

# EXTENSION NOTES



Fisheries  
and Oceans

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## BUFFERS PROTECT THE ENVIRONMENT

Conservation buffers are strips or pockets of permanent vegetation planted in and around fields and along roads, streams, rivers, lakes and wetlands. They can help resolve environmental problems on your property and in your community. In addition, buffers can create habitat for fish and wildlife and beautify the landscape, increasing the value of your land as an investment and as a place for outdoor recreation. Conservation buffers are particularly important on shorelands or riparian zones between land and water. Strategically placed buffer strips in the agricultural landscape can lessen the movement of sediment, nutrients, pesticides and pathogens within farm fields and from farm fields. This Extension Note describes several kinds of buffers and identifies sources to help you develop buffers on your property.

### WHY PLANT BUFFERS?

By planting and maintaining buffers, you can help to prevent some of our most serious environmental problems.

#### WATER POLLUTION

Despite improvements in how we manage chemicals and waste in homes, farms and industries, our ground and surface water remains at risk of being polluted. Fertilizers applied to yards, golf courses and fields can be carried by run off into waterways, where they trigger algal and plant blooms that can kill fish and plants. If mishandled, or in the event of unexpected storms, pesticides and herbicides can leach into waterways, directly destroying aquatic organisms and introducing carcinogens and other toxic substances that pose serious health risks to humans and other forms of life. Harmful viruses, bacteria and other pathogens may migrate into waterways from livestock operations and septic systems that are located too close to waterways. Heavy metals, oil, gasoline, sand, salt and many other harmful substances can be washed off roads, buildings and contaminated sites into



drainage ditches that ultimately feed into streams and rivers. The consequences are deterioration in the quality of drinking water and a degraded, potentially dangerous environment. Some buffers can help by trapping pollutants before they reach waterways. By reducing siltation, buffers can also reduce the cost of cleaning ditches to improve drainage.

### SOIL EROSION

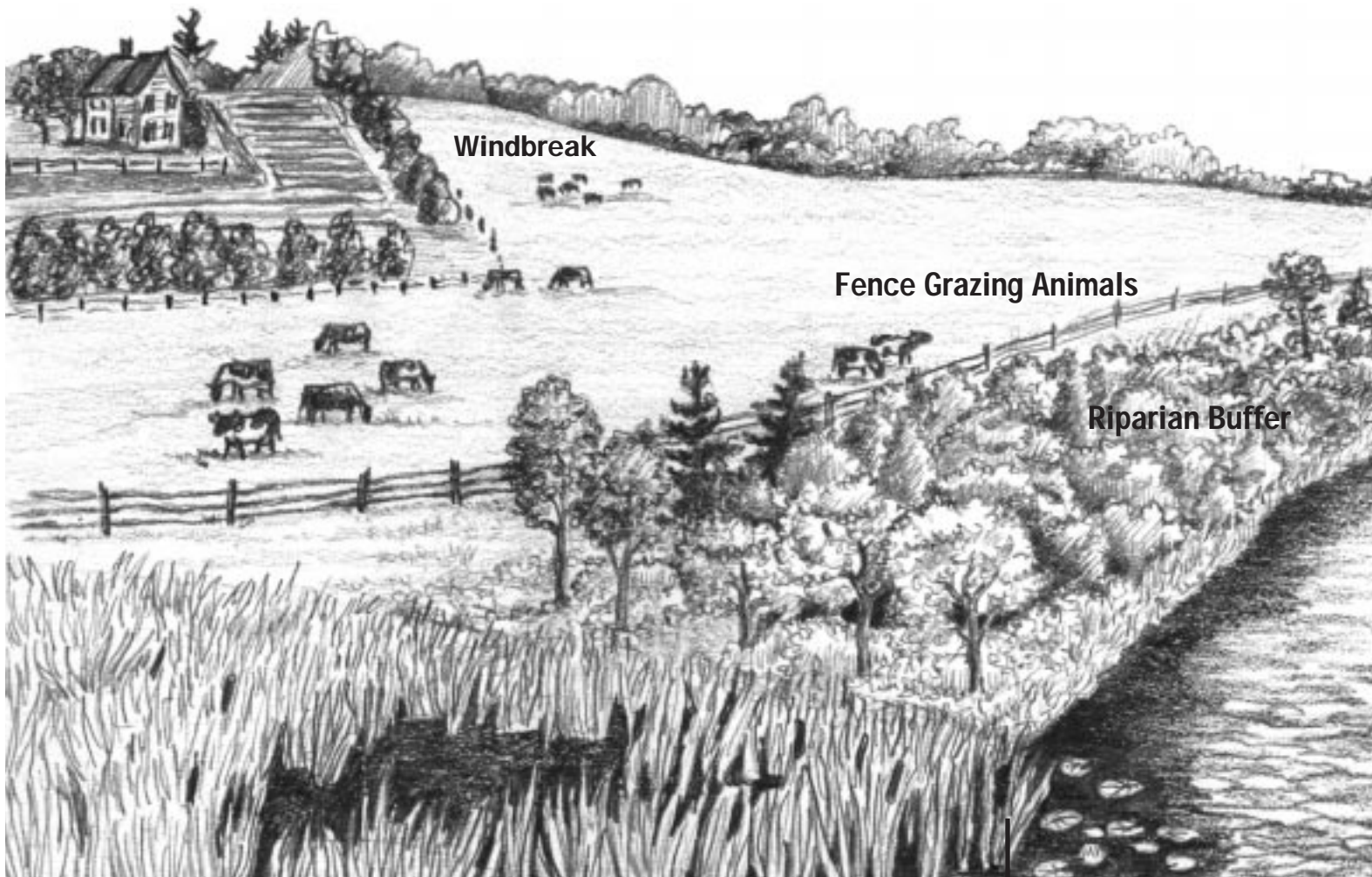
Soil erosion has increased in parts of Ontario where people have created larger fields and removed windbreaks. Two major problems result — the loss of fertile soil for growing food and the degradation of waterways through sedimentation. Urban development can also increase erosion and sedimentation. When soil particles and other sediments are carried by wind and runoff into creeks, rivers and streams, they clog the gills of fish. They may also obscure their vision, making it difficult for them to find food and see predators. Sediments that settle on the bottom cover places where fish feed, hide from predators

