



5 PEST MANAGEMENT

INTRODUCTION

This chapter describes how Integrated Pest Management practices contribute to reduce the impact of managing agricultural pests on the environment. It contains introductory information on the relationship between pest management and the environment. It also contains information on environmental concerns, legislation and beneficial management practices related to:

- ♦ pest management
- ♦ pesticides

PEST MANAGEMENT AND THE ENVIRONMENT

Pests are a constant threat to the economical production of food crops and animals. They may also affect food safety and reduce natural biodiversity. The proper implementation of Integrated Pest Management (IPM) practices helps to protect the environment from the potential adverse effects of pests and pest management.

Integrated Pest Management (IPM)

Integrated Pest Management is a decision-making process for pest control. The process contributes to effective, economical and environmentally sound suppression of pests for crop and livestock production. IPM incorporates several methods to achieve pest control (e.g., crop rotation, crop variety selection, soil amendments, pesticides, time of planting and harvest, etc.).

Noxious Weeds

Noxious weeds are typically non-native plants that have been introduced to British Columbia without the insect predators and plant pathogens that normally keep them in check in their native habitats. For this reason and because of their aggressive growth, these alien plants can be highly destructive, competitive, and difficult to control. Noxious weeds are among the top causes for loss of natural diversity in the environment.

Pesticides

Pesticides are any kind of chemical (organic or synthetic) used to kill, control, or manage pests. Fungicides, insecticides, miticides, herbicides, rodenticides and plant growth regulators are all types of pesticides. Pesticides are chemicals designed to protect crops and animals from pests and can pose risks to the environment. Pesticides are regulated to minimize known and potential risks through prescribed storage, handling, application and disposal practices.

Pests Pests are organisms that cause undesirable effects to agricultural production and include fungi, bacteria, viruses, nematodes, insects, mites, weeds, slugs, rodents, birds and wildlife. They may occur naturally or be introduced from other areas.

Invasive Pests. Invasive pests not only pose a threat to crops and livestock, but also threaten native biodiversity by competing with local species for food and space. Many of the pests affecting cultivated and native plants in BC have been inadvertently introduced into the province. In the absence of natural controls, some have become established and have extended their range as the environment and as availability of host plants permits. Examples of invasive pests include gypsy moth, purple loosestrife, knapweed, canola blackleg, blueberry scorch virus and European chafer.

PEST MANAGEMENT



PEST MANAGEMENT ENVIRONMENTAL CONCERNS

Primary environmental concerns related to pests are:

- ♦ lack of control of pests that results in loss of biodiversity and natural beneficial organisms through invasive diseases, insects, and weed infestations
- ♦ improper choice of pest management strategies that results in soil erosion, water or air pollution, or impacts to non-target organisms

For environmental concerns related to use of pesticides to control pests.

→ see Pesticides, page 5-11

For information on these concerns:

- see Impacts on Biodiversity and Habitat, page 7-7
- see Soil Quality Factors, page 8-2, and refer to Contaminants
- see Water Quality and Quantity Factors, page 9-2, and refer to Contaminants
- see Air Quality Factors, page 10-1, and refer to Contaminants

PEST MANAGEMENT LEGISLATION

The following is a brief outline of the main legislation that applies to pest management.

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

Local Bylaws Many local governments have specific bylaws or restrictions on noise scaring devices for bird control. Some local governments have by-laws that require the control of specific pests. Local governments may also have by-laws restricting the use of “cosmetic” pesticides; these do not apply to agriculture.



Integrated Pest Management Act

This Act and the *Integrated Pest Management Regulation* have numerous requirements regarding the use, containment, transport, storage, disposal and sale of pesticides.



Plant Protection Act

Regulations under this Act provide for the prevention or spread of designated pests and diseases.



Weed Control Act

This Act requires all land occupiers to control designated noxious plants. The *Weed Control Regulation* designates noxious weeds, provincially and regionally.



Wildlife Act The provincial *Wildlife Act* protects wildlife designated under the Act from direct harm, except as allowed by regulation (e.g., hunting or trapping), or under permit. Legal designation as Endangered or Threatened under the Act increases the penalties for harming a species. The Act also enables the protection of habitat in a Critical Wildlife Management Area.



Fisheries Act This Act has three sections of importance to pest management:

- ◆ Section 35: prohibits harmful alteration, disruption or destruction of fish habitat unless authorized (e.g., removing stream side vegetation)
- ◆ Section 36(3): prohibits the deposit of deleterious substances into watercourses (deleterious substances could include pesticides)
- ◆ Section 38(4): requires reporting infractions of Section 35



Migratory Birds Convention Act This Act protects most migratory birds in Canada.

- ◆ Section 5.1: prohibits the deposit of any substance that may be harmful to migratory birds in water or other areas that they frequent (harmful substances may be pesticides)



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



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.

The provisions of the Species at Risk Act (known as the ‘safety net’) could be invoked on BC crown and private lands using a federal order under the Act if provincial action is not sufficient to protect listed species.

PEST BENEFICIAL MANAGEMENT PRACTICES

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

Integrated Pest Management (IPM)

Integrated Pest Management is an approach that relies on the appropriate use of various sound practices to protect crops, animals, and the environment from the adverse impact of pests. Integrated Pest Management does not mean that chemical pesticides are never used nor does it require complete elimination of all pests. A properly designed program aims to create conditions that are optimal for crop production and less favourable for pest development.

Integrated Pest Management includes the use of production practices that prevent or reduce pest problems as well as use of monitoring to determine the need and correct timing of control methods, including pesticide applications. When used, IPM practices reduce potential impact to the environment by means of:













- ◆ less reliance on pesticides by effective use of non-chemical methods, including biological, cultural, behavioural, and mechanical control practices either alone or in combination with pesticides

- ◆ less risk of development of pesticide resistance that can lead to increased pesticide use and poor pest control
- ◆ encouraging use of least-toxic, target-specific pesticides as appropriate

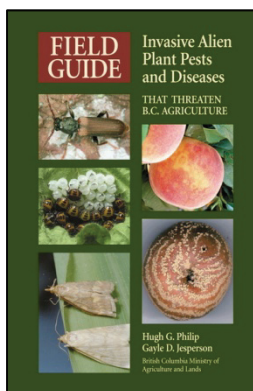
Integrated Pest Management (IPM) is promoted and explained in the commodity-specific  **Crop Production Guides**, shown below. They form a part of the Environmental Farm Plan series of Beneficial Management Practices. This detailed information is recommended for use by producers of these crops. Table 5.1, previous two pages, outlines the basic steps in an Integrated Pest Management. A complete list of Production Guides is available at  <http://www.agf.gov.bc.ca/cropprot/prodguide.htm>




For more detailed information on Integrated Pest Management for specific crops, refer to the following publications.

