



Canadian Food  
Inspection Agency

Agence canadienne  
d'inspection des aliments

Plant Biosecurity

# National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry

## Producer Guide

A Guide for Implementing Proactive Biosecurity into Farm Management





CANADA GRAINS  
COUNCIL



CONSEIL DES GRAINS  
DU CANADA

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# Table of Contents

<b>The Purpose of this Producer Guide</b> .....	<b>2</b>
<b>How to Start Developing Your Biosecurity Management Plan</b> .....	<b>3</b>
<b>Outline of a Biosecurity Management Plan for Your Farm</b> .....	<b>5</b>
Input Procurement Practices .....	7
Managing Equipment Movement .....	10
Variety, Field and Crop Selection (including Rotation).....	13
Infield Monitoring and Control Practices .....	16
Managing People Access and Movement.....	18
Storage, Handling and Transport.....	20
Management Plan Development, Updating and Renewal.....	22
<b>Appendices:</b>	
<b>A: Background to Biosecurity</b> .....	<b>A1</b>
<b>B: Glossary</b> .....	<b>B1</b>
<b>C: Tools for Plan Development and Documentation</b> .....	<b>C1</b>
Self Assessment Tool	
Example of a Documented Biosecurity Management Plan	
Potential Contract Considerations	
Equipment Log	
Farm and Field Mapping	
Communication Plan Outline	
People Log	
<b>D: References and Web-links</b> .....	<b>D1</b>
<b>E: Examples of Pests</b> .....	<b>E1</b>
<b>F: Acknowledgements</b> .....	<b>F1</b>



## The Purpose of this Producer Guide

Biosecurity refers to a series of management practices designed to prevent, minimize and control the introduction, spread and release of plant pests, which include insects, nematodes, weeds, molluscs, bacteria, fungi and viruses (hereafter referred to as pests).

Given the economic significance of the grains and oilseeds industry, biosecurity measures are needed to protect against the introduction and spread of pests. They are very relevant not only to the grains and oilseeds industry, but will indirectly have an impact on other sectors of the economy, such as tourism and the service sector.

This Producer Guide is designed to help farmers assess the relative biosecurity risk to their farm and provide information on the current best management practices available to minimize those risks. This Guide is intended to provide support for the creation of a farm-specific biosecurity plan. It is a “how to” guide for the implementation of the *National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry*. See **Appendix A** for more background to biosecurity in the grains and oilseeds industry. **Appendix B** provides a Glossary of Terms used throughout this Guide.

The Standard identifies a series of desired outcomes in the pursuit of minimizing biosecurity risks for each farm and the broader agricultural community. It is a separate document, and should be studied and reviewed prior to using this Guide.

The Producer Guide is a “living” document and will be updated as new science is available, technology evolves, and new biosecurity risks are identified, introduced, understood and recognized. Requests for additional information and updates pertaining to the Standard and Guide documents should be directed to the Canadian Food Inspection Agency (CFIA).





# How to Start Developing Your Biosecurity Management Plan

The Standard document included a tool (see **Appendix C, page C1**) for assessing an individual farm’s biosecurity management processes to help determine the requirements for a biosecurity management plan. The purpose of completing this assessment is to assist farm owners and operators in determining the need and the priorities of a documented plan for each farm enterprise. Although every farm is exposed to some level of risk in each category, the degree of exposure and the potential consequences may vary widely for each individual farm, depending on region, crop mix and management practices.

The self-assessment tool raises questions about the applicability of a biosecurity plan in the following areas of your farm business:

	Yes	No
<b>1. Can I avoid the introduction of a biosecurity risk that I currently do not have?</b>	<input type="checkbox"/>	<input type="checkbox"/>
By monitoring quality and purity of crop input purchases.	<input type="checkbox"/>	<input type="checkbox"/>
By monitoring and managing delivery vehicle and farm equipment movement.	<input type="checkbox"/>	<input type="checkbox"/>
By controlling and monitoring soil movement from non-agricultural equipment.	<input type="checkbox"/>	<input type="checkbox"/>
By monitoring and controlling access by guests, trades people and suppliers.	<input type="checkbox"/>	<input type="checkbox"/>
By considering where farm vehicles have been before they return.	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
<b>2. Can I contain and minimize the biosecurity risks that I already have?</b>	<input type="checkbox"/>	<input type="checkbox"/>
By using alternative cropping strategies and rotations.	<input type="checkbox"/>	<input type="checkbox"/>
By minimizing soil movement by equipment or people from one area to another.	<input type="checkbox"/>	<input type="checkbox"/>
By employing timely scouting and control measures.	<input type="checkbox"/>	<input type="checkbox"/>
By managing water movement.	<input type="checkbox"/>	<input type="checkbox"/>
By establishing standard practices for employees.	<input type="checkbox"/>	<input type="checkbox"/>
By clear and transparent communication within the farm and to outside suppliers.	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
<b>3. Can I avoid pests leaving my farm?</b>	<input type="checkbox"/>	<input type="checkbox"/>
By monitoring trucks and equipment leaving the farm.	<input type="checkbox"/>	<input type="checkbox"/>
By posting appropriate signage.	<input type="checkbox"/>	<input type="checkbox"/>
By inspecting and cleaning grain bins and handling equipment.	<input type="checkbox"/>	<input type="checkbox"/>
By monitoring water movement.	<input type="checkbox"/>	<input type="checkbox"/>
By managing unmarketable production.	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
<b>4. Do I need a biosecurity risk management plan for my farm?</b>	<input type="checkbox"/>	<input type="checkbox"/>
To support business objectives.	<input type="checkbox"/>	<input type="checkbox"/>
To meet emerging customer demands.	<input type="checkbox"/>	<input type="checkbox"/>
To meet responsibility to my neighbours.	<input type="checkbox"/>	<input type="checkbox"/>
To better understand pest management.	<input type="checkbox"/>	<input type="checkbox"/>
To work more effectively with suppliers.	<input type="checkbox"/>	<input type="checkbox"/>
To be prepared for unexpected pest issues.	<input type="checkbox"/>	<input type="checkbox"/>

If you answered yes to any of these questions, your farm will benefit from having a biosecurity management plan. A biosecurity management plan can add value to a farm by:

- assisting in increasing yield and the quality of crops produced;
- providing additional lines of defense from pests not currently on your farm;
- building greater land value if documented evidence shows a sound biosecurity management plan; and,
- potentially accessing new (higher-value) markets where biosecurity practices and protocols are required.

It is recognized that many existing good agronomic and operational management practices address biosecurity risks in and of themselves. Developing and implementing a biosecurity management plan is not to replace, but to enhance, these management practices.

It is also understood that applying all of the best practices under all circumstances would incur unnecessary costs and economic consequences. Priorities for farm-level biosecurity should be established for each farm enterprise. The responsibility of farmers is to develop and implement their specific management plan.



## Outline of a Biosecurity Management Plan for Your Farm

Farm biosecurity management practices can be organized in the following categories:

- Input procurement practices
- Managing equipment movement
- Variety, field and crop selection (including rotation)
- Infield monitoring and control practices
- Managing people access and movement
- Storage, handling and transport
- Management plan development, updating and renewal

To assist in developing and documenting your own farm specific biosecurity management plan, a sample template is provided (**see page C3**). The following is a possible entry into that plan:

Potential Condition or Vector (Where your farm has specific risks)	Plans and Procedures (What you will do to manage those risks)
Equipment Entry and Access (specifically regarding transmission of soil borne diseases)	Insist on inspections (for soil and plant material) of any purchased or rented equipment, by farm management before entry to the farm.

**The pests mentioned throughout this Guide are examples only, and are not intended to be a comprehensive list of all pests (see examples of pests in Appendix E).**

This Guide continues with suggested tools for each of the categories of management practices. The following information is provided within each of these categories:

- The Standard's Target Outcomes that each category of farm management practices addresses
- Examples of biosecurity risks and/or considerations for building your own biosecurity plan
- Questions to ask, and concepts to consider, in determining your farm's needs and requirements
- A range of potential measures to consider (from a basic level of plans to a moderate level to a highly active or advanced response)

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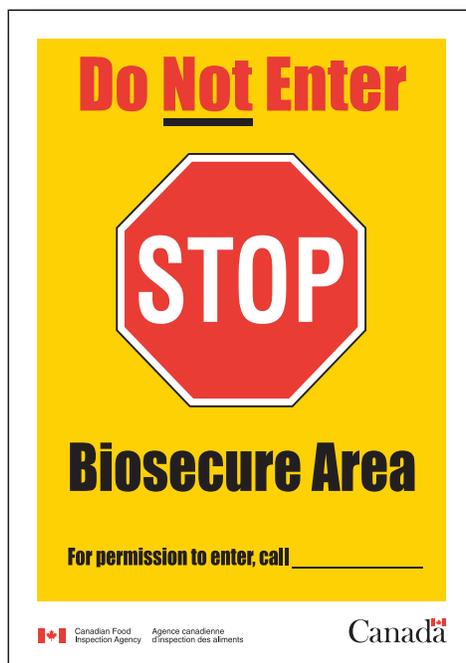
References to samples of other tools or information to consider are listed in **Appendix D, pages D1-D5**. Industry and government web-sites provide linkages to these specific, more detailed articles and management considerations; any current cited articles may be replaced with more recent research and management considerations within the industry or government web-site at any time. While any future updates to this Guide will attempt to cite current relevant references, it is the farmer's responsibility to seek any specific information desired. Further, your farm specific biosecurity management plan should always consider relevant laws or regulations at all levels of government.

