

11 BIODIVERSITY

INTRODUCTION

This chapter discusses farm management practices for protection of the biodiversity of aquatic life, wildlife and plants. It contains information on biodiversity, habitat and stewardship, the complex relationship between biodiversity and agriculture and impacts on biodiversity and habitat. It also contains information on environmental concerns, legislation and beneficial management practices related to:

- ◆ aquatic biodiversity
- ◆ terrestrial biodiversity
- ◆ biodiversity conflicts

This chapter is not intended to provide extensive solutions but to raise awareness and to encourage consideration of fish, other aquatic life, wildlife and plants and their habitat where appropriate in farm management. For information on specific local biodiversity concerns and solutions to conflicts refer to MAFF staff and MWLAP staff or other resource people. The following discussion may not apply to all areas of BC.

BIODIVERSITY AND HABITAT

What is Biodiversity?

Biological diversity, or biodiversity, refers to the number, variety and variability of all living things. This includes many things such as:

- ◆ the genetic diversity of populations
- ◆ the number and types of species
- ◆ the distribution and abundance of species, communities and ecosystems
- ◆ the interactions between organisms and their physical environment

Threats to biodiversity come from all parts of society including agriculture:

- ◆ habitat fragmentation and conversion to other land uses, including mining, agriculture, and urbanization
- ◆ exotic species introduction, including plants such as noxious weeds
- ◆ air and water pollution
- ◆ global climate change

Because valley bottoms and coastal lowlands have longer growing seasons and better soils, these landscapes are more biologically productive than other parts of British Columbia. Greater biological productivity makes these landscapes the best agricultural areas of the province, but it also makes these lands disproportionately important to wildlife. Land conversion has the potential to impact upon the province's biodiversity, but beneficial management practices can help to mitigate those impacts and maintain biodiversity.

Agriculture benefits from biodiversity in many ways, for example:

- ◆ genetic variety is the foundation of plant and animal breeding programs
- ◆ wild species are a source of the genetic material needed to breed crops and livestock that perform better than existing varieties

- ◆ countless species of soil organisms are essential to the process of decomposition, the cycling of nutrients and energy, and the formation of soil
- ◆ insects and other organisms are needed as agents of biological control of crop pests
- ◆ insects serve as plant pollinators

While all farms have some interaction with biodiversity, the character of those interactions will vary greatly by virtue of the many differences between farms. The relationship between fish and wildlife and agriculture is complex and is most usefully viewed as providing both benefits to agriculture as well as having costs to agriculture. Common agricultural activities such as land clearing and drainage have generally been perceived as having a negative effect on fish, wildlife and native plants. Some of these impacts have been mitigated by farms that:

- ◆ provide fish habitat – constructed ditches which fish colonize; provided irrigation reservoirs that are stocked with fish; planted riparian vegetation; assured fish passage at weirs and dams; functional riparian areas
- ◆ provide wildlife feed and habitat – critical winter and early spring forage in feed stacks, pastures and fields, and migratory bird stopover points
- ◆ practice plant stewardship – grassland management and protection

While living in areas abundant with fish and wildlife is considered a positive lifestyle amenity it comes with added environmental responsibilities. The extent of development and the intensity with which we manage the landscape mean that impacts to, and conflicts with, wildlife are inevitable. Good stewardship and effective land management mean considering the effects of our activities and employing means to minimize conflicts and maximize benefits.

Potential impacts to fish and wildlife habitat are receiving increased attention recently, especially those that affect fish. Focus on this concern is challenging *all* landowners, not only farmers, to look at upland and aquatic areas with a different perspective and, where appropriate, reassess practices.

What is Habitat?

Environmental concerns are often mentioned in the context of their effect on habitat. Habitat refers to the air, soil, water, food and cover components of the environment upon which fish, wildlife and plants depend directly or indirectly in order to carry out their life processes. Habitat can include land associated with farms, as well as resources such as constructed ditches, forage areas and woodlots.

➔ see Aquatic Habitat, page 11-7, ➔ see Wildlife Habitat, page 11-12

Species at Risk

New federal legislation has recently been enacted designed to protect wildlife biodiversity and habitats. The *Species at Risk Act* has been cited in many sections of this Guide and is outlined in Appendix A, page A-17 and on the following web site.

 www.speciesatrisk.gc.ca

The provincial *Wildlife Amendment Act, 2004*, applies species at risk protection to private and provincial Crown lands in BC.

At the time of this printing, the Act applies to federal land, defined as “land that belongs to Her Majesty in right of Canada, and all water on and airspace above that land; the internal waters of Canada and territorial sea of Canada; and reserves and any other lands that are set apart for the use and benefit of a band under the *Indian Act*, and all waters on and airspace above those reserves and lands”.

