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UNIVERSITY OF MINNESOTA
Extension
SERVICE

PROTECTING our waters

Managing Crops and Animals Near Shorelands

SHORELAND BEST MANAGEMENT PRACTICES

NUMBER 13 IN THE SERIES

What Are Shoreland BMPs?

Best Management Practices (BMPs) are actions you can take to reduce your impact on the environment. BMPs have been described for agriculture, forest management, and construction. This fact sheet describes BMPs you can adopt on your shoreland property to help protect and preserve water quality. In many cases, the best management for shorelands may be retaining the natural characteristics of your property.

Crops and Animals Affect Water Quality

Rainfall and snow melt running off farmland or seeping into the ground can carry pollution into lakes and streams. Pollution carried by runoff is called **nonpoint source pollution.** In the past, nonpoint pollution from one farm or field has been easy to ignore as insignificant, but it cannot be ignored any longer because the sum of the thousands of nonpoint pollution sources is the main cause of today's water quality problems. Raising crops and animals can contribute to nonpoint pollution if runoff is not properly treated.

Nonpoint Pollution in NE Minnesota

Northeastern Minnesota is blessed with an abundance of clean water. Our lakes and streams are important to tourism, recreation, and the residents who live or vacation in our area.

Nonpoint source pollution from crops and animals in northern Minnesota results from operations ranging from dairy and beef farms to sled dog kennels and hobbyhorse farms. These operations have the potential to send nutrients and organic matter into surface water. Pasturing animals along streambanks can also cause erosion that adds sediment to lakes and streams. Sheet and rill erosion strip away topsoil from steep fields that are farmed in continuous row crops. The topsoil that ends up in lakes and streams often carries nutrients and pesticides along with it.

Major Agricultural Pollutants

The major nonpoint source pollutants are sediment, nutrients, pesticides, bacteria, and oxygen-demanding substances.

sediment – Eroded soil particles from fields, ditches, and streambanks make water turbid, damaging fish and plant habitat and reducing water's aesthetic appeal; sediment may carry nutrients and heavy metals with it.

nutrients – Fertilizer or animal waste in runoff water delivers nutrients such as phosphorus and nitrogen to lakes and streams, causing excessive algae and weed growth; high nitrate concentrations in drinking water can present a health threat for infants.

pesticides – Agricultural chemicals such as insecticides or herbicides can wash off crops and fields into lakes and streams where they can be toxic to fish and other aquatic life; some pesticides pose a threat to human health if they reach drinking water supplies.

bacteria – Runoff or seepage from feedlots and failing septic systems can carry coliform bacteria into surface and ground water, presenting health risks for drinking or body contact.

oxygen-demanding substances – Manure, sewage, crop residue, and other decaying organic matter use up oxygen needed by fish.

Produced by the Arrowhead Water Quality Team, a cooperative effort of Carlton, Cook, Itasca, Koochiching, Lake, and St. Louis counties and state and federal agencies. All publicly funded agencies involved are committed to equal opportunity education, service, and employment.

BMPs to Prevent Nonpoint Source Pollution

Figure 1 illustrates several BMPs designed to minimize the impact of agriculture on nearby lakes and streams.

(1) CROPPED LAND EROSION CONTROL

Careful management of your tillage practice can lead to a more profitable farm operation, reduce erosion, and improve water quality. These management choices added to your tillage options can enhance your operation. Some tillage options to consider are:

- mulch tillage
- no-till and ridge-till systems
- contouring and grass field borders
- strip cropping

Many operations still use the moldboard plow in a conventional tillage system. Fall plowing heavy soils is the best option, but the ground should be left rough and cloddy. Winter conditions can help improve your soil structure by reducing the clump size. Leaving a rough surface also helps cut down surface erosion. Never disc a fall plowing unless it is early enough to establish a fall cover crop. Discing or making seedbeds in the fall will create the opportunity for significant soil and nutrient loss. Spring plowing is your best option in lighter soils and can reduce overall soil erosion.

Some basic BMP practices such as soil management, crop rotation, nutrient management, and seeding fragile and drainage areas with grass for sediment control can greatly increase the profitability of your long-term farming operations. At the same time, negative impacts to water quality will be lessened.

(2) DIVERSIONS AND ROOF GUTTERS

A diversion is a permanently vegetated ridge constructed at the base of a slope to safely divert the runoff. Gutters simply redirect significant amounts of water away from building foundations or, in this case, an animal barnyard.

(3) & (4) MANURE CATCHMENT

This structure allows for the buildup of manure and channels liquid manure to a single outlet. Liquid manure can be either stored and used to fertilize fields or "treated" by a grass filter strip. Solid manure within the catchment can be removed during the growing season and applied to the field, adding organic matter and nutrients. There are many designs and methods of storage for managing both solids and liquids.

