



Environmental Guide for Nova Scotia Farms

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Table of Contents

1.0	Introduction	5
2.0	Provincial Landscape Viewer	5
3.0	Water Resources	6
3.1	Minimum Separation Distances	6
3.2	Municipal Water Supplies and Protected Water Areas . . .	6
3.3	Wells	7
3.4	Water quality – Drinking water	8
3.5	Water quality – Irrigation	9
3.6	Water Conservation	10
3.7	Riparian Buffers	11
3.8	Watercourse Alteration	12
3.9	Water Withdrawal	14
3.10	Wetlands	15
4.0	Waste Handling and Disposal	16
4.1	Packaging and Household Waste	16
4.2	Used Oil, Oil Filters, Glycol (Antifreeze), Container Disposal	16
4.3	Old Tires	17
4.4	Lead-Acid Batteries and Scrap Metal	17
4.5	Agricultural Plastic.	18
4.6	Old Fuel Tanks	18
4.7	Agricultural Sharps	18
4.8	Burning Waste	18
4.9	Cleanfarms Program	19
4.10	Septic systems	19
5.0	Nutrient Management	20
5.1	4R Nutrient Stewardship.	20
5.2	Testing	20
5.3	Spreader Calibration and Record Keeping	22
5.4	Limestone	22
5.5	Stocking Density.	23
5.6	Leased Land	23
6.0	Manure Management	24
6.1	Manure Storage	24
6.2	Stockpiling Manure	25
6.3	Composting Manure	25
6.4	Farmyard Runoff	26
6.5	Constructed Wetlands	26
6.6	Manure Application	27
6.7	Environmental Guidelines for Leased Land	27

7.0 Fertilizer Storage and Application	28
7.1 Minimum Separation Distances	28
7.2 On-Farm Spills	28
7.3 Environmental Guidelines for Leased Land	29
8.0 Pesticide Management	29
8.1 Pesticide Applicator Certification	29
8.2 Pesticide Storage	30
8.3 Spill Kits	31
8.4 Pesticide Mixing	32
8.5 Pesticide Application	32
8.6 Integrated Pest Management	34
8.7 Environmental Guidelines for Leased Land	34
9.0 Fuel Storage and Handling	34
9.1 Bulk Fuel Storage Tanks	34
9.2 Minimum Separation Distances	35
9.3 Fuel Storage Shed	35
9.4 Mobile fuel tanks.	35
9.5 Irrigation Pump Fuel	36
10.0 Soil and Crop Management	36
10.1 Soil Maps	36
10.2 Soil Organic Matter	37
10.3 Soil Health.	37
10.4 Soil Structure	38
10.5 Forages.	38
10.6 Pasture	38
10.7 Row crops	39
10.8 Cover Crops	40
10.9 Tillage	40
10.10 Erosion	41
10.11 Drainage	41
10.12 Environmental Guidelines for Leased Land	42
11.0 Livestock Production	42
11.1 Rotational Grazing	42
11.2 Deadstock	42
11.3 Flies and Rodents	43
11.4 Silage Seepage	43
11.5 Livestock access to watercourses	44

12.0 On-Farm Energy Use	44
13.0 Neighbour Relations	45
14.0 Biodiversity	46
14.1 Agricultural Biodiversity Conservation Plans	46
14.2 Biodiversity Guide	46
14.3 The Habitat and Biodiversity Assessment Tool (HBAT)	46
14.4 Pollinator Conservation	47
14.5 Species at Risk	47
14.6 Agroforestry	48
14.7 Nuisance Wildlife	49
15.0 Industry Contacts	50
Appendix A:	
Environmental Guidelines for Leased Land	51
Nutrient Management Planning.	51
Fertilizer Storage and Use	51
Manure Storage and Use	51
Pesticide Management	52
Soil Management	52
Irrigation Management	52

1.0 Introduction

The 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 farmers in identifying potential areas of environmental risk and provide practical solutions to minimize environmental risks. This is accomplished by conducting an on-farm environmental review, documenting the review findings and implementing the environmental action plan.

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 Environmental Guide for Nova Scotia Farms was prepared by the Nova Scotia Environmental Farm Plan Program. Although every effort has been made to ensure the accuracy of its contents, the Nova Scotia Federation of Agriculture 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 Department of Environment and Climate Change, Department of Natural Resources, Department of Fisheries and Oceans Canada, or the appropriate municipal office for further information on laws, regulations or by-laws which may affect their operations.