-  **Berry Production Guide**
-  **Best Practices Guide for Grapes for British Columbia Growers**
-  **Field Crop Production Guide**
-  **Floriculture Production Guide**
-  **Fresh Market Grape Production – Best Practices Guide in British Columbia**
-  **Ginseng Production Guide for Commercial Growers**
-  **Growing Greenhouse Peppers in British Columbia: A production guide for commercial growers**
-  **IPM for Turfgrass Managers**
-  **Integrated Fruit Production Guide for Commercial Tree Fruit Growers**
-  **Mushroom Production Guide–Guide to Best Management Practices in British Columbia**
-  **Nursery & Landscape Pest Management Production Guide**
-  **Vegetable Production Guide – Beneficial Management Practices for Commercial Growers in British Columbia**

Invasive Pests



It is important that any unusual or unfamiliar diseases, insects, or weed species be reported to AGRI or the Canadian Food Inspection Agency (CFIA) so that the species can be identified and so any necessary actions can be taken. Check the Weeds BC website, the AGRI publication  **Field Guide to Invasive Alien Plant Pests and Diseases that Threaten BC Agriculture** and the non-native pests website for additional information on new and threatening invasive species.

➔ see Weeds, page 5-9, and ➔ see Chapter 7, Biodiversity

 www.agf.gov.bc.ca/cropprot/nonnativepests.htm

 www.weedsbc.ca

To reduce the possibility of introducing invasive pests to a farm, check with the Canadian Food Inspection Agency for permit requirements and other restrictions before importing plant material from outside B.C.

 www.inspection.gc.ca

Table 5.1 Steps to Developing an Integrated Pest Management (IPM) Plan**1. Plan & manage crop and animal production to avoid pest problems**

- select a site that is environmentally suited to the crop, or select a crop or crop variety suited to the growing site to minimize predisposition of the crop to pest attack or competition
- optimize crop and animal health to avoid predisposition towards pest infestation
- encourage the establishment of available biological control agents that can keep pests from becoming problems
- use recommended crop and manure management practices to prevent or reduce the risk of attracting and establishing pests

Example: Brussels sprout variety ‘Vancouver’ is used in the Fraser Valley because of its suitability to that climate and its disease tolerance to pathogens significant to the area.

2. Understand & Identify the pest

Develop a management strategy using information on how the pest, crop and environment affect one another.

Determine:

- how to correctly identify the pest and the damage it causes to a crop
- the pest’s life cycle and its preferred food and environment requirements – most pests go through at least one developmental stage where control measures and products are most effective
 - different products may target a different life cycle stage
 - timing the use of control tools and actions to occur at the pests’ susceptible stage
- what conditions promote pest introduction, development and population increase
- how to identify any beneficial organisms that eat, compete with, or parasitize the pest

Example: Two fungal diseases of chrysanthemum must be properly identified because one (brown rust) causes minor damage and is not of regulatory significance and the other (white rust) is an invasive pest regulated by the Canadian Food Inspection Agency (CFIA). Improper identification or a delay in action will result in greater infestation and significant crop losses.

3. Monitor populations of pests and beneficial organisms, pest damage & environmental conditions

Monitor the crop, flock or herd regularly to collect information on:

- the abundance and stage of development of pest populations
- the numbers of beneficial organisms present
- the crop stage and vigour
- the amount of crop damage
- temperature and moisture conditions - used in models to predict the occurrence of specific pest stages which can assist in decisions regarding the timing of pest management actions (few models are available at this time for BC)

Example: Using an apple scab forecasting model to determine when fungicides should be applied to protect apple orchards. The model uses leaf wetness and temperature data to predict the most likely period of infection.

4. Use economic thresholds (where possible) and past experience in making pest control decisions

Ideally, pests are controlled in advance of reaching a level that causes unacceptable economic damage. However, such threshold data do not exist for the majority of pests. Take the following considerations into account when deciding if and when control actions are necessary:

- use pest numbers and life stage information from monitoring
 - the susceptibility of the crop to damage at various stages of growth
 - pesticide use restrictions such as pre-harvest interval, re-entry interval, buffer zone
- compare the pest control cost with the value of potential losses (quantity and/or quality) if the pest is not controlled (cost/benefit analysis)
 - economic thresholds are specific for given crop/pest combinations and can vary depending on local crop values and control costs
- consult with local experts or use past experiences to make control decisions

Example: Leaf rollers are counted in raspberry buds in spring and insecticide is used only if more than 10% of buds are affected (i.e., more than 10 leaf rollers per 100 buds).

Table 5.1 (Continued)**5. Choose appropriate control methods**

Use a combination of biological, cultural, mechanical, behavioural and chemical controls as described below.

Biological Control: beneficial organisms such as predators and parasites will help control pests. They are naturally occurring or can be released into an area to control pests when needed.

- predators eat the pest
- parasites and some predators live in or on the pest to weaken or kill it
 - parasites are often very small but can be extremely important in controlling pests
- some microorganisms (i.e. bacteria, fungi, nematodes) reduce populations of plant pathogens or insect pests
 - healthy soils often have high populations of “good” microorganisms
 - commercially available beneficial microorganisms available (predators, parasites, nematodes, microbes are readily available)
- monitoring and encouraging beneficial organisms is an important part of an Integrated Pest Management program

Example 1: The controlled introduction of two moth species, (one feeds on roots and the other on leaves), and one flea beetle species, has provided successful control of the noxious weed Tansy Ragwort in localized areas on Vancouver Island and the Fraser Valley.

Example 2: Livestock grazing can help prevent weed seed production and gradually weaken the roots, reducing weed establishment and proliferation.

Cultural Control: production practices that discourage the introduction, establishment or development of pest populations, such as

- selection of varieties resistant to pests
- planting cover crops that compete with weeds and provide shelter or food for beneficial insects
- rotating of crop species to reduce pest population levels
- pruning to remove diseased material, thinning fruit or plants to create an environment less attractive or conducive to pests
- planting certified clean material
- reducing the accumulation of plant residues and animal waste where pests can breed
- timing of cultivation or soil disturbance


Example: Removal of waste material from confined livestock and poultry operations at least once every 10 to 12 days during the fly breeding season helps with fly control.

Mechanical Control: involves the use of barriers or devices to exclude or control pests. These include window screening, netting, rodent traps, seed cleaning to remove weed seeds, air curtains, fly paper, ground fabric, mulches

Example: Netting on blueberry farms to prevent bird damage on ripening fruit

Behavioural Control: takes advantage of specific attraction or repellent responses of pests to certain odours, sounds, and colours in order to cause confusion or disorientation and prevent mate or host finding

Examples: Insect mating disruption using sex attractants (pheromones), odour-baited traps, yellow sticky traps, distress recordings, repellents, and black light electrocutors for flies

Chemical Control: Can be considered when other preventive and non-chemical control options fail to keep pest levels sufficiently low. Pesticides can be used to prevent or reduce pest levels - pesticides vary greatly in risk posed to the environment, mode of action, chemical structure, target specificity, and toxicity (refer to  **Crop Production Guides**)

- when possible, use least-toxic or reduced-risk pesticides such as insect growth regulators and biological pesticides derived from plants, bacteria or fungi
- pesticides labels are legal documents and it is the user’s responsibility to follow it. Using pesticides according to label directions will give best results and pose the least risk to the environment
- in order to prevent or delay the development of pesticide resistance, alternate pesticides from different chemical classes or groups. See front panel of label for type (e.g., fungicide) and the resistance management
- spot spray where possible

Example: Herbicides in pasture and rangeland, along with primary weed management strategies such as grazing and correct fertilizer applications can lead to good weed control.

