Environmental Guide for Nova Scotia Farms

NOVA SCOTIA EFP ENVIRONMENTAL FARM PLAN

November, 2020

CANADIAN AGRICULTURAL PARTNERSHIP

NOVA SCOTIA NSFA FEDERATION OF AGRICULTURE

NOVA SCOTIA

Canada

The purpose of this guide is to provide farms with helpful information and educational resources related to environmental considerations which should be implemented as part of the management of their farm. The Nova Scotia Department of Agriculture (NSDA) has previously prepared the *Environmental Regulations Handbook for Nova Scotia Agriculture*. It provides guidance to agricultural producers for the environmental regulations, standards, codes and guidelines which can affect farm management decisions.

This document was prepared by the Nova Scotia Environmental Farm Plan (EFP) Program. Although every effort has been made to ensure the accuracy of its contents, the Nova Scotia Federation of Agriculture (NSFA) assumes no liability for the accuracy or reliability of the information contained herein. It must be recognized by the user of this guide that acts, regulations, by-laws, standards, codes and guidelines change over time. This guide does not replace the reading of environmental acts, regulations, and guidelines or seeking advice from a lawyer or an environmental expert.

Users of this guide are also recommended to contact the Nova Scotia Department of Agriculture, Nova Scotia Environment, Nova Scotia Department of Lands and Forestry or the appropriate municipal office for further information on laws, regulations or by-laws which may affect their operations. Contact information is included in Section 15 of this guide.

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Table of Contents

1.0 Introduction

The Nova Scotia agricultural industry, as part of an increasingly integrated global food system, faces the challenge of producing healthy food to feed the growing population, while at the same time striving to reduce the negative impacts on the environment. To meet this challenge, farmers have aspired to make improvements in the management and use of resources such as soil, water, nutrients and agro-chemicals.

As more knowledge and experience is gained in areas such as nutrient management, integrated pest management, water management and soil conservation practices, farmers have adopted strategies that protect and make more efficient use of our limited resources. Farmers have also made progress in adopting energy efficient technologies and improved processing and storage capabilities to minimize waste. Through improved management farmers can also have a positive influence on the environment by protecting and enhancing natural ecosystems and providing habitat for threatened and endangered species.

The Nova Scotia Environmental Farm Plan (EFP) program was established in 1999 and is delivered through the Nova Scotia Federation of Agriculture, with funding from the Nova Scotia Department of Agriculture (NSDA) and Agriculture and Agri-Food Canada (AAFC).The goal of the EFP Program is to assist farms in the province in identifying potential areas of environmental risk and providing practical solutions to minimize those risks. This is accomplished by conducting an on-farm environmental review with the farm owners, discussing the potential environmental risks and recommending changes to farming practices to mitigate the observed risks.

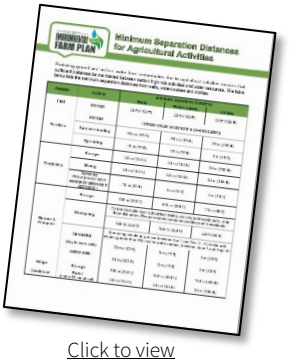
As part of the EFP process, each farm receives a written EFP farm report documenting the review findings and prioritizing the environmental improvements for the farm. The purpose of this guide is to supplement the EFP farm report by providing farmers with general information and links to additional resources related to environmental considerations which should be implemented as part of the management of the farm. While this guide can be a valuable resource to provide information on a variety of common environmental concerns, it does not replace the benefit of an on-farm review to address specific issues. For more information about the EFP program, visit: https://www.nsefp.ca.

2.0 Water Resources

Water is critical for any farming operation, whether it is a drinking water supply for people or animals on the farm, for irrigating crops or processing farm products. This section provides some information and resources related to water sources, water quality and water treatment. It also highlights the importance of riparian areas and buffers and provides initial information related to regulatory implications of water withdrawals, watercourse alterations and wetlands on the farm.

Minimum Separation Distances

It is important to protect surface and ground water supplies by ensuring contaminants are kept away from water sources. Manures, fertilizers, fuels, pesticides and other materials can all contribute to ground or surface water contamination through surface water runoff and/or groundwater leaching, if improperly stored or used. It is important to maintain minimum separation distances from all wells, watercourses and ditches when storing or using these materials.



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Municipal Water Supplies and Protected Water Areas

Some agricultural practices, if not carefully managed, can impair drinking water quality. Farmers operating within an area contributing to a municipal drinking water supply are required to contact the local water utility, Nova Scotia Department of Agriculture, and Nova Scotia Environment as there may be additional provincial or municipal restrictions on farming activities to which a farm must adhere.

Some municipal drinking water supply areas have special designations known as *Protected Water Areas* where regulations apply. Examples of agricultural activities that may be restricted or prohibited in a Protected Water Area include grazing livestock, storage of agricultural waste, spreading manure and pesticide use.

A Guide to Agricultural Best Management Practices within Municipal Drinking Water Supply Areas in Nova Scotia

For management practices and map of specific municipal drinking water supply areas:
http://www.nsfa-fane.ca/efp/wp-content/uploads/2017/04/Watershed_WEB_Final_2017.pdf

Wells

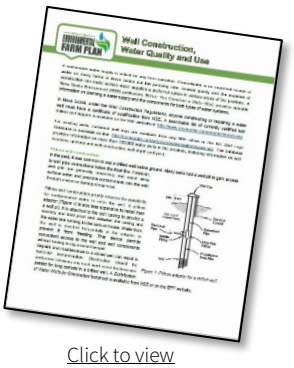
Wells form a direct connection between the surface and groundwater and therefore can be an easy pathway for contaminants to move into the water table. Farm owners and labourers need to be aware of the location of all wells, including your neighbour's and any abandoned or unused wells, in relation to the farm property. An effort should be made to identify the status, location and well type (i.e. drilled

or dug) for wells in close proximity to agricultural production. Care should be taken to ensure minimum separation distances are maintained from these wells.

Before You Construct a Water Well: Facts a homeowner should know

NSE Report: https://novascotia.ca/nse/water/docs/ConstructWell.pdf

When developing a water supply for the farm, there are many factors to consider as there are advantages and disadvantages to each type of construction (i.e. drilled well vs dug well). Drilled wells can provide a more consistent supply of potable water, but are more expensive to construct and flow rates and mineral levels can be issues in many areas in the province. Dug wells are cheaper to construct, but can run dry during dry periods of the growing season when water is needed the most. Bacteria issues are also common with dug wells and a water treatment system should be considered. It would be a good idea to contact local well drillers to discuss the potential of well development in your area as their previous experience will provide an indication as to the potential for development.



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Certified well drillers and diggers

To search for currently certified well drillers and diggers, as well as pump installers:
http://www.novascotia.ca/nse/cms/Search.asp

Under the *Well Construction Regulations*, anyone constructing or repairing a water well must have a certificate of qualification from Nova Scotia Environment (NSE). When a new well is constructed, a Well Report is submitted to Nova Scotia Environment. These individual well logs are available from a regional NSE office or the entire Nova Scotia Well Logs Database is available for download or can be searched on-line. Reviewing existing well logs in the area can provide valuable information related to variability in well depths and well yields.

Nova Scotia Well Logs Database

To find a copy of a Well Report: http://novascotia.ca/nse/groundwater/welldatabase.asp

Water Quality – Drinking Water

Homeowners are responsible for monitoring the quality of their private water supply. NSE recommends testing for bacterial quality every six months and testing for mineral quality every two years. Test more often if you notice changes in physical qualities, e.g. taste, smell, or colour.

Table 1. Canadian Drinking Water Guidelines (maximum concentration).

Total coliform …	Absent
E. coli ……	Absent
Nitrate ……	10 mg/L

Many on-farm food safety programs require annual testing, but this is usually related specifically to bacteria and mineral quality is not assessed. It is important to test your drinking water supply for bacteria at least annually and to incorporate mineral testing periodically to ensure that the Canadian Drinking Water Guidelines are met (*Table 1*).

Nova Scotia Department of Agriculture Animal and Plant Lab
For fee schedule, forms and factsheets related to water testing:
https://novascotia.ca/agri/programs-and-services/lab-services/animal-plant-lab/

Drop on Water Factsheets

Nova Scotia Environment has produced *The Drop on Water* factsheet series. These factsheets provide information on different water quality parameters, such as bacteria and chemicals, that may be present in well water, as well as general information to protect drinking water supplies.

Tip

In 2019, Health Canada issued new guidelines for manganese in drinking water. Aesthetic concentrations above 0.020 mg/L (previously 0.05 mg/L) may affect the taste, smell or colour of water. Current evidence now indicates that consumption of manganese in drinking water above 0.120 mg/L over a prolonged period of time can adversely affect neurologic development in children, and memory, attention and movement in adults. For more information, review the *Drop on Water – Manganese* factsheet.

Drinking Water Interpretation Tool

Also available is a *Drinking Water Interpretation Tool* on the NSE website. The tool allows you to compare your drinking water sample results to Health Canada drinking water quality guidelines and also provides links to additional sources of information.

NSE Water Resources
Drop on Water factsheets: https://novascotia.ca/nse/water/thedroponwater.asp
Drinking Water Interpretation Tool: https://novascotia.ca/nse/dwit/

Water Quality - Irrigation

Irrigation water quality should be tested at least once during the irrigation season. Bacterial contamination in surface water supplies typically increases as the season gets warmer and drier. The results for total coliform and *E. coli* should be within the *Canadian Water Quality*

Table 2. Water quality guidelines for irrigation (maximum concentrations).

Total coliform:	1 000 CFU/100 mL
E. coli:	100 CFU/100 mL

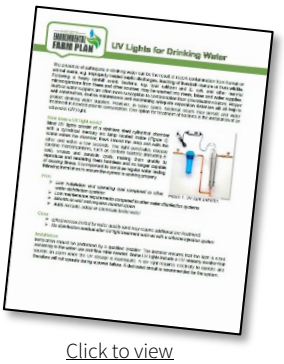
Guidelines for the Protection of Agricultural Water Uses (Table 2). Some food safety programs may have stricter requirements. Take the sample from the point where the water contacts the crop, such as the irrigation nozzles or the drip tape. You can also sample the source, but this will not indicate if there is contamination in the pipes.

Canadian Council of Ministers of the Environment
Water quality guidelines for irrigation and livestock watering:
http://ceqg-rcqe.ccme.ca/en/index.html#void

Bacteria

Coliform bacteria (reported as "total coliform" on lab reports) are commonly found in the environment (i.e. soil or vegetation) and their presence is not likely to cause illness. *E. coli*, however, are a member of the coliform group of bacteria that is found only in the intestines of mammals, including humans. The presence of *E. coli* in water indicates recent fecal contamination of the water supply and may indicate the possible presence of other disease-causing pathogens, such as bacteria, viruses, and parasites. Although most strains of *E. coli* bacteria are harmless, certain strains, may cause severe illness.

The presence of total coliform bacteria is common in dug wells and springs where the water source is in close proximity to potential surface contaminants. Contamination tends to be widespread in the water table and therefore disinfecting shallow wells with chlorine is not usually an effective long-term solution. Add soil around the base of the well in order to ensure that surface water will be diverted from the area around the well. It is also recommended that a water treatment system (e.g. UV light) be installed if there are persistent coliform issues with a dug well.



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The presence of bacteria in drilled wells usually indicates a problem with the integrity of the well casing (i.e. casing not into bedrock, cracked casing or a defective cap) assuming there hasn't been any recent work completed on the well. The well can be disinfected with chlorine and water quality should be re-tested after disinfection. If bacteria are still present in the well, then a water treatment system (i.e. UV light) should be installed on the waterline.