(5) GRASS FILTER STRIP

This is permanent grass sod that filters potentially harmful nutrients from the manure catchment area. In the growing months, excess nutrients can be utilized by the grasses. This method is enhanced by the addition of a buffer strip between the grass filter strip and the stream.

(6) BUFFER STRIPS

Along lakes and streams, removal of excess nutrients can be enhanced by the use of buffer strips. These consist of natural or planted woody vegetation along the edge of the stream or lake. In this case, red pine and spruce trees were planted. The buffer strip acts to:

- stabilize soil
- trap nutrients by filtering runoff
- shade and cool the water to improve aquatic habitat

The wider the buffer strip, the greater its effectiveness. Planting high value tree species could increase your farm's future value.

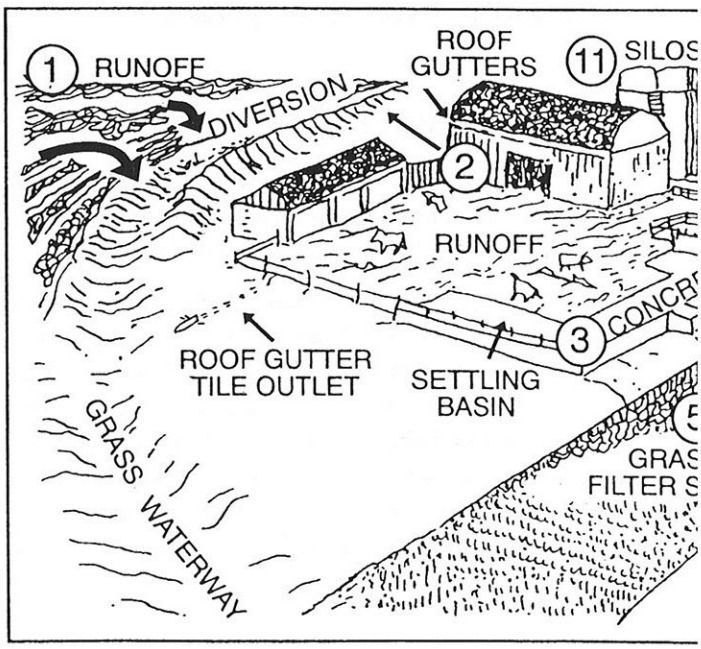


Figure 1: Several BMPs work together to control agricultural runoff.

(7) STREAM CROSSING

The least expensive method is to make a low-flow gravel crossing allowing livestock access to pasture on the other side of the stream. Fencing can be installed on either side of the crossing as gates to prevent them from walking along the stream.

Culverts and bridges are more costly but might be necessary in sensitive areas. These also can be built to allow machinery to cross.

Fencing animals out of lakes or streams will prevent water pollution. Watering your animals can be done with electric pumps, solar-powered pumps, mechanical nose-pumps, and stock watering ponds. Permits may be needed for work done along streams or lakeshores.

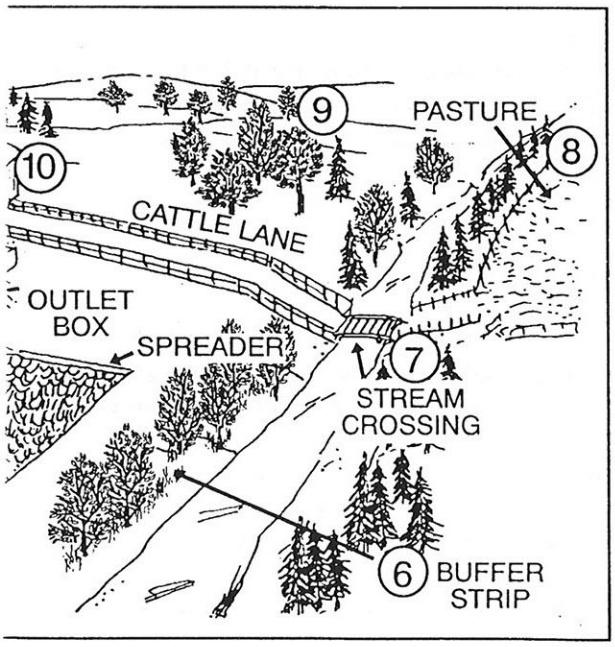
(8) PASTURING LIVESTOCK

Intensive rotational grazing provides better forage for your animals while improving sod and soil coverage between grazing cycles and can reduce overall erosion. Fencing animals from sensitive areas is also important.