Other lands, such as provincial and private, are expected to be covered by provincial legislation. Provision is made to extend the Act to these other lands as required.

There are at least 7 endangered, 5 threatened and 4 species of special concern with close wetland associations. There are 19 endangered, 8 threatened and 7 species of plants, mosses and lichens listed in BC. A significant number of these occur in areas that could be impacted by agriculture. At least one species is thought to benefit from grazing.

IMPACTS ON BIODIVERSITY AND HABITAT

The following biodiversity and habitat impacts are listed in alphabetical order.

Impacts **Air Contaminants.** The major air contaminants that affect biodiversity and habitat are smoke and dust. Smoke can obscure visibility to the point of causing flight or fright responses in animals. Dust contains respirable particles that can cause animal health problems. In high concentrations and over extended time, dust can smother plant habitat.

Habitat Loss. The number one reason for species loss is habitat destruction. Although some animal and plant species are extremely adaptable, others require very specific environmental conditions to survive and reproduce. The amount of habitat required varies considerably depending on the species and its role in nature.

Habitat Connectivity. In addition to the amount of available habitat, the availability of habitat is extremely important. 'Availability' depends on a species' ability to move between habitat patches. Habitat that is isolated from other habitat patches, or cordoned off by often impenetrable barriers such as highways, will not be available to those species that cannot bypass the barrier to movement. Keeping habitat patches connected is one way that small patches of habitat can still be valuable. Farm development activities such as land clearing or fencing may disrupt established corridors.

Pest Introduction. Invasive or exotic insects and weeds can be introduced into new habitats via the movement and transportation of grazing animals, forage, machinery or clothing, or by the introduction of infested seed or plant material. Similarly, diseases of domestic animals and plants brought into a new environment may be destructive to wildlife populations or plant ecosystems. For instance, large areas of the province are covered by non-native vegetation that do not support native species to the same degree native grasslands do. A number of noxious weeds have had their start as ornamentals.

Physical Habitat. Some species require very specific habitat features. Some birds require specific types of trees with particular physical characteristics for nesting. A bat cave is an excellent example of a specific habitat feature. Fish need a watercourse habitat that contains pools and riffles, and substrate materials consisting of clean gravel and other larger substrates found naturally according to the watercourse gradient. Fish habitat is also highly dependent on water flow and magnitude-timing of flows. Farm activities that change habitat characteristics may impact biodiversity.

Soil Contaminants. These include nutrients, micro-nutrients and metals, hydrocarbons, and pesticides. Excess concentration can cause the loss of vegetation or secondary toxic effects to animals ingesting plant material.

Stream Flow Reduction. Low stream flows can result in elevated water temperatures or insufficient water for fish, wildlife and riparian vegetation. Also, reduced water velocities can speed up the eutrophication of the stream. Stream flows may be affected by farm water withdrawals.

Water Contaminants – Dissolved. These include nutrients, micronutrients and metals, pesticides, petroleum products, and silage or woodwaste leachate. Aquatic and soil environments can be harmed when contaminants flow directly into watercourses from runoff, or indirectly from drainage discharge and soil leaching. Direct ingestion of such water by fish and wildlife can impact health and longevity.

Water Contaminants – Suspended. These include dust, eroded soil, manure, and crop residue. Suspended contaminants can enter watercourses via runoff, by drainage, or by wind. Negative impacts include the smothering of habitat, eggs, gill tissue damage to fish and reduced feeding, elevated levels of chemicals and lower oxygen levels.

Farm Activities and Impacts

Agriculture changes the landscape and while farm development typically removes specific habitat types, it will also create other habitat types. For instance, land clearing removes forested habitat and replaces it with fields that may have forage value for some wildlife and waterfowl.

Impacts on habitat may occur as a result of various ongoing general farm activities. Works done near watercourses such as bridge and culvert crossings, or the construction of farm buildings may pose risks to fish and wildlife habitat. Similar risks may occur as a result of transporting, handling, and storing farm products and chemicals.

Crop Production. Any operation associated with increasing crop production, whether clearing or tilling land, may cause a direct or indirect impact on habitat. Landowners may clear as much land as possible to maximize the farm's crop area. Various degrees of habitat infringement will result. The removal of native vegetation will unavoidably displace some wildlife which might be able to relocate if sufficient replacement habitat is available. On the other hand, a more severe impact of clearing, for example, could be the loss of riparian vegetation which could affect fish, unable to relocate. Excessive riparian vegetation removal can also increase the risk of

bank erosion and impair the ‘functioning condition’ of a riparian area. Such losses affect both habitat and landowner.

Tillage operations, whether carried out annually or only once every few years, may increase the risk of erosion or runoff flow, both of which can impact water-related habitat.