NSE Factsheet – Disinfection of Water Wells by Chlorination
https://novascotia.ca/nse/water/docs/DisinfectWaterWell.pdf

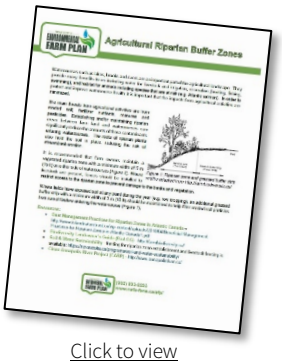
Water Treatment

There are several options for water treatment including filtration, aeration, reverse osmosis and disinfection. The type of system needed can vary depending on the water source (e.g. ground or surface water) and intended use (e.g. drinking water or irrigation supply). If treatment is required, contact a

qualified water treatment system dealer to discuss treatment options and to ensure that the water quality is compatible with the treatment system prior to installation. After the installation of a water treatment system, the water quality should be re-tested to ensure the system is functioning properly and routine monitoring should continue as outlined in the previous pages.

Riparian Buffers

It is important to leave areas between watercourses and farmland in which no farming activities occur. These riparian zones are areas adjacent to a watercourse, where natural vegetation such as grasses, shrubs, bushes and trees are allowed to grow. They provide an area where contaminants can be filtered from runoff water before reaching a watercourse. If there is currently limited vegetation, trees and shrubs native to the area can be planted along the watercourse to help stabilize the stream bank and provide shade. Riparian zones should be a minimum of 5 m (15 ft) wide (*Figure 1*).



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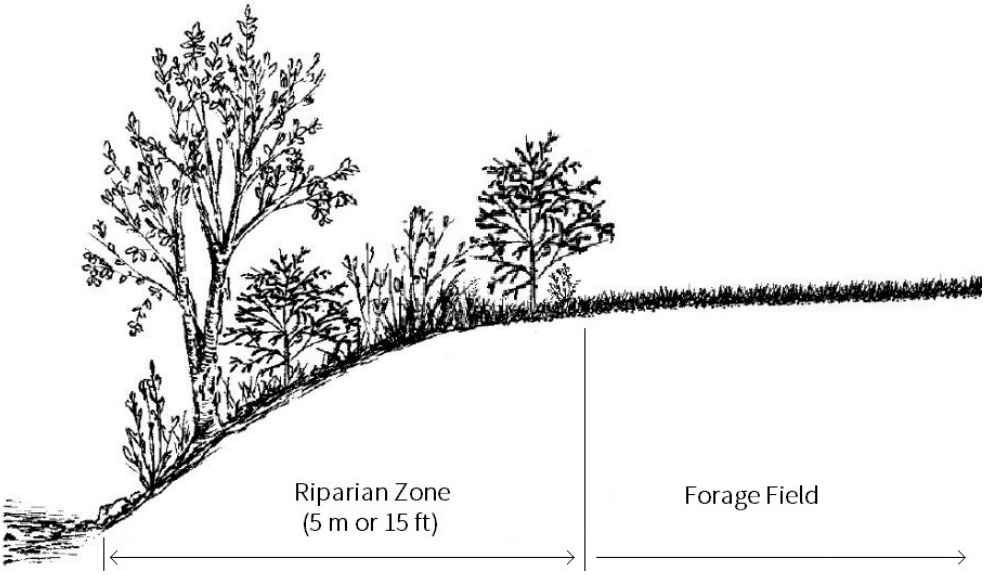


Figure 1. Recommended riparian zone width for forage production.

Buffer Strip for Row Crops

When row crops are grown next to a watercourse, a grassed buffer strip should be grown between the field and the riparian zone (*Figure 2*). The grassed buffer strip should be a minimum of 3 m (10 ft) wide, but depending on site characteristics, may need to be wider to ensure it functions effectively. Wider filter strips also provide greater wildlife habitat benefits. Grass buffer strips should be inspected periodically so that eroded areas (i.e. running through the strip or channels that may develop along the edges) are

Beneficial Management Practices for Riparian Zones in Atlantic Canada

For additional information: http://www.nsfa-fane.ca/efp/wp-content/uploads/2019/09/BMP-Atlantic-riparian_zones.pdf

identified, repaired, and reseeded. Weed control by mowing may be needed in the buffer until the vegetation is well established and then less frequently to control woody growth. Fertilizers, pesticides or manures should not be applied to the buffers due to the proximity of the watercourse. Buffers provide long-term conservation benefits but also provide practical benefits to farmers by straightening irregular fields and avoiding the need to plant end-rows where crop yields are often lower. These areas can also serve as a turning and parking area to improve field access for custom equipment operators.

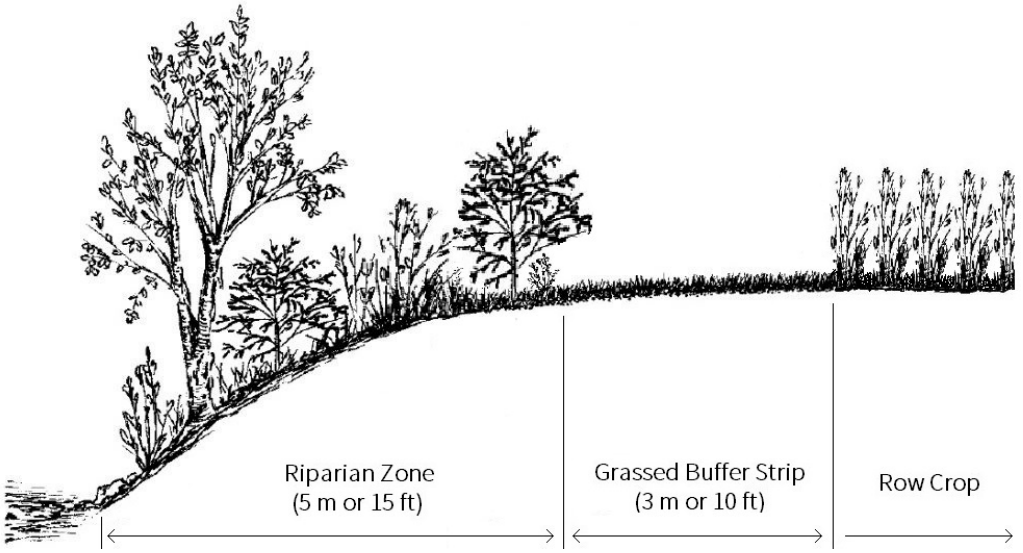


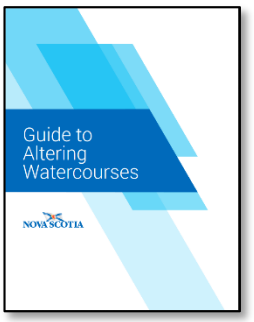
Figure 2. Recommended riparian zone & buffer strip widths for row crop production.

Riparian Buffers for Land Clearing

In the forestry industry, *Forest Sustainability Regulations* require a 20 m (65 ft) buffer zone along all watercourses that are more than 50 cm (20 in) wide. Where streams are less than 50 cm wide, a 5 m (15 ft) buffer should be maintained along the watercourse. Although there are no such regulations for agricultural development, it is recommended that these regulations be implemented during land clearing activities to reduce the risk of surface water contamination. If a woodlot on a farm is being harvested by the farm owner or contracted equipment operator for non-agricultural purposes, they are required to follow the *Forest Sustainability Regulations*.

Watercourse Alteration

Watercourse alterations refer to activities that alter the bed or bank of a watercourse, such as installing a crossing (e.g. culvert or bridge). The submission requirements for some watercourse alterations have changed from applications for approval to notifications. The *Guide to Altering Watercourses* explains the importance of avoiding and minimizing disturbances to watercourses. It describes what to do when alterations are necessary – how to do the work correctly to prevent or lessen damage and to maintain healthy rivers, lakes, streams and ponds.



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Activities that do not alter the bed or bank of a watercourse will not require submission to NSE. Approvals or notifications will be potentially required for watercourse alteration activities within the watercourse bed and/or banks.

Watercourse Alteration

For regulatory requirements, forms, guidance materials, and a list of certified watercourse alteration sizers and installers:
http://novascotia.ca/nse/watercourse-alteration/

Fording

Fording is the act of driving equipment through a watercourse to cross it from one side to the other. Fording of watercourses with vehicles should be avoided to prevent damage to the bed and banks of the watercourse, to prevent the suspension of fine particles that can increase sedimentation and turbidity and to avoid the risk of water contamination from petroleum products (e.g. fuels and lubricants). In situations where fording would only be required for a short period of time, a temporary bridge should be constructed. If a watercourse is forded on a repeated basis, a permanent crossing should be constructed or an alternative access point established.

An individual instance of taking a vehicle through a watercourse does not require an approval under the *Watercourse Alteration Program*. However, the adverse effects that may be caused by driving a vehicle in a watercourse could be sufficient to be deemed a violation of the *Environment Act* and may lead to compliance and enforcement action by NSE. If fording a watercourse cannot be avoided, here are some practices that can reduce the environmental risks and adverse effects:

- Only ford a watercourse with a bedrock or gravel bed as it is less likely to cause sedimentation
- Avoid dragging anything through a watercourse (e.g. logs)
- Ensure equipment is in good condition (e.g. no leaking fuel tanks or hydraulic connections)
- Water levels should be below equipment axles
- Pesticide sprayers and manure spreaders should not be forded
- Watercourses should only be forded between June 1st and September 1st

Building a ford (e.g., establishing a layer of rock or other material for the purpose of driving vehicles through a watercourse) is considered an activity under the *Activities Designation Regulation* as it would disturb the bed and banks of the watercourse and requires an approval from NSE prior to construction.

Pond Construction

When planning to construct a pond on your property, there are a few considerations to keep in mind. A Nova Scotia Environment (NSE) approval is required for water storage that exceeds 25,000 m^3 or if wetlands or watercourses will be impacted during construction. For scale, 25,000 m^3 is equivalent to a 2-acre pond that is 10 ft deep.

Run-off from prolonged rainfall or heavy storms can flood a pond quickly. An important consideration is a good-sized overflow or spillway. Spillway design is one aspect of pond construction where professional assistance may be beneficial, however overflows work best if kept simple. Culverts through the front of an embankment, or tubular risers extending from the water surface to a drain running through the base of a dam, may leak around the edges, get plugged, or be too small to handle floods. The alternative is to place a spillway at a low point in the embankment, so excess water flows over and down the side of the pond. A liner made of waterproof geotextile should be used to prevent erosion, with rip-rap, or armor rock, placed on the liner to break the force of the water. Whenever possible, overflows should spill onto the natural gradient where the soil is well-sodded, rather than onto an artificial embankment where the soil may be more prone to erosion. An emergency spillway, set slightly higher than the main one, should also be considered as a backup.

Tip

If a water control structure (e.g., dam) is used, it is the applicant's responsibility to ensure the integrity and safety of the structure meets industry standards. NSE may request that the integrity of the structure be confirmed by a professional engineer licensed by Engineers Nova Scotia.

Water Withdrawal

Under the *Environment Act*, a water withdrawal approval is required if a water withdrawal exceeds 23,000 litres per day (subject to the exemptions outlined in the *Activities Designation Regulations,* e.g. for emergency use less than 2 weeks in duration) from a ground or surface water source. To obtain a water withdrawal approval, a farmer needs to submit a completed application form with supporting documentation.

Tip

2.5 cm (1 inch) of water applied to 0.4 ha (1 acre) of land using an overhead irrigation system amounts to 102,789 L (22,610 gal) of water; over 4 times the daily withdrawal limit.

