

Enhancing Wildlife and Biodiversity

INTRODUCTION

The purpose of this fact sheet is to provide information on wildlife habitats in agricultural environments and to outline practices that can be implemented to lower risks to these habitats.

Farmers are biodiversity managers in that they produce living products such as crops and livestock in habitats and landscapes where wild animals and plants live.

Developing a biodiversity management plan can help landowners identify sensitive areas of their farms which could benefit from changes in management.

DEFINITIONS

Biological diversity or *biodiversity* is a term that describes the variety and variability within and among living organisms and their relationship with each other and with their physical environment. It includes diversity within species (genetic diversity), between species (species diversity), and of ecosystems (ecosystem diversity).

Convention on Biological Diversity

Canada signed the *Convention on Biological Diversity* at the United Nations Conference on the Environment and Development (UNCED) in Rio de Janeiro in 1992. The objectives of the Convention are:

- the conservation of biological diversity;
- the sustainable use of biological resources; and
- the fair and equitable sharing of the benefits that arise out of the use of genetic resources.

Following ratification of the Convention, the *Canadian Biodiversity Strategy* was released in 1995. The Strategy addresses biodiversity issues in agriculture and directs federal and provincial governments to:

- maintain the agricultural resource base through research, policy and program reform, and economic incentives;
- conserve biological resources through off-site facilities (e.g., seed and field gene banks);
- develop on-site conservation mechanisms for wild relatives of crops, domesticated animals, and microbial organisms; and
- promote sustainable farm practices that are compatible with wildlife.



An *ecosystem* is most often defined as the interactions among the living and non-living parts of the environment in a particular area. Terms such as *forest ecosystem*, *grassland ecosystem*, and *wetland ecosystem* are commonly used. The term *habitat* is used to describe the biological and physical environment of a particular species (*adapted from: Biodiversity in Agriculture: Agriculture and Agri-Food Canada's Action Plan, 1997*).

A *wildlife habitat* includes the area of land and/or water used by animal and plant species in order to survive and complete their life cycles. Habitats provide for vital needs such as food, water, cover, and space, and allow for the reproduction and dispersal of species.

BENEFITS OF BIODIVERSITY

Biodiversity can be enhanced by managing habitats, benefiting the farm in many positive ways. For instance:

- Soil organisms, bacteria and fungi break down organic matter which makes nutrients available for crops.
- Contaminants found in the soil, air and water can be degraded through ecological processes which involve many organisms.
- Certain insects ensure the pollination of a variety of crops, such as blueberries and canola.
- Some birds and insects also ensure the biological control of crop pests.
- Greater biodiversity leads to lower variability in standing crop production and improved agricultural productivity.

- Water quality can be enhanced when natural vegetated buffers are used to trap sediments and runoff. These natural areas are also wildlife habitat and contribute substantially to the biodiversity of the surrounding environment.
- Rotational grazing is beneficial to livestock because it can improve forage quality. This results in healthier cattle with more rapid weight gain. It can also provide better nesting cover habitat for birds.
- Through photosynthesis, plants remove carbon dioxide from the atmosphere and release oxygen. This process also plays an important role in mitigating greenhouse gases in the atmosphere.
- Various wildlife species provide genetic material for crop and animal breeding programs.
- Biodiversity can improve our well-being. Many people find comfort in the presence of wildlife and healthy habitats.
- Many recreational activities can take place such as hunting, fishing, hiking, and bird watching.
- The aesthetic appearance of the farm and the property can be enhanced where habitats are healthy.
- Biodiversity can support the tourism industry of a region.

NUISANCE

Agricultural producers sometimes associate biodiversity enhancement with an increase in nuisance animals. However, the presence of wildlife on the farm is not necessarily a nuisance. An animal only becomes a nuisance when it causes damage to crops, livestock, farm buildings, or other economic loss. When essential needs are not met in a natural habitat, some species will use other habitats (i.e. croplands) or attack livestock. However, when natural habitats are healthy and all vital needs of wildlife can be met, conflicts can be greatly reduced.