(9) UNUSABLE LAND CONVERSION

Highly erodable and marginal fields can be converted to various uses depending on your objectives. Changing marginal cropland or pastures can provide long-term benefits both financially and environmentally. Some conversion possibilities are:

- intercropping trees and pasture
- planting nut trees or high quality timber
- planting Christmas trees
- using native and imported species for wildlife habitat



(10) FUEL, FERTILIZER, & PESTICIDE STORAGE

A small amount of fuel oil, gasoline, diesel, fertilizer, or other chemicals can contaminate a large volume of water. Here are some suggestions:

Fuel Oil, Gasoline, and Diesel

- Locate tanks away from other buildings and water.
- Dike the area around above-ground tanks to contain spills.
- Follow maintenance, safety, and disposal precautions.

Fertilizer and Other Chemicals

- Store only small amounts for short periods.
- Clearly mark containers and check their condition.
- Cover and store on a sealed surface to contain any spills.
- Properly dispose of outdated unused chemicals; contact your county solid waste officer who may accept unused chemicals free of charge.

(11) SILAGE/HAYLAGE

Improperly contained silage can contaminate ground and surface water. Using basic BMPs minimizes risk from these operations:

- Store silage away from any water source.
- Provide impermeable surface soil around the storage.
- Install a seepage collection system.
- Divert clean water away from area.
- Adequately cover silage.

Regulations That Apply

Owners of feedlots with more than ten animal units are required to have a feedlot permit available from the MN Pollution Control Agency (PCA). Check with local zoning authorities for assistance.

Program Assistance for Agricultural BMPs

Programs are available to help individuals cover up to 75% of the cost of applying BMPs. Many animal owners have used this assistance to apply systems such as the ones shown in Figure 1. They find these practices save time and money. Valuable organic fertilizer is stored for use on fields rather than flowing downstream.

The Soil and Water Conservation Districts (SWCD), the MN Board of Water and Soil Resources (BWSR), the University of Minnesota Extension Service, and the U.S. Department of Agriculture (USDA) agencies of the Natural Resources Conservation Service (NRCS) and the Farm Services Administration (FSA) all offer programs to help people plan and adopt BMPs. Through the SWCD, state and federal cost-share programs are available to help people apply these practices. Planning and design assistance is offered at no cost and up to 75% of the installation cost can be covered by cost-share dollars.

For More Information...

call

county offices:

- Soil and Water Conservation District (SWCD)
- University of Minnesota Extension Service

regional offices of MN State agencies:

- MN Pollution Control Agency (PCA)
- MN Department of Agriculture (MDA)

federal agencies:

- Natural Resources Conservation Service (NRCS)

read

Agriculture and Water Quality – Best Management Practices for Minnesota. MN Pollution Control Agency.

Running your Feedlot for Farm Economy and Water Resource Protection. MN Pollution Control Agency.

Nitrogen Management for Livestock Producers. Beltrami Soil and Water Conservation District.

Protecting Minnesota's Water Resources -- Best Management Practices for Atrazine and Nitrogen. MN Department of Agriculture.

PART OF A SERIES...

This fact sheet is one of a series designed to assist shoreland property owners in protecting and preserving water quality. The series includes:

1 Understanding Shoreland BMPs
2 Maintaining Your Shoreland Septic System
3 Installing a Shoreland Septic System
4 Ensuring a Safe Water Supply
5 Limiting Impact of Recreation on Water Quality
6 Developing Shoreland Landscapes and Construction Activities
7 Stabilizing Your Shoreline to Prevent Erosion
8 Minimizing Runoff from Shoreland Property
9 Caring for Shoreland Lawns and Gardens
10 Managing Your Shoreland Woodlot
11 Valuing Your Shoreland Trees
12 Preserving Wetlands
13 Managing Crops and Animals Near Shorelands
14 Reducing the Use of Hazardous Household Products
15 Preventing the Introduction of Exotic Species
16 Accessing Information to Protect Water Quality
17 Shoreland Stewardship Scorecard
18 Conserving Water

This series of fact sheets is a cooperative effort of the following agencies:

University of Minnesota Extension Service of the Arrowhead counties
College of Natural Resources, University of Minnesota
Water Plan Coordinators of the Arrowhead counties
Minnesota Board of Water and Soil Resources
Minnesota Department of Health
Minnesota Department of Natural Resources, Division of Fish and Wildlife, Division of Waters, Division of Forestry
Minnesota Pollution Control Agency
Minnesota Sea Grant Extension Program
Mississippi Headwaters Board
St. Louis County Health Department, Environmental Services Division
Soil and Water Conservation Districts of the Arrowhead counties
Natural Resources Conservation Service
Environmental Protection Agency
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