The *Guide to Surface Water Withdrawal Approvals* describes the submission requirements, supporting documentation, and the criteria used by NSE to evaluate surface water withdrawal applications. Applications for surface water withdrawals are classified into three categories (i.e. if a qualified person or qualified professional is required or not). A surface water withdrawal approval is one of the primary mechanisms used by the department to ensure that water resources are being developed in a sustainable way. Water allocations are considered on a "first-come, first-served" basis and are based on the applicant's current water needs rather than potential future needs. The applicant cannot reserve water for future use beyond the expiry date of the approval.

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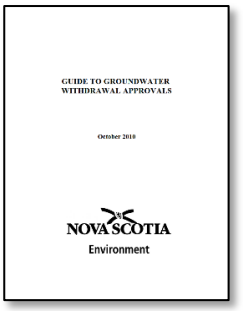
The *Guide to Groundwater Withdrawal Approvals,* describes the minimum submission requirements, supporting documentation and the criteria used by NSE to evaluate groundwater withdrawal applications. A hydrogeological study must be completed to the satisfaction of NSE and must clearly evaluate the potential effects of the proposed withdrawal on existing groundwater users and the environment. The report must be prepared by, or under the direction of, a qualified hydrogeologist. A "qualified hydrogeologist" is a person with hydrogeology training and experience, and is licensed to practice in Nova Scotia by the Association of Professional Geoscientists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (Engineers Nova Scotia).



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Water Withdrawal Information

NSE has more information and applications available on-line:
https://www.novascotia.ca/nse/water/withdrawalApproval.asp

Wetlands

Wetlands provide important environmental benefits, such as maintaining and improving water quality and quantity, reducing flood damage and providing wildlife habitat. The province developed a *Nova Scotia Wetland Conservation Policy* that provides a framework for the conservation and management of wetlands in Nova Scotia. All wetland alterations require a *Wetland Alteration Approval* from Nova Scotia Environment, with a couple of exceptions, e.g. altering wetlands that are less than 100 m^2 (approximately 1,000 $feet^2$) in size. Other exemptions to wetland alterations can be found stated within the NS Wetland Conservation Policy. These exemptions include harvesting trees, grazing animals, or making hay in wetlands as well as altering wetlands that are less than 100 m^2 in size. However, if in doubt contact NSE before conducting any work in or around a wetland.

Marshes, swamps, fens, bogs and shallow water areas that are saturated with water long enough to promote wetland or aquatic processes are all considered wetlands. Nova Scotia's Wetland Classification is available for viewing through the Lands and Forestry website using the Provincial Landscape Viewer. The Provincial Landscape Viewer is a mapping tool to provide easy access to ecological landscape data, along with forestry and wildlife information for natural resource planning and management. The wetland classifications are based upon visual interpretation of aerial photography and the accuracy for individual wetlands can vary. It is important to note that NSE may consider additional areas as wetlands that are not identified on the map, and

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conversely, not all map designations are indeed wetlands. If you have any questions about wetland identification or the approval process, contact your regional NSE office.

Wetlands of Nova Scotia
The Wetlands of Nova Scotia map is available on-line: https://nsgi.novascotia.ca/plv/
NS Wetland factsheets: https://novascotia.ca/nse/wetland/fact-sheets.asp

Wetlands of Special Significance (WSS), (e.g., salt marshes, wetlands known to support at-risk species under the Federal Species at Risk Act or the Nova Scotia Endangered Species Act), will not be considered for alteration. Support or approval of alterations proposed for a WSS or any alterations that pose a substantial risk to a WSS will not be given except for alterations that are required to maintain, restore, or enhance a WSS. More information on the definition of a Wetland of Special Significance can be found within the *Nova Scotia Wetland Conservation Policy.* The alteration of other wetlands should be avoided when possible to prevent the net loss in area and function of these ecologically significant areas.

Links to Additional Information:
• *Stream Bank Protection Project*

3.0 Waste Handling and Disposal

Depending on farm size and commodity, the type and quantity of waste materials generated on-farm can vary significantly. It is important to ensure waste products are properly handled on-farm and disposed of at appropriate locations. Some important points regarding common waste handling and disposal issues on farms have been provided.

For more waste disposal information or for questions related specifically to your municipality, contact your regional waste authority. Each region also has coordinators that can provide recommendations to improve waste disposal and recycling practices.

Regional Waste Information
Regional/municipal sorting guides: https://divertns.ca/recycling/sorting-guide
Coordinators/Educators by region: https://divertns.ca/education/tools-downloads/waste-educators

Packaging and Household Waste

Packaging materials and household wastes should be collected and properly disposed of through roadside garbage, recycling and green bin pickup (or on-farm composting).

Used Oil, Oil Filters, Glycol (Antifreeze), Container Disposal

Small volumes of used oil and glycol should be stored inside a building, in plastic containers with tightly secured lids. This will make transporting and disposal more convenient and will reduce the risk of a spill. The province of Nova Scotia has introduced a new regulation for the safe disposal and recycling of used oil, oil filters, coolant (glycol products), and certain containers. Starting on January 1, 2020, a new collection and recycling program began. The Used Oil Management Association (UOMA) NS has been approved by Nova Scotia Environment (NSE) to manage and deliver the program on behalf of producers within the province. Designated products that are eligible for collection through the program:

- Oils: petroleum or synthetic derived crankcase oil, engine oil and gear oil, hydraulic fluid, transmission fluid and heat transfer fluid, and fluid used for lubricating purposes in machinery or equipment.
- Filters: spin-on style or element style fluid filter that is used in hydraulic, transmission or internal combustion engine applications and an oil filter, a diesel fuel filter, a storage tank fuel filter or a household furnace oil filter other than a gasoline filter.
- Oil, glycol and diesel exhaust fluid (DEF) containers: any container with a capacity of up to 50 litres manufactured for the purpose of holding an oil, glycol or DEF product.
- Aerosol containers: containers manufactured for the purpose of holding an oil product as well as aerosol containers used to contain products used to clean automotive parts.
- Glycol (antifreeze): ethylene or propylene glycol used or intended for use as a vehicle or commercial engine coolant, but does not include the following: plumbing antifreeze, windshield washer antifreeze, lock de-icer and gasoline and diesel fuel antifreeze.

For more information including a list of collection facilities and collectors:
Call: 1-833-222-8662 or https://ns.uoma-atlantic.com/en/homepage

Generators are the users of the designated products. Generators of small volumes must take them to a registered collection facility for disposal. *Collection Facilities* are the establishments registered with UOMA to receive the designated products from small generators free of charge. Examples of collection facilities include garages, car dealerships or Regional Waste Management Authorities. *Collectors* are businesses registered with UOMA NS to collect the designated products from collection facilities and generators who generate a sufficient quantity of products to justify an on-site collection (e.g. a farm with a bulk used oil tank).

Lead-Acid Batteries and Scrap Metal

Old lead-acid batteries can be returned to the point of purchase for a refund and they are accepted at most local Enviro-Depots. Scrap metal should be sorted and stored in a single location on the farm until it is taken to a metal recycling facility.

Old Tires

Excess used automotive tires should be taken to a tire retailer for disposal. Under the *Nova Scotia Solid Waste Resource Regulations*, tire sellers are required to collect an environmental fee to fund *The Used Tire Management Program*. Under this program, residents can return up to four used, regulated tires to any tire retailer in the province, at any time, free of charge. Large agricultural tires are not included in the program and need to be disposed of in the landfill, except for small tractor tires (not exceeding 24.5 inches) and on-the-road trailer tires, which are still eligible to be recycled in the program. More detailed information on tire disposal can be found at https://divertns.ca/recycling/what-goes-where/tires.

Tip

DivertNS makes regularly scheduled pick-ups of tires at tire retailers. If you have a large number of tires to dispose of, call DivertNS to discuss the possibility of a pick-up at the farm 1-877-313-7732.

For a map of Enviro-Depot locations and a list of items they accept:
https://divertns.ca/recycling/find-a-depot

Agricultural Plastic

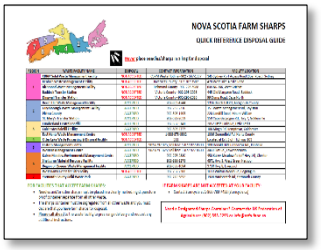
Agricultural plastic (e.g. silage plastic, greenhouse plastic, row covers, netting) should be recycled or reused if possible. Silage plastic, for example, can be recycled in some jurisdictions in Nova Scotia. If recycling options do not exist, plastic should be bundled up, tied or placed in plastic bags and placed at roadside for garbage collection. If the volume produced is too large for roadside collection, the plastic should be taken to the landfill or a commercial dumpster should be considered for the farm. If unsure, contact your Regional Waste Authority to determine if a product is recyclable.

Old Fuel Tanks

Old fuel tanks that are no longer in use should be properly drained, have absorbent material placed in the bottom of the tanks and be taken to a metal recycler or the landfill if not accepted for recycling.

Agricultural Sharps

Agricultural sharps (e.g. hypodermic needles, lancets) should be placed in a designated sharps container. The container should be puncture proof and clearly labelled. When this container is full, contact your veterinarian or local Waste Management Authority for proper disposal. Divert NS has developed a *Nova Scotia Farm Sharps Disposal Reference Guide*.



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Burning Waste

Under the regulations of the *Environment Act*, you are not allowed to burn garbage (i.e. plastics, cardboard). Only wood products that are not painted or chemically treated may be burned.

Brush Burning Restrictions

Burning of brush and wood products that are not painted or chemically treated is allowed in Nova Scotia under certain conditions. Pile sizes must be less than 2 m (6.5 ft) high and 3 m (10 ft) wide and at least 10 m (33 ft) apart and no more than 4 piles can be burning at one time. A water supply must be available for containment purposes. During wildfire-risk season, from March 15 – October 15, the province has developed an online system that replaces domestic burning permits and eliminates their fees. Burning restrictions are also available as a recorded message updated daily on a toll-free phone line: 1-855-564-2876 (BURN). Also check municipal by-laws to determine if there are additional restrictions.

Burning advisory website

The website is updated a 2 pm daily and uses a colour-coded system to let people know if burning in their county is permitted: https://novascotia.ca/burnsafe/

Large Scale Brush Burning

If the pile size or number of piles exceed the limits above (i.e. during land clearing, orchard removal or blueberry field burning over 2 ha), an industrial burning permit is required and a technician from NS Lands and Forestry must inspect the site prior to the permit being issued. Conditions for the permit will be determined by the technician following the site visit.

Industrial permits

For additional information related to industrial permits:
https://novascotia.ca/natr/forestprotection/wildfire/burnsafe/burning-industrial.asp

Cleanfarms Program

Cleanfarms is a non-profit environmental stewardship organization. To help farmers better manage their waste, Cleanfarms partners with agricultural retailers and municipalities across the country to make programs available to farmers in every region.

- Obsolete pesticides and/or expired livestock medications - a periodic collection program where farmers can drop off their unwanted, expired, restricted or obsolete pesticide products at designated collection sites at no charge. The program is anticipated to return in 2021. (In the interim, expired or obsolete pesticides should be disposed of at your municipal hazardous waste drop-off or through a private chemical disposal company).

- Pesticide bags/seed bags - from May 1 - October 31, an annual collection program for dry or powdered pesticide bags and seed bags. Obtain a free plastic recycling bag from your seed dealer or pesticide retailer. Place small (up 100 kg) empty bags in the plastic recycling bag and tie at the end when full. Bulk bags need to be folded and tied in bundles of five or six. Take bags to participating farm service providers for proper disposal. Check with your local farm service provider or contact Cleanfarms for collection locations: 1-877-622-4460.
- Container recycling - from May 1 to October 31, drop off your clean, empty pesticide and fertilizer containers (23 L or less) at your nearest collection site. For non-deposit, bulk pesticide containers (larger than 23 L) totes/drums, return your drained, empty containers with all bungs and/or closures in place to the point of sale (For deposit bulk pesticide containers (larger than 23L), return these containers to the point of sale - retailer will usually work with the manufacturer to facilitate the recycling or re-use of these containers).