Livestock Production. Release of contaminants from products associated with livestock production such as feed, water, manure, and bedding may cause direct impacts on either aquatic or terrestrial habitat.

Livestock grazing practices can negatively impact the desired features that define well-established riparian areas. The water and forage typical in such areas attract both livestock and wildlife requiring good management to minimize habitat degradation. Undesired and *direct* impacts related to poor grazing management practices include excessive vegetation removal, hoof and bedding damage to riparian areas and bird nests, and the introduction of pathogens, bacteria and nutrients from manure entering watercourses. These impacts can be mitigated if they are related to management factors such as livestock density, the timing and duration of grazing, and the degree of access to a watercourse.

Livestock activities at upland sites may *indirectly* affect riparian areas. The degree of impact will depend on the management of feed, feed storage, livestock watering, manure, and outdoor bedding areas.

It is particularly important that game farm animals be contained to insure that livestock do not impact wildlife by becoming established on crown land. Disease transfer from game animals in this context is an additional concern.

Water Access. This refers to animals watering at watercourses or unrestricted movement through streambeds or over crossings such as bridges and culverts. Siltation of the watercourse, trampling of riparian vegetation, or slumping of stream banks can occur from such activity. Direct habitat loss may also be incurred as floodplain materials are removed as a result of the construction or installation of bridges and culverts.

Water Control Structures. The construction of any structures such as dams, ditches, water diversions, bridges, and culverts located in watercourses can affect fish passage and water flows.

Water Withdrawal. The excessive removal of water, for uses such as irrigation and stock watering, can result in insufficient availability of water volume or velocity for fish food production, fish and fish habitat. Insufficient availability of water can also be a concern for terrestrial wildlife and may increase the risk of fish predation due to easier access for predators. Also, reduced water levels will typically exacerbate water quality concerns and may result in elevated water temperatures.



AQUATIC BIODIVERSITY CONCERNS

Primary environmental concerns related to protection of fish and other aquatic life are:

- ◆ contaminants, such as manure, pesticides and sediments, in water that results in fish health concerns
- ◆ reduced water quantity or low watercourse flows or velocities causing fish habitat loss resulting in reduction of fish food production, fish, and number of fish species
- ◆ dredging, dyking and channelizing streams that results in fish habitat loss
- ◆ loss of riparian vegetation that provides shade, leaf litter and insects for fish food
- ◆ lack of screens or incorrectly-sized screens on water intakes that results in fish population losses

For information on these concerns:

- ➔ see Buffers, Riparian Areas, and the Environment, page 7-2, and refer to Riparian Areas
- ➔ see Water Quality and Quantity Factors, page 9-1, and refer to Contaminants
- ➔ see Impacts on Biodiversity and Habitat, page 11-3, and refer to Farm Activities and Impacts

AQUATIC BIODIVERSITY LEGISLATION

The following is a brief outline of the main legislation that applies to aquatic biodiversity.

- ➔ see page A-1 for a summary of these and other Acts and Regulations



Fish Protection Act

This Act has many provisions not fully enacted at this time. This Act allows for some basic changes affecting water licenses.

- ◆ Sections 6 and 7: allow sensitive streams designation and recovery plans



Environmental Management Act

This Act protects against pollution but makes no reference to habitat protection directly. Similarly, the *Code*, which is concerned with agricultural wastes, makes no direct references to fish habitat. **Compliance with the *Code* does not necessarily ensure habitat protection.**



Water Act

This Act and Regulations allows “changes in and about a stream” under an approval, licence, or by regulation:

- ◆ Section 9: requires “changes in and about a stream” in accordance with an approval, licence, or order of the Act or Part 7 of the Regulations of the Act
- ◆
- ◆ The *Water Regulation*, Part 7, regulates “changes in and about a stream”:
- ◆ Section 40: authorizes Notification to MWLAP for certain “changes”
- ◆ Section 44: lists “changes” authorized (not requiring an approval or licence)



Wildlife Act

This Act (as amended by the *Wildlife Amendment Act 2004*), regulates species at risk on Crown and private lands.



Fisheries Act

This Act has several sections regarding aquatic life are:

- ◆ Sections 20, 21 and 22: fish passage ways, sufficient flow at obstructions
- ◆ Sections 27 and 29: prohibits obstructions to fish passage
- ◆ Section 30: requires water intakes to be screened to protect fish
- ◆ Section 32: prohibits the destruction of fish except by fishing
- ◆ Section 35: prohibits harmful alteration, disruption or destruction of fish habitat unless authorized
- ◆ Section 36(3): prohibits the deposit of deleterious substances into watercourses (deleterious substance could include many farm products or wastes)
- ◆ Section 37(4): requires approval for work that may impact fish habitat
- ◆ Section 38(4): requires reporting infractions of Sections 35 or 36



Species at Risk Act

This Act has sections that protect listed species, their residence and critical habitat. It applies to federal lands, internal waters (i.e., all watercourses), territorial sea of Canada, and the air space above them.