WILDLIFE HABITATS

Habitat loss or alteration is common in agricultural environments and associated with a decline in wildlife species and biodiversity. The conservation of habitats found on the farm, and the connection of these habitats with one another, is important to ensure the movement and survival of various species. Here are some of the habitats usually found in agricultural environments that can be conserved or enhanced:

Riparian buffer zones

Riparian buffers zones are strips of land in permanent vegetation that border watercourses such as streams, rivers, and wetlands. These areas are a transition between terrestrial and aquatic habitats; therefore, they harbour a rich diversity of vegetation and wildlife.

Riparian buffer zones, when properly managed, play a vital role in the protection of aquatic life by preventing sediments and contaminants from entering watercourses. Trees also provide shade which helps control water temperature and the level of oxygen in the water for fish. Banks along watercourses can be stabilized through proper establishment of a riparian buffer zone which prevents the loss of land and habitats.



Various species of birds and insects found in riparian buffer zones are beneficial to control crop pests. Riparian buffer zones also act as a corridor that links various habitats with one another, allowing the movement and dispersal of wildlife and plant species.

A riparian buffer should consist of three zones, and the width should ideally be a minimum of 30 metres (100 feet) *for it to be beneficial to wildlife species*.

Each zone has the potential to be habitat for different species of wildlife.

- The zone along the fields should be composed of perennial grasses that filter sediments and contaminants in the runoff water (5 m).
- The middle zone is composed of larger and deeper rooted trees and shrubs that filter the remaining surface runoff as well as shallow ground waters (20 m).
- The zone adjacent to the watercourse consists of densely rooted trees and shrubs well adapted to wet environments. Its role consists of stabilizing the bank (5 m).

Riparian buffer zones in agricultural environments are frequently used to increase the land base for crop production or cattle grazing. With fewer trees and less vegetation to stabilize the area, bank erosion, sedimentation, and runoff may potentially affect water quality and aquatic life.

Wetlands

Of all the different types of habitats, wetlands are one of the most valuable and productive habitats. Whether it's a bog, marsh, or swamp, wetlands provide habitat for an array of wildlife species such as insects, fish, amphibians, reptiles, birds, waterfowl, and mammals.



Properly managed wetlands near the farm can contribute to the enhancement of biodiversity at the same time as they filter and purify water. Wetlands can act as a sponge that stabilizes streambanks and shorelines, regulates water flow, and reduces the risk of flooding.

The restoration of in-filled or drained wetlands or the construction of an artificial wetland to treat runoff water can benefit biodiversity as they can provide habitat for a rich diversity of fauna and flora species.

Woodlots, travel corridors, windbreaks

Woodlots often contain a rich diversity of plants and animals. The more complex a woodlot is, the greater the variety of species it can support. Thus, it is essential to ensure that woodlots contain a mix of hardwood and softwood species of various ages and sizes, as well as a diverse under-story of shrubs and plants.



Woodlots are often another source of income for producers (e.g. maple syrup, wood harvesting). The development and implementation of a woodlot management plan, both for a

natural woodlot and a plantation, is an important way to conserve and enhance biodiversity on the farm. A plan will ensure that wood harvesting is done in a way that sustains both the woodlot and the species it supports.

In an agricultural landscape, it is not uncommon to see forest fragmentation where woodlots are isolated from other habitats such as forests, riparian zones, wetlands, and so on. The presence of travel corridors is effective in maintaining biodiversity in the long term as it will allow the movement of animals from one habitat to the other, and provide shelter and food. Well-managed natural fence lines or windbreaks can serve the function of travel corridors, and are not only beneficial to biodiversity but also to agricultural lands. Their presence can help protect against soil erosion by wind and water. Windbreaks also support populations of natural enemies of pests and beneficial insects that can ensure pollination of various crops.

The establishment and proper management of windbreaks on the farm can provide substantial wildlife habitat. Windbreaks provide shelter, food, travel paths, reproductive and nesting sites for wildlife. The biodiversity of wildlife in a windbreak is related to its width, diversity, and integration or connection to other habitats.