6. Evaluate the effects & efficacy of the program

- keep good records such as: pest and weather monitoring, pesticide application (site or area treated, products and amounts used, crop stage, application dates, application methods, spray volume), crop harvest dates, crop yield and quality, and any other observations related to the condition or appearance of the crop or animals
- annually review this information to decide how to improve the Integrated Pest Management program

Pathogens Pathogens (disease-causing organisms) are easily spread and diseases impact the host (plant or animal). Prevention is the best management strategy, but early detection and treatment can also be effective. While many pathogens are crop-specific, some may affect a wide range of crops. Implement the following practices:

- ◆ use clean certified seed or plant sources, where available
- ◆ remove infected plants or affected plant parts to prevent further spread
- ◆ practice crop rotation to discourage the build up of specific pathogens
- ◆ select disease-resistant varieties, where available
- ◆ use qualified laboratories to confirm pathogen identification and then follow their recommendations

Soil Fumigation. This technique is used to control soil borne pests such as nematodes. Implement the following practices:

- ◆ follow label restrictions
- ◆ ensure applicators have been certified and are using proper equipment
- ◆ do not apply when the weather forecast is for heavy rain
- ◆ ensure that adequate moisture is in the soil prior to fumigation
- ◆ use plastic tarps to seal in the fumigant to reduce air pollution and to increase effectiveness of treatment
- ◆ ensure that adequate buffers are in place to prevent soil loss from fumigated fields left bare through winter → see Buffers, page 11-4

Insects and Mites Insects and mites are easily spread and can impact the host (plant or animal). The life cycles for many insect pests are well known and most management strategies target a specific developmental stage. Implement the following practices:

- ◆ remove insects to prevent their spread to other hosts
- ◆ practice crop rotation to discourage the build up of pests
- ◆ select insect-resistant or tolerant varieties of crops, where available
- ◆ monitor population levels of both pests and beneficial organisms
- ◆ learn to identify all species and development stages of pests and beneficial organisms
- ◆ protect and encourage the establishment of beneficial organisms
- ◆ when possible and appropriate, release (introduce) beneficial organisms

Flies in Confined Livestock Facilities. An integrated fly management program involves a combination of appropriate animal waste management and fly prevention measures. Implement the following practices:

- ◆ begin a fly control program early in the year
- ◆ maintain low fly populations by using
 - biological fly control programs
 - electronic zappers
 - chemicals such as fly cake and/or insecticidal bait bands or boards

Implement the following practices to reduce the need for pesticides to control nuisance fly populations:

- ◆ reduce or periodically remove fly breeding materials such as manure, bedding, and spoiled feed
- ◆ ensure that potential breeding materials are dried quickly and remain dry

- ◆ store manure in enclosed structures if it cannot be dried easily or if it cannot be spread every 10-12 days
- ◆ dispose of dead animals using approved disposal methods
→ see Livestock Mortality Disposal, page 3-37

In some situations, regular spraying with insecticides may be necessary for effective fly control. Seek advice from a qualified pest control specialist before embarking on any spraying programs. Ensure that only approved chemicals are used. Spraying should never be considered a substitute for proper waste management.

📖 **Management of Flies in Layer Barns**

📖 **Control of Insect and Related Pests of Livestock and Poultry in British Columbia**

Weeds

Weeds reduce crop growth and affect the ability of crops to effectively use nutrients. Although some weeds can use a significant amount of soil moisture and nutrients, as they are not harvested, the nutrients remain in the field and will be released when the weed material breaks down. To reduce the impact of weeds, implement the following practices:

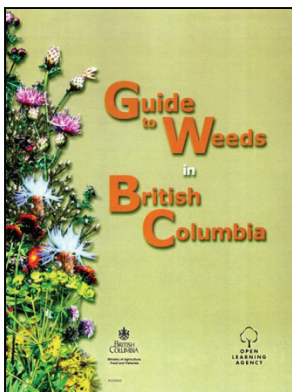
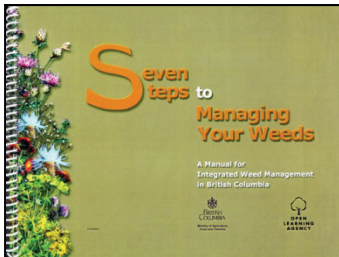
- ◆ always use clean certified seed
- ◆ control problem weeds before they go to seed
- ◆ practice crop rotation to discourage build up of specific weeds
- ◆ learn to identify weeds, particularly at the seedling stage
- ◆ apply appropriate controls at the recommended stage of crop and weed development
- ◆ control persistent perennial weeds prior to planting crops
- ◆ use plastic and organic mulches to control or suppress weeds when appropriate
- ◆ prevent the movement of weeds to new locations via movement of livestock or equipment
 - discourage visits to the farm if the potential for weed movement exists
→ see Invasive Pests, next page

📖 **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**



Noxious Weeds. Noxious weeds should be prevented from becoming established on a farm and, if present, prevented from spreading to neighbouring properties by following the above beneficial management practices for weeds. Noxious weeds are listed in the *Weed Control Regulation*.


📖 **Invasive Plant Alert: Prevent the Escape of Aggressive Plants**

📖 **Field Guide to Noxious and Other Selected Weeds of British Columbia**

Wildlife

Some wildlife, such as rodents and some birds, are managed as pests. Other wildlife, such as deer, elk, or beaver, are managed as problem wildlife. For problem wildlife information, → see Biodiversity Conflicts, page 7-23

- Rodents** To effectively ward off rodent infestations, implement the following practices:
- ◆ control food and water supplies by
 - avoiding spillage of feed both inside and outside barns
 - keeping all feed in covered containers
 - eliminating water sources like leaky taps, sweaty pipes and open drains
 - ◆ rodent-proof buildings and eliminate nesting sites by
 - keeping buildings in good repair
 - keeping areas next to buildings free of weeds, long grass, and debris
 - screening ventilation ports and other openings
 - ◆ maintain good general sanitation and cleanliness throughout the farmstead

When rats and mice are established, they can be controlled by poisoning with rodenticides, fumigating, trapping or any combination of such practices. Always place rodenticides in covered bait stations. If placed in and around manure piles, collect before the manure is removed for land spreading. Rodenticides spread on land with waste products pose a serious threat to pets, birds, farm animals, and wildlife.  **Control of Rats and Mice on Poultry Farms**

- Birds** Starlings, robins, crows, magpies and other bird species may cause significant crop loss, are a nuisance to livestock and crop producers, and have been implicated in the spread of diseases. Control measures are usually less effective once birds have established feeding patterns. Implement the following practices:
- ◆ bird-proof structures that store or contain grain
 - ◆ clean up spilled grain immediately
 - ◆ drain or fill water pools and puddles as starlings are attracted to water
 - ◆ keep water in livestock waterers at levels low enough to prevent birds from drinking when perched on the waterer edge

To manage damage to crops, use techniques or equipment such as bird distress calls, noisemakers, netting, population control, and starling traps. **Check local municipality bylaws before using any methods.**

-  **Berry Production Guide**
-  **Bird Predation Management Plan - Blueberries**
-  **Starlings and Livestock Farms**

Manage audible bird scaring devices according to Normal Farm Practices as set out in established standards and decisions issued by the BC Farm Industry Review Board.

 www.firb.gov.bc.ca

Also refer to AGRI's Wildlife Damage Control guidelines.