and lay eggs. By filling water channels, sedimentation also causes permanent physical changes in waterways that affect aquatic life and contribute to flooding problems. By reducing the force of the wind and changing wind patterns, buffers such as windbreaks can reduce soil erosion. Other kinds of buffers planted along the edges of streams and rivers can prevent sedimentation by trapping eroding soils before they reach the water.

### DESTRUCTION OF NATURAL SHORELINES

Shoreline development, unnatural approaches to landscaping and intensive livestock grazing along waterways can harm land and aquatic habitat and reduce the quality of water for human consumption. The destruction of natural shoreline vegetation increases streambank and shoreline erosion by eliminating the plant root systems that provide stability. It increases the risk of pollution and sedimentation by removing natural traps. By reducing shade, it also destroys habitat for

## PUTTING IT ALL TOGETHER Many different kinds of buffers can be installed to form a conservation system.



Establish buffer of natural vegetation surrounding wetland

Flow Area

trout and other species that need cold water to survive. Buffers planted along waterways can help to reduce these problems by stabilizing soils, trapping pollutants and shading and cooling the water. In addition, they can reduce the risk of flooding.

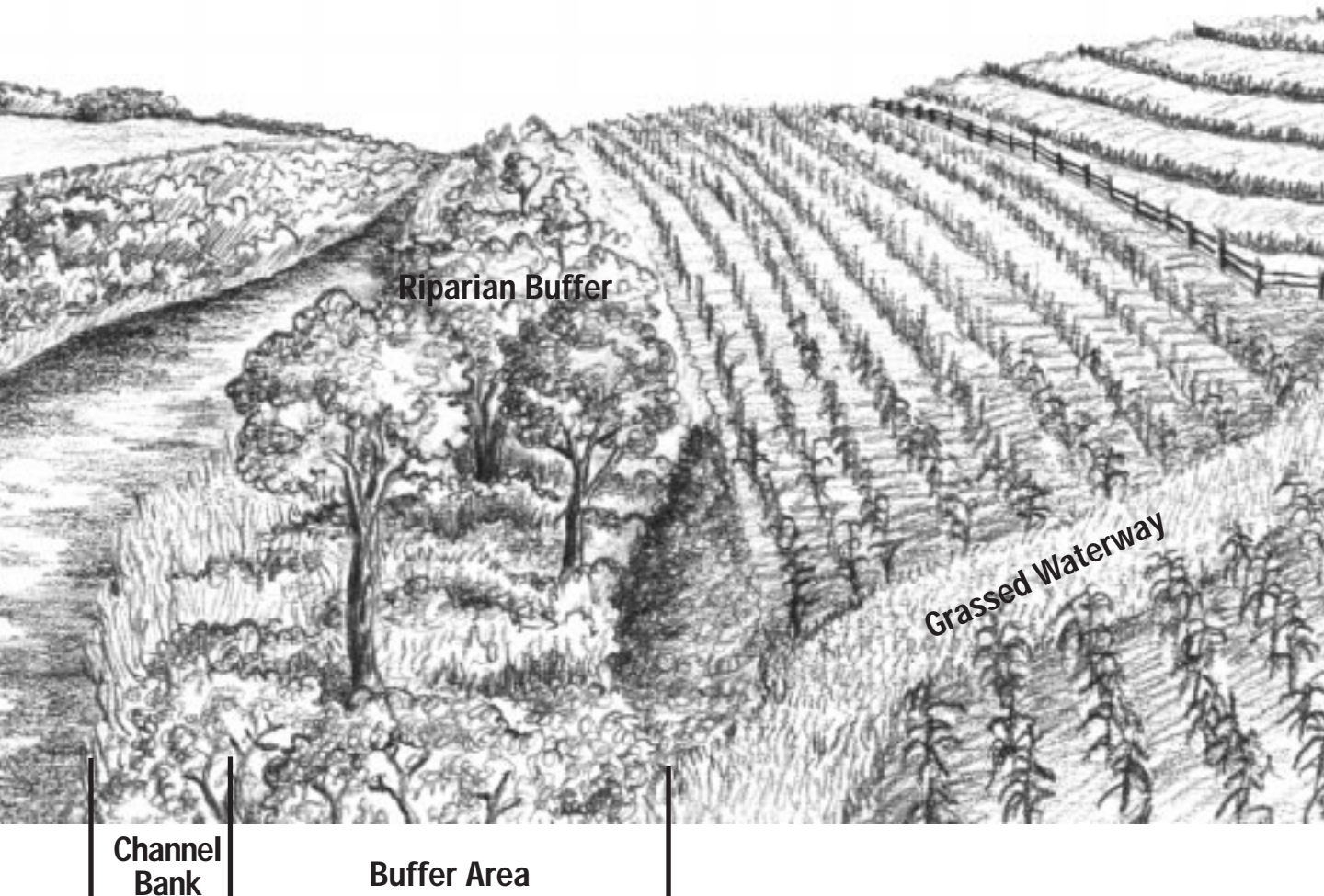
#### **DESTRUCTION OF HABITAT AND LOSS OF BIODIVERSITY**

The southern Ontario landscape has changed dramatically in the past 200 years. Forests now cover only about 20 per cent of the land south and east of the Canadian Shield — and what remains is fragmented into small islands of forest. The result has been a decline in species that depend on forest habitat. The decline in forest along streams, rivers and lakes has also led to the decline of both land and aquatic species. Buffers can help by providing travel corridors between larger areas of natural habitat and protected areas along waterways where wildlife can safely drink and feed.