AQUATIC BIODIVERSITY BENEFICIAL MANAGEMENT PRACTICES

Comply with applicable aquatic related legislation, including the above, and where appropriate, implement the following beneficial management practices to protect the environment.

Protection of fish and other aquatic life on farm operations includes practices that not only directly protect them but also protect water quantity and quality, riparian areas, and habitats as well.

When planning work in or near a watercourse, contact Fisheries and Oceans Canada to ensure that it does not harmfully alter fish habitat or cause a deleterious substance to enter water. Designs for works in and about a stream should be submitted to Land and Water BC where an approval or licence is required; or to MWLAP where works are being carried out under regulation (*Water Act*, Section 9, and *Water Regulations*, Part 7).

Aquatic Habitat

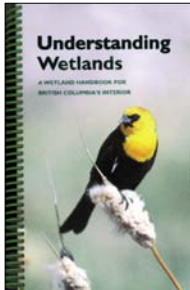
For fish and other aquatic life, habitat clearly refers to the water and physical features in watercourses. A holistic view of aquatic habitat includes grassed and wooded areas adjacent to the water that provide various services to aquatic

life, the water and the watercourse. Habitat concerns include water quantity, water quality, and the loss of in-stream habitat and riparian vegetation.





Where farm activities are present adjacent to watercourses, they will vary from low to high risk but all will require careful management to protect fish and other aquatic life.

Lakes, Ponds and Wetlands. These still, and slow moving water environments vary widely through the province but share important fundamentals when considering farm impacts. They typically:

- ◆ receive and hold water in a watershed reducing runoff peak flows
- ◆ depending on their size, have low tolerance for contaminants; water quality may easily be impacted
- ◆ provide important habitat for a wide range of aquatic life and wildlife
- ◆ have vegetation that varies greatly, some that may be grazed or browsed by livestock
- ◆ will have reduced functionality if riparian and buffer areas are impacted



Wetlands in BC tend to be small and dispersed across the landscape. Some of our most important wetlands occur in off channel riverine areas. The draining and filling in of wetlands is a major conservation concern, for wetlands tend to be disproportionately important to wildlife, particularly in the more arid regions of the province.

-  **Understanding Wetlands: A Wetland Handbook for BC's Interior**
-  **Lakes and Wetlands**
-  **Wetlands Stewardship Factsheets**
-  **Wetlands of British Columbia: A Guide to Identification**

Streams, Ditches and Floodplains. These moving water environments vary considerably through the province but share similar important features:

- ◆ stream bank stability, in-stream structure and sinuosity to dissipate the energy of flowing water without significant erosion
- ◆ riparian vegetation to provide habitat, organic debris inputs and shade
- ◆ water quality and quantity for multiple uses, including fish and other aquatic organisms, wildlife, and drinking water supply
- ◆ floodplains that provide high-water relief to help reduce down-stream erosion and flooding, and to provide nutrients and seasonal rearing habitat for fish
- ◆ ground water influence in controlling and moderating watercourse flow and temperature

Riparian Areas. These areas bordering watercourses usually have vegetation that is different than the surrounding upland area due to the presence of water. Healthy riparian areas are important to aquatic life.

➔ see Riparian Areas, page 7-10

Aquatic Life and Aquatic Habitat Protection

To protect stream habitat and riparian areas implement the following practices:

- ◆ protect water quality and quantity by following the water quality protection practices listed on the next page
- ◆ limit the number and use of in-stream crossings by constructing bridges or culverts wherever feasible

- ◆ perform an annual assessment of riparian health, implement changes identified, and monitor the results of any changes or improvements made (consider the assistance of local environmental enhancement groups)

📖 **Riparian Management Field Workbook**

- ◆ use planned grazing systems with separate riparian and upland pastures
- ◆ schedule grazing in riparian areas to maintain vegetation diversity
- ◆ follow the Agricultural Watercourse Maintenance Guide
- ◆

Water Quality. To protect water quality in watercourses that fish and other aquatic life depend on, implement the following practices:

- ◆ keep both dissolved and suspended water contaminants out of watercourses
- ◆ establish and maintain adequate vegetated buffers directly alongside watercourses → see Buffers, page 7-3
- ◆ use special nutrient management practices in buffer areas such as avoiding the spreading of manure in the fall
- ◆ manage stormwater to maintain watercourse hydrology and water quality in the state it was prior to land development as much as possible
- ◆ maintain wetlands for reducing peak runoff flows and purifying the water
 - where wetlands have been drained, resulting in marginal agricultural land, re-establish the wetland (conservation incentive programs may be available, such as from Ducks Unlimited Canada)
- ◆ on annual croplands located near vegetative buffers and riparian areas, use cover crops to limit bare soil areas created by late-season crop harvesting
- ◆ → see Cover Crops, page 4-5 and → see Buffers, page 7-3
- ◆ design livestock watering systems that reduce watercourse impacts either by providing controlled access points or no access whatsoever, if appropriate
- ◆ use pesticide application methods that reduce the risk of direct drift into watercourses or indirect drift onto runoff flows entering riparian areas
- ◆ manage and control grazing programs to avoid negative impacts such as manure deposition or contaminated runoff flow

Fish Passage at Control Structures. Water control structures such as reservoir dams, weirs, flood boxes and pump stations on fish bearing watercourses may require fish passage structures. Such structures will be specific to fish species requirements and should be developed after consultation with Fisheries and Ocean Canada. Depending on the structure and location MWLAP may provide recommendations.

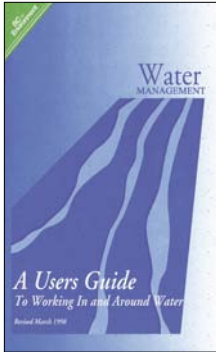
Water Withdrawals. Withdraw irrigation and livestock water at or below the licensed rates, and use acceptable water management practices. During exceptionally dry years, consider the unusual impacts to aquatic life from normal water withdrawals. → see Licencing of Surface Water , page 9-9

Surface water withdrawals require screened intakes to protect fish. They are designed for opening size to prevent fish entry and for low water velocity across the screen to prevent fish loss from being drawn against the screen.

→ see Water Intakes, page 9-13

Changes In and About a Stream

When planning any work in or near a watercourse, contact the appropriate agencies to ensure that it does not harmfully alter fish habitat or cause a deleterious substance to enter water.



Provincial Requirements. Work that involves “changes in and about a stream” (such as water intakes, stream crossings, etc) requires an approval or licence from Land and Water BC Inc under the *Water Act*, Section 9. Notification to MWLAP is required for works that may be done in compliance with the *Water Regulation*, Part 7, such as those that do not involve any diversion of water, can be completed in a short period of time, and have little impact on the environment:

- ◆ installation, maintenance or removal of stream culverts, clear span bridges, docks or wharves, ice bridges, stream fords, and fences
- ◆ installation or maintenance of pipeline crossings, drain tile outlets
- ◆ repair and maintenance of dykes, bridge superstructures
- ◆ cutting of annual vegetation, beaver dam removal

 **A Users Guide to Working In and Around Water**

 **Standards and Best Practices for Instream Works (lower mainland)**

Federal Requirements. The *Fisheries Act* requires authorization for work that may impact fish habitat (from Fisheries & Oceans Canada, DFO).

 www-heb.pac.dfo-mpo.gc.ca/publications/pdf/fishhablaw.pdf

Aquatic Life Establishment

Farm projects that include water impoundment or conveyance, such as reservoirs, ditches, etc. may also provide habitat for aquatic life. Consider consulting with Fisheries and Ocean Canada to see if measures can be taken (consistent with the farm goals) that may assist in creation of aquatic habitat.



TERRESTRIAL BIODIVERSITY CONCERNS

Primary environmental concerns related to terrestrial biodiversity are:

Wildlife

- ◆ contaminants, such as manure, pesticides and sediments, in water from agriculture that results in wildlife health concerns
- ◆ reduced riparian health that results in wildlife habitat loss
- ◆ land clearing, drainage of wetlands and introduction of weeds that results in
 - wildlife habitat loss
 - wildlife movement corridor disruption
- ◆ pesticide management that results in loss of beneficial insects

Plants

- ◆ invasive pests that result in reduced population of native plants
- ◆ pesticide management that results in loss of beneficial native plants

For information on these concerns:

- ➔ see Pest Management and the Environment, page 5-1
- ➔ see Water Quality and Quantity Factors, page 9-1, and refer to Contaminants
- ➔ see Impacts on Biodiversity and Habitat, page 11-3, and refer to Farm Activities and Impacts

TERRESTRIAL BIODIVERSITY LEGISLATION

The following is a brief outline of the main legislation that applies to terrestrial biodiversity.

- ➔ see page A-1 for a summary of these and other Acts and Regulations



Plant Protection Act

Regulations under this Act provide for the prevention of the spread of designated pests (i.e., insect, plant or pathogen) destructive to specific plants.



Environmental Management Act

This Act protects against pollution but not habitat directly. Note that the *Code* has no direct references to wildlife habitat. The *Code* is only concerned with agricultural wastes. **Compliance with the *Code* does not necessarily ensure habitat protection.**



Weed Control Act

This Act imposes a duty on all land occupiers to control designated noxious plants.