In the sections to follow, the **target outcomes** as presented in the ***National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry*** provide the framework for more specific guidelines and measures for developing an individualized plan for your farm.

The tables provide mitigation strategies that should be considered to minimize your risk. Options range from:

- **basic:** potential for exposure to pests, and/or the consequence is low; to,
- **moderate:** potential for exposure to pests, and/or consequence is moderate; to,
- **advanced:** potential for exposure to pests, and/or consequence is high.

Corresponding suggested risk mitigation strategies increase in rigour along this continuum of level of exposure. It is recommended that your management plan include the basic options provided for each category and, based on the level of risk to the farm, the moderate and advanced options be added to the plan.





# Input Procurement Practices

## Addressing Target Outcome 1.1

**Target Outcome 1.1: Crop inputs are sourced and managed to minimize or eliminate biosecurity risks.**

### Building your own biosecurity management plan

Application of crop inputs may directly introduce pests to a field. Depending on the placement and distribution of the inputs, even very low incidence of a pest introduction can create an immediate and long lasting issue.

The inputs of greatest concern would be:

- **Seed** (disease and/or weed seeds)
  - Seed diseases like fusarium or ascochyta are examples of important seed input concerns.
  - Weed seeds like cleavers can cause considerable problems when commingled with canola seed, even when at or below certified seed tolerance levels.
  - Soil present with or on seed may also be a concern for diseases such as clubroot.
  - Herbicide-resistant weeds, such as glyphosate tolerant giant ragweed and group one resistant wild oats, which can no longer be controlled by the herbicide.
- **Fertilizer** (weed seeds)
  - A variety of potential weed seeds and/or volunteer crop seeds can end up in fertilizer shipments if the transportation and handling system is not completely clean.
- **Manure** (disease and/or weed seeds)
  - Weed problems like velvet leaf can be transferred through feed from unknown origins, fed to animals and transferred within incompletely composted or non-composted manure.

## Determine Your Needs

Do you purchase inputs from anyone other than licensed or certified dealers?

Do you verify if the inputs you are purchasing or using (e.g. farm saved seed, fertilizer) are adequately pure and pest free?

Does your supplier conduct appropriate testing and/or have you done so independently?

Do you source seed that might substantially increase your biosecurity risk?

Examples of risk mitigation procedures to consider include:

Input Procurement Practices	
Intensity	Risk mitigation procedures and management considerations
<b>Seed</b>	
<b>Basic</b>	Use certified seed and/or test farm-saved seed to ensure it meets all equivalent purity and pest standards. Ensure (for example, inspect trucks) in your own seed handling (or custom trucking) that no impurities are commingled. Use seed treatments to suppress disease and/or insects, dependant on crop and pest profile.
<b>Moderate</b>	Determine regions where you should not source seed and check all seed sources for the area of origin before purchasing. Generally, it is expected that local seed is less likely to have new pest issues that you do not already have, but that may not always be the case. Regions that are at higher risk may not be easy to determine. Vigilance is required.
<b>Advanced</b>	Consider testing seed to specific disease and/or purity standards beyond those of certified seed. There may be a limited number of seed testing labs able to test for specific diseases. Ask your lab about their testing procedures and what samples are required. Seek the advice of your agronomist or production advisor on what tests are required, and the interpretation of results.
<b>Fertilizer</b>	
<b>Basic</b>	Monitor your own trucks and/or custom truckers for adequate cleanout of previous loads. Identify where the cleanout should take place and what to do with the cleanout material. Truck inspections are important. Stay in touch with your local farm organization as further guidelines are developed.
<b>Moderate</b>	Confirm with agricultural suppliers what precautions they take to ensure fertilizer purity and exclude suppliers that are unable to meet your requirements. For example, some crop input locations may (at times) blend canola seed with fertilizer in the fertilizer blender for floater application. Be aware of when this is occurring and what biosecurity risk it presents. Know your trucker and the care that they are prepared to take on your behalf. Make sure truckers are aware of your expectations. See potential contractual considerations in <b>Appendix C, page C10</b> .
<b>Advanced</b>	Inspect and/or sample fertilizer loads for impurities like weed/crop seeds and reject or redirect a load if necessary. The specific impurity found may be more manageable for certain crops or on certain areas of the farm. Adjust accordingly (for example, a few rogue wheat seeds in a field being planted with canola are far less of a problem than herbicide tolerant canola in a soybean field).

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## Input Procurement Practices – *continued*

Intensity	Risk mitigation procedures and management considerations
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Manure, sludge and bio-waste	
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<b>Basic</b>	Understand product origin and content. In the case of manure, origin should include where the feed source came from. Some suppliers of manure may have used feed from their own farms while others may have no idea of the origin of the feed source. For example, the introduction of weeds like velvet leaf through manure can have very long term implications.
<b>Moderate</b>	Do independent testing of content characteristics like nutrients, heavy metals and weed species. Ask your lab about their testing procedures and what samples are required. Testing for everything is not likely required. Seek expert advice.
<b>Advanced</b>	Consider only composted (biodigested) material to mitigate the risk, such as weed seeds. There is very limited availability of composted material and testing may be required to ensure adequate digestion/composting has occurred.



## Managing Equipment Movement

### Addressing Target Outcomes 1.2, 1.3, 2.2

**Target Outcome 1.2: Minimize or eliminate the biosecurity risks introduced with farm equipment access to the farm.**

**Target Outcome 1.3: Minimize or eliminate the biosecurity risks introduced by the access of non-agricultural equipment to the farm.**

**Target Outcome 2.2: Minimize or eliminate the movement and multiplication of pests through the movement of farm equipment and people within the farm.**

### Building your own biosecurity management plan

The movement of equipment onto the farm and within the farm can be considered the primary carrier for some of the most invasive and economically damaging pests.

The movement of equipment is particularly important because it creates the potential for four different kinds of pest movement through soil and/or plant material.

- Soil borne diseases/pathogens: For example, clubroot, soybean cyst nematode, and stem and bulb nematode.
- Disease associated with plant material: For example, diseases like blackleg, anthracnose, and fusarium. In some cases, the pathogen can be carried on equipment without plant material or soil (particularly in high moisture conditions) and pose a biosecurity risk.
- Weed seeds: Examples of these risks currently include cleavers, group one resistant wild oats, and glyphosate resistant giant ragweed. The movement of weed seeds on harvest equipment is of particular concern.
- Insects: Examples include cereal leaf beetle, wireworm, and swede midge.

## Determine Your Needs

Do you purchase, rent or contract custom equipment? And/or is there non-agricultural equipment entering your farm? If so...

Might it have traveled from a region that has pests not yet introduced to your farm? Are there pests that are recognized as particularly damaging?

Is there assurance that equipment is cleaned after its last use, before it arrives at your farm?

Are there areas within your own farm that have pests not yet introduced to other parts of your farm? Are these pests recognized as particularly damaging?

Do you grow, do you plan to grow, or might some future owner or renter plan to grow crops that are particularly vulnerable to some of the pests of greatest concern?

Based on your own assessment of the potential for the introduction of a biosecurity risk, choose a suitable risk mitigation strategy that you would like to be followed on your farm in order to adequately address those risks. Examples of protocol to consider on your farm include:

Managing Equipment Movement	
Intensity	Risk mitigation procedures and management considerations
<b>Equipment Access to your Farm</b>	
<b>Basic</b>	<p>Inspect all purchased or contracted equipment before arrival at the farm for excess soil, plant material or weed seeds to ensure compliance with your requirements. Inspections can be done by farm staff or a third party. As much as possible, inspections and cleaning should be done at the point of last use.</p> <p>Ensure that non-agricultural equipment requesting access to your property is inspected and cleaned.</p> <p>For long distance purchases, verify “clean enough” using digital photos.</p> <p>Special consideration should be given to trucks hauling grain from your farm. Question whether the trucks have been adequately cleaned out before they arrive empty at your farm. If there is something left in it, a plan is required. <i>(For example: Is it better to clean the truck on-site or is it better to leave the material left in the truck knowing that, depending on the clean-out material, the grain elevator is in a better position to deal with the material as dockage? Do not encourage truckers to clean out on the road a mile before arriving at the farm. Consider a specified area for cleanout on your farm.)</i> Stay in touch with your local farm organization as further guidelines are developed.</p>
<b>Moderate</b>	<p>Identify the history of where the equipment, including non-agricultural equipment, has been located, when practical.</p> <p>Clean equipment to remove soil and plant material either off-site, or in a specified and contained catchment area on your farm, with access to washing capability and appropriate drainage.</p> <p>Consider methods for reducing the potential for mud retention and further movement.</p>
<b>Advanced</b>	<p>Deny access and/or do not purchase/rent/custom contract equipment (agricultural or non-agricultural) from any supplier that does not have a verifiable protocol for cleaning equipment to your required standard (<b>see page C10</b>). Although it is unlikely you will ever eliminate all risk, it is clear in the case of soybean cyst nematode or clubroot that the level of risk drops rapidly with any additional cleaning effort.</p> <p>Your cleaning requirements can be built into all farmer/supplier/access agreements.</p>

