Cropland Conservation Practices for Protecting Groundwater

Farmers grow our food and protect our water

Do your part to protect drinking water for future generations.

Adopt conservation practices on your land!

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Are you familiar with practices you can adopt to help protect drinking water?

Each of the following practices will not only help protect drinking water but may also help improve your bottom line. The majority of these practices are effective in reducing nitrate loss to groundwater. Nitrate in groundwater is a human health concern in areas of Minnesota.

Conservation Practice	Description	Key Points

Nutrient Management (590*)

Managing the source, amount, timing, and placement of plant nutrients and soil amendments to improve crop nutrient use efficiency and minimize nutrient losses to surface and groundwater.

- Nutrient management concepts are centered on the 4R Nutrient Stewardship Program, which recommends applying crop fertilizer or manure using the right source, right rate, right time, and right place.
- The 4R Nutrient Stewardship Program and the University of Minnesota's Best Management Practices (BMPs) for Nitrogen Fertilizer closely parallel each other. The BMPs form the core of the Minnesota Nitrogen Fertilizer Management Plan for groundwater protection.
- Key to good nitrogen management is crediting all sources of nitrogen when setting fertilizer rates; including nitrogen from previous crops, manure, soil mineralization, and fertilizers like MAP and DAP which apply nitrogen in addition to other nutrients.
- Split fertilizer application can synchronize nitrogen availability with crop demand, increasing nutrient use efficiency and reducing environmental risk.
- Nutrient management planning, soil sampling, manure testing, equipment calibration, and record keeping are tools used to improve nutrient management.

Irrigation Water Management (442*) and Irrigation System Sprinkler (449*)

Determining and controlling the volume, frequency and application rate of irrigation water in a planned, efficient manner.

- Maximizes the use of water stored in the soil profile.
- Minimizes the potential to over irrigate, decreases nutrient movement to surface and groundwater.
- Promotes proper and safe chemigation/ fertigation management.

*NRCS practice standard number

Conservation Practice	Description	Key Points
Irrigation Water Nitrogen Credits	Taking nitrogen fertilizer credits for nitrate present in irrigation water.	• Allows irrigators to reduce nitrogen inputs and protect groundwater by accounting for nitrogen applied through irrigation water. • Nitrogen fertilizer credits for corn are calculated with this formula: N credit (lb/acre) = Irrigation prior to silking (inches) X 0.225 X nitrate-N concentration (ppm). • Example: 6 inches x 0.225 x 15 ppm = 20 lb/acre N
Cover Crop (340*)	Grasses, legumes, and forbs planted for seasonal vegetative cover.	• Cover crops take up nutrients that would otherwise be lost through surface or drainage water. • Reduces compaction, increases water infiltration and water holding capacity. • Source of feed for livestock.
Conservation Crop Rotation (328*)	A system for growing several different crops in a planned succession on the same field, including at least one low nitrogen input crop such as winter wheat, or two or more years of hay.	• Growing legumes and other crops in a rotation reduces the need for fertilizer inputs. • Improve soil health.
Conservation Buffers – Filter strip (393*), Riparian Forest Buffer (391*), Field Borders (386*), Conservation Cover (327*)	Areas or strips of land maintained in permanent vegetation to help control and trap nutrients and sediment.	• Reduces nutrient movement to groundwater by increasing plant uptake. • Buffers are strategically located on the landscape to protect sensitive areas such as surface waters, sinkholes, wells and tile inlets.

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Conservation Practice	Description	Key Points
Forage and Biomass Planting (512*)	Perennial vegetation utilized for pasture, hay or biomass production. Also provides food and cover for livestock, pollinators and wildlife.	• Conversion of row crop to perennial vegetation reduces the need for fertilizer inputs. • Rotational grazing improves forage plant health by increasing root structure allowing maximum nutrient plant uptake. • Decreases surface water runoff towards sensitive features which impact groundwater.
Integrated Pest Management (595*)	A site-specific, comprehensive evaluation of pest prevention, pest avoidance, pest monitoring, and pest suppression strategies.	• Reduce movement of pesticides to groundwater. • Scout for pest changes to manage decisions to avoid unnecessary use of pesticides (fungicides, insecticides, and herbicides). • Periodically review your plan when the rotation changes or when new pesticides are used.
Karst Sinkhole Treatment (527*)	Sinkholes are a common feature in karst areas and allow contaminants in surface waters to flow directly into groundwater.	• Treating sinkholes reduces movement of contaminants into groundwater. • Treatment typically includes installing a vegetative buffer around the sinkhole and managing nutrients and pesticides within the watershed that flows into the sinkhole.
Well Decommissioning (351*)	Sealing and permanent closure of an inactive, abandoned, or unusable water well. Improperly sealed wells can allow contaminated surface water to bypasses the natural filtration process and mix with groundwater.	• Prevents contamination of groundwater by surface water inflow. • Limits cross contamination between groundwater aquifers.

While any of these practices can have a positive impact on protecting groundwater, a systems approach to conservation planning will maximize benefits. Technical professionals (NRCS Staff, SWCD Staff, or Technical Service Providers (TSP)) can help you identify potential options and develop a management plan. The final decisions are yours. To locate a USDA Service Center near you visit: www.nrcs.usda.gov/wps/portal/nrcs/main/mn/contact/local/

In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651-201-6000. TTY users can call the Minnesota Relay Service at 711. The MDA is an equal opportunity employer and provider.