Cleanfarms

Recycling solutions for agricultural communities: www.cleanfarms.ca

Septic Systems

In order to prevent surface and ground water contamination, proper septic systems should be used for treating waste. New systems or changes require a Professional Engineer or Qualified Person to look at the site and determine the best design. The Engineer or Qualified Person then submits a form to NSE: either a notification or an application for approval. The property owner then hires a certified on-site sewage installer to build the system. It is important to monitor the septic every three to five years and to get the tank pumped by a registered septic tank cleaner if the level of the solids in the tank is near capacity.

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Compost from composting toilets has the potential to contain human pathogens and should not be used for food production. It is recommended that compost from a composting toilet be used as a soil amendment on ornamental beds only.

4.0 Nutrient Management

Growing healthy crops and achieving economic yields requires a soil that can supply balanced fertility through the growing season. Encouraging biological activity in the soil through organic amendment (e.g. manure or compost) additions, cover cropping and crop rotations including forages, can increase overall soil health and promote more efficient nutrient cycling. The goal of a nutrient management strategy should be to balance nutrient inputs with crop requirements to optimize yields and reduce nutrient excesses. Excess nutrients can be lost to the wider environment causing ground or surface water contamination or can build up in the soil causing crop production or livestock health issues. The loss of nutrients from farming systems not only represents an environmental risk, but also represents an economic risk to the farm. Some tools that are used to manage nutrients efficiently are soil testing, manure or compost testing, and spreader calibration. A formal nutrient management plan completed by a qualified nutrient management planner can offer a wholistic nutrient program based on factors unique to a specific farm.

Nova Scotia Department of Agriculture Animal and Plant Lab

For fee schedule, forms and factsheets related to soil, tissue, manure and compost testing:
https://novascotia.ca/agri/programs-and-services/lab-services/animal-plant-lab/

Soil Testing

Soil testing provides a wealth of information to crop producers. It gives a measure of the levels of plant available nutrients (both macronutrients and micronutrients), the level of soil organic matter, the pH and lime requirement, fertility recommendations as well as the cation exchange capacity, which is a measure of the soils ability to hold and release nutrients.

Tip

Registered NS farms qualify for a 50% discount on the price of soil testing at the provincial Plant and Animal Laboratory. The information contained in the soil test report will help you tailor your fertility program to maximize the use of your fertility budget. The EFP office has soil sampling probes that can be signed out for use in sampling your fields. Call the office to make arrangements: 902-893-2293

These factors together help to describe the nutrient capacities and limitations of the soils on the farm and can act as a foundation from which good fertility decisions can be made. It is recommended that soils be tested at least once every three years or, in the case of high value cash crops or on fields with excessive nutrients, testing should be done annually.

NS Department of Agriculture Soil Testing Factsheets

How to take a field soil test:

https://novascotia.ca/agri/documents/lab-services/analytical-lab-howto-soiltest.pdf

Understanding the soil test report:

https://novascotia.ca/agri/documents/lab-services/analytical-lab-understand-soil.pdf

Manure Testing

Manure nutrient content can vary depending on many factors. In order to meet nutrient management targets, manure should be tested for nutrient content at least once every three years or more frequently if a change occurs in livestock rations, method of storing manure, type and volume of bedding and/or waste feed added to the manure. Your manure analysis is only as good as the samples taken, so it is important to take good representative samples as close to the time of application as possible.

NS Department of Agriculture Manure Testing Factsheets

How to Take a Manure Sample:

https://novascotia.ca/agri/documents/lab-services/analytical-lab-howto-manure.pdf

Understanding the Manure Test Report:

https://novascotia.ca/agri/documents/lab-services/analytical-lab-understand-manure.pdf

Compost Testing

Compost nutrient content can vary depending on many factors. In order to meet nutrient management targets, compost should be tested for nutrient content at least once every three years or more frequently if a change occurs in the materials making up the compost pile or the methods of storing or turning the compost. Your compost analysis is only as good as the samples taken, so it is important to take good representative samples.

NS Department of Agriculture Compost Testing Factsheets

How to Take a Compost Sample:

https://novascotia.ca/agri/documents/lab-services/analytical-lab-manure-compost-sample.pdf

Understanding the Compost Test Report:

https://novascotia.ca/agri/documents/lab-services/analytical-lab-manure-compost-report.pdf

Spreader Calibration and Record Keeping

Manure and fertilizer spreaders should be calibrated on a regular basis for several application rates with the application rates related to a tractor speed (e.g. range, gear, and rpm). It is also important to accurately communicate application details to the equipment operator to ensure that nutrients are applied as anticipated to meet the needs of the crop. All nutrient (e.g. fertilizer, lime, manure/compost,

biosolids) application records, including spreader calibration details, should be documented in a cropping record book or software-based system for future reference.

Nutrient Management Plans (NMP)

Nova Scotia soil test reports give general lime and fertility recommendations for specific crops based on the soil test results. However, soil test reports cannot incorporate many other factors that are specific to your farm into their recommendations. For example, manure applied one year will release a portion of the nutrients contained within in the first year, however, there will be a nutrient contribution from the manure in the second and possibly third year as well. Accurate nutrient recommendations depend on a knowledge of soil characteristics and fertility, the crop being grown, the cropping history of the field, added organic amendments, cover crops, crop residues etc. A formal nutrient management plan (NMP) prepared by a qualified nutrient management planner would consider the relationship between all of these factors allowing for a more accurate prediction of your soils ability to supply nutrients and therefore a more accurate estimate of the nutrients that would be required in a given year.

Livestock Stocking Density

A current nutrient management plan will recommend manure application rates that will not contribute to excessive nutrient levels. The *Nova Scotia Manure Management Guidelines* recommend farms that don't have a current nutrient management plan restrict their stocking rate to a maximum of 1 livestock unit (LU) per hectare (2.5 acres). The number of animals equivalent to a single livestock unit is defined in the *Manure Management Guidelines*. If the stocking rate exceeds 1 LU/ha, then the amount of manure being produced cannot be spread on the farms land base without nutrient excesses becoming a problem. If your farm is in this position, purchasing more land or developing a manure disposal plan with another farm in need of additional nutrients should be a priority.

Environmental Guidelines for Leased Land

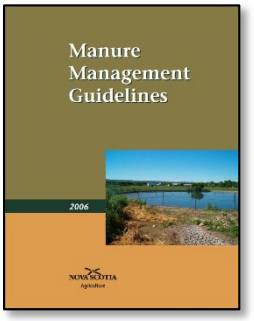
As the landowner, it is your responsibility to ensure that best management practices are followed for nutrient management. Refer to *Appendix* A for important nutrient management information that can be communicated to the lease holder.

Links to Additional Information:
• *How to Take a Plant Tissue Test* • *Understanding the Tissue Test Report* • *Vegetable Crop Tissue Sampling Guide* • *Field Crop Tissue Sampling Guide* • *Fruit Crop Tissue Sampling Guide* • *How to Calibrate a Manure Spreader* • *Calibration of Fertilizer Application Equipment On-Farm*

5.0 Manure Management

All farms should have enough storage capacity for at least seven months of manure production. This would ensure that manure could be stored through the fall or well into spring if conditions were unfit for application.

In 2006, the *Manure Management Guidelines* were developed to promote the effective use of manure as a nutrient source, while providing instruction in environmental protection. The guidelines apply to all livestock commodities and both new and existing farming operations are encouraged to follow the recommendations in the guidelines. The guidelines include information related to siting facilities, design considerations, storage volumes, types of storage, land application and odour management.



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5.1 Manure Storage

A concrete pad is recommended for storing manure. The pad would act as barrier between the manure and soil and would make cleaning up the manure easier. Before the pad is constructed, all organic matter should be removed and the site should be built up with gravel. The pad should be constructed so water does not pool around the manure and any runoff drains away from the barn and into grassed fields. Minimum separation distances should be observed when constructing a new manure storage area (*Table 3*).

Manure Storage Runoff

Add plenty of bedding and waste feed to the solid manure. This will make certain that any precipitation runoff (rainfall or snow melt), that is carried off an area such as a manure storage, contains very few solids. Precipitation runoff from the solid manure should drain to a grassed area. Research has indicated that grassed vegetative filter areas of at least 100 m (330 ft) in length provide adequate treatment of precipitation runoff from manure storages.

Activity	Minimum Separation Distances			
	Wells	Watercourses	Ditches	Property Lines or Provincial Highways
Solid Manure Storage	100 m (330 ft)	100 m (330 ft)	20 m (66 ft)	50 m (165 ft)
Contained Liquid or Semi-Solid Manure Storage	100 m (330 ft)	50 m (165 ft)	20 m (66 ft)	50 m (165 ft)

Table 3. Minimum separation distances for manure storage (NS Manure Management Guidelines (2006))

Livestock Yards

During times of wet weather, runoff from livestock yards can occur. The runoff from the manure should drain to a grassed area. Keep livestock yards scraped during the winter months in order to prevent

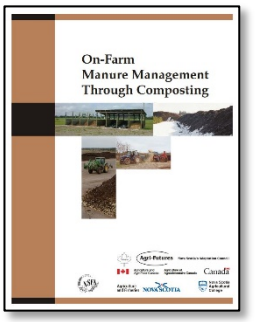
manure from accumulating. This should be done at least once a week if the temperature allows or before a storm.

Stockpiling Manure

When stockpiling manure, it is important to ensure that it contains plenty of bedding and maintains a stackable solid pile. Manure should not be stockpiled over subsurface drains, very permeable soils, or in flood risk areas. Farms should have designated areas in each field for stockpiling manure. The location of the stockpiled manure must be adequate to minimize runoff from impacting water resources. It is important to ensure that it is located on a relatively flat, well drained area following the minimum separation distances recommended for manure storages (Table 3).

Composting Manure

Composting is a managed decomposition process that transforms raw organic waste materials such as manure into a more biologically stable soil amendment which can improve soil health and supply a growing crop with required nutrients. When done properly, composting can eliminate pathogens, reduce moisture content, weight and volume, concentrate and stabilize nutrients and reduce odour. Certain conditions need to be met, however, in order to achieve the desired outcomes. These conditions include mixing materials in the correct proportions and managing factors such as temperature, moisture and aeration.



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It is recommended that composting take place on an impermeable pad which would act as a barrier between the compost and the soil and would make mixing and turning the compost easier. Controlling the moisture content of compost is an important management consideration and composting under a roofed structure can improve composting conditions especially in the winter months. It is important to maintain minimum separation distances when siting a new composting area (Table 4).

Activity	Minimum Separation Distances				
	Wells	Watercourses	Ditches	Property Lines or Provincial Highways	Areas Zoned Residential
On-Farm Composting	100 m (330 ft)	100 m (330 ft)	20 m (66 ft)	50 m (165 ft)	600 m (1968 ft)

Table 4. Minimum separation distances for on-farm composting operations

Farmyard Runoff

Farmyard runoff, e.g. wash water, urine and contaminated water from manure storages, livestock yards and feed storage areas, must be managed to prevent it from contaminating surface water or leaching to groundwater impacting water quality from increased nutrients, i.e. nitrates and phosphates, and/or biological contamination from bacteria, viruses and parasites. The amount of possible runoff can be

minimized by directing all clean water away from the farmyard before it is allowed to come into contact with potential contaminants. Surface water flowing from higher elevations should be diverted by installing berms, ditches (and culverts) or grassed waterways.

