

This is Wisconsin Water News, a production of the University of Wisconsin Sea Grant Program. I'm your host, Marie Zhuikov. Today's episode is:

### **An experimental cultivation method could mean healthy potato yield and healthier water**

Fried, baked or mashed, we love our potatoes. What we don't love is drinking water with lots of nitrate — a form of nitrogen that fuels a robust potato crop because it acts as a fertilizer. In the Central Sands area of Wisconsin, which is where most spuds are grown, drinking water is groundwater and groundwater can bear the brunt of unwelcome potato cultivation effects.

*"When you look at impacts on the groundwater system from typical cropping systems in the Central Sands, they tend to leach nitrate. Potatoes are particularly challenging because the hill and furrow system tends to promote both (water) recharge, as well as nitrate leaching loss due to the high nitrogen demand of that particular crop."*

That's Kevin Masarik, a researcher from the University of Wisconsin-Stevens Point and University of Wisconsin-Madison Division of Extension. Although he's not armed with regulatory suggestions — or even salt, butter and sour cream — Masarik is coming for those potatoes. He is armed with a one-row hand planter, and rye, millet and oat seeds. He's got in mind science-based solutions, not potato-growing restrictions or even gastronomical intentions.

With two years of funding from the University of Wisconsin Water Resources Institute, Masarik is pursuing what he termed an outside-the-box idea for assessing whether this tasty tuber can be cultivated in a way that reduces the movement of nitrite into groundwater.

In children six months and younger, nitrate promotes the oxidation of hemoglobin to methemoglobin, which limits blood's ability to bind and transport oxygen, depriving the infant of oxygen. Nitrate has also been linked to cancer, thyroid disorders, birth defects and hypertension. Both state health and agricultural officials name nitrate as the most widespread groundwater contaminant in Wisconsin, affecting both municipal and private water systems. Because groundwater also makes its way to surface waters -- rivers, lakes, streams and wetlands can see higher nitrate levels with one result being increased algae growth, which disrupts ecosystems.

Masarik said during the last 20 or 30 years, when the cause and extent of nitrate in groundwater has been documented, there's been a simultaneous gap.

*"We've been good at pointing out that there's a problem, but we haven't been good at pointing out what the solution is. In the last five years, I've been trying to switch the questions that I'm interested in devoting my time and attention to, investigating potential solutions that significantly improve water quality. And that's what this project was born out of."*

"Investigating in-season cover crops for reducing nitrate loss to groundwater below potatoes" is an aptly descriptive title of what his project is doing: it's interseeding cover crops — the rye, millet and oats — among potato rows to see if these added plants will take up the excess nitrate and thereby improve water quality.

Critically, the project also needs to ensure that the potato harvest isn't hindered nor yield significantly reduced by the additional vegetation between rows.

Masarik is grateful for the cooperation of Portage County farmer Justin Isherwood who provided a test plot in 2020. Isherwood credited Masarik for giving him "the language of the landscape," by providing information about aspects of agriculture he wasn't aware of. Isherwood is planning to participate in the study again this year.

Discoveries of last year will be applied. For example, rye is likely to be removed from the seed mix because it put early energy into root growth, resulting in slow above-ground growth. The rye was then shaded out by the potato plants.

Masarik explains that other plants worked better.

*"Did have some success. I think it showed that the amount of biomass accumulation and the amount of nitrogen that the interplanting, or that cover crop, was able to capture is significant enough that this could be viable."*

Masarik is energized for the coming growing season. He also wanted to talk about potato growers, who he termed as wanting to be proactive on the nitrate-loading challenge.

*"It's all about establishing the plots and making sure that biomass we're able to grow in that space is successful. If it's successful, then what is the impact on the actual crop itself. If the impact isn't too great, it might be a viable strategy. It might not be something that growers would naturally want to do. I think they are looking for solutions."*

If Masarik's project is successful, it can be used with other crops to reduce nitrate leaching in those fields.

That's it for this episode of Wisconsin Water News, just one of the ways that Wisconsin Sea Grant promotes the sustainable use of Great Lakes resources through research, education and outreach. Listen and subscribe to us through Spotify, I-Tunes and Google Play or at [seagrant.wisc.edu](http://seagrant.wisc.edu). Thank you to Kevin Masarik and thank you to Moira Harrington, assistant director for communications, for the script. And as always, thank you for listening.