-  **Wildlife Damage Control - Interior BC**
-  **Wildlife Damage Control - South Coastal BC**

PESTICIDES



PESTICIDE ENVIRONMENTAL CONCERNS

Primary environmental concerns related to pesticides are:

- ◆ pesticides inappropriately applied, spray or vapour drift, spills, backflow and improper disposal of chemicals or containers that results in soil, water or air pollution; or in damage to non-target organisms
- ◆ birds and wildlife coming into contact with pesticides or crops receiving pesticide application that results in damage to birds and wildlife

For detailed information on these concerns:

- ➔ see Impacts on Biodiversity and Habitat, page 7-8, and refer to Impacts to Biodiversity and Habitat
- ➔ see Soil Quality Factors, page 8-2, and refer to Contaminants
- ➔ see Water Quality and Quantity Factors, page 9-2, and refer to Contaminants
- ➔ see Air Quality factors, page 10-1, and refer to Contaminants

PESTICIDE LEGISLATION

The following is a brief outline of the main legislation that applies to pesticides that are related to environmental protection.

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

Local Bylaws The National Farm Building Code 1995 outlines standards for pesticide storage and **is enforced only where proclaimed by local governments.**

- ◆ Section 4.1.4: requires storage facilities for pesticides to:
 - be vented to the outdoors, accessible from outdoors only, secured against unauthorized entry
 - have an impervious floor that is curbed to contain spills,
 - be identified with a sign at entrance stating “Danger – Chemical Storage – Authorized Person Only” or words to that effect
 - be separated from all food, feed and water supplies
 - be insulated and have a heated cabinet for chemicals requiring frost protection
 - separate oxidizing and flammable chemicals

Local governments may also have by-laws restricting the use of “cosmetic” pesticides; these bylaws do not apply to land used for agriculture, residential areas of farms or for the management of pests that impact agriculture.



Drinking Water Protection Act

This Act and Regulations have requirements regarding the protection of drinking water quality and regulate domestic water systems (those serving *more* than one single-family residence).

- ◆ Section 23(1): subject to subsection (3), a person must not (a) introduce anything or cause or allow anything to be introduced into a domestic water system, a drinking water source, a well recharge zone or an area adjacent to a drinking water source, or (b) do or cause any other thing to be done or to occur if this will result or is likely to result in a drinking water health hazard in relation to a domestic water system



Environmental Management Act

This Act has two regulations dealing with pesticides.

The *Spill Reporting Regulation* requires spills of a polluting substance be reported immediately to the Provincial Emergency Program (PEP) at 1-800-663-3456 (24 hour service). Report spills of pesticides (pesticide, pesticide mixture or waste) greater than 5 kg or 5 litres.

The *Hazardous Waste Regulation* specifies empty pesticide containers will be considered hazardous waste unless rinsed and disposed of according to Table 5.3, page 5-23. Equipment wash water is also dealt with in Table 5.3



Integrated Pest Management Act

This Act and the *Integrated Pest Management Regulation* have numerous requirements regarding the use, containment, transport, storage, disposal and sale of pesticides.

- ◆ Section 3 of the Act states that:
 - a person must not use a pesticide that causes or is likely to cause an unreasonable adverse effect
 - a person must not use, handle, release, transport, store, dispose or sell a pesticide in a manner that causes or is likely to cause an unreasonable adverse effect
 - a pesticide has to be used according to label instructions

The *Integrated Pest Management Regulation* has several sections that apply to agriculture:

- ◆ Section 1:
 - the definition for “body of water” allows pesticides to be applied according to label conditions to self contained human-made bodies of water (i.e. dugouts)
 - a permit or other authorization from MOE is required for any other application to water
- ◆ Section 5, 18, 24:
 - an authorization such as a pesticide use licence, pesticide use notice confirmation (pest management plan) or permit is required to apply pesticides to public land
 - the type of authorization required is dependent on the pesticide type, land use and area of land to be treated
 - contact the MOE regional office for details
- ◆ Section 16:
 - a valid pesticide applicator certificate issued by MOE is needed to purchase or use restricted or permit-restricted pesticides

- information on pesticide applicator certification and examination is available at 1-800-282-7955 or (250) 356-0475 or
http://www.env.gov.bc.ca/epd/ipmp/pest_certification/certif_main.htm
- ◆ Section 44:
 - producers may only purchase pesticides from a licensed pesticide retailer
 - anyone applying pesticides in exchange for a fee must have a valid applicator certificate and Pesticide Use Licence
 - if a farmer sprays another's crops they do not need a Pesticide Use License if the work is done as a favour and no money is exchanged
- ◆ Section 65:
 - pesticides must be kept in their original container with the original label
 - if the label is not legible, the container must have the trade name of the pesticide, the name and concentration of active ingredient, and the registration number on it
- ◆ Section 66:
 - pesticides labelled Restricted or Commercial must be kept in locked storage that is vented to the outside and has a warning sign on the door that says "WARNING CHEMICAL STORAGE – AUTHORIZED PERSONS ONLY"
 - pesticides must be stored separately from food intended for human or animal consumption



Public Health Act This Act prohibits activities that may cause a health hazard:

- ◆ Section 11: requires the reporting of any health hazard to a prescribed person (a health hazard may be the escape of toxic substances)
- ◆ Section 15: a person must not willingly cause a health hazard, or act in a manner that the person knows, or ought to know, will cause a health hazard

The Act also has conditions under the *Public Health Act Transitional Regulation*:

- ◆ Section 18: separation distance of wells to be at least 30.5 m from any probable source of contamination (probable source of contamination could include pesticides)



Wildlife Act The provincial *Wildlife Act* protects wildlife designated under the Act from direct harm, except as allowed by regulation (e.g., hunting or trapping), or under permit. Legal designation as Endangered or Threatened under the Act increases the penalties for harming a species. The Act also enables the protection of habitat in a Critical Wildlife Management Area.



Fisheries Act This Act has three sections of importance to pesticide management:

- ◆ Section 35: prohibits harmful alteration, disruption or destruction of fish habitat unless authorized (e.g., removing stream side vegetation)
- ◆ Section 36(3): prohibits the deposit of deleterious substances into watercourses (deleterious substances could include pesticides)
- ◆ Section 38(4): requires reporting infractions of Section 35 or 36



Migratory Birds Convention Act This Act prohibits the deposit of any substance harmful to migratory birds to any area frequented by migratory birds.