#### **WASTE OF ENERGY RESOURCES**

The wasteful burning of energy resources for home heating and cooling is expensive and contributes to global warming and associated climate changes. Windbreaks, shelterbelts and other buffers can help by conserving energy that might otherwise be used for heating and cooling. Windbreaks, for example, can reduce winter heating costs by up to 25 per cent. Windbreaks can also dramatically reduce summer cooling costs. Studies have shown that the cooling effect of one mature deciduous tree is equal to 10 room-sized air conditioners.

### **Contour Grass Strips and Vegetative Barriers**



## THE BENEFITS OF BUFFERS

### DEPENDING ON THEIR DESIGN AND LOCATION, BUFFERS CAN:

- protect and improve air and water quality
- reduce soil erosion caused by wind and rain
- helps prevent wind damage to crops
- stabilize the banks of streams, rivers and lakes
- trap water-borne sediments that pollute streams, rivers and lakes (can reduce up to 80 per cent of sediment)
- buffers along drains help protect investments in outlet drains and other erosion control works
- trap fertilizers, pesticides, organic chemicals, heavy metals, salt and other contaminants that pollute ground and surface water (reduces 40 per cent of phosphorous and a significant amount of nitrate)
- trap bacteria and other pathogens that cause water-borne diseases in people, livestock and wildlife (up to 60 per cent of pathogens removed from runoff)
- trap snow, making roadways easier to travel in winter
- protect homes, barns and livestock from wind and harsh weather, reducing heating and animal-feed costs
- provide habitat for fish and wildlife
- cool streams and rivers, creating good conditions for trout and other cold-water species
- generate income through wood, nut, fruit and other products
- help prevent flooding
- make the landscape more beautiful and properties more valuable
- increase outdoor recreation opportunities

## TYPES OF BUFFERS

There are many kinds of buffers. Each is designed to serve a specific function or set of functions within a particular type of landscape or situation. Buffers are most effective if planned and designed as components of a conservation system that considers the geographic location of your property, its characteristics and relationship to surrounding lands and waters, how you use it and your long-term goals.

