

Putting Down Roots

Building a more sustainable, prosperous Minnesota through Continuous Living Cover

Minnesota's waterways and watersheds provide drinking water to millions of people and support billions of dollars in tourism annually. Yet today, our lakes, rivers and streams are so impaired by **pollutants such as nitrates and sediment** that the federal government has stepped in to call for swift changes.

The **EPA cites more than 300 bodies of water across the state as impaired, threatened, or unsafe**, including parts of the Minnesota, Mississippi and St. Croix rivers. Moreover, it says **20 communities around Minnesota have an unsafe drinking water supply due to toxic nitrate levels**.

A first-of-its-kind report, *Putting Down Roots*, lays out a clear path to cleaner waters while supporting Minnesota's farmers and economy.



PHOTO BY DODD DEMAS FOR FMR

Led by a team of more than **60 researchers and advisors**, this landmark impact analysis demonstrates the effectiveness of **Continuous Living Cover cropping systems (CLCs)** in cutting nitrogen loss, reducing soil erosion and making a dent in greenhouse gas emissions.

Produced by **Ecotone Analytics, Friends of the Mississippi River and the Forever Green Partnership**, the report offers a clear-eyed assessment of CLCs, detailing the **significant impact they can have on our water and rural economies by 2050**.

Access the full report

 fmr.org/clc-report

Minnesota's (bare) fields of opportunity

Minnesota is struggling to meet the goals it set to reduce **nitrates going into the Mississippi River** (45% by 2040) and **sediment going into the Minnesota River**, a main Mississippi tributary (50%).

A big reason for this: Nearly 52% of Minnesota's current cropland is bare in the late fall and early spring. (*Putting Down Roots*, pg. 54.) This recurring “big brown spot” — millions of acres of cropland, devoid of living vegetation — allows pollutants to flow unimpeded into our rivers, streams and other waters.

Minnesota's big brown spot

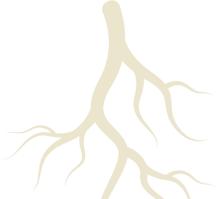


The “big brown spot” — a recurring period of bare cropland — is an environmental and economic opportunity

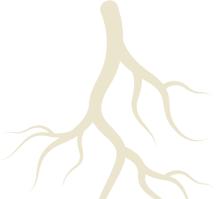
The good news

The report finds that under a “medium adoption scenario” of CLCs, Minnesota cropland can be covered at least 75% of the year by 2050 (*Putting Down Roots*, pg. 56), improving soil health and water quality. The power is in the continuous living cover these crops provide.

Continuous Living Cover (CLC) means having live plants on cropland year-round. Their roots anchor the soil, absorb excess nutrients and foster healthier ecosystems, all while covering the big brown spot. And since many CLCs are planted on acres that would otherwise remain bare over winter, they can be integrated into crop rotations with conventional summer annuals, opening up new revenue streams for farmers.



Reduce
nitrogen loss
23%



Reduce soil
erosion
35%



Increase
on-farm gross
revenues
3%



Increase
on-farm
net returns
20%

(*Putting Down Roots*, pg. 11.)

Fueling a prosperous future

CLC crops are designed specifically to be harvested – providing direct financial benefit to farmers.

Conventional cover crops cost money to plant and don't provide a harvest. CLC crops, on the other hand, provide a harvest and economic benefits for farmers.

Businesses in Minnesota and nationwide are already using CLCs such as Kernza in food products, from baked goods to breakfast staples to beer. Elderberries, hazelnuts, and winter peas also support food systems and food suppliers across the state and beyond.

Other commercial uses for CLCs crops include animal feed and forage, alternative proteins, and grazing. (*Putting Down Roots*, pg. 30.)



PHOTO BY DODD DEMAS FOR FMR

Winter oilseeds and biofuels

PHOTO BY DODD DEMAS FOR FMR



Winter camelina planted in Minnesota in fall of 2023.

While all CLC cropping systems show promise of increased on-farm revenues and environmental impact, winter annual oilseeds emerged as a tentpole crop.

Pennycress and winter camelina have immense potential for reducing lifecycle greenhouse gas emissions (GHGs) through their use in jet fuel and biodiesel. Research shows camelina-based jet fuel, for example, emits 60-90% less GHGs than petroleum-based jet fuel. (*Putting Down Roots*, pgs. 78, 208.) Innovative investors are already taking note and supporting their early development.

Planting the seeds of opportunity



PHOTO BY DODD DEMAS FOR FMR

Minnesota is uniquely positioned to make the most of this opportunity:

- Being at the top of the Mississippi River watershed, decreasing pollution here improves water quality for downstream neighbors.
- The Forever Green Initiative is a world-class research institution, developing cold-hardy, non-GMO seeds and cropping systems.
- We have a high concentration of renewable, biofuel industries and technologies.
- Minnesota ranks 5th in the nation in agriculture production.

Putting Down Roots provides a realistic, practical, and achievable path toward building a more sustainable, prosperous Minnesota. **Yet change doesn't happen overnight.**

Minnesota must invest in its farmers, researchers and businesses by providing the tools, resources, and critical support needed to build our state's long-term health and prosperity through the adoption of CLCs.



Friends of the Mississippi River is a non-profit that works to protect and enhance the Mississippi River and its watershed. *Ecotone Analytics* is an impact analysis consultancy that does benefit-cost, data, and strategy analysis for clients' social, economic and environmental impacts. The *Forever Green Partnership* is a multi-sector partnership working to to develop crops and markets that will increase Continuous Living Cover.

For more information go to fmr.org/clc-report.