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2.0 Provincial Landscape Viewer

Sustainable land management requires accurate, integrated and easily accessible information that can be used to make better decisions. The [Provincial Landscape Viewer](#) is an online map-based tool that has been developed to:

- Support ecosystem-based natural resource management and land use planning
- Provide interested users with integrated land and natural resource data

The viewer currently includes data on Nova Scotia's forests, wildlife, wetlands, watercourses, Crown lands and protected areas. A detailed list and descriptions of the data layers available in the viewer can be found on the [viewer help page](#). From an agricultural perspective, the watercourse, wetlands and wet area mapping (WAM) information can be helpful to identify features on the landscape prior to any future alterations, i.e. land clearing or development. The viewer supports sustainable land and resource management by providing easily accessible information. It is important to note that the data provided is for informational purposes only and can be helpful when making land use decisions, but the viewer must not be used as the only source for identifying water resources on the property.

3.0 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. Agriculture also has the potential to negatively impact water resources in many ways, and it is the obligation of farm owners to minimize their impact. 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.

3.1 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.

3.2 Municipal Water Supplies and Protected Water Areas

Some agricultural practices, if not carefully managed, can have a negative impact on drinking water quality. Farmers operating within areas contributing to a municipal drinking water supply are required to contact the local water utility, Nova Scotia Department

CLIMATE CHANGE

Climate change models predict that overall, the amount of precipitation we receive in Nova Scotia will increase. However, it is likely that this increase will also come with changes to when we receive precipitation. There will likely be increased periods of dry weather and increased periods of heavy precipitation. Many of the recommendations of the EFP program can help prepare for these situations. For example, having water storage, such as a pond, can help during dry periods; having a riparian buffer zone can help reduce damage caused by the flooding of waterways. CLIMAtlantic has a [climate information and data guide](#) to help understand possible future challenges.

of Agriculture, and Nova Scotia Environment and Climate Change 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 ([map](#)) 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. The province has a table of [protected water areas regulations](#).

3.3 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 employees 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 near agricultural production. Care should be taken to ensure minimum separation distances are maintained from these wells.

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 around 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.

Under the Well Construction Regulations, anyone constructing or repairing a water well must have a certificate of qualification from Nova Scotia Department of Environment and Climate Change (NSECC). When a new well is constructed, a Well Report is submitted to NSECC. These individual well logs are available from a regional NSECC 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.

RESOURCES: [Before You Construct a Water Well: Facts a homeowner should know](#)
[Certified well drillers and diggers](#)
[Nova Scotia Well Logs Database](#)

3.3.1 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 near 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 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.

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.

3.4 Water quality – Drinking water

Homeowners are responsible for monitoring the quality of their private water supply. NSECC 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.

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**).

For fee schedule, forms, and factsheets related to water testing, see the [NSDA Analytical Lab](#) website.

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

3.4.1 The Drop on Water factsheets

Nova Scotia Environment and Climate Change 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 can adversely affect neurologic development in children, and memory, attention and movement in adults. For more information, review [The Drop on Water – Manganese](#) factsheet.

3.4.2 Drinking Water Interpretation Tool

Also available is a [Drinking Water Interpretation Tool](#) on the NSECC website. The tool allows you to compare your drinking water sample results to Health Canada drinking water quality guidelines and provides links to additional sources of information.

3.5 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 Guidelines for the Protection of Agricultural Water Uses

Total coliform	1 000 CFU/100 mL
E. coli	100 CFU/100 mL
Nitrate	10 mg/L

(**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. This will indicate if there is any contamination, either in the source or in the pipes. You can also sample the source, but this will not indicate if there is contamination in the pipes.

3.5.1 Soil Salinity in High Tunnels

When evaporation from the soil surface and transpiration from plants exceeds water input, salts can start to accumulate at the soil surface. In some situations, as much as 50% of water loss can be due to evaporation from the soil surface. High tunnels, caterpillars, or hoop houses, if left covered and cropped year-round, are particularly susceptible to salinity buildup. This is more common when using trickle irrigation systems, which supply water to a relatively small area within the environment.

