that pumps 1.8 billion gallons of water a year to 36 municipalities and rural residents in a 10-county region. Results available in 2020.
- 13 acres planted on karst topography in the southeastern community of **Chatfield**. The project is on land owned by the city and a private party and will test nitrate reduction in wellhead management areas. Results available in 2020.
- 4 acres planted on **Central Lakes College**-managed farmland in the state's central region. The sandy soil here typically has low annual crop yield unless irrigated, and it is very prone to nitrate leaching. Results available in 2020.
- 20 acres planted in the **Cold Spring** area on sandy central region soil. The aim here is to develop water-efficient production methods, supply chains, and end-use markets for three profitable perennial crops: Kernza, prairie, and alfalfa. Results available in 2021.
- 40 acres planted in the southwestern community of **Edgerton** in a wellhead management area for Kernza variety seed increase. Results available in 2021.



- Through these projects **communities will directly benefit through reduced nitrate leaching to their drinking water sources.** Long-term, these projects will demonstrate the environmental benefits and economic viability of Kernza to Minnesota’s farmers and landowners.
- *Funding for these projects comes from the Minnesota Legislative Trust Fund for Natural Resources, the Clean Water Fund – Forever Green Initiative, the Institute for Renewable Energy and the Environment, The Land Institute, the Malone Family Foundation, and the Minnesota Department of Agriculture.*



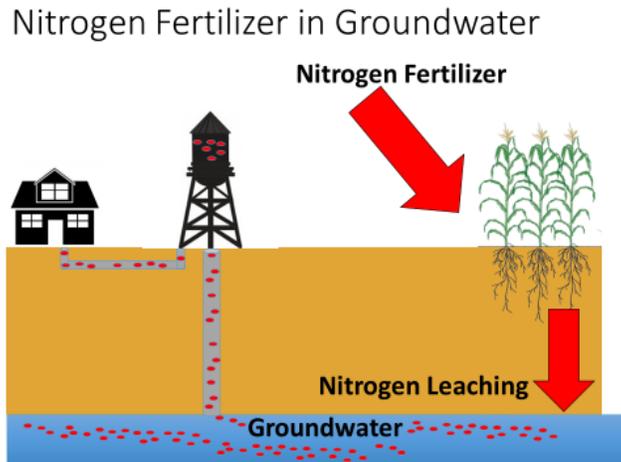
Green Lands Blue Waters is a vision for productive, profitable agriculture in the Upper Midwest based on the straightforward concept of getting as much value as possible from farmlands by growing crops that keep the soil covered year-round—what we call farming with Continuous Living Cover. The values from the crops we promote can be measured in yields and farm profits; but also as reduced risk, improved outlook for long-term productivity from the soil, more jobs, more wildlife, cleaner water and resiliency in the face of a changing climate.

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To read the full paper, ***Using Perennial Farming Systems to Protect Groundwater Supplies in Minnesota***, visit http://greenlandsbluwaters.net/Resources_CLC.html

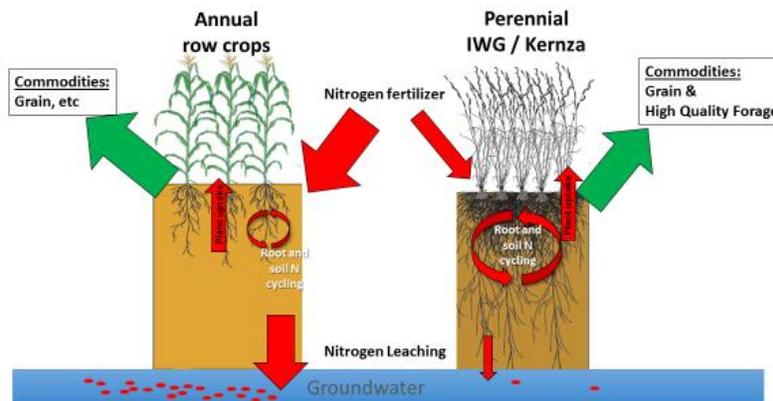
Nitrogen Fertilizer and How it Impacts Drinking Water

Corn and other conventional crops can leach significant nitrogen (N) to groundwater where the N then enters public water sources.



Nitrogen Leaching from Annual Row Crops vs. Perennial Crops

Commodities produced by conventional crops are the economic driver of the farming system that is the source of nitrogen (N) in groundwater. Converting cropland perennial crops provides living cover with deep roots and eliminates the need for added nutrients, thereby ending most N leaching to groundwater.



Figures from Jacob M. Jungers, University of Minnesota.