### RIPARIAN BUFFERS

Riparian buffers are strips of trees, shrubs and grasses that line the edges of waterways. They intercept sediments, pathogens, pesticides, fertilizers and other contaminants that could reduce water quality and harm fish habitat in streams, creeks and rivers. They prevent erosion of banks and improve habitat for fish by shading and cooling the water. They provide protective cover for birds, mammals and other wildlife that feed, breed and rear young near water.

### SHALLOW-WATER AREAS FOR WILDLIFE

These pockets of trees, shrubs and grasses can be planted around small areas of water or wetland within or near croplands to provide nesting areas, feed and protective cover for wildlife.

### WINDBREAKS, SHELTERBELTS, LIVING SNOW FENCES AND ALLEY CROPPING

Windbreaks are formed by a row or rows of trees or shrubs. They are also called shelterbelts and hedgerows. They can be designed to serve many different functions. Depending on the species and placement, windbreaks can reduce wind erosion of topsoil, provide shade, protect young crops and livestock from both heat and cold, provide habitat and protective travel routes for wildlife and reduce the amount of energy required to heat houses, farm buildings and other facilities.

Windbreaks can also function as living snow fences that manage snow deposits along roads and near buildings and collect snow to enhance soil moisture and water supplies. The reduction of snow drifts on roads increases road safety.

Alley cropping refers to the practice of growing crops between rows of trees that provide protection from sun and wind and help prevent soil erosion.

## **FILTER STRIPS**

These strips of grass intercept and trap sediments and potential pollutants before they reach a body of water. Planted beside crops, they help stop fertilizers, pesticides and soil particles from being carried into wetlands and waterways by rain runoff. They are also useful for intercepting runoff from livestock operations.

## **GRASSED WATERWAYS**

Grassed waterways are patches of grass created in low areas of fields where water collects and flows down slope. They prevent gully erosion and can be combined with filter strips to trap sediments and contaminants.

## **CONTOUR GRASS STRIPS AND VEGETATIVE BARRIERS**

Contour grass strips are narrow bands of grass that lie across slopes in an alternating pattern with crops. Vegetative barriers are narrow, permanent strips of dense perennial vegetation established perpendicular to the dominant slope of a field. Contour grass strips and vegetative barriers reduce soil erosion caused by wind and rain, trap contaminants and provide wildlife habitat.

## **CROSS-WIND TRAP STRIPS AND HERBACEOUS WIND BARRIERS**

Cross-wind trap strips are rows of tall perennial grasses placed perpendicular to the prevailing wind. Herbaceous wind barriers are similarly placed rows of perennial vegetation. They can prevent wind erosion and wind damage in susceptible vegetable fields.

## **FIELD AND FACILITY BORDERS**

Strips of grass along the edges of fields help prevent soil erosion from wind and rain runoff, trap contaminants and provide protective cover and food for wildlife. Where fields border woodlots, edge plantings of conifers followed by large shrubs and then lower shrubs can enhance the edge effect and increase habitat diversity. Grassed or herbaceous borders along the edges of roads, parking facilities, yards, golf courses, industrial operations, commercial centres and other kinds of operations can trap sediment, salt and other contaminants that could pollute waterways. Field borders also provide good turning headlands. These help to avoid dead furrows that otherwise would run up and down the slope.

# **HOW TO DEVELOP BUFFERS**

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Before you start to plan your buffers, consider your whole property and its relationship to your neighbours' and the local landscape. What environmental problems or risks would you like to solve? What kinds of buffers could help solve those problems? What additional benefits might they provide? What level of maintenance can you commit to? What are some of the problems that may be encountered and how can they be minimized, for example, nuisance wildlife and wildlife related damages? The answers to these questions will help you establish long-term goals and design a conservation system to achieve them. Here are some steps to follow as you proceed:

## **1. CONDUCT AN INVENTORY**

Look at the following elements of your property:

- fields
- fencerows, hedgerows and windbreaks
- forests
- wetlands
- other natural areas
- waterways
- prevailing winds
- soils
- drainage
- slopes
- lanes
- buildings and paddocks

Also consider the amount of time and money you have for making improvements, what markets you have for your products and the values you place on environmental protection, wildlife and the appearance of your property.