## Managing Equipment Movement – *continued*

Intensity	Risk mitigation procedures and management considerations
<b>Equipment Cleaning – Own Equipment</b>	
<b>Basic</b>	<p>Remove soil or plant material accumulations on equipment before moving from any field. The first level of cleaning effort makes the biggest difference.</p> <p>A hammer on a shank or the sweeping off of the header on a combine can dramatically reduce the probability of spreading a pest. Consider using a mobile pressure washer in cleaning at the field. For combines, air compressors can be installed, or gas powered leaf blowers can be used for clean-offs. Cleaning off the combine may be considered more critical than cleaning out the combine.</p>
<b>Moderate</b>	<p>Consider a designated area within the yard for more thorough cleaning by pressure washer. Consider a specified catchment and contained area on your farm with access to washing capability and drainage. Consider reducing the potential for mud retention and further movement. Prevent transmission from the wash area.</p> <p>The wash water needs to be adequately isolated and/or decontaminated (cleaned/disinfected).</p>
<b>Advanced</b>	<p>Under some circumstances equipment may require disinfectant. It is believed that this additional step of disinfection may be particularly effective for clubroot, soybean cyst nematode and/or other pathogens. A standard disinfectant, at a suggested rate (1 to 2% solution of bleach [hypochlorite]), can be used. Check with suppliers and/or manufacturers of washers for effective alternatives. The majority of soil material must be removed off of the machine for the disinfectant to be effective.</p> <p><b>Note – do not confuse bleach solution with an ammonia solution often used for a sprayer tank clean out, and never combine the two.</b></p>
<b>Equipment Travel Patterns</b>	
<b>Basic</b>	<p>Complete field operations on clean areas first before traveling into areas with known or potential spreadable pests to minimize the probability of transfer and the number of cleanings required.</p> <p>Although the sequencing of events may not always work out, some advance planning back to planned seeding dates could prove beneficial and save considerable time and effort in cleaning.</p>
<b>Moderate</b>	<p>Isolate and limit exposure to suspected pest-infested areas. If farming with multiple pieces of equipment, assign only one machine to the infested areas in order to minimize the exposure and the number of intensive cleanings required. Log equipment usage (<b>see page C11</b>).</p>
<b>Advanced</b>	<p>Alternatively crop or plant grass on known pest infested areas. Construct a new field access to avoid high traffic. This technique is being used in clubroot areas where infested areas are known to be near field exits.</p>



## Variety, Field and Crop Selection (including Rotation)

### Addressing Target Outcome 2.1

**Target Outcome 2.1: Crop selection and field susceptibility to a specific crop or variety are to be managed to reduce the propagation and transmission of pests.**

#### Building your own biosecurity management plan

The susceptibility of a field to a number of pest problems can increase dramatically depending on the sequence of crops grown and/or the varieties selected.

For many plant diseases there can be a low base level of infection that may only do minimal damage unless allowed to flourish in an ideal environment. Crop sequence, short rotations and/or the use of susceptible varieties can effectively provide that ideal environment. For example, the further distribution of blackleg and clubroot in canola are considered highly connected with rotation and the use of susceptible varieties.

In some circumstances, crops act as host or multiplier for a pathogen. For example, a corn crop followed by a wheat crop may substantially increase the potential for fusarium in the wheat crop, even if the preceding corn crop showed relatively little infection.

In some cases, a combination of resistant and susceptible varieties, i.e. refuge varieties, is used for long term pest resistance management. The inclusion of a small amount of the susceptible variety (refuge) dramatically reduces that selection pressure for the development of resistant pests.

In terms of weed management, varying crop patterns and varying chemistries of crop protection products reduces the likelihood of developing weeds that become resistant to a specific chemistry group. The loss of the use of any one crop protection chemistry immediately puts more pressure on the use of other chemistries (groups of chemicals), and consequently increases the likelihood of another resistance developing. For example, resistance to group one and group three herbicides in green foxtail and wild oats are existing risk conditions.

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The relationship between crop prices and cropping choice can create very real conflict and challenging management decisions, resulting in ignoring or disregarding what are considered to be agronomic best practices. It is understood that economic opportunity is a key driver in decision making. It is also understood that it is easier to calculate and consider the economic benefit of a high value crop in this year's budget than it is to assess the potential cost of a major pest introduction for your farm and/or the region for multiple future years.

It is difficult to assess in any one year how much additional risk is taken by shortening a rotation. It is also very difficult to assess the risk borne by other farms in the area by one single farm being the entry point to the region of a new disease, or a new race of an existing disease, as a result of taking those risks.

### ***Determine Your Needs***

Do you generally follow best management rotation practices?

Do you grow crops that are recognized as potentially vulnerable to rotational risk?

Do you look for and select varieties that demonstrate the highest available levels of resistance or tolerance of disease?

Do your cropping patterns take into account the rotation of pesticide grouping and rotation?

Within each of the following areas, you should assess the potential for the introduction of a biosecurity risk and choose a risk mitigation strategy accordingly. Develop your own protocol using the following suggested guidelines:

<b>Variety, Field and Crop Selection (including Rotation)</b>	
<b>Intensity</b>	<b>Risk mitigation procedures and management considerations</b>
<b>Basic</b>	<p>Rotate crops according to agronomic best practices to minimize the development of ideal conditions for the introduction of new pests. Choose best available resistant and/or tolerant varieties.</p> <p>Rotate between varieties with different primary tolerances if required. Focus variety choice on the highest priority protection issues.</p> <p>Always follow mandated refuge seed requirements where applicable to minimize the selection pressure for resistant pests.</p> <p>Rotate herbicide group. Rotating crops does not automatically mean rotating of herbicide groups. Be aware of the need to rotate both.</p> <p>Rotate fields, based on your knowledge of each field’s conditions.</p> <p>Adjust the sequence of crops to minimize the host effect; for example, canola on soybean stubble (white mold) or wheat on corn stubble (fusarium). If you have shortened the rotation of a certain crop due to especially high expected returns, consider years where the return spread is not so substantial to “get back” in rotation.</p>
<b>Moderate</b>	<p>Use multiple modes of action if available; some pesticides are packaged with a combination of modes of action and effectively reduce the likelihood of the development of resistance.</p> <p>Ensure field selection considers emphasis on field conditions in rotation decisions.</p> <p>Consider application of pesticides in “spot treatments”, for managing specific pest infestations and perimeter control.</p>
<b>Advanced</b>	<p>Consider swapping land for a growing season with other producers of alternate and applicable crops to stay in rotation. When producing higher-value specialty crops, you may be able to swap land with other farmers who prefer to specialize in a different crop. There have been some successful examples with potatoes and/or lentils.</p>



## Infield Monitoring and Control Practices

### Addressing Target Outcome 2.3

**Target Outcome 2.3: Minimize or eliminate the spread of pests throughout the farm by timely scouting, monitoring, assessment and decision-making.**

#### **Building your own biosecurity management plans**

Early detection, containment and management of new pests that have been introduced to the farm are crucial components of biosecurity management. Industry experts familiar with initial outbreak areas for pests confirm that nearly all of the initial problems persisted for some time before detection. Had the original problems been identified and dealt with earlier, the financial consequences for the landowner, the region, and the industry as a whole, could have been significantly reduced.

#### ***Determine Your Needs***

- Does all of your farmland get carefully monitored throughout the growing season for unusual pests?
- Are there geo-referenced records to track and identify new occurrences of potential biosecurity issues?
- Are you adequately connected to agronomic resources to make rapid and informed control decisions?