**Pest Control Products Act**

The Act and *Pest Control Products Regulations* require all pesticides used in Canada to be registered and have a Pest Control Products number on the label. Pesticides can only be used according to label directions (directions include environmental protection requirements).

**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.

The provisions of the Species at Risk Act (known as the ‘safety net’) could be invoked on BC crown and private lands using a federal order under the Act if provincial action is not sufficient to protect listed species.

**Transportation of Dangerous Goods Act**

This Act regulates the handling and transportation of “poisonous substances” which includes pesticides. Farmers transporting more than 1,500 kg of pesticides in a licensed farm vehicle more than 100 km must comply with special requirements. Farmers moving a sprayer containing more than 6,000 litres of spray mixture for more than 100 km on a public road must comply with special requirements.

PESTICIDE BENEFICIAL MANAGEMENT PRACTICES

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

Since pesticides are designed to harm target organisms, take proper safety precautions to protect non-target organisms and the environment. If pesticides come in contact with surface or ground water there is a high risk of environmental impact.

Pesticide Applicators Certificate

Pesticides that require a Pesticide Applicator Certificate before purchasing or use are listed in the various Crop Production Guides. → see page 5-5

Pesticide Risks

Pesticide Movement. A pesticide is any material used to kill, control or manage pests, including products to manage the growth of plants. The primary concern related to pesticides is any unwanted movement to sensitive environmental areas such as watercourses, ground water, fish or wildlife habitat. Pesticides can move off-target by:

- ◆ drift – the movement of spray droplets or vapour in the air
- ◆ runoff – the movement across the surface of the land in water or bound to eroding soil
- ◆ leaching – the movement in water through the soil
- ◆ direct transport – the movement of soil, vegetation and other materials that contain pesticide residues

Movement of pesticides depends on pesticide characteristics, site characteristics, and pesticide application practices.

Pesticide Characteristics. Once released into the environment, pesticides dissipate at varying rates. Dissipation characteristics influence a pesticides’ potential to harm the environment. Such characteristics include:

- ◆ degradation – the ability to break down in the environment
 - pesticides are broken down by microbes, chemical reactions and sunlight
 - the faster a pesticide degrades in the soil, the less likely it is to be carried to aquatic systems and ground water
- ◆ volatility – ability to turn into fumes
- ◆ solubility in water – ability to dissolve in water
 - soluble pesticides can leach through soil to ground water
- ◆ adsorption – the ability to bind onto soil particles
 - pesticides that bind to soil particles are less likely to contaminate water
- ◆ absorption – ability to move into organisms or materials
- ◆ bio-accumulation – ability to accumulate in tissues
- ◆ toxicity – the degree to which a substance is harmful or poisonous

When selecting pesticides, choose ones with the shortest degradation period, lowest volatility, lowest solubility, highest capacity to bind onto soil, and lowest toxicity.

Site Characteristics. Site conditions affecting pesticide movement include:

- ◆ the infiltration and permeability of soil
- ◆ the binding capacity of soil to hold pesticides
 - ➔ see Contaminant Movement in Soil, page 8-15
- ◆ the closer the water table is to the surface, the greater the contamination risk
- ◆ the closer proximity to surface water bodies, the greater the contamination risk
- ◆ the steeper the slope, the greater is the risk of runoff (slope direction determines runoff path)

If a site is likely to pose a high risk of pesticide movement, select crops or production methods that require little or no pesticide application.

Pesticide Application Practices. Application characteristics affecting the movement of pesticides include:

- ◆ application method – direct-applied pesticides (wipe-on) have a lower risk than sprayer-applied
- ◆ droplet size – coarse droplets are less prone to drift than fine droplets
- ◆ application rate – lower rates decrease the risk of runoff and leaching

When selecting pesticide application equipment, check the label information. If feasible, choose methods that wipe-on chemical or produce coarse droplets, and have low application rates.

 http://www.agf.gov.bc.ca/pesticides/h_1.htm

Pesticide Transport

When transporting pesticides, implement the following practices:

- ◆ transport only pesticide containers that are undamaged, properly labelled and securely closed
- ◆ secure pesticide containers in transport vehicles
- ◆ transport in a separate compartment from people, animals, food or clothing
- ◆ place pesticides on non-absorbent materials such as metal or plastic (wood is not considered a preferred material to wash spillage from)
- ◆ carry a pesticide spill cleanup kit

Pesticide Storage

When storing pesticides, implement the following practices:



- ◆ store following label directions
- ◆ use a locked, dry, vented to outside building posted with a “Warning – Chemical Storage – Authorised Person Only” warning sign on the door
- ◆ locate the building away from yard drains, ditches, wells, and watercourses
 - at least 30.5 m from any well (*Public Health Act*)
 - 15 m or more from watercourses (suggested)
 - 30 m or more from a water intake used for domestic purposes (suggested)
- ◆ construct the storage with curbs of concrete or other impervious material that will contain spills and allow for easy cleanup
- ◆ site to protect the storage from collision by vehicular traffic
- ◆ store pesticides in their original containers and close containers tightly
- ◆ if the original container is damaged, place pesticide in a suitable container
- ◆ if the original label is illegible or missing, obtain a replacement label from the supplier or website <http://www.agf.gov.bc.ca/pesticides/>
 - and label container with the name, trade name, concentration of active ingredient, and PCP registration number
- ◆ do not store food, feed, fertilizer, seed, livestock or livestock medication with pesticides
- ◆ store herbicides separate from other pesticides to prevent cross-contamination
- ◆ locate a pesticide spill cleanup kit nearby
- ◆ store pesticide-treated seed in areas where animals, including wildlife will not come in contact with the seed
- ◆ keep an updated list of stored pesticides in case of fire or spill emergencies
- ◆ keep a list of emergency phone numbers in a convenient location known by all farm workers
- ◆ Refer to Figure 5.1, for an example of a pesticide storage shed.