## **2. DEFINE YOUR GOALS AND PRIORITIES.**

Write down your long-term goals and establish priorities that are based on your personal preferences and resources.

## **3. IDENTIFY THE KINDS OF BUFFERS THAT WILL HELP YOU ACHIEVE YOUR GOALS.**

Get more information or expert help to determine the required widths of the buffers you want to install and the best species to plant. Also, find out whether your proposed buffers are in keeping with municipal, provincial and federal regulations, and whether government funding is available.

## **4. DEVELOP A CONSERVATION PLAN THAT INCLUDES PHASED INSTALLATION AND MAINTENANCE.**

Consider developing buffers over time as resources permit. Take advantage of opportunities to work with your neighbours on joint projects and to get funding from assistance programs.

## **5. GET ANY REQUIRED PERMITS.**

Permits, such as those required for working around water, may be required before you do any work.

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## 6. INSTALL THE BUFFERS.

Depending on the kind of buffer, installation could require several steps over several seasons.

## 7. MAINTAIN THE BUFFERS.

The degree of maintenance required will depend on the type of buffer and the species planted.

## SOURCES OF EXPERTISE AND ASSISTANCE

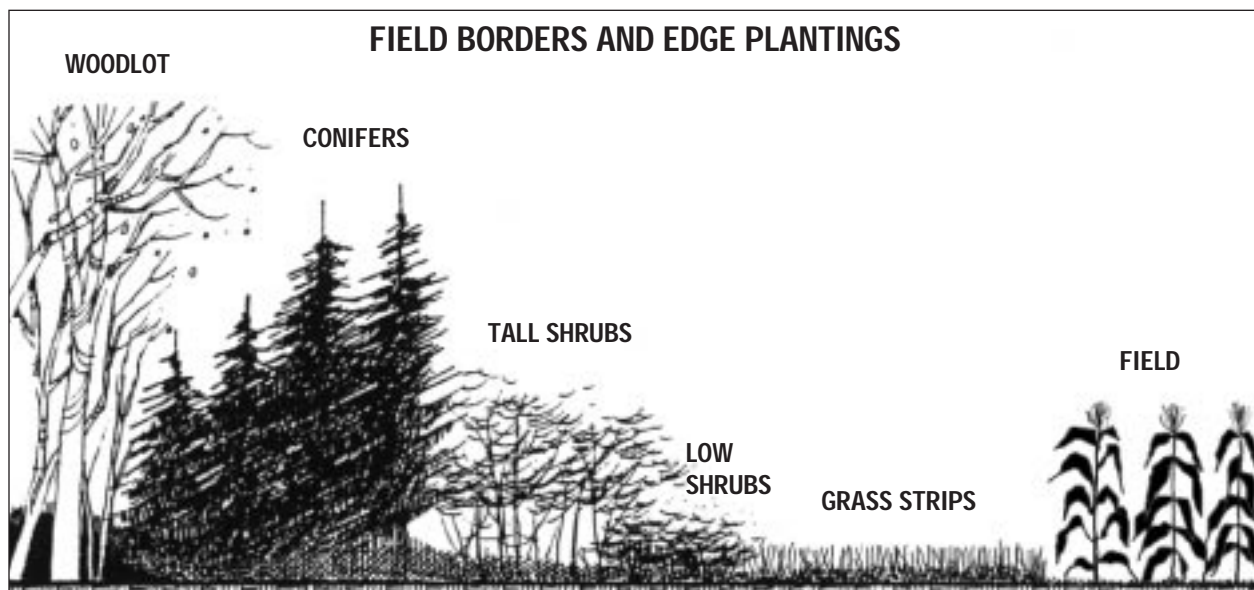
There are sources of expertise and assistance to help you plan buffers and work them into your farming operation or recreational property. Some of these sources may offer funding support or may be able to direct you to potential funding sources. For more information, contact:

- your local municipality
- your local conservation authority
- your local stewardship council
- the nearest office of the Ontario Ministry of Natural Resources
- the Ontario Environmental Farm Plan
- Ducks Unlimited
- OMAFRA

## FURTHER READING

The following Extension Notes are good sources of information related to conservation buffers:

- *Benefits of Windbreaks*
- *Designing and Caring for Windbreaks*
- *Improving Fish Habitat*
- *Preserving and Restoring Natural Shorelines*
- *Preserving Water Quality*
- *Protecting Fish Habitat*
- *Restoring Shorelines with Willows*
- *Preventing Sediment From Destroying Fish Habitat When Building Around Water*



For more information contact:

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