



# RIPARIAN AREA MANAGEMENT

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## INTRODUCTION

Maintaining healthy riparian areas requires an understanding of how they function and how agricultural practices affect them. This **Water Quality Matters** publication provides information about the role of riparian areas in maintaining good water quality and how the careful management of riparian areas can provide sustainable forage for producers and improved water quality for all.

## WHAT ARE RIPARIAN AREAS?

A riparian area is defined as the strip of moisture-loving vegetation growing along the edge of a natural water body. The exact boundary of the riparian area is often difficult to determine because it is a zone of transition between the water body and the upland vegetation. A riparian management zone usually extends from the water's edge to the upland area.

## BEST MANAGEMENT PRACTICES

Sustainable agriculture requires that soil and water quality be maintained. Some farm practices have the potential to cause environmental harm, which may affect rural and urban areas alike. Many of the potential negative impacts of farming can be greatly reduced by the use of *Best Management Practices*. These are agricultural practices that reflect current knowledge about conserving soil and water without sacrificing productivity.

Water is continually cycling. The water that we use has been used before. Producers and consumers, rural and urban people and the public and private sectors, are all responsible for using water wisely and ensuring that the resource is maintained for others. *Best Management Practices* are one way for the agricultural sector to help preserve water quality.

All riparian areas do not look the same. The vegetation of healthy riparian areas around prairie pothole sloughs or southern prairie streams often consists mostly of sedges, grasses and shrubs, such as willows or dogwood. On the other hand, the riparian zones of boreal, foothill, or parkland streams usually include larger trees such as alder, aspen or spruce, in addition to the grasses, sedges and shrubs.

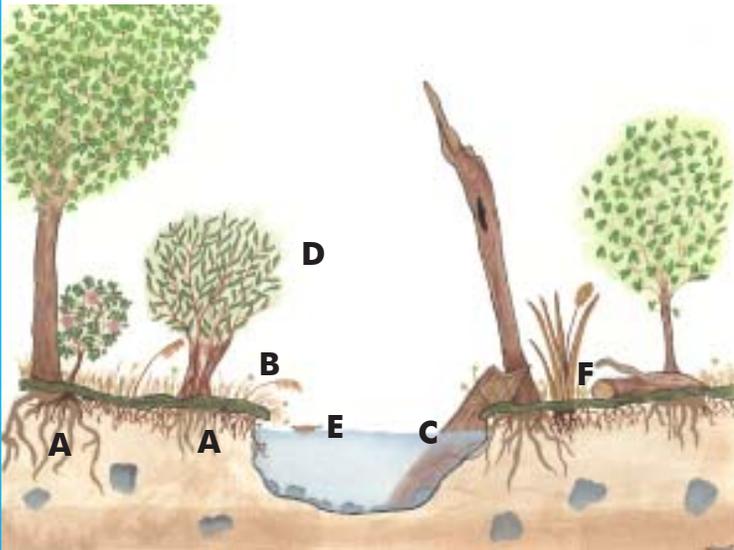


Riparian areas follow the edge of the water body and extend outwards. Management zones may include regions outside of the true riparian area

## HOW ARE RIPARIAN AREAS LINKED TO WATER QUALITY?

Riparian areas serve many ecological functions, some of which act to protect water quality or maintain an ecological balance in a water body.

Healthy riparian areas perform several basic functions which help maintain good water quality.



- A. Natural riparian vegetation usually has deep roots. The deep root mass helps maintain the bank or shoreline structure by holding the soil together. This vegetation provides a barrier to the erosive power of the water. By reducing erosion, less sediment is transported to the water body. Reducing sediment helps keep fish spawning areas clear, reduces nutrients, and makes water treatment easier.
- B. Riparian vegetation can also help reduce the amount of sediment and nutrients that are transported in runoff. The vegetation physically traps sediment in surface flow, and uses the nutrients in the shallow sub-surface flow.
- C. Some riparian vegetation is a source of large woody debris. When floating or beached in a water body, debris provides shelter for fish and habitat for aquatic insects. In flowing water, the debris also traps

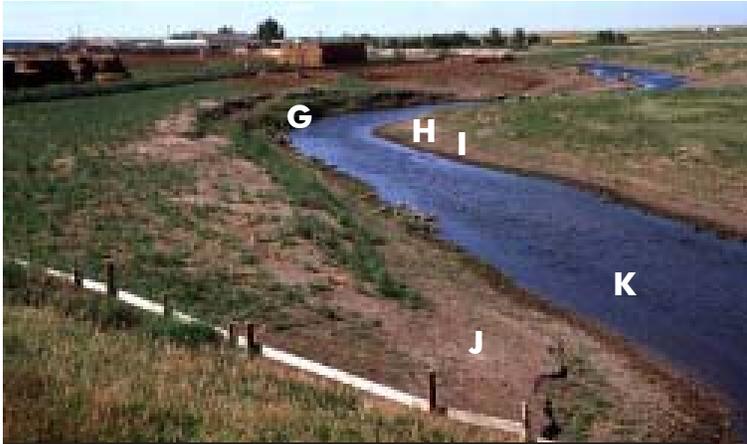
sediment and helps create structure (pools, riffles and runs) in the stream. Pools, riffles and runs are important components of a stream's ability to maintain aquatic life.