In saline soil, plants have a reduced ability to take up water. Plants exposed to saline soil can become water stressed and various crops respond differently to saline soils. Salt injury symptoms can manifest as necrosis (death or burning) along the leaf margins, wilting, stunted plants, and in severe cases, a complete crop loss. Perennia’s [Soil Salinity in Nova Scotia High Tunnels](#) factsheet provides information on how to measure soil salinity and how to prevent saline soils in high tunnels.

3.5.2 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.

3.6 Water Conservation

Water conservation is an important part of a farm management plan. Using water more efficiently and adopting water conservation techniques can help with long-term sustainability in agriculture.

Harvesting rainwater and storing for later use is a good water conservation practice that might ordinarily be lost by runoff. This can be done by installing gutters and downspouts to direct rainwater from building/barn rooftops into your storage system. It's good to consider what type of tank (e.g. steel, concrete, or plastic), placement (above or belowground), and location (on-farm or off-site storage) before making a purchase. The benefits of aboveground storage tanks are they are easier to install, maintain, and repair. However, they are vulnerable to damage because they are exposed to the elements outside. If you are limited on space, you may lean towards underground tanks, such as cisterns. When tanks are underground, consider the depth for frost protection.

Water is used in many aspects of farming. Irrigation, livestock watering, washing of equipment, milking parlor, and milk pipelines. A water meter can be used to monitor water consumption by livestock, irrigation or on-farm processing facilities. Changes in consumption can indicate problems, such as leaks, which should be fixed immediately to prevent wasting water. Checking for leaks on a weekly/monthly basis is suggested. Metering can also be used to monitor periods of high demand to allow for better planning in situations when the supply is limited.

Keeping livestock comfortable and cool can reduce excessive water consumed. Capturing the pre-cooler water that chills down milk can help use water more efficiently. Allowing it to run down the drain can waste up to 20-30 gallons of water every minute water is running through the cooler. Diverting wash water from a clean-in-place (CIP) system to a storage tank that can be reused to wash down the parlor is another option for dairy producers.

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.

RESOURCES: [Vegetated Infiltration Areas for the Management of Milkhouse Wastewater](#)
[Water Conservation; A Dairy Farmer's Perspective](#)
[Water Use on Canadian Dairy Farms](#)

3.6.1 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 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.

RESOURCE: [Monitoring Soil Moisture](#)

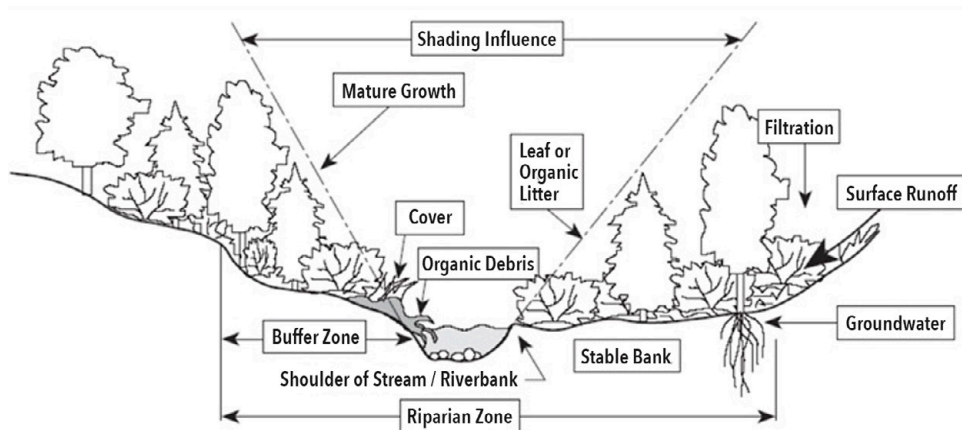
3.7 Riparian Buffers

A riparian area is the land adjacent to streams, rivers, lakes, ponds, and wetlands with no definite boundaries, between the body of water and more upland areas (**Figure 1**). This transitional area includes the streambanks, the floodplain and plant and animal communities. A buffer zone is a designated protected zone, often within a riparian area, specifically set aside to protect the waterway from disturbances like erosion or pollution, usually by maintaining vegetation and limiting development. Essentially, a riparian area is a broader ecological area, while a buffer zone is a more specific management zone within the area to safeguard the waterway, e.g. [PEI has a mandatory](#) 15 m buffer zone for watercourses and wetlands.

While both are important for protecting water quality and wildlife habitat, a riparian area serves a broader ecological role, while a buffer zone is specifically designed to mitigate negative impacts from land use activities. Sometimes “riparian buffer zone” is used to describe the protected area within a riparian zone, essentially combining the two terms.