Runoff Control Planning

If possible, consider how runoff is to be managed at the planning stage of the manure storage, livestock yard or feed storage area. Earthwork and materials (e.g. concrete, fill, gravel, geotextiles required for drainage) can add a significant expense to construction, but these costs will generally be lower if incorporated in the design phase as opposed to being installed after the pad or yard is constructed.

Eaves Troughs

Eaves troughs on barns or adjacent storage buildings can direct roof water away from manure storages, livestock yards and other farm structures. This water can outlet away from the storage/livestock area, be redirected to a catch basin with subsurface drainage, or stored in a bulk tank for another farm use, i.e. filling a pesticide sprayer or irrigating a small garden.

Constructed Wetlands

Constructed wetlands are engineered to pre-treat various types of agricultural wastewater prior to reaching natural watercourses. These systems are designed to mimic the functions that natural wetlands provide such as the sedimentation of suspended particles and the reduction in nutrient levels and bacteria. Various types of agricultural wastewater have been shown to be effectively treated by constructed wetlands including run-off from manure storages and livestock yards, milk house wash water, tile drainage outflow, slaughterhouse wash water, and field surface runoff. There are several design considerations that should be taken into account before construction begins.

5.2 Manure Application

When manure is applied to fields, ensure that soil conditions are adequate to prevent compaction and practices are followed to minimize run-off. To achieve the greatest benefit from manure applications, while minimizing the impact to the environment, the following practices should be implemented:

- Whenever possible, manure should be incorporated into the soil.
- Manure should not be applied on frozen, snow covered or excessively wet ground because if applied under these conditions, the manure provides little nutrient value and is prone to runoff, which could lead to pollution of watercourses. In general, conditions from December 1st to April 1st are unfavorable for manure applications.
- Multiple applications that supply only the nutrients required for specific periods of crop growth are recommended.
- Apply manure to upland fields adjacent to watercourses and with a slope greater than 5% during the growing season (June to September).

- Maintain minimum separation distances from wells, watercourses and ditches when applying manure (Table 5). Manure can leach to the ground water table more readily in coarse textured (sandy) soils so additional separation distance from wells should be maintained.

Activity	Soil Type	Minimum Separation Distances		
		Wells	Watercourses	Ditches
Manure Application	Clay to Loam Soils	30 m (100 ft)	5 m (15 ft)	3 m (10 ft)
	Sandy Soils	60 m (200 ft)	5 m (15 ft)	3 m (10 ft)

Table 5. Minimum separation distances for manure application

Environmental Guidelines for Leased Land

It is your responsibility to ensure that the person leasing your land handle manure in an appropriate manner. Refer to *Appendix* A for important manure use and handling information that can be communicated to the lease holder.

Links to Additional Information:
• *Constructed Wetlands for the Treatment of Agricultural Wastewater in Atlantic Canada*

6.0 Fertilizer Storage and Application

It is important to ensure that any fertilizer that may be stored over the winter or until later in the growing season is placed in a building where it is protected from rainfall and runoff. When water enters a damaged or improperly closed bag, not only does it cause the fertilizer inside to harden into a solid block, it also puts ground and surface water at risk of contamination from nutrient leaching.

Minimum Separation Distances

In order to protect surface and ground water resources, adequate separation distances should be maintained when handling and applying fertilizers (Table 6).

Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Fertilizer Storage	Fertilizer should be stored in a covered building		
Fertilizer Spreader Filling	30 m (100 ft)	30 m (100 ft)	30 m (100 ft)
Fertilizer Application	10 m (33 ft)	10 m (33 ft)	3 m (10 ft)

Table 6. Minimum separation distances for fertilizer storage and use

When applying fertilizer, it is important to accurately communicate the field location and details of the application to the equipment operator (e.g. speed, rate) to ensure accurate fertilizer application.

Spills

Under the *Environment Act*, spills of 50 L or 50 kg or more of miscellaneous products, e.g. fertilizer, must be reported by calling the environmental emergencies centre at 1-800-565-1633. The person responsible must also initiate containment and cleanup of a spill as soon as possible after they are aware of the spill.

Environmental Guidelines for Leased Land

It is your responsibility to ensure that the person leasing your land handle fertilizer in an appropriate manner. Refer to *Appendix* A for important fertilizer use information that can be communicated to the lease holder.

7.0 Pest Management

Due to concerns with pesticide resistance, negative effects on beneficial organisms and potential impacts on water quality, farmers are increasingly aware of the risks associated with pesticide applications and are making efforts to reduce applications and maximize efficacy. This section provides some information and resources related to pesticide applicator certification and training. It also highlights the importance of proper pesticide storage, mixing and application and discusses the benefits of Integrated Pest Management on the farm.

Integrated Pest Management

Integrated Pest Management (IPM) is based on the principle that a combination of management strategies, e.g. biological, cultural, physical and chemical approaches, is more effective than reliance on a single strategy to control insects, diseases or weed infestations for sustainable crop production. IPM programs are intended to keep pest damage below unacceptable levels while tolerating some level of crop loss. Economic thresholds exist for common pests for a variety of commodities. This threshold level is the number of a particular pest or the amount of pest damage that can be tolerated before control is economically warranted.

In order to determine if a pest population has built up to threshold levels, fields need to be routinely monitored for pest populations, symptoms of damage and other related factors, e.g. distribution within the field. Regular monitoring can make a significant contribution to crop management by detecting problems early and having time to confirm disease diagnosis. As such, crop scouting is a key component to an IPM program.

Integrated Pest Management

To learn more about IPM, NSE has a Frequently Asked Questions page:
https://novascotia.ca/nse/pests/ipm.asp

Pesticide Applicator Certification

Pesticide applicator certification in Nova Scotia is based on the National Standard for Pesticide Education Training and Certification in Canada. Individuals wishing to obtain their pesticide certification in Nova Scotia must pass the NSE pesticide certification exam. The required passing grade is 75%. There are two options for completing the exam; i) participating in a pesticide safety course, studying the pesticide manuals on the NS Environment website and subsequently writing the exam or ii) obtaining and studying the appropriate pesticide safety educational material from the NS Environment website and subsequently writing the exam. Applicators choosing the self-study option must register for one of the exam-writing sessions at a Nova Scotia Environment office.

Nova Scotia Pesticide Certification Exam Schedule

https://novascotia.ca/nse/pests/docs/Pesticide-exam-schedule.pdf

In Nova Scotia, a pesticide applicator certificate is required to apply commercial and restricted class pesticides. This requirement applies to farmers who wish to use a pesticide by ground application for the protection of agricultural crops or livestock, including use for control of noxious weeds, bird and rodent control, in a farm pond with no outflow, use on a Christmas tree plantation, use on livestock and poultry pests, use in farm seed treatment, use for soil fumigation and use around farm buildings associated with crop and livestock production. A certificate is also needed for use of pesticides in a greenhouse or for commercial seed treatment. An application form can be found on NSE's website: https://novascotia.ca/nse/resources/permits.asp#pests.

NSE also administers the Pesticide Continuing Education Points (CEP) Program to create safe, knowledgeable and professional pesticide applicators and vendors. This program promotes continued learning and skill development to ensure the safe and effective application of pesticides. The CEP Program enables some applicators and vendors to renew their certification through continued education rather than completing an exam.

Tip

During the 5-year period in which a pesticide applicator certificate is valid, points can be accrued for participating in NSE approved classes and training courses. To renew a pesticide certificate, 15 points must be collected over the 5-year period, with a maximum of 10 points being collected in any one year (per certificate).

7.1 Pesticide Storage

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It is important to locate all pesticides in a building or container that prevents any spills during storage, and ensures any potential spills are contained. Pesticides should always be stored in their original, labelled containers. The pesticide storage area or building should ONLY be used for storing pesticides and pesticide measuring equipment. Pesticides must be stored separately from flammable materials (e.g. other farm chemicals such as paints, lubricants, solvents, fuels etc.). Flammable and combustible liquids should not be stored within 1.5 meters of pesticides. Pesticides must be stored separately from all food, animal feed, veterinary supplies, seed and personal protective equipment and should be stored separately from fertilizers. The building/storage area should be insulated and maintained at temperature and moisture levels consistent with the product requirements. Herbicides, fungicides, and insecticides must all be separated within the pesticide storage area. Proper ventilation is essential. Volatile fumes escaping from pesticide containers can buildup in the storage area and surrounding building. The building/storage area should have no windows and should be ventilated to the outside. It should be located a minimum of 30 m (100 ft) away from a well or watercourse (Table 7). For storage of small quantities of pesticides, an old freezer or other rigid container could be used. The storage location should be locked. A Chemical Warning sign should be posted, including an emergency contact list and telephone numbers. The local fire brigade should be made aware of the location, type and general quantity of pesticides stored on the farm.

Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Pesticide Storage	30 m (100 ft)	30 m (100 ft)	30 m (100 ft)

Table 7. Minimum separation distances for pesticide storage

Available Pesticide Signage

To view the resources available to download or order, check Farm Safety Nova Scotia's website: https://farmsafetyns.ca/available-resources/

Pesticide Storage Building

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For farms working with and storing large quantities of pesticide, a designated storage building may be needed. Buildings should include adequate ventilation, lighting and a curb to contain spills. A large door should be included in the design to allow bulk purchases to be easily unloaded with a minimal amount of handling. This also ensures that the products are kept on pallets during storage and keeps the dry formulations off of the floor. It is important that liquid formulations are kept separate

from dry formulations (i.e. opposite sides of the room) to minimize the risk of contamination if a container is damaged or spills while in storage.

Spill Kits

To minimize the impact of a pesticide spill, the components of a spill kit should be assembled. A pesticide spill kit should contain rubber boots, chemical resistant coveralls, chemical resistant gloves, a felt tipped permanent maker, a VOC respirator, eye goggles, absorbent material (peat moss, sawdust or kitty litter), a small broom and dustpan, and thick plastic bags to contain the absorbed pesticide and contaminated soil. All of the above equipment should be stored near the pesticide storage area in a plastic container (pail or tub) with a tight-fitting lid. In the event of a spill, the spill kit container can be used to contain the absorbed pesticide and any contaminated soil or protective gear. The container should be labelled clearly with a black felt tipped marker indicating the chemical name. If a spill greater than 5 kilograms or 5 litres in concentrated form, or 70 litres of diluted pesticide occurs you MUST contact the 24-hour Environmental Emergencies toll-free number at 1-800-565-1633. Also report any spill into the environment, regardless of volume, that may cause an adverse effect, such as a spill close to a watercourse.

Anyone using pesticides regularly should have a contingency plan so anyone involved with the pesticide understands what needs to be done if a spill should occur. Nova Scotia Environment has developed two contingency plan templates for pesticide users.

NSE Contingency Plan Templates
https://novascotia.ca/nse/resources/permits.asp#pests

7.2 Pesticide Mixing

To prevent backflow on the water supply, an anti-backflow device should be installed on the water line. It is also important to maintain an air gap above the water level in the sprayer tank during filling to further prevent backflow on the water supply. Ensure that someone is constantly watching the sprayer during filling to prevent overflows. This is important as sometimes the sprayer is not completely empty when refilling. An elevated bulk water tank would enable the sprayer to be filled more quickly and reduce the risk of overflows due to inattention. Ensure minimum separation distances are maintained from wells, watercourses and ditches when filling and mixing pesticides (Table 8).