- D. Riparian vegetation provides shade. Shade helps regulate stream temperatures by controlling the amount of sunlight that reaches the stream. Most fish species prefer the cooler temperature of shaded streams. Shady areas also provide refuge areas for fish. Less algae grows in shaded streams because reduced sunlight limits photosynthesis.
- E. Riparian vegetation is a source of small organic debris, which may include leaves, twigs and terrestrial insects. This debris is an important food source for many aquatic organisms.
- F. Riparian vegetation helps reduce stream velocity during high flow events. This helps to slow down the natural erosion of the stream bed. Rapid erosion of the stream bed results in a lowering of the local groundwater table. Once the groundwater table is lowered, it is very difficult for water-loving plants to re-establish.

## WHAT ARE SOME INDICATORS OF AN UNHEALTHY RIPARIAN ZONE?

Managed riparian areas are generally considered healthy if they are well-vegetated with a diverse group of plants that have a deep binding root mass, and have the age classes of vegetation that allow for regrowth. These types of plants are important in helping to ensure that the riparian area functions the way it should. The different age classes ensure that if the riparian area is used for forage, it will be sustainable. As long as the forage is sustainable, it will provide economic returns for a producer.

Healthy riparian areas differ from one water body to another, particularly with respect to plant species and structure. On the other hand, unhealthy riparian areas have several similarities.



**Common features of unhealthy riparian areas often include a lack of woody vegetation and an abundance of bare or trampled ground**

- G. An abundance of weeds and non-native plant species is caused by removal of the native vegetation. Often these plants do not have the deep binding root mass that the native plants had and streambanks become unstable and highly erodible.
- H. A lack of shade-providing trees promotes greater sunlight penetration, leading to warmer stream temperatures and a decreased capacity to hold dissolved oxygen. These factors can lead to an increase in algal growth and a decrease in the abundance of aquatic organisms.
- I. A lack of tree saplings is caused by over-grazing. These saplings are needed to replace the mature trees as they age.
- J. Large areas of bare ground are caused by trampling of the vegetation by cattle. Slumping and erosion of the bare ground increases sediments in the stream, lowering water quality.
- K. A lack of large woody debris limits available habitat for fish or other aquatic organisms. *Note:* Some healthy riparian areas (e.g. streams in grassland regions) may not have large woody plants and therefore would not contribute woody debris to the stream.

## SOLUTIONS

Improving the health of a riparian area can sometimes be as simple as allowing a rest period from grazing and changing the way the riparian zone is managed. Activities that can lead to unhealthy riparian areas include such things as removing vegetation to plant annual or forage crops, over-grazing and trampling of the stream bank by cattle, which are using the water body as a water source. Some management techniques to consider include the following.

- Avoid cropping right to the edge of a water body and allow natural vegetation or appropriate planted forage to regenerate.
- Provide remote watering systems for cattle.
- Construct cattle crossings to reduce disturbance of the site.
- Alter livestock distribution by rotating salt and mineral locations, and using temporary fencing.
- Defer grazing until after the spring and early summer period.
- Reduce the intensity of grazing within the riparian area.
- Use alternative grazing management systems such as rotational grazing.
- Manage the riparian area as a separate and unique pasture.
- Use corridor or exclusion fencing in severely disturbed areas to allow regeneration of natural vegetation.

## THE BIG PICTURE

Healthy riparian areas serve many functions including protecting water quality, providing habitat for wildlife and providing aesthetic and recreational value. These areas also provide a sustainable source of forage, which means the land is not lost from production.

When riparian areas are functioning well, everyone benefits. By helping maintain water quality, users will have access to clean water for human, livestock or irrigation uses. Healthy riparian areas also ensure that aquatic ecosystems flourish. Healthy aquatic ecosystems allow for recreational use of the water body by anglers and bird watchers, whose influx can help support the rural economy. Lastly, when a riparian area is healthy, it can be used as a sustainable grazing resource.

For more information about *Best Management Practices* see the following **Water Quality Matters** publications: "Protecting Your Water", "Agricultural Best Management Practices", "Soil Texture and Water Quality", "Alternatives to Direct Access Livestock Watering", "Nutrient Management Planning" and "Pest Management and Water Quality".

For further information on rural Prairie water quality issues:

- read the other publications in PFRA's **Water Quality Matters** series;
- visit our website at [www.agr.ca](http://www.agr.ca);
- **contact your local Prairie Farm Rehabilitation Administration Office**

(PFRA is a branch of Agriculture and Agri-Food Canada)

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