 **On Farm Pesticide Storage and Handling Facilities**

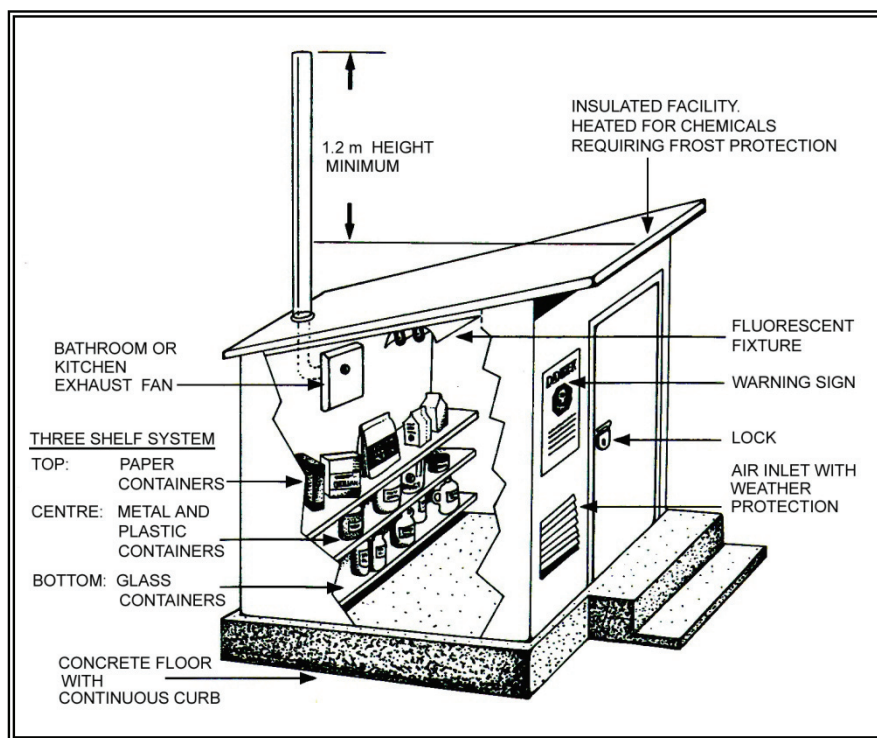


Figure 5.1 Pesticide Storage Shed

Pesticide Use Use Integrated Pest Management (IPM) principles to determine if and when pesticides may be needed. Only use pesticides that are registered for a particular pest and crop. Pesticide labels have environmental protection information (such as buffer zones). Follow the specified uses and instructions on the label to minimize impacts to the environment.

<http://www.agf.gov.bc.ca/pesticides/> for a link to label information




Pre-Application. Before mixing pesticides, implement the following practices:

- ◆ ensure that the correct pesticide is selected for a given pest
- ◆ read the entire label carefully, including any attached booklets, and follow safety precautions and instructions
- ◆ pesticides can only be applied via aerial application or chemigation if it is stated on the pesticide label
- ◆ know the size of the crop area to be treated and know exactly how much pesticide is required for that area to avoid excess chemical disposal
- ◆ if spraying near an environmentally sensitive area, ensure that the pesticide can be used safely
 - determine the size and type of buffer zone needed to protect the sensitive area
 - ➔ see Buffer Zones, page 5-20
- ◆ ensure that the application equipment is in good working order
- ◆ ensure that equipment is calibrated
- ◆ be prepared to handle a spill

Equipment Calibration. Before mixing pesticides, ensure the equipment will apply the correct amount uniformly by completing a thorough calibration. Implement the following four-step equipment calibration practice:

- ◆ Step 1: set-up of the equipment (usually the most time-consuming step, but one that must be done to ensure uniform and properly targeted application)
 - ensure there are no leaks, the spray boom is properly arranged for the target, and the swath width and driving pattern are determined
 - select nozzles, spray pressure and spray volume
 - measure the output of individual nozzles for uniformity and wear
- ◆ Step 2: measure the delivery rate of the application equipment
- ◆ Step 3: adjust the delivery rate, if required, after comparing the measured delivery rate to the rate recommended on the pesticide label or the Production Guide
- ◆ Step 4: calculate the amount of pesticide to add to the sprayer tank to provide the correct pesticide application rate


Calibration should be done:

- ◆ before new or altered equipment is used
- ◆ when making changes that affect the delivery rate
- ◆ at regular intervals to see if wear is affecting output
- ◆ at least once a year
 -  **various Crop Production Guides**, (as listed on page 5-5)
 -  **Suggestions for Field Sprayer Operation and Maintenance**
 -  **Calibration Worksheet – Boom Sprayer**

Sprayer Filling and Mixing. To protect the environment at filling and mixing locations, implement the following practices:

- ◆ install an approved back-flow prevention device on the waterline or ensure that an air gap of at least 30 cm (suggested) between the end of the water supply line and the spray tank exists
- ◆ locate sprayer filling sites
 - at least 30.5 m from any well (*Public Health Act*)
 - 15 m or more from watercourses (suggested)
 - at a lower elevation than any wells – if not at a lower elevation, have a berm around the well to divert runoff
 - with buffer areas between it and all watercourses
- ➔ see Buffers, page 11-4
- ◆ mix only the required pesticide needed for a single day
- ◆ have spill cleanup equipment such as absorptive materials, personal protective equipment and shovels readily available
- ◆ after emptying any pesticide container and prior to spraying its contents, rinse the container and pour the rinse water into the sprayer (rinse according to Table 5.3, page 5-23)

Application. While applying pesticides, implement the following practices:

- ◆ hold a valid Pesticide Applicator Certificate, if required by law
 -  http://www.agf.gov.bc.ca/pesticides/h_1.htm
- ◆ use the application rate specified on the label
- ◆ maintain an untreated buffer between treated areas and sensitive areas

- ◆ follow pesticide label setbacks from non-target aquatic and terrestrial areas, and from wells → see Buffers, page 11-4
- ◆ only apply pesticides by aircraft or chemigation if specified on the label
- ◆ use GPS guidance systems where appropriate to avoid application overlap
- ◆ apply pesticides in suitable weather conditions
 - do not spray in strong winds
 - do not apply if heavy rain is expected
- ◆ protect bees and other beneficial insects by applying pesticides
 - when flowers are not present
 - during early morning or late evening hours when insects are not active
 - away from insect drinking water sources
 - that are least toxic to insects
- ◆ shut off spray nozzles when they are over non-targeted areas (e.g., while turning on headlands)
- ◆ incorporate granular insecticides into soil to protect birds and wildlife

Drift Control. Drift refers to the movement of pesticide droplets, dust or vapours, by wind or air currents, away from target areas.

The degree of drift is strongly related to droplet size. The smaller the droplet, the farther wind carries them from the target area. Fine droplets can be carried several kilometres. In addition, larger distances between the sprayer nozzle and the target will result in more drift.

Vapour drift from volatile chemicals can continue long after the spraying operation is completed. Small amounts of highly volatile pesticides can impact susceptible plants and watercourses near treated areas. This can occur even under stable air conditions because vapours tend to flow along the ground without dispersal.

To minimize spray drift, implement the following practices when practical:

- ◆ replace or clean faulty nozzles to reduce fogging
- ◆ use nozzles such as low-pressure, flat-fans, flooding, or raindrop nozzles to produce drops more resistant to drift
- ◆ use shrouded, air-assist or tunnel sprayers
- ◆ only use special, low-volume sprayers where suitable
 - such sprayers typically produce small droplets more subject to drift
- ◆ apply pesticides at low spraying pressures to reduce the number of fine spray droplets
- ◆ keep boom height as low as possible while maintaining uniform coverage
- ◆ do not spray during strong or gusty wind conditions or during dead calm
 - early morning and evening are often the best times but avoid spraying during conditions when temperature inversions may occur

Use plastic tarps when fumigating soils to contain fumigant. Tarps not only reduce air pollution but increase the effectiveness of treatment. Tarp removal or cultivation of fields too soon after fumigation can result in the release of unwanted pesticide into the air. Plastic used in fumigation should go to a landfill.