Examples of risk mitigation procedures to consider include:

Infield Monitoring and Control Practices	
Intensity	Risk mitigation procedures and management considerations
<b>Basic</b>	<p>Routinely monitor fields for unusual occurrences symptoms and patterns. When detected early, pest infestations are easier to manage and impacts are reduced.</p> <p>Consult with agronomists and production advisors to determine how to manage new or unknown observations.</p> <p>Keep notes or maps of important areas for future reference (<b>see page C12</b>). Photocopies of soil maps, aerial photos, or satellite images may serve as a backdrop to keep important notes and observations.</p> <p>Be prepared to act quickly with appropriate mechanical or chemical control measures to control and/or contain new pest infestations. The window of opportunity for effective control can be very short and specific.</p> <p>Control decisions need to make economic sense in both the short run (annual) and the long run (5-10 years).</p>
<b>Moderate</b>	<p>Contract out scouting and monitoring to third party service providers capable of providing timely reports and investigating findings. This addresses capacity and efficiency issues if your farm size now makes it nearly impossible to scout and evaluate every acre.</p> <p>Keep electronic records of areas requiring special consideration. Handheld computers and smart phones now have GPS geo-reference capability. Movement and severity of specific problems can be effectively tracked over time.</p> <p>Adjust cropping plans to improve control and containment measures. For example, if you suspect you have group one resistance, consider rotating to alternative chemistry in the future. Minimize the selection pressure for the resistant variety.</p> <p>Adjust field operations (for example, scheduling, tillage practices, spraying coverage) to improve containment (<b>see Managing Equipment Movement</b>).</p> <p>Undertake analysis of benefits and compare to relevant costs. Consider all acres, not only those currently affected.</p>
<b>Advanced</b>	<p>Employ advanced technologies, such as satellite imagery, aerial photos, and yield maps, and monitor for changes in growth activity and yield capability. Digital technologies allow for layering of observations to look for patterns and problems.</p> <p>If necessary, take critical areas out of annual production (for example, establish grass) to further contain problems that cannot be adequately controlled through other means.</p> <p>As crop input decisions are made (for example: whether or not to apply pesticides), consider all crop growth dynamics and market outlook conditions in the decision.</p>



## Managing People Access and Movement

### Addressing Target Outcomes 1.4, 1.5

**Target Outcome 1.4: Minimize or eliminate the biosecurity risks introduced by people having access to the farm.**

**Target Outcome 1.5: Minimize or eliminate the biosecurity risks introduced by farm employees and/or management.**

### Building your own biosecurity management plan

People and personal vehicles (including ATV's) can travel significant distances and be exposed to a wide range of pests that may not currently be in the destination area. Although it is generally expected that people and personal vehicles may move relatively small amounts of soil, weed seeds or plant pathogens, the possibilities for exposure to pests over a wide area makes the potential for introduction a significant concern. Trades people, and in particular field scouts, by the nature of their business, are potentially exposed to many different biosecurity risks as part of their daily activity. International travelers can bring new pests from great distances. It is important to note that some diseases may be transferred from different species of plants. For example, it is believed that clubroot was originally transferred from other crucifer vegetable crops.

### *Determine Your Needs*

Are there people and personal vehicles traveling on your farm arriving from: a) great distances b) other farms c) zones or areas that have pests that you currently do not have?

If so, are you able to advise these guests and travelers of the potential risk they may bring to your farm before they arrive?

Can you request that guests follow appropriate precautions before entering potentially sensitive areas?

Consider using the following examples for your own farm biosecurity management plan:

Managing People Access and Movement	
Intensity	Risk mitigation procedures and management considerations
<b>Basic</b>	<p>Inform guests of the potential risks they may bring to your farm to enhance their understanding of the need to take precautions. Awareness alone is a powerful tool.</p> <p>Park guest vehicles in a low-risk area in your yard, and travel throughout the farm in one of your own farm vehicles that is known to be adequately cleaned.</p> <p>Use gates where appropriate to limit access.</p> <p>Plan access roads and gates to limit access when designing the layout of a farmyard.</p> <p>Post signs to discourage unnecessary access (“No Trespassing”; “Food Production Area: Do Not Enter”).</p>
<b>Moderate</b>	<p>Establish procedures for farm service/trade people and travelers that can be communicated before they arrive (<b>see Communications Plan Outline on page C13</b>). For example, for a custom soil sampler, identify what you expect of them, how they should conduct themselves and what they should do with your samples and/or the samples from previous fields.</p> <p>Ensure that the procedure is crop and/or season specific as required.</p> <p>Minimize people movement, limit access, and ensure people follow the required protocol to reduce exposure where there is no potential benefit to do otherwise.</p>
<b>Advanced</b>	<p>Provide visitors with a clean up zone and/or protective clothing prior to access. If someone does present a risk to your farm and you still have a need to grant them access, then it should be your farm’s responsibility to provide adequate equipment, clothing and/or sanitation options to minimize the risk to your satisfaction. For example, you should consider using disposable overalls and booties.</p> <p>You do not have the responsibility to be a tourist attraction or a demonstration farm. If you do host tourists or crop demonstrations, you need to have protocols in place to limit potential pest introduction.</p>



## Storage, Handling and Transport

### Addressing Target Outcomes 3.1, 3.2

**Target Outcome 3.1: Minimize the establishment and spread of pests by ensuring the inspection and appropriate sanitation of any transport and/or field equipment leaving the farm.**

**Target Outcome 3.2: Minimize or eliminate the introduction of biosecurity risks to another farm or area due to crop transfer, sale or storage.**

### Building your own biosecurity management plan

The issues that may be of concern for entering your farm are also concerns for entering other farms. The considerations you request of others, others should be able to expect of you. Any risk or unique problem that you know of or suspect you have should be declared to anyone who may be at risk or who may transfer that risk to others. In most cases, production from the farm will be headed into grain elevators or processors and not back to other farms. In the situation of farm to farm sales (for example grain for animal feed), the risk of moving or transferring a biosecurity risk to another farm is much higher.

#### ***Determine Your Needs***

Do you mitigate the establishment of pests in your storage practices?

Does the production from your farm with a known pest problem get commingled with other production through the storage and handling process?

Does grain in storage remain at moisture levels and temperatures required to stay in condition?

Are those receiving grain from you aware of the potential biosecurity risks that you may be passing on to them (particularly if they are unexpected and unique to the area)?

The following are examples for developing your farm management protocol:

Storage Handling and Transport	
Intensity	Risk mitigation procedures and management considerations
<b>Basic</b>	<p>Start with clean bins and keep transport and handling equipment clean between crop movements. Sweep bins thoroughly, let concrete floors fully dry prior to using. Empty hoppers, run augers backward. Remove all spoiled grain.</p> <p>Ensure grain storage quality through moisture and temperature control using adequate aeration, drying, and/or turning bins as required. Each crop has an ideal moisture and temperature range. Stay within that range.</p> <p>Monitor bins frequently; probe bins for changes.</p> <p>In the event that insects and/or molds are found, follow appropriate fumigation, aeration or other management strategies to reduce impact.</p> <p>Tarp trucks for any road travel.</p> <p>Declare to grain buyers any pests that could be of concern. If the buyers know of the pest risk, they may be able to handle the product in a way that puts no other farms, or the supply chain, at risk. The next time, it might be you that is being protected.</p>
<b>Moderate</b>	<p>Bin grain from pest infested areas separately to isolate the risk.</p> <p>Keep samples from each bin or lot of production that may have different characteristics.</p> <p>Fumigate when appropriate and required.</p> <p>Treat grain with recommended pesticides when appropriate and required.</p> <p>When using temporary field storage, monitor grain condition and the integrity of the storage facility frequently.</p>
<b>Advanced</b>	<p>Document storage use year over year to monitor possible pest propagation.</p> <p>Purchase temperature-monitoring systems for large bins. The larger the bin, the more cost effective the available technology and tools are for monitoring storage conditions.</p>



## Management Plan Development, Updating and Renewal

### Addressing Target Outcomes 4.1, 4.2

**Target Outcome 4.1: Biosecurity management practices are developed and documented, understood and implemented by all management and staff.**

**Target Outcome 4.2: Minimize or eliminate the introduction, spread and/or transfer of biosecurity risks through active external communication.**

#### **Building your own biosecurity management plan**

It is one thing to have plans to manage biosecurity, and yet another to ensure that those plans are implemented. Today's farm is now much more likely to have multiple managers, employees and/or suppliers who must all work together to meet the objectives. There is a need for a comprehensive management plan that is well communicated and well understood in order to achieve the desired outcomes.

#### ***Determine Your Needs***

How many other members of your management, employee and/or service provider team need to have a complete understanding of the biosecurity plan?

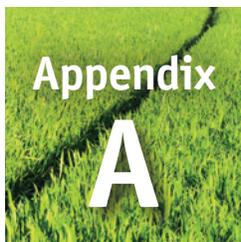
How can you effectively document and communicate that plan to each member of your team?

How will you monitor to ensure that everyone is implementing the plan?

How will you update and improve the plan as new information and new issues arise?