Furthermore, keeping stumps and dead trees in any type of habitat can provide shelter for several species (e.g. woodpeckers, squirrels)

BENEFICIAL AGRICULTURAL MANAGEMENT PRACTICES

Some agricultural management practices can be adopted or improved to reduce their impact on biodiversity and wildlife habitat.

Control livestock access to sensitive areas

Sensitive habitats such as riparian buffer zones, woodlots, wetlands, and aquatic habitats need to be protected from livestock because trampling and grazing can destroy the vegetation they sustain.

For instance, livestock access to riparian buffer zones can negatively impact aquatic habitats because cattle tend to compact the soil and destroy vegetation that stabilizes the bank. This reduces water infiltration and increases runoff and sedimentation during heavy rainstorms. As well, damage to the stream bottom and sedimentation of the stream reduce spawning and food habitat for fish.

Livestock access to watercourses can be detrimental to fish habitat because the loss of streambank vegetation will decrease shading and increase stream temperature.

Therefore, it is important to fence off sensitive areas to restrict cattle access to watercourses, and to provide cattle with an alternative watering source.



Stream crossings

Sometimes, a watercourse has to be crossed to access other parcels of land for grazing purposes or machinery crossing. It is therefore important to build appropriately constructed stream crossings (i.e. hardened ford, low-level crossing, mid-level crossing, culvert, or bridge). Unprotected watercourse crossings can damage the watercourse bed, reduce fish habitat and cause streambank erosion. A stream crossing must not interfere with the passage of fish or reduce fish habitat.

Rotational grazing

Rotational grazing consists of subdividing a pasture into smaller paddocks where each paddock can be grazed for a few days. Livestock can then be moved to another paddock. The rotation allows each paddock to rest until there has been adequate regrowth.

Rotational grazing is beneficial to livestock because it can improve forage quality.

Fertilizer and pesticide use

Excessive use of fertilizer or inappropriate pesticide use can pose a serious threat to biodiversity as it can:

- Enter water sources and degrade aquatic habitat.
- Lead to the decline of soil organisms such as earthworms.
- Affect organisms that were not targeted (i.e. birds, fish).
- Transfer to other organisms in the food chain.

Therefore, it is important to develop a Nutrient Management Plan that balances the supply of adequate crop nutrients for economic crop yields with the goal of reducing residual nutrients in the environment.



Also, the implementation of Integrated Pest Management (IPM) approaches is an effective way to reduce reliance on chemical pesticides. IPM integrates cultural practices, pest scouting, and mechanical, biological, and chemical measures that effectively control pests with a low impact on the environment.

Crop rotation

The implementation of an adequate crop rotation system can:

- Increase crop yields.
- Reduce soil erosion.
- Improve soil structure.
- Reduce pest populations.
- Increase beneficial micro-organisms in the soil.

Therefore, crop rotation can significantly reduce reliance on fertilizer and pesticides, saving input costs and reducing impacts on biodiversity and habitat quality.

Cover and catch crops

The establishment of a winter cover crop or a catch crop reduces soil erosion caused by water runoff or wind. It can also absorb leftover nutrients in the soil and release them to the next crop. This practice can reduce the risk of:

- Soil erosion by wind and water.
- Surface water contamination and sedimentation.
- Groundwater contamination through leaching of nutrients.

As a result, biodiverse areas such as wetlands, streams and riparian zones can be protected for fish and wildlife.

Conservation tillage

From an agricultural point of view, crop residues can help maintain soil moisture, reduce soil erosion, improve water infiltration, and increase soil organic matter while benefiting soil biodiversity.

Conservation tillage such as no-till or minimum tillage that leaves the soil covered with 30% of the residues of the previous crop after seeding can also benefit biodiversity because:



- Small mammals and birds can feed on cereal and weed seeds.
- Wildlife can find refuge in these residues.