Buffer Zones. Many pesticide labels have buffer zone information on the label. The pesticide labels may specify:

- ◆ whether the buffer zone is to protect aquatic and/or terrestrial habitat
- ◆ what is considered to be aquatic or terrestrial habitat (See Figure 5.2)
- ◆ the type of pesticide application equipment that requires a buffer zone
- ◆ if and how buffer zones can be reduced; the use of drift reducing spray shields, special nozzles, or other application modifications may allow the applicator to reduce the buffer zone
 - and any types of application equipment that do not need a buffer zone
- ◆ that the buffer zones on a label are required between the point of direct application and the closest downwind edge of sensitive terrestrial or aquatic habitats
 - buffer zones may depend on wind direction
- ◆ the size of the buffer zone (see the example in Table 5.2)

Table 5.2 Example of a Buffer Zone on a Pesticide Label					
Method of Application	Crop		Buffer Zones (metres) Required for the Protection of:		
			Freshwater Habitat of Depths:		Terrestrial Habitat
			Less than 1m	Greater than 1m	
Field Sprayer	Field crops		10	5	1
Airblast Sprayer	Stone fruits and grapes	Early Growth stage	40	30	2
		Late growth stage	30	25	1

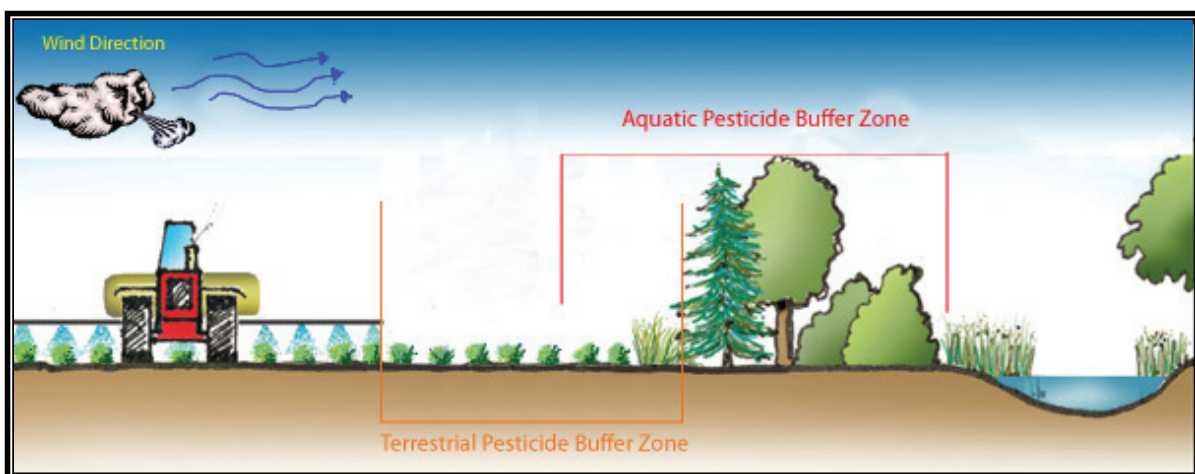


Figure 5.2 Identifying Aquatic and Terrestrial Buffer Zones

Leaching Control. Pesticides that have a tendency to leach into ground water may have special restrictions on the label. Read and follow these instructions. Be aware of the depth of the ground water and characteristics of the site and pesticides applied.

Runoff Control. Runoff from areas treated with pesticides can pollute streams, ponds, lakes and wells. To reduce pesticide runoff, implement the following practices:

- ◆ to prevent the application of pesticides immediately prior to a heavy rain, check the weather forecast (rain can wash pesticides off treated surfaces and can cause runoff or erosion to occur from treated areas)
- ◆ use minimum tillage techniques to reduce soil erosion and runoff of pesticides bound to the soil
- ◆ leave a buffer of vegetation and plant material around ditches and natural water bodies to filter pesticide-contaminated runoff
- ◆ collect contaminated runoff, where feasible → see Runoff, page 9-42


Equipment Washing. When washing equipment used to apply or mix pesticides, implement the following practices:

- ◆ clean sprayers as far as conveniently possible from watercourses, ditches, or wells to prevent pesticide movement from runoff into watercourses, or via leaching to ground water
 - cleaning sites must be at least 30.5 m from any well (*Public Health Act*)
 - 15 m or more from watercourses (suggested)
- ◆ dispose of wash water by using as a pesticide or by following Table 5.3, page 5-23

Record Keeping. Knowing when, where and how pesticides were applied is a critical part of an IPM program, implement the following practices:

- ◆ maintain a record of all pesticide applications including the site (field size and location), date, target pest, pesticide and amount used, crop stage, harvest date, application method, spray volume, weather observations, and precautions followed (e.g., buffer zones)
- ◆ food safety programs and WorkSafe BC also have record keeping requirements; incorporate their requirements into your records
- ◆ often there are examples of records in Crop Production Guides
→ see, page 5-5 for list of Guides

Pesticide Application to Livestock. Several species of insects and mites attack cattle. Pesticides are available in various formulations to protect livestock from injury and disease associated with pest attack.

 **Control of Insects and Related Pests of Livestock and Poultry in BC**

Pesticides applied to animals for the purposes of reducing disease or applied internally to control arthropods are not considered pesticides and are exempt from the *Integrated Pest Management Act* and *Regulation*.

To avoid contamination of soil and water, implement the following practices:

- ◆ use pour-on or spot treatments in place of whole-body sprays
- ◆ place self-activated and forced-use pesticide backrubbers at least 30.5 m from wells (*Public Health Act*) and 15 m from watercourses (suggested)
- ◆ ensure that backrubbers are not leaking and are adjusted correctly for dispensing appropriate concentrations of insecticide
- ◆ ensure that used insecticidal ear tags are collected and properly disposed

Pesticide and Pesticide Container Disposal

Disposal of pesticides is complicated and expensive. The best precaution to avoid disposal is through good planning. Plan pesticide purchases to minimize the amount of pesticides stored and the accumulation of unwanted pesticides.