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Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Pesticide Mixing	30 m (100 ft)	30 m (100 ft)	30 m (100 ft)

Table 8. Minimum separation distances for filling sprayer and mixing pesticides

7.3 Pesticide Application

It is important to observe weather conditions prior to and during application as conditions will change throughout the day. Handheld weather meters are readily available at low cost. During pesticide application, wind, temperature and relative humidity should be measured every half hour. It is important to be aware of and comply with product specific maximum windspeed requirements as stated on the product label. If the label does not include windspeed restrictions, do not spray when wind speed is above 10 Km/hr. If low-drift technology is being used (drift mitigating nozzles, larger droplets, slower forward speeds, shrouds or deflectors and/or reduced distance to the target), do not spray above 15 km/hr.

Tip

The EFP program has handheld wind meters that can be borrowed for accurately measuring wind speed. Call the NSFA office to make arrangements to borrow one: 902-893-2293.

Several additional points to consider regarding pesticide use and handling include:

- Ensure that the person applying pesticides has a current pesticide applicators certificate or is directly supervised by someone with a current certificate. Ideally, all people handling pesticides should complete the pesticide applicators course.
- Always read the label and follow instructions, maintain this information with the chemical and make sure all containers are clearly and properly labelled.
- Ensure that safe re-entry times are observed. Greenhouses and nursery blocks should have signage posted showing the product used, time of spraying, and safe re-entry time.
- Monitor crops on a regular basis for the quantity of pests/diseases or their damage in order to determine the need for timing and type of management action (Integrated Pest Management - IPM).

Click to view

- Maintain records of pesticide application including:
  - Stage of crop and pest development
  - Date and time of day of application
  - Type of pesticide
  - Rates applied
  - Distribution within the field
  - Weather conditions
  - Equipment settings

- Maintain minimum separation distances from wells, watercourses and ditches when applying pesticides (Table 10). Some pesticides have their own required minimum separation distances which may be greater than those in the table. It is important to read pesticide labels carefully and use minimum separation distances printed on the label.

- When rinsing/cleaning the pesticide sprayer, water should be used to dilute the chemical and this rinse should be sprayed on the same area/field or on headlands or unused areas between fields, maintaining adequate separation distances as mentioned above. However, it is still important to follow pesticide label recommendations and exercise caution when rinsing herbicides, as even small over-applications can cause plant injury and water pollution.

Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Pesticide Spraying	10 m (33 ft)	5 m (15 ft)	3 m (10 ft)

Table 10. Minimum separation distances for pesticide application

Environmental Guidelines for Leased Land

It is your responsibility to ensure that the person leasing your land handles pesticides in an appropriate manner. Refer to *Appendix A* for important pesticide handling and use information that can be communicated to the lease holder.

Links to Additional Information:
• *Field Sprayer Calibration* • *Nozzle Selection for Blueberry Growers*

8.0 Fuel Storage and Handling

Small quantities of fuel should be stored in CSA or ULC approved fuel storage and transport containers. Periodically inspect the containers and replace as required. Materials to absorb or contain an accidental spill (i.e. sawdust, peat moss, or cat litter) should be available in the storage area.

Bulk Fuel Storage Tanks

Bulk gas or diesel should be stored in a ULC or CSA approved tank equipped with an electric pump with automatic shutoff. The tank should be located on a concrete pad, which will act as a barrier between any spillage and the soil and enable visibility to all parts of the tank. The concrete pad should extend 30 cm (1 ft) beyond the edges of the tank.

Click to view

If tanks are situated in a high traffic area, guardrails or posts to prevent farm machinery and vehicles from hitting the tank should be installed. It is also recommended that a security system, such as a lock or switch to turn off power to the pump, be used to prevent spills due to vandalism or accidents.

Tip

It is advised that you check with your insurance company and fuel supplier prior to establishing or changing a bulk storage area in order to determine if there are any additional changes or specific issues that have to be addressed.

Minimum Separation Distances

Minimum separation distances should be observed when deciding where to situate a new bulk fuel storage area (Table 11). Where minimum separation distance requirements cannot be met, providing secondary containment is another option. Double walled tanks or fuel storage buildings with curbed floors can reduce the risk of water contamination.

Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Fuel Storage	30 m (100 ft)	30 m (100 ft)	30 m (100 ft)

Table 11. Minimum separation distances for fuel storage

Fuel Storage Shed

Another option is to construct a fuel storage shed. The storage shed should have a curbed floor capable of containing 110% of the volume of the largest tank (there are 6.23 gallons in one cubic ft). In addition to housing the fuel tanks, the fuel storage shed will also provide a good location to store containers of new and used oil. Fuel storage sheds can provide additional containment in cases where a well or watercourse is located nearby. Storage sheds also provide protection from vandalism.

Mobile Fuel Tanks

A proper mobile fuel tanks that is either ULC or CSA approved should be used to transport fuel to fields. It is important that the mobile fuel tank is properly secured during transportation and that a fuel spill cleanup kit is available in the transport vehicle. If the tank capacity is larger than 450 L (100 gal), the tank would be required to undergo an annual inspection. The inspection should include a visual inspection and a pressure test and be completed at a facility registered with Transport Canada.

Irrigation Pump Fuel

If a gasoline or diesel-powered pump is used to pump water from a pond or other water supply, it is important to provide secondary containment to prevent fuel spills. For small scale systems, placing the pump and/or fuel containers in a plastic tub would provide containment in the event of a spill or leak. For larger systems, it is recommended that the tanks be placed on a concrete pad with a concrete curb

capable of holding a volume of 110 % of the tank size. A drain, that can be locked, should be installed in the curb. This drain should only be plugged when the tank is placed in the concrete structure in the summer time. Another option is to purchase double walled tanks with a fuel line connected to the top of the fuel tank. This will reduce the risk of fuel entering the ground or irrigation source if the tank was to be vandalized. Where possible, protect the fuel line or use a high strength line such as hydraulic hose as the fuel line is the most susceptible area for an accidental break or vandalism.

Tip

When replacing a fuel tank with a new metal tank, any fuel left in the old tank should not be transferred into the new tank as this fuel may contain contaminants, such as water or bacteria, which may accelerate corrosion of the new tank.

Other important points regarding fuel storage include:

- Inspect fuel tanks, fuel lines and dispensing equipment at least monthly by visual observation and by running a hand underneath each tank to check for moisture. Leaks from dispensing equipment or fuel lines should be immediately repaired, while a leaking tank should be immediately replaced.
- It is important to not overfill fuel tanks and to allow for the expansion of fuel in hot weather.
- Establish an emergency preparedness and response plan to respond to emergency situations. As part of the plan, materials to absorb or contain an accidental spill (i.e. sawdust, peat moss or cat litter) should be available at all times and emergency telephone numbers should be posted.
- When a fuel tank is located inside of a building, all vents and fill pipes must be located outside of the building.
- According to the *National Farm Building Code of Canada,* fuel tanks used to refuel equipment must be located at least 12 m (40 ft) from all buildings.

9.0 Soil Management

Soil is one of the most valuable resources on a farm and in order to sustain its long-term productivity it requires special management considerations. Soil features such as soil structure, organic matter content, soil moisture and soil biology are all affected by cropping practices. The goal of any cropping system should be to maintain or improve overall soil health. Cropping practices that adversely affect any of these features are not sustainable and will result in decreased yields and increased potential for erosion.

Soil Maps

Soil maps contain valuable information about the characteristics of the soil on your farm. Maps show the extent of individual soil series and include information about the soil texture, drainage, stoniness and topography. Some of the county maps describe the suitability of individual soils for production of specific agricultural crops.

Provincial Soil Surveys and Maps

The Canadian Soil Information System (CanSIS) website has detailed soil reports and soil maps for each county in Nova Scotia
http://sis.agr.gc.ca/cansis/publications/surveys/ns/index.html

Soil Organic Matter

Soil organic matter is the fraction of the soil that consists of plant or animal tissue in various stages of decomposition. Levels of soil organic matter in agricultural fields usually range from 3-6%. Using management practices that increase soil organic matter can have many benefits. Physical benefits include increased aggregate stability, improved water infiltration and aeration, improved ease of seedbed preparation, and improved water holding capacity. Chemical benefits include improving the pH buffering capacity, increasing the cation exchange capacity (CEC) and nutrient supplying capacity. Soil organic matter provides food for living organisms in the soil and enhances soil biodiversity which in turn can help to suppress disease and pests. It is important to monitor soil organic matter levels, because of the increased risk of soil erosion in fields with low (less than 4%) organic matter. Growing forages or the addition of manure or compost will help to increase organic matter levels in the soil.

Soil Health Testing

The PEI Analytical Lab now offers a soil health package as a part of their soil testing offerings
https://www.princeedwardisland.ca/en/information/agriculture-and-land/pei-analytical-laboratories-peial

Soil Structure

Soil structure is important because it determines the ability of the soil to hold and conduct the water and air necessary for healthy plant root activity. All crops need a good root system to be productive. Soil compaction occurs when farming activity occurs in a field when the soil is too wet. A compacted soil has less pore space and can result in rutting, reduced internal drainage, increased surface water runoff, decreased moisture holding ability and decreased yields.

Soil structure can be improved and compaction reduced by implementing the following practices:

- Monitor organic matter levels - high levels can help prevent compaction and erosion
- Applying solid manure or compost can help maintain or increase soil organic matter
- Reduce the number of trips over a field by combining jobs when possible

- Stay off wet soils whenever possible
- Reduce the weight of equipment
- Use deep rooted cover crops
- Subsoil where necessary

Tip

Determining the depth and extent of soil compaction can be difficult. Soil penetrometers are a tool that can measure the force plant roots need to exert to move through the soil at different depths. Nova Scotia Agriculture regional offices have soil penetrometers that farmers can borrow. NSA Regional Offices: https://novascotia.ca/agri/programs-and-services/regional-services/

Forages

Perennial forage systems have the capacity to improve soil over time, by building organic matter, improving soil structure, and adding nitrogen. This is dependent however, on maintaining good soil fertility and pH levels. Ideally, there should be no bare soil going into the winter. While fall ploughing exposes the soil, there would be minimal risk of erosion provided the field has been in sod for several years. However, secondary tillage (i.e. disking) should only be conducted in the spring. It is important, where appropriate, to plough across the slope on long fields.

Pasture

An effective grazing system is critical to successful pasture management. Continuous grazing is a system that has animals grazing on one set pasture for a prolonged period of time and potentially for the entire grazing season. This system is often used by producers with a relatively large pasture base and low numbers of livestock. Due to the inefficient forage utilization that results from this type of system, it is best suited for animals that do not have high nutritional demands and/or farms that have limitations with available labour and watering locations.

Maritime Pasture Manual

Perennia has the Maritime Pasture Manual and other forage related factsheets available: https://www.perennia.ca/portfolio-items/forages/

The concept behind rotational grazing is to harvest the grass quickly and then give the forage time to recover and re-grow. Rotational grazing involves dividing large pasture areas into smaller paddocks and grazing each paddock in sequence. Animals are moved from each paddock after a length of time determined by the rate of pasture growth and sward height. The more frequent these moves, the more productive the pastures will be. Adequate rest periods are an essential tool for managing a pasture and the time of year has a significant impact on the duration of the rest period.

Feeding livestock on pasture in the winter can lead to nutrient loading, runoff, damage to pasture plants, exposed soil and increasing erosion potential. Moving the feeding area periodically or constructing an impermeable pad for feeding can reduce these issues.

Pasture renovation is an important management strategy to improve pasture quality. It can allow for a higher stocking rate by replacing older, possibly diseased, pasture species with new, more vigorous improved species. Options for pasture renovation that don't require tillage and reduce the risk of soil erosion include frost seeding and no-till seeding into the existing pasture.