Consider using the following examples of protocol for the development of your own farm biosecurity management plan:

Management Plan Development, Updating and Renewal	
Intensity	Risk mitigation procedures and management considerations
<b>Basic</b>	<p>Develop awareness of the need for biosecurity risk management with yourself and staff.</p> <p>Document at least one management practice, using a format <b>as outlined on pages C3-C9</b>, which addresses your primary concern for each category discussed in this Guide.</p> <p>Identify and document contact information for professional agronomists, and provincial or municipal weed specialists to be contacted and or informed should a potential biosecurity risk be suspected.</p> <p>Train your staff on the management practices required.</p> <p>Implement the plan.</p> <p>Review and update the plan bi-annually, or as any biosecurity risk is identified and addressed.</p>
<b>Moderate</b>	<p>Identify and prioritize specific issues facing your farm that introduce biosecurity risk.</p> <p>Develop and document management practices that will address these risks. Consider including practices that address soil movement, unwanted people access, and the introduction of possible pests when bringing supplies or services onto your farm.</p> <p>Geo-reference map your farm enterprise (<b>see page C12</b>); use that map to help guide the movement of supplies, equipment and inventory.</p> <p>Develop and document a procedure for reporting pests and other biosecurity risks to the appropriate plant health authority and specialist as required. Be aware that there are provincially and federally regulated pests.</p> <p>Include clauses within supplier or service contracts that specify biosecurity management considerations (<b>see illustration on page C10</b>).</p> <p>Conduct management and staff meetings at the beginning of each production season to communicate and review biosecurity management protocol.</p> <p>Review and update the plan annually, or as any biosecurity risk is identified and addressed.</p>
<b>Advanced</b>	<p>Consider contracting expert advice in the development of a biosecurity management plan for your farm. This may include agronomic specialists, farm management specialists, and agriculture extension professionals. Discuss and document appropriate biosecurity management procedures for all aspects of your farm enterprise.</p> <p>Present your biosecurity protocol to all suppliers and visitors arriving at your farm.</p> <p>Develop a risk zone map for your farm, identifying low to potentially high biosecurity risk areas to enable management plans specific to pest infestations.</p> <p>Develop and document a procedure for tracking the movement of vehicles and equipment as they are used in or near high risk areas (<b>see sample in page C11</b>).</p> <p>Develop and document a procedure for logging the access and movement of people, particularly in higher-risk areas (<b>see sample page C14</b>).</p> <p>Review and update the plan seasonally, or as any biosecurity risk is identified and addressed.</p>



## Background to Biosecurity

### What is Biosecurity?

Biosecurity refers to a series of management practices designed to prevent, minimize and control the introduction, spread and release of plant pests, which include insects, nematodes, weeds, molluscs, bacteria, fungi and viruses (hereafter referred to as pests).

### Why Adopt or Implement Biosecurity Measures?

The grains and oilseeds industry currently consists of the twenty-one crops defined under the *Canada Grain Act* (barley, oats, rye, triticale, wheat, canola, flaxseed, mustard, rapeseed, safflower seed, solin, soybeans, sunflower seed, beans, chick peas, fababeans, lentils, peas, mixed grain, buckwheat, and corn), as well as unofficial grains, for example, canary seed, kamut, spelt, and quinoa.

This industry is one of the largest in Canadian agriculture. It is in the interest of every farmer to protect their crops from pests, such as khapra beetle, karnal bunt, dwarf bunt, soybean cyst nematode, clubroot, blackleg in canola, and woolly cup grass. Moreover, exports of grains and oilseeds from Canada in 2010-11 amounted to approximately \$15.6 billion. In addition to the export market, the domestic industry that processes grains to produce such products as flour, vegetable oil, meal, ethanol, malt and other value-added products, adds appreciably to the Canadian economy. Processed grains and oilseeds product exports were \$5.8 billion in 2010-11. Canadian grain production is also used for livestock feed.

Given the economic significance of this industry, the biosecurity measures needed to protect against the introduction and spread of pests are relevant not only to the grains and oilseeds industry, but will indirectly affect other sectors of the economy such as tourism and the service sector.

From the farmer's perspective, there are several differing frames of reference when considering biosecurity risk management:

- What are my business objectives in maintaining markets and accessing new markets?
- What do my customers demand for biosecurity practices and procedures?
- How can I avoid the introduction of a biosecurity risk that I currently do not have?
- How can I contain and minimize the biosecurity risks that I already have?
- What are my responsibilities to my neighbours and my industry to ensure I am not the point of introduction of a biosecurity risk to someone else?

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## Capacity to Manage Biosecurity Risks

Drifting of soil infested with pests, air-borne pathogens from neighbouring fields, field borders that are not maintained, and water erosion are significant threats to grains and oilseeds production. It is recognized that some vectors are more easily managed than others. Vectors such as wind, water, and wildlife, can be difficult to control. However, the resulting risks such as pest establishment and spread within the farm may be minimized by implementing biosecurity practices.

The farm-level biosecurity standard and the guidance document focus specifically on farm management practices within the control of the farmer at the production or farm activity level. Examples of management practices that can help mitigate biosecurity risk are:

- Care in sourcing, transportation and handling of input supplies
- Minimization of soil and plant material movement
- Monitoring the movement of people, vehicles, and equipment
- Cleaning of equipment
- Timely field scouting
- Beneficial crop production practices
- Communication, training, and record-keeping

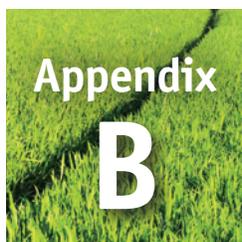
## The Process Used in the Development of a Guidance Document

In February 2011, the Canadian Food Inspection Agency (CFIA), in collaboration with Agriculture and Agri-Food Canada (AAFC) and the Canada Grains Council, identified and established a Grains and Oilseeds Biosecurity Advisory Group (including members of AAFC, the Canadian Grain Commission, provincial governments, grains and oilseeds industry organizations and farmers) to guide the development of a National Voluntary Farm-Level Biosecurity Standard and the Producer Guide to the National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry.

The ***National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry*** identifies a series of desired outcomes in the pursuit of minimizing biosecurity risks for each farm and the broader agricultural community. This is a separate document.

This ***Producer Guide to the National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry: A Guide for Implementing Proactive Biosecurity into Farm Management***, has also been developed to provide a series of farm management approaches that may be considered in order to achieve the desired outcome described in the Standard. The development process has included:

- A literature review of relevant and related topics
- A systematic gap analysis of existing farm level programs to identify current knowledge and best practices
- Farmer consultation to identify current practices and best practices that have been adopted by grains and oilseed farmers from all regions of Canada
- Ongoing feedback and input from the advisory group, CFIA, industry leaders and subject area experts



## Glossary

**Biosecurity:** A series of management practices designed to prevent, minimize and control:

- the introduction of pests into a production area or farm;
- the spread of pests within a production area or farm; and
- the movement of pests off the production area or farm.

**Biosecurity Plan:** A written plan that includes protocols of uniquely designed practices to prevent, minimize, control and contain pest movement onto, and spread within, and off a farm.

**Commercial/custom applicators:** Contractors who are hired to apply pesticides, including fungicides, herbicides, lime, etc., using their own equipment.

**Disease:** An impairment of the normal state of the plant caused by a pathogen, such as bacteria, fungi, nematode, or virus.

**Farm:** A tract(s) of land (commonly referred to as a farm unit) used for the purposes of crop production. The farm includes residences and all farm storages, buildings and structures, as well as fields (remotely located) used for the production of a crop.

**Farm Equipment:** Tractors, farm machinery and implements, excluding vehicles.

**Farm Vehicles:** Farm vehicles such as trucks, pickups and all terrain vehicles, either used on the farm or used to deliver grains and oilseeds to the market.

**Farmer/producer:** One who owns or rents land for crop production, produces the crop, markets the crop, manages the assets to produce and market the crop, and manages the business of a farm enterprise.

**Field:** An area designated for the production of crops.

**Guests:** Any non-farm personnel who arrives at the farm (includes salespersons, inspectors, delivery people, contractors, friends/relatives of farm personnel, etc.).

**Management Process:** Some assurance that what is identified as important is integrated into a management system to ensure it gets done.

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**Non-agricultural Vehicles:** Vehicles used by various service providers visiting the farm to provide a specific service, such as electrician, plumber, heating specialist, etc.

**Non-agricultural Equipment:** Equipment used by various industries that may visit the farm to gain access for pipeline, oil site or such industrial developments and uses.

**Off-Road Vehicles:** All-terrain vehicles, quads, dirt bikes and snowmobiles.

**Pathogen:** An agent that causes disease, especially a living microorganism such as a bacterium, fungus, nematode or virus.

**Pest:** According to the *Plant Protection Act, Government of Canada*, any thing that is injurious or potentially injurious, whether directly or indirectly, to plants or to products or by-products of plants, and includes any plant prescribed as a pest. (“thing” includes a plant and a pest; “plant” includes a part of a plant).

**Pest monitoring plan:** A written protocol routinely followed to monitor crops for the presence of pests.

**Practice:** A procedure(s) that is followed by the operator(s), without necessarily being written or detailed to the extent of a protocol.

**Production area:** A field designated for cultivation of crops.

**Property:** The land on which the production area(s) is located, including the residence and all farm buildings/structures.

**Protocol:** Defined and written procedures, which detail the steps to be followed to achieve an objective such as disinfecting a piece of farm equipment.

**Quarantine pest:** A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (International Standard for Phytosanitary Measures (ISPM) No. 5).