It is important to leave areas between watercourses and farmland in which no farming activities occur. Natural vegetation (grasses, shrubs, bushes and trees) provides an area where contaminants can be filtered from runoff water before reaching a watercourse. Buffer zones should be a minimum of 5 m (15 ft) wide, but maintaining a 30 m buffer zone provides additional benefits and opportunities (e.g. improved run-off filtration, nesting habitat and wildlife corridors). Fertilizers, pesticides or manures should not be applied in the buffer zone due to the proximity of the watercourse.

Enhancing buffer zones and establishing filter strips 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. The grassed headlands can also serve as a turning and parking area to improve field access for custom equipment operators.



Importance of the Riparian Zone to Aquatic Habitat

Figure 1. An example of a well developed riparian zone.

3.7.1 Buffer Strip for Row Crops

Vegetated filter strips are maintained in grass or other permanent vegetation (other than trees or shrubs) at the lower end of annual crop fields in addition to the buffer zone designed to reduce amounts of sediment, organic material, nutrients, pesticides, and other pollutants in surface water runoff from adjacent cropland from reaching bodies of water. The grassed filter 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 (**Figure 2**). Vegetated filter strips should be inspected periodically so that eroded areas (i.e. running through the strip or channels that may develop along the edges) are identified, repaired, and reseeded. Weed control by mowing may be needed in the strip until the vegetation is well established and then less frequently to control woody growth.

RESOURCE: [Beneficial Management Practices for Riparian Zones in Atlantic Canada](#)

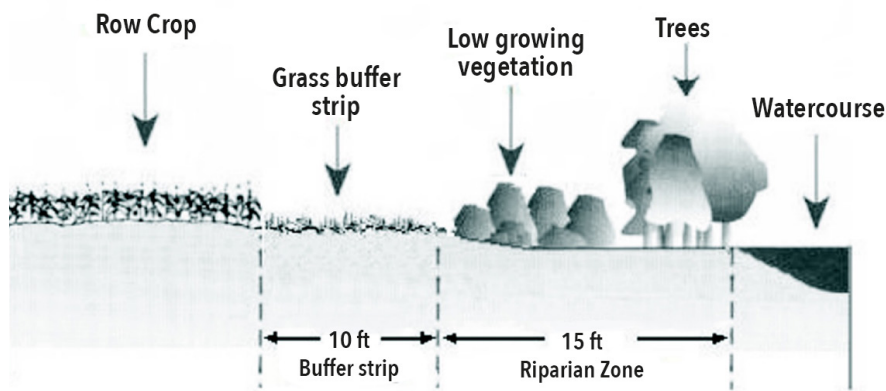


Figure 2. Recommended riparian zone & buffer strip widths for row crop production.

3.7.2 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.

3.8 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 [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. Activities that do not alter the bed or bank of a watercourse will not require submission to Nova Scotia Environment and Climate Change (NSECC). Approvals will be required for watercourse alteration activities within the watercourse bed and/or banks.

As heavy rainfall events are becoming more common, it is important to properly size culverts and crossings to accommodate these events. NSECC maintains a list of [certified sizers and installers](#). It is recommended to select a contractor with the appropriate training to ensure the crossing is well suited for the location.

Certified Watercourse Alteration Sizers can plan the following types of watercourse crossings and get authorization through notification, where:

- watercourse has a slope of less than 0.5%, and
- watershed above crossing site is less than 20 square kilometres (km²), and
- culvert is less than 25 metres long, and
- meets Nova Scotia Watercourse Alteration Standard

3.8.1 Fording

Fording is the act of driving equipment through a watercourse to cross it from one side to the other. Efforts should be made to comply with the fish and fish habitat protection provisions of the Fisheries Act by implementing measures to avoid death of fish, damage to the bed and banks of the watercourse, to avoid sedimentation, and any release of petroleum products into the aquatic habitat. Whenever possible, a crossing should be constructed. This could include a culvert, bridge or open-bottom box culvert spanning the watercourse. Activities that alter the bed or bank of a watercourse, such as installing a bridge, will require a Watercourse Alteration Approval or notification submission. The timing of work in or near streams should be done between June 1–September 30 to avoid harming aquatic species life stages (e.g. egg and fry of salmonid species or juvenile rainbow trout).