Row crops

Growing row crops presents several challenges in terms of soil management. The risk of soil erosion will increase with each subsequent year that row crops are grown, as many row crops leave little residue on the soil surface after harvest. Some soil management strategies that can help to reduce the potential for erosion are:

- Grow corn for no more than two consecutive years. On land most susceptible to soil erosion, greater than 4% slope and organic matter less than 4%, corn should only be planted for one year.
- Add several years of forage in the crop rotation. Forage crops can improve soil structure, build organic matter and add nitrogen, while also providing excellent soil coverage.
- Planting a cover crop, such as fall rye. When row crops are harvested before October 1st, a cover crop will usually have time to become established.
- Consider harvesting fields with greater slopes and higher erosion potential first so a cover crop can be established.
- It is important to ensure that at least 85% of the soil surface is covered during the winter.
- Cover crops should be seeded in time to produce at least 10 cm of growth (tillering stage) before winter. If this growth is not achieved by the end of November then an alternative soil cover should be considered.
- Organic mulch can be applied at a rate of 3.3 T/ha (1.5 t/ac). On areas of the field prone to erosion, the mulch should be applied at a rate of 4.5 T/ha (2 t/ac). At these rates, the mulch will cover 85 to 100% of the soil surface respectively.
- It is recommended that field operations (tillage, planting, mulching) be done across the field slope following the contour of the land to prevent ruts up and down the slope that would allow water to flow quickly downhill causing more severe erosion.
- Visually inspect fields for signs of soil erosion and regularly monitor soil organic matter levels. If small rills are visible in a field, erosion is not only taking place, it is occurring at a rapid and unsustainable rate.

Cover Crop Decision Tool

An on-line cover crop decision tool is available for eastern Canada:
http://decision-tool.incovercrops.ca/

Erosion

It is important to remember that fields with high soil erosion potential (i.e. long gradual slopes or bare soil going into the winter) increase the risk of water contamination and possible transport of fertilizers, pesticides and manure applied on fields. The loss of fertile soil is not only a problem for the farmer, it is an environmental problem. When soil and nutrients carried by the soil enters a watercourse, fish and aquatic habitat is negatively impacted. Erosion cannot be completely eliminated, but good soil conservation practices can have a major influence on soil erosion. Tillage practices, residue management, cover crops and crop rotations are all strategies that can reduce the potential for soil erosion.

Click to view

Drainage

It is important to maintain surface ditches as needed on the farm. In situations where open ditches are required to transport large volumes of water, they should be carefully planned to avoid ditch bottom and side slope erosion (Figure 3). If high water volumes are expected, fieldstone can be used to line portions of the ditch to create small dams to dissipate the energy of the water flowing down the ditch. The ditch banks should also be seeded with a recommended grass mix as soon as possible after construction. This will help stabilize the ditch bank and prevent erosion.

Click to view

[Horizontal [x] : Vertical]

Soil	Shallow Channels < 1.2 m [4 ft.]	Deep Channels >1.2 m [4 ft.]
Peat and Muck	Vertical	0.25:1
Heavy Clay	0.5:1	1:1
Clay or Silt Loam	1:1	1.5:1
Sandy Loam	1.5:1	2:1
Loose Sandy	2:1	3:1

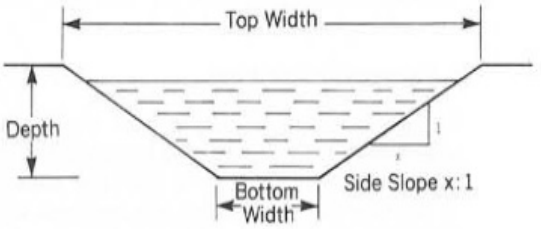
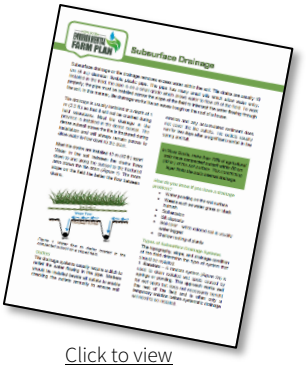


Figure 3. Recommended open ditch side slopes (left) and a typical open ditch cross section.

In some cases, wet areas may need to be addressed with subsurface drainage. To work properly, the pipe should be installed at a depth of 1 m (3.3 ft) so that it will not be crushed during field operations. It must be installed across the slope of the field to intercept the water flowing through the soil. In this manner, tile drainage works like eaves trough on the roof of a house. Install tile drainage and construct ditches as needed to provide appropriate outlets for subsurface drainage systems. After the installation of a tile drainage system, periodically check the tile outlets to ensure soil erosion and any accumulated sediment does not cover the outlets.



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Environmental Guidelines for Leased Land

It is your responsibility to ensure that the person leasing your land manages your soils in an appropriate manner. Refer to *Appendix* A for important soil management information that can be communicated to the lease holder.

Links to Additional Information:
• *A Cover Crop Resource List* • *Farm Drainage in the Atlantic Provinces*

10.0 Crop Production

Depending on farm size and commodity, the environmental considerations for crop production can vary significantly. It is important to ensure crop management decisions incorporate sustainable cropping practices that minimize risks to the environment and maximize water use efficiency.

Irrigation

When choosing an irrigation system, opt for a system with high water use efficiency such as a trickle irrigation system. These systems only deliver water where it is needed in the root zone and therefore minimize leaching, runoff and evaporation. Trickle systems are not viable for all commodities, especially in vegetable production, so irrigation scheduling can play a more significant factor for crops using overhead irrigation systems.

Soil Moisture Monitoring

It is recommended that farms use a system to monitor soil moisture levels. Irrigators who monitor soil moisture levels in the field can greatly increase their water use efficiency, reduce energy consumption, optimize crop yields, and avoid soil erosion and water pollution. There are a variety of tools and methods that can be used to measure soil moisture (i.e. tensiometers, time domain reflectometry, gypsum blocks) to ensure that excess irrigation does not take place.

Links to Additional Information:
• *Monitoring Soil Moisture to Improve Irrigation Decisions*

11.0 Livestock Production

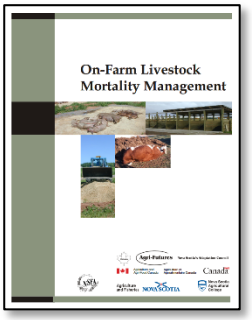
There are a variety of environmental considerations for livestock production and the impact of these can vary based on commodity and herd/flock size. This section covers some of the most common issues that are not commodity specific.

Deadstock

The recommended methods for dead stock disposal are by burial in the soil, or by composting. If burial is chosen, the carcass(es) should be buried:

- at least 30 m (100 ft) away from watercourses and wells
- under at least 60 cm (2 ft) of earth
- within 48 hours of death

Proper management of dead stock is an important aspect of sustainable livestock production. A practical alternative to traditional deadstock disposal methods is an adaptation of traditional composting best described as burial in an above ground biofilter. Composting animal carcasses is an effective way to manage dead stock, allowing the nutrients contained within the animal(s) to be recycled on the farm. There are several considerations that should be made when composting dead stock and these are addressed in the *On-Farm Livestock Mortality Management* booklet.



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Flies and Rodents

Ensure that manure is not stored in areas where water can pool, especially during the summer months. Manure and stagnant water provide an ideal habitat for flies. Tarps over solid manure piles have proven very successful in killing the fly larvae and breaking the breeding cycle. Rodents are attracted to spilled feed so it is important to keep all spilled and waste feed cleaned up.

Integrated Fly Management for Livestock Farms

Perennia factsheet: https://www.perennia.ca/wp-content/uploads/2018/04/integrated-fly-management-for-livestock-farms.pdf

SPCA Barn Cat Program

Cats can significantly reduce the rodent population on farms. The Nova Scotia SPCA has an "Adopt a Barn Cat" program in place that provides barn cats to farms free of charge. The cats are spayed or neutered, vaccinated, dewormed and flea treated. Farmers are expected to provide food and shelter for the cats.

Barn Cat Program

For more information contact the Nova Scotia SPCA at 1 (844) 835-4798 or visit their website: www.spcans.ca

Silage Seepage

Silage seepage is one of the most polluting organic materials that a farm can produce and cannot be treated in vegetated ditches or wetlands. Systems to collect leachate are available; however, disposal of leachate poses both health risks and environmental risks. Adjustments in machinery setup, such as mower-conditioner windrow formation and conditioner operation, can significantly increase drying in grass forage and minimize the need for collection systems.

Silage Storage

For silage production, an impermeable pad should be constructed for silage storage. The pad would act as a barrier between the silage and the soil and would make handling the silage easier. Ensure that minimum separation distances are met when siting silage storages (Table 12). To avoid silage seepage from bunker silos, while still ensuring good fermentation, the moisture content at harvest should be between 60% and 65% (upright silos), 65% and 68% (bunker silos) 55% to 65% (silage bags). Harvesting at higher moisture contents will result in silage seepage.

Click to view

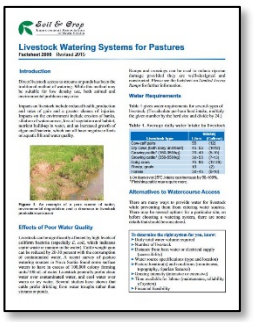
Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Silage Storage	100 m (330 ft)	100 m (330 ft)	100 m (330 ft)

Table 12. Minimum separation distances for silage storage

Livestock Watering

Due to stream bank damage, siltation and water quality concerns caused by livestock watering from streams, all livestock should be fenced from watercourses. A number of alternative livestock watering systems are available, such as gravity flow, solar powered pumps and well pipelines.

When an alternative watering system cannot be installed, providing restricted access for watering is acceptable as long as the approach to the watercourse is well managed to prevent stream bank damage and limit sedimentation.


Livestock Watering Systems for Pastures

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The following management practices should be implemented for restricted access:

- Choose access points that slope gently to the water
- Ensure that the approaches are well graveled to reduce sedimentation
- Fence the brook (except at designated watering sites)

Links to Additional Information:
• *On-Farm Bin Composting of Deadstock* • *Water Quality Impact of Cattle Access to Watercourses* • *Providing Water with Limited Access Ramps* • *Remote Winter Watering Systems for Pastures* • *Solar Powered Pumping Systems for Livestock Watering*

12.0 On-Farm Energy Use

There are an increasing number of opportunities for farm owners to improve energy efficiency on the farm. Funding is available for energy efficiency audits and to implement energy efficiency options. Pay-back times vary depending on the technology, but the potential for energy savings is definitely worth exploring before purchasing any new electrical equipment.

Efficiency Nova Scotia – Agriculture Technologies

Efficiency Nova Scotia offers rebates on several business and agricultural technologies: https://efficiencyns.ca/product-area/agriculture-technologies/

Efficiency Nova Scotia, in partnership with the Nova Scotia Department of Agriculture, appointed Kraig Porter as the On-site Energy Manager (OEM) for the agriculture industry to help encourage Nova Scotian farmers to save energy and lower operating costs. As the On-site Energy Manager, Kraig can help:

- Identify energy efficiency opportunities
- Perform energy saving analysis on equipment throughout the farm
- Provide technical support related to energy efficiency systems and equipment
- Serve as the single point of contact to facilitate and support farmer decision making
- Navigate Efficiency Nova Scotia programs and services, and address farmer questions
- Complete measurement and verification of installed measures and ensure that energy savings are quantified

Tip

If you are interested in booking a free on-site energy assessment or to chat about how you can save energy on your farm, you can contact Kraig Porter, On-site Energy Manager at Efficiency Nova Scotia – 902-470-3590 or 902-872-1191 or by email at kporter@efficiencyns.ca or agriculture@efficiencyns.ca.