**Regulated pest:** A quarantine pest or a regulated non-quarantine pest (ISPM No. 5).

**Regulated non-quarantine pest:** A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of importing contracted party (ISPM No. 5).

**Representative Grain Sample:** Grains and oilseeds grades are based on samples. To ensure samples adequately reflect the entire lot of grain, proper sampling procedures must be used. These procedures are outlined by the *Canadian Grain Commission*.

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**Rotation:** Alternating types of crop production in a field from year to year to help mitigate pests within the crop.

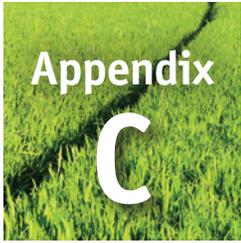
**Scouting:** Monitoring of field crop conditions during the growing season by qualified experts.

**Seed:** Grains and oilseeds recognized as meeting the requirements defined in the *Seeds Act* and *Regulations of the Government of Canada*.

**Target outcome:** A goal that all farmers/producers, regardless of the size of their operation, should try to implement, to protect their farm and crops from the introduction and spread of pests.

**Vector:** A carrier, or an agent, capable of transmitting a pest from an infected source to a host.

**Volunteer crop:** Self-set plants from previous years' crops that may become established as weeds in the current crop.



# Tools for Plan Development and Documentation

## Self-Assessment Tool

The purpose of completing this assessment is to assist farm owners and operators in determining the need and the priorities of a documented plan for each farm enterprise. Although every farm is exposed to some level of risk in each category, the degree of exposure and the potential consequences may vary widely for each individual farm, depending on region, crop mix and management practices. This tool, or checklist of key questions, is as follows:

	Yes	No
<b>1. Can I avoid the introduction of a biosecurity risk that I currently do not have?</b>	<input type="checkbox"/>	<input type="checkbox"/>
Crop inputs like seed, fertilizer, manure, waste, and water brought onto the farm are assessed for their potential to introduce pests.	<input type="checkbox"/>	<input type="checkbox"/>
Delivery vehicles, farm implements and/or equipment that enter the farm are assessed for their potential to introduce pests.	<input type="checkbox"/>	<input type="checkbox"/>
Soil movement is minimized. Non-agricultural equipment entering the farm is assessed for the potential to introduce pests.	<input type="checkbox"/>	<input type="checkbox"/>
Visitors, guests, trades people, agronomists, and suppliers travelling by vehicle or by foot are assessed for their potential to introduce pests.	<input type="checkbox"/>	<input type="checkbox"/>
Farm vehicles, implements or people that leave the farm and return home are assessed to determine the potential introduction of pests.	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
<b>2. Can I contain and minimize the biosecurity risks that I already have?</b>	<input type="checkbox"/>	<input type="checkbox"/>
Alternative cropping strategies, crop rotation, crop and variety selection and field history are recognized as potential management tools to minimize the spread of pests.	<input type="checkbox"/>	<input type="checkbox"/>
Soil movement is minimized. The movement of equipment and people within the farm, seen as potential carriers of pest problems, is managed in a practical and effective manner.	<input type="checkbox"/>	<input type="checkbox"/>
Timely scouting and monitoring, along with a clear understanding of economic thresholds and implications of control measures, are used in decision-making.	<input type="checkbox"/>	<input type="checkbox"/>
There is a water management strategy for my farm. Appropriate drainage exists to minimize the movement of pests.	<input type="checkbox"/>	<input type="checkbox"/>
Intended management practices are documented and all farm employees and decision-makers are aware, informed and committed.	<input type="checkbox"/>	<input type="checkbox"/>
Intended management practices are documented and all external service providers and production partners are aware, informed and committed.	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
<b>3. Can I avoid pests leaving my farm?</b>	<input type="checkbox"/>	<input type="checkbox"/>
Trucks and/or farm equipment leaving the farm are assessed for their potential to spread a pest from the farm to other farms or areas.	<input type="checkbox"/>	<input type="checkbox"/>
Appropriate signage exists.	<input type="checkbox"/>	<input type="checkbox"/>
Bins and handling equipment are inspected and cleaned before being used and grain condition is monitored.	<input type="checkbox"/>	<input type="checkbox"/>
Water exiting my farm is managed to reduce the potential to spread pests.	<input type="checkbox"/>	<input type="checkbox"/>
Unmarketable product and screenings are managed to minimize the risk of pests leaving the farm.	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
<b>4. Do I need a biosecurity risk management plan for my farm?</b>	<input type="checkbox"/>	<input type="checkbox"/>
Will a biosecurity management plan help support my business objectives in maintaining markets and accessing new markets?	<input type="checkbox"/>	<input type="checkbox"/>
Do my customers currently demand biosecurity practices and protocols? Will this be increasing in the future?	<input type="checkbox"/>	<input type="checkbox"/>
Do I have a responsibility to my neighbours and my industry to ensure I am not the point of introduction of a biosecurity risk to others?	<input type="checkbox"/>	<input type="checkbox"/>
Do my management and staff know and understand pest management techniques?	<input type="checkbox"/>	<input type="checkbox"/>
Do I make it known to my suppliers, farming colleagues, researchers, local governments, working partners and visitors that we need to manage pests?	<input type="checkbox"/>	<input type="checkbox"/>
Would I, my management, and/or my staff know what to do if a significant pest issue became evident on my farm?	<input type="checkbox"/>	<input type="checkbox"/>

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## Example of a Documented Biosecurity Management Plan

The following pages are not intended to be a workbook for completion. These templates are provided as an example of how you may wish to format your farm's biosecurity plan.

### Input Procurement Practices

Crop inputs like seed, fertilizer, manure, waste, and water brought onto the farm are assessed for their potential to introduce pests.

Potential Condition or Vector (Where your farm has specific risks)	Plans and Procedures (What you will do to manage those risks)
Seed	
Fertilizer	
Manure	
Waste	
Water	
Other	
Other	
Other	

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## Managing Equipment Movement

Delivery vehicles, farm implements and/or equipment that enter the farm, travel within the farm and/or leave the farm, are assessed for their potential to introduce pests.

Soil movement is minimized. Non-agricultural equipment entering the farm, traveling within the farm and/or leaving the farm, is assessed for the potential to introduce pests.

When farm vehicles or implements leave the farm and return home, an assessment has been made to determine the potential introduction of pests.

Potential Condition or Vector (Where your farm has specific risks)	Plans and Procedures (What you will do to manage those risks)
Equipment purchases/rental	
Custom field operators	
Non-agricultural equipment	
Combine	
Tillage equipment	
Other	
Other	
Other	

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### Variety, Field and Crop Selection (including Rotation)

Alternative cropping strategies, crop rotation, crop and variety selection and field history are recognized as potential management tools to minimize the spread of pests.

Potential Condition or Vector (Where your farm has specific risks)	Plans and Procedures (What you will do to manage those risks)
Crop residue	
Variety susceptibility	
Herbicide resistance	
Field susceptibility	
Water	
Other	
Other	

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## Infield Monitoring and Control Practices

Timely scouting and monitoring, along with a clear understanding of economic thresholds and implications of control measures, are used in decision-making.

There is a water management strategy for my farm. Appropriate drainage exists to minimize the movement of pests.

Potential Condition or Vector (Where your farm has specific risks)	Plans and Procedures (What you will do to manage those risks)
Lack of scouting	
Lack of monitoring	
Multiple conditions in consideration of economic threshold analysis	
Water	
Other	
Other	

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## Managing People Access and Movement

Visitors, guests, trades people, agronomists, and suppliers travelling by vehicle or by foot are assessed for their potential to introduce pests.

When people leave the farm and return home, an assessment has been made to determine the potential introduction of pests.

Appropriate signage exists.

Potential Condition or Vector (Where your farm has specific risks)	Plans and Procedures (What you will do to manage those risks)
Guest	
Off-road vehicle operators	
Neighbours	
Trades people, suppliers, agronomists	
Hunters, eco-tourists	
Other	
Other	

## Storage, Handling and Transport

Bins and handling equipment are inspected before being used and grain condition is monitored. Unmarketable products and screenings are managed to minimize the risk of pests leaving the farm.

Potential Condition or Vector (Where your farm has specific risks)	Plans and Procedures (What you will do to manage those risks)
Trucking	
In-field equipment / temporary storage	
Condition and integrity of storage facilities	
Water	
Bin monitoring	
Lack of grain sampling	
Disclosure to buyers	
Other	
Other	

## Management Plan Development, Updating and Renewal

My management, and/or my staff, know what to do if a significant pest issue became evident on my farm.

My suppliers, farming colleagues, researchers, local governments, working partners and visitors are aware that together we need to take specific actions to manage pests.

Intended management practices are documented and all internal farm employees and decision makers, as well as external service providers and production partners, are aware, informed and committed.