Soil erosion control structures

Soil erosion control structures such as grassed waterways and diversion terraces reduce soil erosion by water. This benefits biodiversity by helping to reduce stream sedimentation and the contamination of surface water by nutrients and pesticides.

Flushing bars and delayed haying

A flushing bar is essentially used to scare off or flush wildlife such as birds, ducks, rabbits, and fawns away from hayfields when cutting hay. A flushing bar consists of a metal bar mounted on the front of a tractor pulling haying equipment or on a self-propelled mower. As the tractor moves along, chains hanging down from the bar drag through the hay or grass, and the crackling noises and motion frighten nesting birds and other animals from their hiding places. This prevents mainly females with young or females reluctant to leave their nests from being killed by the cutting blades. It also allows females to re-nest that year or return and nest the next year.

Even with a flushing bar, nests will not be spared as they will be destroyed, exposed to predation or abandoned. However, to mitigate the damage done to eggs and young, delaying haying operations until mid-July (where possible) can help as the nesting period for most ducks and ground-nesting birds is over by then. This practice can be achieved by seeding late forage varieties. Use native forages that are locally adapted where possible. Your pastures can be managed to support overall landscape health.

Nesting structures

Some desirable species can be attracted with easy-to-make nesting structures if natural nesting areas are lacking on or near the farm. Species such as bats and birds can help control crop pests. However, conserving habitat is far more beneficial than adding nesting structures because wildlife may become dependant on these structures for their survival. These structures may be used as a temporary solution when habitats are in the process of being improved or enhanced.

Examples of species aided by nesting structures include the Eastern Bluebird, the Tree Swallow and the Purple Martin.

Habitat restoration

The best management practice is to conserve and maintain habitats found on or near the farm. Inevitably, many of these habitats may have already been altered or destroyed. However, it is possible to restore them to their original state with good management.

CONCLUSION

Through proper planning and management, biodiversity and wildlife habitat can be enhanced on the farm. Many agricultural management practices can be adopted to enhance both crop yields and biodiversity. The sustainability of our farms and the quality of our life and that of future generations depends upon biodiversity for social, recreational, and health reasons. There are benefits available to producers from enhancing biodiversity.

ADDITIONAL INFORMATION

Agriculture and Agri-Food Canada
www.agr.gc.ca

Canadian Biodiversity Information Network
www.cbin.ec.gc.ca

Canadian Wildlife Service
www.cws-scf.ec.gc.ca

Ducks Unlimited Canada
www.ducks.ca

Environment Canada
www.ec.gc.ca

Natural Resources Canada
www.nrcan.gc.ca

NS Wet Places: Eastern Habitat Joint Venture
www.gov.ns.ca/natr/wildlife/wetlands/page0.htm

Wetkit: Tools for Working with Wetlands in Canada
www.wetkit.net

A Practical Guide to the Importance of New Brunswick's Wetlands. Government of New Brunswick.
www.gnb.ca/0078/reports/wetlands/wetland_guide-e.pdf

Biodiversity in Agriculture: Agriculture and Agri-Food Canada's Action Plan. Agriculture and Agri-Food Canada, 1997.
www.agr.gc.ca/policy/environment/pdfs/biodiv/action_plan.pdf

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www.agr.gc.ca/policy/environment/pdfs/biodiv/bioinit_cap.pdf

Canadian Biodiversity Strategy: Canada's Response to the Convention on Biological Diversity. Environment Canada, 1995.
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Do You Have a Healthy Woodlot?—Extension Notes. LandOwner Resource Centre.
www.lronline.com/Extension_Notes_English/pdf/hlthywdlt.pdf

Do You Need a Buffer Zone. Prince Edward Island Department of Fisheries, Aquaculture and the Environment, 2003.
www.gov.pe.ca/photos/original/fae_bufferzones.pdf

Fish and Wildlife Habitat Management: Best Management Practices. Agriculture and Agri-Food Canada and Ontario Ministry of Agriculture, Food and Rural Affairs, 1996.

Managing Small Wetlands for Waterfowl. Ducks Unlimited Canada.

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