In situations where fording would only be required for a short period of time, a temporary bridge should be constructed; however, 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 NSECC. 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 NSECC prior to construction.

3.8.2 Pond Construction

When planning to construct a pond on your property, there are a few considerations to keep in mind. A Nova Scotia Environment and Climate Change (NSECC) approval is required for water storage that exceeds 25,000 cubic meters or if wetlands or watercourses will be impacted during construction. For scale, 25,000 cubic meters 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.

3.9 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.

The [Guide to Surface Water Withdrawal Approvals](#) was updated in 2016 and describes the submission requirements, supporting documentation, and the criteria used by NSECC 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.

The Guide to Groundwater Withdrawal Approvals, prepared in 2010, describes the minimum submission requirements, supporting documentation and the criteria used by NSECC to evaluate groundwater withdrawal applications. A hydrogeological study must be

completed to the satisfaction of NSECC 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 a scientific or engineering organization, such as the Association of Professional Geoscientists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (APENS).

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.

3.10 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.

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’s 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 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.

It is important to recognize that the [provincial wetland maps](#) are only an approximation of the location of wetland areas based upon visual interpretation of aerial photographs (1:10,000 scale). These maps must not be used as the only source for identifying wetland locations or be considered a substitute for obtaining field confirmation of wetland locations when evaluating the suitability of new property for agricultural production. The Department of Natural Resources (DNR) wet areas mapping tools can also be used to help identify and predict where wetlands are more likely to be located.

All wetland alterations require a Wetland Alteration Approval from NSECC, with a few exceptions, e.g. altering wetlands that are less than 100 m² (approximately 1,000 feet²) in size. Other exemptions to wetland alterations can be found stated within the Nova Scotia Wetland Conservation Policy. These exemptions include harvesting trees, grazing animals, or making hay in wetlands. However, if in doubt about a property being wet or a wetland, e.g. tree or shrub swamp, contact NSECC or a qualified wetland assessor before conducting any work in or around the area in question.

3.10.1 Ducks Unlimited Canada

[Ducks Unlimited Canada](#) (DUC) staff work with agricultural landowners by implementing conservation easements to help protect the natural value of the farm property through conservation easements. While maintaining ownership, the farm owner makes a commitment to conserve the natural integrity of the habitats agreed upon with DUC.

DUC also offers restoration opportunities to help lessen the impacts of flooding and drought on farms by restoring previously drained wetlands and establishing wetland ponds for livestock watering. The restoration programs focus on restoring naturally occurring water levels of drained or altered wetlands.

RESOURCES: [NS Wetland factsheet](#)
[Changes to the Watercourse Alteration Program: What are the New Regulatory Requirements?](#)
[Stream Bank Protection Project](#)

4.0 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.

4.1 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).

4.2 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 and Climate Change (NSECC) 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 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.

Here is a list of [UMOA](#) collection facilities and collectors.

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 enough products to justify an on-site collection (e.g. a farm with a bulk used oil tank).

4.3 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. Agricultural tires are not included in the program and need to be disposed of in the landfill.

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. (877) 313-7732

4.4 Lead-Acid Batteries and Scrap Metal

Old lead-acid batteries should be returned to the point of purchase or to your local [Enviro-Depot](#) for a refund. Scrap metal should be sorted and stored in a single location on the farm until it is taken to a metal recycling facility.

4.5 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.

4.6 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.

4.7 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](#).

4.8 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.

4.8.1 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 2 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, it is recommended to check the [Fire Restrictions](#) online or call toll-free phone line: 1-855-564-2876 (BURN) to see if open fires are allowed. Restrictions are updated daily at 2pm. Also check municipal by-laws to determine if there are additional restrictions. Domestic burning permits are not required but fire restrictions must be followed. Failing to comply with the restrictions a fine of \$25,000 may be issued.

4.8.2 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.

4.9 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** – every three years a collection program is offered 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 2027. 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).

4.10 Septic systems

To prevent surface and ground water contamination, proper septic systems should be used for treating waste. If your septic system needs upgrading, contact a licensed septic system installer. Residential septic system upgrades require a Qualified Person (QP1 or QP2) to submit a notification and application to Nova Scotia Environment and Climate Change and then a professional installation by a Certified Installer. 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.

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.

5.0 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 maximize 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.