Potential Condition or Vector (Where your farm has specific risks)	Plans and Procedures (What you will do to manage those risks)
Poor documentation of practices	
Lack of training	
Poor record keeping	
Lack of communication among management and staff	
Lack of communication with external stakeholders	
Other	
Other	
Other	

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## Potential Contract Considerations

Biosecurity risks and related management plan issues, particularly those with significant potential financial consequences, need to be understood by those with whom you do business. Realistic agreements should be documented to clarify what course of action each party expects. This should not be perceived as being overly detailed and difficult to deal with. It is about being prudent and protecting the value of your assets.

Examples of potential considerations to include in documented contracts include:

### Equipment Purchase Agreement

- Define levels of adequate cleaning; include verification of adequate cleaning.
- Some mechanism that the seller/dealer can use to provide assurance that all soil and plant material will be removed before the equipment arrives at the farm.

### Custom Work Agreement

- Define levels of adequate cleaning; include verification of adequate cleaning.
- Understand and agree upon protocol on how clean the equipment should be before it arrives at the farm.
- Seek service providers that respect such protocol.

### Trucking Affidavit

- Define truck clean-out procedures and verification.
- Does the trucker have a standard protocol that they already use that can verify the truck has been cleaned?
- Seek service providers that respect such protocol.

### Crop Scouting and Monitoring Contract

- Define the requirements regarding hygiene for access and movement.
- For specific crops in specific seasons, ensure an understanding of the expectations of protocol to be followed.
- Seek service providers that respect such protocol.

### Input Supplier Agreement

- Define delivery protocol, for example, truck delivery points determined and documented, and adequate cleaning of wheels and chassis specified.
- Document the need for adequate clean-outs in the input supply chain to help ensure no weed seeds or impurities are delivered to the farm.



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## Farm and Field Mapping

Following is an example of a satellite image used to geo-reference a farmyard and fields:



Photo: Courtesy of Farmers Edge

Water management issues, weed infestation locations, and insect or disease outbreaks could be recorded to assist in managing multi year biosecurity management plans. Third party service providers can be used to develop and retain this information.

A hand-drawn map could be used to assist in recording grain storage locations year over year.

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## Communication Plan Outline

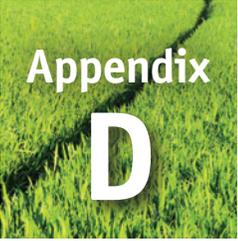
Ensure farm management and staff have an understanding of the biosecurity management plans and procedures. Conduct seasonal meetings to review and update protocol.

Ensure adequate communication; inform suppliers, farming colleagues, researchers, local governments, working partners and visitors of your biosecurity management plans. Use such tools and techniques as:

- Logs to record people, vehicles, and/or equipment movement, where necessary, in an advanced risk situation
- Signage to help limit access
- Signage to help direct traffic in your yard
- Documentation of working agreements and operational expectations with suppliers
- Seasonal meetings with staff to discuss key biosecurity issues for the upcoming season
- Biosecurity management responsibilities outlined within job descriptions or listing of accountabilities



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## Appendix D

# References and Web-Links

### **Input Procurement Practices**

Seed quality and pest issues around canola for both weed species and diseases like clubroot and fusarium have heightened industry awareness. There are a number of more detailed resources that are available and that can provide rationale for standard best management practices. The following current industry and government references are examples of the resources available.

#### **Guidelines for the Storage and Handling of Treated Seed**

[www.seedgrowers.ca](http://www.seedgrowers.ca)

#### **Seed Program Quality System Procedure – Pedigreed Seed Crop Inspection Procedures**

[www.inspection.gc.ca](http://www.inspection.gc.ca)

#### **Using Cultural Practices to Reduce Pest Problems in Crops**

[www1.agric.gov.ab.ca](http://www1.agric.gov.ab.ca)

#### **Biosecurity Guidelines – To Prevent the Introduction and Spread of Plant Pests from Farm to Farm**

[www.agf.gov.bc.ca](http://www.agf.gov.bc.ca)

#### **Canola Integrated Pest Management**

[www.canolacouncil.org](http://www.canolacouncil.org)

#### **Controlling Weeds in Canola**

[www.canolacouncil.org](http://www.canolacouncil.org)

#### **Sustainable Manure Management, Prairie Agricultural Machinery Institute**

[www.pami.ca](http://www.pami.ca)

#### **Agricultural Best Management Practices**

[www4.agr.gc.ca](http://www4.agr.gc.ca)

#### **Pest Management and Water Quality**

[www4.agr.gc.ca](http://www4.agr.gc.ca)

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## Managing Equipment Movement

Considerable attention has been given to the potential spread of clubroot and/or soybean cyst nematode, depending on crop production and location in Canada. The best management practices and consideration for these biosecurity risks provide important guiding principles for the evaluation and management of other potential pests as well. Current relevant industry and government references include the following:

### **National Farm-Level Biosecurity Planning Guide Proactive Management of Plants Resources**

[www.inspection.gc.ca](http://www.inspection.gc.ca)

### **Alberta Clubroot Management Plan**

[www1.agric.gov.ab.ca](http://www1.agric.gov.ab.ca)

### **Best Management Practices for Disinfesting Farm Machinery and Equipment to Prevent the Spread of Clubroot between Canola Fields**

[www1.agric.gov.ab.ca](http://www1.agric.gov.ab.ca)

### **Research Developing BMP for Clubroot Disinfection**

[www.topcropmanager.com](http://www.topcropmanager.com)

### **Biosecurity Guidelines – To Prevent the Introduction and Spread of Plant Pests from Farm to Farm**

[www.agf.gov.bc.ca](http://www.agf.gov.bc.ca)

### **On-Farm and Greenhouse Sanitation and Disinfection Practices**

[www.al.gov.bc.ca](http://www.al.gov.bc.ca)

### **Managing Clubroot: Equipment Sanitation Guide**

[www.canolacouncil.org](http://www.canolacouncil.org)

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## **Variety, Field and Crop Selection (including Rotation)**

For further information on best or beneficial management practices, consider the following:

### **Agri-Réseau Grandes Cultures**

[www.agrireseau.qc.ca](http://www.agrireseau.qc.ca)

### **Réseaux Grandes Cultures du Québec**

[www.cerom.qc.ca](http://www.cerom.qc.ca)

### **Glyphosate Resistant Weeds in Ontario**

[www.ridgetownc.uoguelph.ca](http://www.ridgetownc.uoguelph.ca)

### **Field Crops Implementation Projects**

**Management of Fusarium diseases in field crops with a new biopesticide**

**Biological control of soil insect pests in field crops**

**On-Farm Remediation of Pesticide Wastes using Biobeds**

**Development of reduced-risk strategies through coordinated monitoring, forecasting and risk warning systems for insect pests of field crops in Canada**

**Pesticide free production systems for flax, wheat and oat**

[www4.agr.gc.ca](http://www4.agr.gc.ca)

### **Rust Diseases in Canada**

[www.prairiesoilsandcrops.ca](http://www.prairiesoilsandcrops.ca)

### **Using Cultural Practices to Reduce Pest Problems in Crops**

[www1.agric.gov.ab.ca](http://www1.agric.gov.ab.ca)

### **Biosecurity Guidelines – To Prevent the Introduction and Spread of Plant Pests from Farm to Farm**

[www.agf.gov.bc.ca](http://www.agf.gov.bc.ca)

### **Insect Control**

[www.gov.mb.ca/agriculture](http://www.gov.mb.ca/agriculture)

### **Best Management Practices – Field Crop Production**

[www.omafra.gov.on.ca](http://www.omafra.gov.on.ca)

### **Best Management Practices of Leading Farmers**

[www.wrap.ab.ca](http://www.wrap.ab.ca)

### **Best Management Practices**

[www.gov.mb.ca/agriculture](http://www.gov.mb.ca/agriculture)

### **Oat Grower Manual – Weed Management**

[www.poga.ca](http://www.poga.ca)

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## **In-Field Monitoring and Control Practices**

For further information on best or beneficial management practices, go to the following links:

### **Canola Disease Scouting and Risk Assessment Card**

[www.canolacouncil.org](http://www.canolacouncil.org)

### **Canola Scouting and Sweep Net Insect identification Card**

[www.canolacouncil.org](http://www.canolacouncil.org)

### **Field Crops Implementation Projects**

[www4.agr.gc.ca](http://www4.agr.gc.ca)

### **Plant Disease Control – Integrated Plant Disease Management**

[www.gov.mb.ca/agriculture](http://www.gov.mb.ca/agriculture)

### **Insect Control**

[www.gov.mb.ca](http://www.gov.mb.ca)

### **Western Committee on Crop Pests: Guide to Integrated Control of Insect Pests of Crops Western Committee on Plant Diseases: Guidelines for the Control of Plant Diseases in Western Canada**

[www.westernforum.org](http://www.westernforum.org)

### **Réseau d'avertissements phytosanitaires**

[www.agrireseau.qc.ca](http://www.agrireseau.qc.ca)

### **SAgE pesticides**

[www.sagepesticides.qc.ca](http://www.sagepesticides.qc.ca)

### **Guide des ravageurs de sol en grandes cultures**

[www.agrireseau.qc.ca](http://www.agrireseau.qc.ca)