Excess Mixed Pesticide. Implement the following practices:

- ◆ reduce the volume of waste by mixing only the amount of pesticide required for a specific application
- ◆ do not store excess mixture in spraying equipment for extended periods of time
 - some pesticides may undergo chemical degradation resulting in a decrease in efficacy
- ◆ use excess spray mixtures on another crop or at another site if label specifications allow
- ◆ do not exceed label application rates by re-spraying treated areas
- ◆ do not dump unused mixed pesticide on land or allow to drain into sewers or other piping systems

Excess Concentrated Pesticide. Implement the following practices:

- ◆ purchase no more than one year's supply of pesticide at a time
- ◆ return unopened pesticide containers to the manufacturer or dealer
- ◆ do not dump unused or unwanted pesticide concentrate on land or allow to drain into sewers or other piping systems
- ◆ contact a hazardous waste disposal company or MOE for information on disposal of leftover pesticides
- ◆ occasionally there are agricultural unwanted pesticide collection programs that will accept unwanted pesticides from farmers. These collections are advertised at www.al.gov.bc.ca/pesticides, through grower associations, the BC Agriculture Council or pesticide distributors

Disposal of Empty Pesticide Containers. After emptying pesticide containers it is a legislative requirement that all pesticide containers are properly rinsed and disposed of as outlined in Table 5.3. After rinsing the container implement the following practices:

- ◆ crush or puncture the container so that it cannot be reused
- ◆ dispose of containers at pesticide container collection sites, or safely store for a short time until disposal is more convenient
- ◆ do not burn paper or plastic pesticide bags to prevent the release of toxic fumes

Some pesticide dealers in BC now accept properly rinsed metal and plastic containers for recycling. This is the preferred disposal method for containers whereas burial should only be used if there are no other options available. Visit <http://www.cleanfarms.ca> to find disposal locations and procedures for your region.

Table 5.3 Hazardous Waste Regulation for Empty Pesticide Containers

Rinsing Method for Empty Pesticide Containers ★	
Type of Container	Rinsing Method
Rigid plastic or metal (non-pressurized)	Pressure rinse ¹ for 30 seconds or single rinse 3 times
Rigid plastic or metal (pressurized)	No rinsing required
Glass bottle	Rinse ² three times
Paper or plastic bag	Rinse
Containers labeled “Domestic”	No rinsing required
Any container type not listed above	As approved by MOE
Disposal Method for Empty Pesticide Containers ★	
<p>The owner of a waste pesticide product container that has been emptied and rinsed must recycle or dispose of it:</p> <p>(a) in an approved landfill, or;</p> <p>(b) by burying it, but only if;</p> <p>(i) the burial location is on land owned or leased by the person owning the container or is on land owned, leased or maintained in a tree farm license as defined in the <i>Forest Act</i> by the person owning that container;</p> <p>(ii) the burial location is on flat ground, not in a swale and at least 200 m from surface water or a well;</p> <p>(iii) the ground does not consist of gravel, sand or other similarly porous material, and;</p> <p>(iv) the owner covers it with at least 0.5 m of soil immediately after burial.</p>	
Disposal Method for Container and Equipment Wash Water ★	
<p>Waste produced by cleaning pesticide application equipment or by rinsing waste product containers must, if practicable, be used in mixing a product solution but, if not practicable, it may be applied to land if the area to which it is applied</p> <p>(a) is on land to which the product contained in the waste has been applied for purposes of pest control,</p> <p>(b) is flat ground, not in a swale, and at least 200 m from surface water or any well, and</p> <p>(c) does not consist of gravel, sand or other similarly porous material.</p>	
<p>★ Reg. 63/2009 - these methods must be used for the containers not to be considered a hazardous waste.</p> <p>¹ pressurized spraying of an appropriate solvent into an empty container for at least 30 seconds</p> <p>² introduce an appropriate solvent into an empty container in an amount not less than 20% of its volume, to close and shake the container so that the solvent makes contact with all interior surfaces, and to open and empty the container</p>	

Pesticide Storage Fires

Pesticide fires are extremely dangerous because they may release highly toxic fumes. Implement the following practices:

- ◆ keep an up-to-date list of stored pesticides in an easily accessible location separate from the storage
- ◆ inform local fire department about the type of pesticides stored and location of storage
- ◆ post a warning sign on all entrance doors to any pesticide storage facility
- ◆ keep emergency phone numbers posted in an accessible location
- ◆ keep pesticide storage areas locked
- ◆ do not store pesticide in glass containers in sunlight
- ◆ keep fire extinguishers approved for chemical fires near storage areas
- ◆ store combustible materials away from heating systems

If a fire occurs, call the fire department and keep people upwind and away from the fire. Warn firefighters of the presence of pesticides in the building.

Pesticide Spills Be prepared to handle spills by having a pesticide spill cleanup kit when transporting, storing or using pesticides. Such a kit includes gloves, protective clothing, containers for contaminated waste, tools to collect the waste and absorbent materials such as clay, kitty litter or sawdust.

Report pesticide spills in accordance with all of the following:

- ◆ *Public Health Act* (a prescribed person as defined by regulation)
- ◆ the *Spill Reporting Regulation* of the *Environmental Management Act* (contact the 24-hour Provincial Emergency Program 1-800-663-3456 to report)
- ◆ the Integrated Pest Management Act and Regulation

If a pesticide spill occurs, proper cleaning and decontamination of the area may avoid environmental contamination. Implement the following practices:

- ◆ prevent exposure of people and animals to the pesticide and its fumes
- ◆ put on appropriate personal protective equipment
- ◆ prevent the spread of the pesticide
- ◆ cover a liquid pesticide with soil, sawdust or any absorptive material to prevent spread or entry into a watercourse or subsurface drain
- ◆ dry formulations can be swept up and reused if they have not become wet or contaminated with soil or debris
- ◆ place collected contaminated dry formulations and absorbent material into an empty clearly-labelled garbage container and contact MOE for information on appropriate disposal
- ◆ if possible, safely decontaminate the surfaces that the spill has come into contact with
- ◆ check the label for specific directions – many pesticides can be detoxified by washing the area with chlorine bleach and detergent – do not use excessive amounts of water
- ◆ prevent the wash solution from spreading and contaminating a larger area
- ◆ if the spill occurs on the soil, remove the top 5 to 7 cm of soil (suggested), cover the area with lime and uncontaminated soil and contact MOE for instructions on disposal of contaminated material
- ◆ if the spill occurs beside a watercourse, remove the top layer of contaminated soil immediately and relocate it to a safe site

Reporting Requirement

Under the *Spill Reporting Regulation*, pesticide spills greater than 5 litres or 5kg of product, mixture or waste must be reported immediately to the Provincial Emergency Program (PEP) at 1-800-663-3456 (24hr service).

It is very easy to generate more than 5 kg or 5 litres of contaminated materials. By law, MOE must be contacted for advice on the proper method for disposal. If the spill takes place in a public area like a highway, call the local police. If the spill has released pesticide into the environment, contact the 24-hour Provincial Emergency Program (PEP) at 1-800-663-3456.

Pesticide Contingency Plan

Have a list of emergency numbers so it is easy to notify emergency responders (such as the local fire department) of the amount and type of pesticide stored and the storage locations. Develop a contingency plan when storing any quantities of pesticides. The plan should provide a timely and effective response to any emergencies involving the release of pesticides into the environment, from:

- ◆ accidental spills, such as when transporting, storing, applying or dispensing
- ◆ release due to building fires or natural events, such as forest fires, floods, or earthquakes
- ◆ release due to vandalism
- ◆ application errors, such as applying the wrong pesticide or too much pesticide



Contingency Plan - Template for On-Farm Planning