RESOURCES: [When Added Nutrients are Too Much of a Good Thing](#)
[Nitrogen Phosphorous and Potassium for Pastures](#)
[Nutrient Management Planning](#)
[Nitrogen Mineralization from Organic Fertility Sources](#)
[Sidedress Nitrogen Fertilizer for Corn in Atlantic Canada](#)

5.1 4R Nutrient Stewardship

4R nutrient stewardship is a framework designed to optimize the use of fertilizers and other nutrient inputs in farming. It focuses on using the right nutrient source, applied at the right rate, at the right time, and in the right place. By following these principles, farmers can improve crop yields while minimizing nutrient losses to the wider environment. 4R Nutrient Stewardship promotes the achievement of economic, social and environmental goals.

RESOURCES: [4R Nutrient Stewardship](#)
[Nitrogen Management Practices to Increases Nutrient use Efficiency](#)

5.2 Testing

5.2.1 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 as well as the cation exchange capacity, which is a measure of the soils ability to hold and release nutrients.

These factors together help to describe the nutrient capacities and limitations of the soils on the farm and

TIP

Registered NS farms qualify for a 50% discount on the price of soil testing at the provincial analytical lab. 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

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.

5.2.2 Tissue Testing

Tissue sampling can be an important part of a crop fertility program. Tissue analysis shows if the crop is taking up the nutrients from the soil or through the plant tissue from a foliar application. Tissue testing can provide valuable information on nutrient levels to help improve crop quality. A combination of soil analysis and tissue testing results should be interpreted together as part of an effective nutrient management program for various horticultural crops, e.g. apples, blueberries, to improve fruit quality and storage capability. In the tree fruit industry, tissue samples are collected annually, and foliar applications are adjusted accordingly.

5.2.3 Sap Testing

Sap analysis, or plant sap testing, is a relatively new method for measuring the nutrients in a plant's sap. It can help identify nutrient deficiencies and improve crop quality and yield. Similar to tissue testing, the results provide an opportunity to better match foliar applications with plant needs during the season to optimize applications and apply what the plant needs when the plant needs it.

5.2.4 Manure Testing

Manure nutrient content can vary depending on many factors. 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.

5.2.5 Compost Testing

Compost nutrient content can vary depending on many factors. 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.

5.2.6 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 Professional Agrologist 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. NMPs provide producers with three years of fertility and crop rotation recommendations.

5.2.7 Fertility Plans

Some companies offer soil testing and fertilizer recommendations as a service. These fertility plans are often single year plans and generally do not include manure testing and manure application rate recommendations.

Resources: [How to take a field soil test](#): (additionally, see [this video](#) and [this video](#))
[How to Take a Plant Tissue Test](#)
[How to Take a Manure Sample](#)
[Understanding the Manure Test Report](#)
[How to Take a Compost Sample](#)
[Understanding the Compost Test Report](#)
Perennia's [On-Farm Climate Action Fund](#) website has a list of resources around nitrogen management, including videos, podcasts, and factsheets.

5.3 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 for future reference.

5.4 Limestone

The quality of limestone found in a quarry can vary. The degree of variation in quality depends on the amount of non-carbonate minerals, i.e. impurities like clay, sand and organic matter, in the sediment. Fineness is measured by how much material passes through different mesh sieves. A finer ground material has more surface area in contact with the soil and will be faster acting. Although there are many factors that affect how quickly lime will react in the soil, the relationship between particle size and reaction times has been approximated. For example, particles that pass through a 60 mesh or finer sieve will react 100% within the first year whereas particles that pass through a 10 mesh, but not a 60 mesh, will only react 40% in the first year and particles that do not pass through

a 10 mesh are considered to have little liming value as the particles will not react in a reasonable amount of time. For more information, review Perennia's [Which Limestone Should You Use?](#) factsheet.

In addition to particle size, it is also important to determine if dolomitic or calcitic lime would be more beneficial for application. Dolomitic lime contains a significant amount of magnesium in addition to calcium, while calcitic lime is primarily composed of calcium carbonate, providing only calcium when added to soil. Both sources will enhance the pH of the soil, but choose dolomitic lime if the soil needs magnesium, which should be determined based on a recent soil analysis. Both dolomitic and calcitic lime are mined and processed in the province.

It is also important to note that when applying lime on sod cover, e.g. pasture and forage, do not apply more than 5 tonnes/ha (2 tonnes/acre) per year if there is a high lime requirement based on analysis. More frequent light applications of lime are better than one heavy application to avoid losses to the environment.