### **Gestion intégrée des insectes nuisibles dans la culture du canola au Québec**

[www.agrireseau.qc.ca](http://www.agrireseau.qc.ca)

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## **Managing People Access and Movement**

For further information on best or beneficial management practices, refer to the following:

### **Field Crops Implementation Projects**

[www4.agr.gc.ca](http://www4.agr.gc.ca)

## **Storage, Handling and Transport**

For further information on best or beneficial management practices, consider the following:

### **Managing Stored Grain: Maintaining Quality and Managing Insect Infestations**

[www.grainscanada.gc.ca](http://www.grainscanada.gc.ca)

### **Good Operating Practices for: Grains, Oilseeds and Pulses Grain Handling and Processing Facilities**

[www.grainscanada.gc.ca](http://www.grainscanada.gc.ca)

### **Good Grain Storage Practices at Harvest Help Prevent Problems Later**

[www.grainscanada.gc.ca](http://www.grainscanada.gc.ca)

### **Canola Storage: Management Tips for Conditioning and Drying**

[www.canolacouncil.org](http://www.canolacouncil.org)

### **Stored Grain Insect Pest Management**

[pubs.ext.vt.edu](http://pubs.ext.vt.edu)

## **Management Plan Development, Updating and Renewal**

For further information on best or beneficial management practices, go to the following links:

### **National Farm-Level Biosecurity Planning Guide – Proactive Management of Plant Resources**

[www.inspection.gc.ca](http://www.inspection.gc.ca)

### **BC Pest Management Plans**

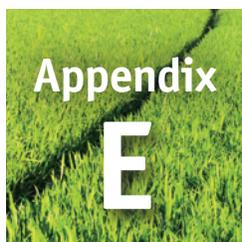
[www.for.gov.bc.ca](http://www.for.gov.bc.ca)

### **The Potential Impacts of the Biosafety Protocol on Agricultural Commodity Trade**

[www.canadagrainscouncil.ca](http://www.canadagrainscouncil.ca)

### **Guide to Best Management Practices in British Columbia for Cereals, Canola, Field Corn, Field Peas, Grasses and Legumes for Forage and Seed Production**

[www.agf.gov.bc.ca](http://www.agf.gov.bc.ca)



## Examples of Pests

The following examples of pests are those cited within the guide. This is not intended to be a complete list of pests in the grains and oilseeds industry in Canada.

Pest	Potential Vectors	Technical Reference: Current Web-link
<i>Anthracnose</i> Plant disease pathogen affecting a number of pulse crops.	Seed Crop residue Spore movement on people and equipment	<a href="http://www.gov.mb.ca/agriculture/crops/diseases/fac34s00.html">http://www.gov.mb.ca/agriculture/crops/diseases/fac34s00.html</a> <a href="http://www.gov.mb.ca/agriculture/crops/diseases/fac20s00.html">http://www.gov.mb.ca/agriculture/crops/diseases/fac20s00.html</a>
<i>Ascochyta</i> Plant disease pathogen affecting a number of pulse crops.	Seed Crop residue Plant material movement	<a href="http://www.agriculture.gov.sk.ca/ascochyta_blight_faqs">http://www.agriculture.gov.sk.ca/ascochyta_blight_faqs</a>
<i>Blackleg</i> Plant disease affecting canola.	Seed Crop residue	<a href="http://www.agriculture.gov.sk.ca/Default.aspx?DN=da235d53-4d3b-448f-9942-fc4ce40cee93">http://www.agriculture.gov.sk.ca/Default.aspx?DN=da235d53-4d3b-448f-9942-fc4ce40cee93</a>
<i>Cereal Leaf Beetle</i> Insect where adult and larva can damage most grassy plants.	Crop residue	<a href="http://www.agf.gov.bc.ca/cropprot/clbeetle.htm">http://www.agf.gov.bc.ca/cropprot/clbeetle.htm</a>
<i>Cleavers</i> Weed problem difficult to separate from Canola seed and difficult to control.	Seed Equipment movement Water	<a href="http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/prm2587">http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/prm2587</a>
<i>Clubroot</i> Soil-borne pathogen rapidly emerging as a concern in Canola. Can affect all crucifer plants.	Seed Soil, equipment and people movement Crop residue	<a href="http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex8593">http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex8593</a>
<i>Dwarf Bunt</i> Regulated pest of Canada. Pathogen affecting winter wheat. <b>restricted distribution and under official regulatory control</b>	Seed Equipment movement	<a href="http://www.agf.gov.bc.ca/cropprot/dbunt.htm">http://www.agf.gov.bc.ca/cropprot/dbunt.htm</a>
<i>Fusarium</i> Plant disease pathogen primarily on cereals and corn. Often referred to as scab or tombstone.	Seed Soil movement Crop residue Wind	<a href="http://www.gov.mb.ca/agriculture/crops/diseases/fac12s01.html">http://www.gov.mb.ca/agriculture/crops/diseases/fac12s01.html</a>

Pest	Potential Vectors	Technical Reference: Current Web-link
<i>Glyphosate-Resistant Giant Ragweed</i> Giant Ragweed no longer able to be controlled by glyphosate herbicides.	Seed Equipment movement Water	<a href="http://www.ridgetownc.uoguelph.ca/research/documents/sikkema_GlyphosateResistantWeedsInOntario.pdf">http://www.ridgetownc.uoguelph.ca/research/documents/sikkema_GlyphosateResistantWeedsInOntario.pdf</a>
<i>Group One Resistant Wild Oats</i> Wild oats no longer able to be controlled by group one herbicides.	Seed Soil movement Equipment movement Water	<a href="http://www.gov.mb.ca/agriculture/crops/weeds/fab19s00.html">http://www.gov.mb.ca/agriculture/crops/weeds/fab19s00.html</a>
<i>Karnal Bunt</i> Regulated pest of Canada. Pathogen affecting wheat. <b>absent in Canada</b>	Seed Equipment movement	<a href="http://www.uiweb.uidaho.edu/ag/plantdisease/kbwheat.htm">http://www.uiweb.uidaho.edu/ag/plantdisease/kbwheat.htm</a>
<i>Khapra Beetle</i> Regulated pest of Canada. Insect pest of stored grain. <b>absent in Canada</b>	Seed Equipment movement	<a href="http://www.inspection.gc.ca/plants/plant-protection/insects/khapra-beetle/eng/1328540150400/1328540259977">http://www.inspection.gc.ca/plants/plant-protection/insects/khapra-beetle/eng/1328540150400/1328540259977</a>
<i>Mycotoxin Ochratoxin</i> Mold based toxins that develop in stored grains.	Storage facilities Stored grain residue	<a href="http://www.grainscanada.gc.ca/storage-entrepose/ota/ota-eng.htm">http://www.grainscanada.gc.ca/storage-entrepose/ota/ota-eng.htm</a>
<i>Soybean Cyst Nematode</i> Soil borne pathogen.	Seed Soil movement (soil peds with seed) Equipment movement	<a href="http://www.omafra.gov.on.ca/english/crops/field/news/croppest/2009/14cpo09a2.htm">http://www.omafra.gov.on.ca/english/crops/field/news/croppest/2009/14cpo09a2.htm</a>
<i>Stem and Bulb Nematode</i> Soil borne pathogen.	Seed Soil movement (soil peds with seed) Equipment movement	<a href="http://www.plantwise.org/?dsid=19287&amp;page=4270&amp;site=234">http://www.plantwise.org/?dsid=19287&amp;page=4270&amp;site=234</a>
<i>Swede Midge</i> Insect which feeds on crucifer crops.	Crop residue	<a href="http://www.omafra.gov.on.ca/english/crops/facts/08-007.htm">http://www.omafra.gov.on.ca/english/crops/facts/08-007.htm</a>
<i>Velvet Leaf</i> Weed often associated with corn and soybean territories of the US Midwest.	Seed Manure Water	<a href="http://www.weedinfo.ca/en/weed-index/view/id/ABUTH">http://www.weedinfo.ca/en/weed-index/view/id/ABUTH</a>
<i>Volunteer RR Canola</i> Unintended volunteer crop.	Seed Plant material movement Equipment movement Water	<a href="http://www.omafra.gov.on.ca/english/crops/field/news/croppest/2005/04cpo05a3.htm">http://www.omafra.gov.on.ca/english/crops/field/news/croppest/2005/04cpo05a3.htm</a>
<i>Wireworm</i> Insect that feeds on seed and seedlings.	Soil movement Crop residue Water	<a href="http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/prm2509">http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/prm2509</a>
<i>Woolly Cup Grass</i> Regulated pest in Canada. Invasive weed species. <b>restricted distribution and under official regulatory control</b>	Seed Equipment movement	<a href="http://www.inspection.gc.ca/english/plaveg/inenv/pestrava/eriovil/eriovilfse.shtml">http://www.inspection.gc.ca/english/plaveg/inenv/pestrava/eriovil/eriovilfse.shtml</a>



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