Wildlife Act

This Act regulates harassment, trapping, poisoning, shooting and other actions harmful to wildlife. Some main sections are:

- ◆ Section 6 (as amended by the *Wildlife Amendment Act 2004*) regulates species at risk on Crown and private lands
- ◆ Section 7: makes it an offence to alter, destroy or damage wildlife habitat within a wildlife management area
- ◆ Section 9: makes it an offence to disturb, molest or destroy a muskrat or beaver house, den or dam unless you are a licensed trapper or have lawful authority to protect property or maintain irrigation or drainage facilities
- ◆ Section 33.1: makes it an offence to intentionally feed or attract dangerous wildlife to any land or premises
- ◆ Section 34: makes it an offence, except by regulation, to possess, take, injure, molest or destroy a bird or its egg; the nest of an eagle, peregrine falcon, osprey, heron or burrowing owl; or the nest of any bird not mentioned above when the nest is occupied by the bird or its egg



Migratory Birds Convention Act

The Regulation under this Act has sections of importance:

- ◆ Section 6: no person shall: disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird without permit
- ◆ Section 24(1): any person may, without a permit, use equipment, other than an aircraft or firearms, to scare migratory birds that are causing, or a likely to cause damage to crops or other property (other control measures require a permit)
- ◆ Section.33: no person shall introduce into Canada for the purpose of sport, acclimatization or release from captivity a species of migratory bird not indigenous to Canada except with the consent in writing of the Director.
- ◆ Section 35(1): prohibits the deposit of oil, oil wastes or any other substance harmful to migratory birds in any area frequented by migratory birds



Plant Protection Act

This Act protects plant life by preventing the importation, exportation and transportation of pests.

- ◆ Policy Directives outline requirements for the importation and/or domestic movement of straw to prevent the introduction and spread of the cereal leaf beetle



Species at Risk Act

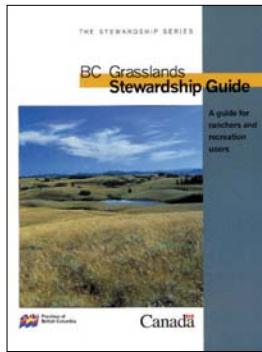
This Act has sections that protect listed species, their residence and critical habitat. It applies to federal lands, internal waters (i.e., all watercourses), territorial sea of Canada, and the air space above them.

WILDLIFE BIODIVERSITY BENEFICIAL MANAGEMENT PRACTICES

Comply with applicable wildlife biodiversity related legislation, including the above, and where appropriate, implement the following beneficial management practices to protect the environment.


Wildlife Habitat

Wildlife habitat concerns include the reduction or loss of habitat due to the establishment or expansion of farms, such as drainage of wetlands for crop production. Wildlife protection on farm operations includes practices that protect both wildlife and their habitat. Assess the type and density of wildlife



on or around a farm to ensure that a desired agricultural development, activity, or operation does not cause adverse affects.

Grasslands. Grasslands cover only 1.5% of BC’s land area, and about 70% is located on privately owned land. Nevertheless, grasslands are important both as wildlife habitat and as forage for grazing livestock. Grasslands often contain species at risk.

 **BC Grasslands Stewardship Guide**

Woodlands. Farm woodlots may be operated on privately owned and/or Crown land. Impacts from harvesting trees may affect both fish and wildlife. Specific concerns include the growth management activities, the timing and method of trees removal, the size of harvest area, and post-harvest activities.


Riparian Areas. Healthy riparian vegetation supports a diversity of bird and wildlife species with both food and shelter. This vegetation is particularly important to wildlife as it is very productive and located next to water. → see Riparian Areas, page 7-10

Wetlands. These still, and slow moving water environments vary widely through the province but share important fundamentals when considering farm impacts. Many wetlands do not have fish, and as such do not have direct legal protection, except as they relate to the *Species at Risk Act* and to bird nests.