Links to Additional Information:
• *Improving Energy Efficiency in Livestock Facilities (OMAFRA)* • *Using Less Energy on Dairy Farms (OMAFRA)*

13.0 Nuisance

Conflicts between farming and non-farming neighbours do occur. Fortunately, conflicts with neighbours can often be avoided by taking a few preventative measures. Ensure that you stay informed about changing legislation. Periodically review your Environmental Farm Plan and current farming practices to ensure best management practices are being implemented on your farm. Strive to develop a good relationship with neighbours by being active within your community and by reducing the number of potential nuisance events. It is important to handle nuisance complaints from neighbours in a friendly manner and to make every attempt to resolve the problem cooperatively. Identifying potential nuisance sources is an important first step. Some possible sources of nuisance complaints include:

- loose animals
- flies
- odours - manure storage and/or application
- manure and soil on the road
- noise - during the weaning of calves; from fans; irrigation pumps; operation of farm machinery on early mornings, weekends or holidays
- smoke from burning
- pesticide drift

Tip

The Nova Scotia Department of Agriculture (NSDA) published a Sonic Devices policy statement in 2019. The statement provides recommendations on the best practices for the use of sonic devices on farms for the purpose of protecting crops, while minimizing their impact on neighbours and the public. For more information, contact your regional NSDA office: https://novascotia.ca/agri/programs-and-services/regional-services/

14.0 Habitat and Biodiversity

In the agricultural landscapes of Nova Scotia, a wide variety of ecosystems are present, ranging from cropland to woodland, and pasture to wetlands. Numerous ecosystems often exist within an individual farm operation that support biodiversity and provide habitat for a variety of wildlife species. Our geography naturally lends itself well to diversity because field size in Nova Scotia is often limited by landscape factors. It is important to recognize that environmentally sound farm practices that support sustainability also directly improve biodiversity and wildlife habitat.

There are several land management practices that can benefit both the farm operation and wildlife. These practices include:

- planting shelterbelts and hedgerows
- establishment and management of riparian areas
- conservation of wetlands and wetland buffers
- conservation of remaining natural (native) lands

Agricultural Biodiversity Conservation Plans

Peter Austin-Smith, a Biodiversity Stewardship Coordinator with the Nova Scotia Lands and Forestry, is currently providing *Agricultural Biodiversity Conservation Plans* for individual farms. These plans identify current and potential activities that support biodiversity within the farm operation and include a biodiversity assessment and a riparian health assessment of the farm. Participation is voluntary and there is no cost for the plan or obligation to implement any of the recommendations.

Enhancing Wildlife and Biodiversity

AAFC factsheet: http://www.nsfa-fane.ca/efp/wp-content/uploads/2018/08/Enhancing-wildlife-and-biodiversity.pdf

Biodiversity Guide

Wildlife nuisance issues along with biodiversity are important issue on many farms. The School for Resource and Environmental Studies (Dalhousie University), with support and input from the Nova Scotia Federation of Agriculture and many other partners, has created a *Biodiversity Landowners Guide* website. The website provides information, resources, and guidance to landowners that benefits both agricultural production and biodiversity. It also provides strategies to deal with nuisance issues related to deer, bears, raccoons, coyotes, groundhogs, geese and beavers.

Biodiversity Landowners Guide

Visit the website: http://www.farmbiodiversity.ca/

Pollinator Conservation

Impacts of climate change and other stressors on populations of managed and native bees and other pollinators have raised concerns as to the potential impacts on agricultural crop production. The EFP program, based on recommendations from the Nova Scotia Beekeepers Association, are asking industry and individuals to consider implementing pollinator conservation practices from the Xerces Society for Invertebrate Conservation.

Xerces Society for Invertebrate Conservation

The website has various resources available: https://xerces.org/

Species at Risk

Species at risk include any plant, animal, or other organism that is seriously at risk of extinction. At risk species have special protections under the *Endangered Species Act*, which governs what individuals can do to them and their habitat. There are currently 71 species listed as at risk in Nova Scotia and the number of species continues to grow as there are many more potentially vulnerable species that haven't been listed yet. There are five categories of species at risk in Nova Scotia:

Endangered - a species facing imminent extirpation or extinction (e.g. Barn Swallow)
Threatened - a species likely to become endangered if limiting factors are not reversed (e.g. Wood Turtles)
Vulnerable - a species of special concern because of characteristics that make it particularly sensitive to human activities or natural events (e.g. Bobolink)
Extirpated - a species that no longer exists in the wild in the Province but exists in the wild outside the Province (e.g. Woodland Caribou)
Extinct - a species that no longer exists (e.g. Great Auk)

Species at Risk conservation and recovery is an important component of the Biodiversity Program within the Nova Scotia Department of Lands and Forestry. The status of wildlife species is determined through both a provincial and national status assessment process. Species listed through the provincial process are legally protected under the *NS Endangered Species Act*. Species listed through the national process are protected under the federal *Species at Risk Act (SARA)*. Once a species has been assessed, and legally listed, a recovery team is established and recovery and conservation efforts are initiated.

List of Species at Risk

https://novascotia.ca/natr/wildlife/biodiversity/species-list.asp

15.0 Industry Contacts

Nova Scotia Federation of Agriculture (Nova Scotia Environmental Farm Plan)

- **Phone:** 902-893-2293
- **Federation Website:** http://www.nsfa-fane.ca
- **EFP Website:** https://www.nsefp.ca
- **Address:**
  7 Atlantic Central Drive
  East Mountain, N.S.
  B6L 2Z2

Nova Scotia Department of Agriculture

- **Regional Offices**: https://novascotia.ca/agri/programs-and-services/regional-services/
- **Funding Programs**: https://novascotia.ca/programs/

Perennia

- **Website**: https://www.perennia.ca/agriculture/
- **Kentville Location:**
  Address:
  32 Main Street,
  Kentville, N.S.
  B4N 1J5
  Phone: 902-678-7722
  Fax: 902-678-7266
  Email: info@perennia.ca

  Truro Location:
  Address:
  173 Dr Bernie MacDonald Drive,
  Bible Hill, Nova Scotia
  B6L 2H5
  Phone: 902-896-8782
  Fax: 902-896-8781
  Email: innovation@perennia.ca

Nova Scotia New Farmer Website: https://nsnewfarmer.ca/

Nova Scotia Department of Environment

- Regional and District NSE office locations:
  https://novascotia.ca/nse/dept/regional-office-locations.asp

- Ashley David, Solid Waste Coordinator
  Phone: 902-266-9420
  Email: Ashley.David@novascotia.ca

- Don MacQueen, Environmental Engineer
  Phone: 902-499-3271
  Email: Donald.MacQueen@novascotia.ca

- Steve Conway, Pesticide Specialist
  Phone: 902-220-4138
  Email: Steve.Conway@novascotia.ca

- Matthew Brufatto, Hazardous Material Specialist
  Phone: 902-225-9295
  Email: matthew.brufatto@novascotia.ca

- Brent Cox, Contaminated Site Specialist
  Phone: 902-233-3069
  Email: brent.cox@novascotia.ca

Nova Scotia Department Lands and Forestry

- Offices - Map and list
  https://novascotia.ca/natr/staffdir/offices.asp

- Peter Austin-Smith, Biodiversity Stewardship Coordinator
  Phone: 902-679-6733
  Email: Peter.Austin-Smith@novascotia.ca

Efficiency Nova Scotia

- Kraig Porter, On-site Energy Manager
  Phone: 902-470-3590
  Email: kporter@efficiencyns.ca

Appendix A: Environmental Guidelines for Leased Land

As a land owner, it is your responsibility to ensure that the farming practices undertaken by the people leasing your land are in line with the best management practices outlined in this document. Listed below are a few points that can be useful when communicating your expectations for the use of your land to the lease holder or when negotiating a new lease agreement.

Nutrient Management Planning

- Fields managed by another farmer should be included in a Nutrient Management Plan (NMP).
- As part of the NMP, soil testing should be conducted at least once in every three years. Soil nutrient levels should be monitored annually on fields with excessive nutrients.
- Copies of the NMP and soil test results should be obtained by the landowner for their records.
- Manure and fertilizer application rates should not exceed those needed to meet crop nutrient requirements not supplied by soil reserves, other amendment applications and possible legume residuals (i.e. as defined in an NMP).
- Fertilizer and manure spreaders should be regularly calibrated.

Manure Storage and Use

- When solid manure is stockpiled on fields, it should be located on a flat area that is at least 100 m (330 ft) from a watercourse or well, 20 m (65 ft) from ditches and at least 45 m (150 ft) from a property line or highway. The manure should contain plenty of bedding to remain stackable and should not be stockpiled over subsurface drains, very permeable soils, or in flood risk areas.
- Manure should not be applied on frozen, snow covered or excessively wet ground. Manure applied under these conditions provides little nutrient value and is prone to runoff. In general, conditions from December 1st to April 1st are unfavorable for manure applications.
- When land applying manure, minimum separation distances should be maintained from wells (30 m (100 ft) on clay or loam soils, 60 m (200 ft) on sandy or gravelly soils), watercourses 5 m (15 ft) and agricultural ditches 3 m (10 ft).

Fertilizer Storage and Use

- Fertilizer should be stored in a building protected from rainfall and runoff.
- The fertilizer spreader should be loaded 30 m (100 ft) from a well, watercourse or ditch.
- When applying fertilizer, minimum separation distances should be maintained from wells 10 m (33 ft), watercourses 10 m (33 ft) and ditches 3 m (10 ft).

Pesticide Management

- Pesticides should be stored in an area capable of containing a spill.
- A pesticide spill kit should be available at all times in the storage and mixing areas to contain a spill or unintentional release of pesticides.
- Soil, crop and weather conditions should be adequate to prevent drift during pesticide applications.
- The person applying pesticides should have successfully obtained a pesticide applicators certificate.
- The pesticide sprayer should be calibrated regularly and nozzles should be replaced as required.
- When filling the sprayer and mixing pesticides, an adequate separation distance of 30 m (100 ft) should be maintained from wells, watercourses and ditches.
- Water used to fill the sprayer should be transported to fields with the use of a water tank or other acceptable means that does not allow backflow into the water supply. If water is pumped from a well or watercourse, a backflow protection valve should be installed.
- It is important to read pesticide labels carefully, label instructions are provided to mitigate the risk to your crops/livestock, the applicator, the public and the environment. When applying pesticides, adequate separation distances should be maintained from wells (30 ft), watercourses (15 ft) and agricultural ditches (10 ft). Read and follow the pesticide label as some pesticides have different separation distance.

Soil Management

- It is important to ensure that practices are in place to minimize soil erosion and compaction.
- On land most susceptible to soil erosion (greater than 4% slope, organic matter less than 4%) root crops should be grown only one year in three.
- Fields should be managed to achieve an organic matter content greater than 3%.
- There should be adequate cover on fields going into the winter.
- Extra care should be taken on fields with excessive phosphorous levels to avoid bare soil going into the winter and to prevent soil erosion.
- All fields should be checked on November 1st to determine the level of cover; if a cover crop has not established, then a hay mulch should be applied; the goal is to achieve a crop cover or residue level on the soil surface of at least 80%.

Irrigation Management

- A system to monitor soil moisture levels (i.e. tensiometers) should be in place to ensure that excess irrigation does not occur. Water application rates and the pond levels should also be monitored.
- Water quality should be within the Canadian Water Quality Guidelines for the Protection of Agricultural Uses. Select guideline parameters can be found in Table 2.
- If a gasoline or diesel-powered pump is used to pump water from a pond or other water supply, and the pump is located in close proximity to the water source, it is important to provide secondary containment to prevent water contamination from fuel spills.