Wetlands are important to biodiversity because the presence of a vast range plant and animal species. They typically:

- ◆ receive and hold water in a watershed, reducing runoff peak flows
- ◆ depending on their size, have low tolerance for contaminants; water quality may easily be impacted
- ◆ provide important habitat for a wide range of aquatic life and wildlife
- ◆ have vegetation that varies greatly, some that may be grazed or browsed by livestock
- ◆ will have reduced functionality if riparian and buffer areas are impacted


 **Understanding Wetlands: A Wetland Handbook for BC’s Interior**

 **Wetlands of British Columbia: A Guide to Identification**



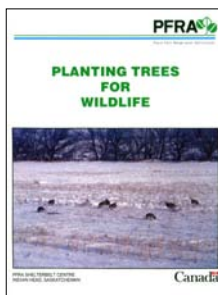
Wildlife and Wildlife Habitat Protection

To protect wildlife habitat, implement the following practices:

- ◆ follow the beneficial practices to protect water quality as previously mentioned in the fish protection section
 - ◆ know the wildlife species on the farm and what habitats are present to determine if there are any threatened or endangered species
 - ◆ perform an annual assessment of habitat health, implement changes identified, and monitor the results of any changes or improvements made
-  **Riparian Management Field Workbook**
- ◆ use planned grazing systems that consider impacts on wildlife habitat
 - ◆ improve livestock management to minimize impacts on habitat by
 - using cross fencing to move livestock
 - installing off stream or off site watering
 - ◆ use devices such as flushing bars when cutting hay to reduce wildlife mortality

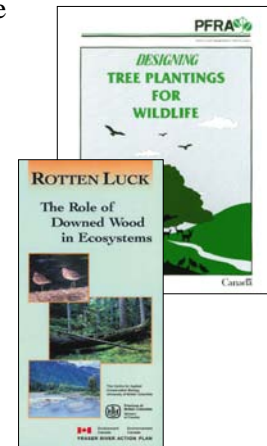
- ◆ buffer sensitive habitats from loss or alteration due to road and building construction, outdoor livestock areas, land clearing, wetland drainage, cultivation, crop harvest, soil erosion, compaction, and air contaminants caused by agricultural activities → see Buffers, page 7-3
- ◆ provide wildlife with corridors for moving across the landscape (where appropriate, work with neighbours to establish continuous corridors)
- ◆ conserve wildlife trees and other habitat features
- ◆ contain and treat livestock diseases
- ◆ use Integrated Pest Management (IPM) to decide when and how to control pests

Wildlife Habitat Establishment



Under some circumstances land owners may choose to plant trees and other vegetation specifically for wildlife.

- 📖 Designing Tree Plantings for Wildlife
- 📖 Planting Trees for Wildlife
- 📖 Rotten Luck: The Role of Downed Wood in Ecosystems



PLANT BIODIVERSITY BENEFICIAL MANAGEMENT PRACTICES

Comply with applicable plant biodiversity related legislation, including the above, and where appropriate, implement the following beneficial management practices to protect the environment.

Livestock Management

Livestock may have an impact on plant biodiversity. The main concerns are over grazing and trampling of sensitive vegetation on native grasslands, rangelands and riparian areas. → see Outdoor Livestock Areas, page 3-4

Weeds

Noxious weeds are typically non-native plants that have been introduced into British Columbia without the insect predators and plant pathogens that help keep them in check in their native habitats. For this reason and because of their often aggressive growth characteristics, these alien plants can be highly destructive, competitive, and difficult to control. Non-native weeds are among the leading cause associated with loss of the natural diversity in the environment.

It is important that any unusual or unfamiliar weeds be reported to the MAFF or the Canadian Food Inspection Agency so that the species can be identified for appropriate action to be taken to eradicate the pest before it spreads.

🖥 www.agf.gov.bc.ca/cropprot/nonnativepests.htm for additional information on new and threatening invasive species

To reduce the possibility of introducing weeds to a farm, implement the following practices:

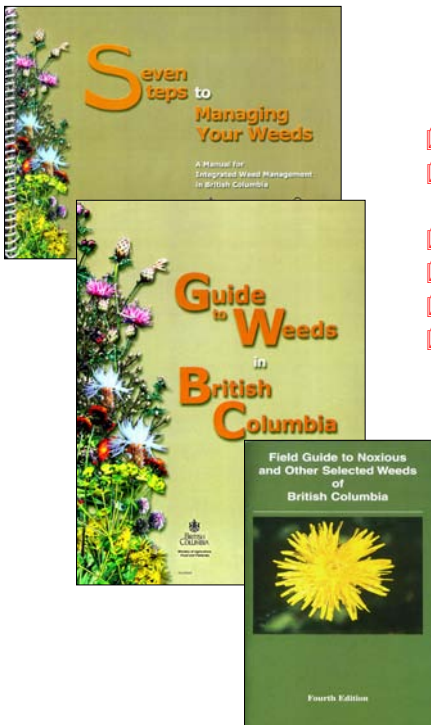
- ◆ before importing plant material from other countries or provinces, check with the Canadian Food Inspection Agency for permit requirements and other restrictions







 www.inspection.gc.ca

- ◆ report the presence of any unusual weeds to the Canadian Food Inspection Agency or the nearest MAFF office as soon as possible

To reduce the impact of weeds, implement the following practices:

- ◆ always use clean certified seed sources
- ◆ prevent problem weeds from going to seed
- ◆ practice crop rotation to discourage build up of specific weeds
- ◆ learn to identify weeds, particularly at the seedling stage
- ◆ use Integrated Pest Management (IPM) to decide when and how to control pests
 - apply appropriate controls at the recommended stage of crop and weed development
- ◆ clean up persistent perennial weeds prior to planting crops
- ◆ prevent the movement of plants to new locations
 - such as may occur when livestock move from an weed infested area to an uninfested area
 - control weeds along farm roads and trails
 - → see Invasive Pests, page 5-9



-  Integrated Weed Management
-  Seven Steps to Managing Your Weeds: A Manual for Integrated Weed Management in British Columbia
-  Rangeland Handbook for BC
-  A Guide to Weeds in British Columbia
-  Invasive Plant Alert: Prevent the Escape of Aggressive Plants
-  Field Guide to Noxious and Other Selected Weeds of British Columbia



This chapter has outlined environmental impacts that may occur *to* biodiversity from a farm operation. However, farms are affected by impacts *from* biodiversity.

BIODIVERSITY CONFLICT CONCERNS




Examples of concerns related to biodiversity and agriculture conflicts are:

- ◆ elk and deer feeding resulting in damage to forage land and feed storages
- ◆ large carnivores such as wolves, coyotes, cougars and bears causing the killing or maiming of livestock; destruction of bee hives, damage to fences and water piping
- ◆ waterfowl migration and overwintering causing damage to cropland
- ◆ birds and bats causing
 - damage to buildings and crops, and the contamination of feeders
 - the nuisance of birds, bats and other wildlife taking up residence around farmsteads and within barns
 - a nuisance concern for affected neighbours from the need to use noise makers for bird control
- ◆ small wildlife such as beaver, racoon, ground squirrels, rats and mice
 - causing damage to feed, crops and buildings
 - carrying pathogens that cause disease in humans, such as tularemia (beaver), Hantavirus (mice)

BIODIVERSITY CONFLICT RESOLUTIONS

Minimize Wildlife Damage. To aid in reducing conflicts or damage, implement the following practices:

- ◆ to help minimize waterfowl damage
 - delay fall tillage of already harvested fields (waterfowl will use the waste grain or crop residue)
 - straight combine grain crops instead of swathing
 - plant lure or sacrifice crops
 - post harvested fields as “no-hunting” (essentially creating your own lure crop-preventing damage on unharvested crop)
- ◆ to help minimize ungulate (deer, elk) damage:
 - stack bales at least two tiers high, keeping stack edges as straight as possible (prevents climbing)
 - stack bales near human habitation

- use farm machinery to prevent access to stacks
 - clean up spilled grain, loose forage and other food sources which may attract wildlife
 - ◆ follow the pest management strategies in Chapter 5
 - ◆ minimize the impact of problem wildlife by
 - not attracting them to feed, such as timely and appropriate disposing of mortalities
 - by excluding them from feed, such as with fencing orchards, vineyards, or other high value crop production areas
 - by excluding them from habitat, such as screening culverts to exclude beavers
 -  Beaver Damage Control in Agricultural Areas of B.C.
 -  Control of Beaver Damage
 - ◆ work with agencies and other interested parties to address wildlife problems
 - ◆ producers are encouraged to follow normal farm practices as outlined by previous Farm Practices Board rulings
 -  Wildlife Damage Control - Farm Practice Guidelines
-
- ◆ The Provincial Problem Wildlife Committee, a subcommittee of the BC Partnership Committee on Agriculture and the Environment, reviews problem wildlife conflict issues that have a provincial scope. Various projects and programs have been developed in BC to solve local conflicts, including the following examples.
 - ◆ The East Kootenay Trench Agriculture Wildlife Committee (EKTAWC) The mandate of this committee is to work with local interest groups to implement a strategy for reducing wildlife and livestock conflicts
 - ◆ The Delta Farmland and Wildlife Trust is voluntary on-farm stewardship that encourages demonstration and research. The Trust has supported planting ‘lure crops’, grassland ‘set a side’, buffers, and public education and awareness projects.
 - ◆ The Comox Valley Waterfowl Management Project has been involved in monitoring swan behaviour, planting ‘lure crops’, developing hazing programs to scare off birds, and encouraging producer/agency/public communication.
 - ◆ Canadian Wildlife Service, at Alaksen National Wildlife Area on Westham Island, planting “lure crops” to keep snow geese and other water fowl within the NWA. They have also worked with other partners to maintain egg addling programs on eastern Vancouver Island.
 - ◆ Habitat Stewards (helping communities protect fish habitat) have been involved with riparian plantings and fencing, off-stream watering facilities, and ditch maintenance in many areas of the province.