5.5 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.

5.6 Leased Land

As the landowner, it is your responsibility to ensure that best management practices are followed for nutrient management. **Appendix A** contains Environmental Guidelines for Leased Land which can be used when communicating your expectations to the lease holder or when negotiating a new lease agreement.

6.0 Manure Management

Manure is a valuable resource for farms. As a soil amendment, it contains nutrients and organic matter that have a non-trivial monetary value when compared to the cost of replacing them with fertilizers etc. It is in a farms best interest to maximize the efficient use of this resource. 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. The loss of manure to the wider environment where it is unavailable to the growing crop, is both an economic and environmental risk.

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. For a paper copy of the guidelines, contact your regional NSDA Extension Coordinator or the EFP office.

6.1 Manure Storage

6.1.1 Solid Manure Storage

A concrete pad is recommended for storing solid 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**).

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

6.1.2 Earthen Manure Storage

Earthen manure storage systems are earthen pits designed to hold liquid manure safely. They need to be designed by an engineer to ensure they can handle the manure appropriately and prevent leaching. Generally, earthen manure storages are less expensive to construct over other types of liquid manure storage, however, uncovered earthen manure storages will collect approximately 20% more rainwater compared to a vertical walled storage leading to increased costs for transport and land application of manure. This can be an important consideration in Nova Scotia due to the amount of rainfall we receive.

6.1.3 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.

RESOURCES: [Earthen Manure Storage](#)
[Earthen Manure Storage webinar](#)

6.2 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 knoll following the minimum separation distances recommended for manure storages (**Table 3**).

6.3 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, to achieve the desired outcomes. These conditions include mixing materials in the correct proportions and managing factors such as temperature, moisture and aeration.

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**).

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

6.4 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 priority should be on preventing run-off; the amount of runoff can be minimized by directing clean water away from the farmyard before it is allowed to come into contact with contaminants. Surface water flowing from higher elevations should be diverted by installing berms, ditches (and culverts) or grassed waterways. Keep livestock yards scraped during the winter months to prevent manure from accumulating. This should be done at least once a week if the temperature allows or before a storm. Farmyard run-off should be directed into a grassed field.

6.4.1 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.

6.4.2 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.

6.5 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 considered before construction begins.

6.6 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:

- Manure application should be timed as close to the period of crop requirement as feasible.
- Whenever possible, manure should be incorporated into the soil. For liquid manure, minimizing contact with air when spreading (e.g. manure injection) can reduce nitrogen losses significantly.
- 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.

Table 5. Minimum separation distances for manure application				
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)

6.7 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.

7.0 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.

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.

7.1 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**).

Table 6. Minimum separation distances for fertilizer storage and use			
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)

7.2 On-Farm Spills

In Nova Scotia, reporting of spills and cleanup requirements normally falls under the Environment Act and Emergency Spill Regulations. Under these regulations, you are required to report any spills of certain substances above minimum reporting amounts (See [Table 1: Reporting On-Farm Spills](#) factsheet) or any amount if it could cause an adverse environmental effect, e.g. contaminating a well or water source.

In addition to the Environment Act and Emergency Spill Regulations, spills and/or release of pesticides into surface and/or groundwater can trigger other pieces of legislation, including the Canadian Environmental Protection Act (CEPA), Federal Fisheries Act, Nova Scotia Health Act and Migratory Birds Convention Act. If a spill greater than 5 kilograms or 5 litres in concentrated form, or 70 litres of diluted pesticide occurs you must call 1-800-565-1633. This number is for the Maritime Regional Office Canadian Coast Guard Fisheries and Oceans Canada. It is a 24-hour telephone number with an Environmental Emergency Responder on call to respond to all environmental emergencies.

7.2.2 Fertilizer Spills

Although not specifically included in the Emergency Spill Regulations, under the Environment Act, spills of 50 L or 50 kg or more of miscellaneous products, e.g. fertilizer, must be reported by calling 1-800-565-1633. This number is for the Maritime Regional Office Canadian Coast Guard Fisheries and Oceans Canada. It is a 24-hour telephone number with an Environmental Emergency Responder on call to respond to all environmental emergencies. The person responsible must also initiate the containment and cleanup of a spill as soon as possible after they are aware of the spill.

7.2.3 Fuel Spills

A spill is defined as an “unintentional release” of a substance that is prohibited by the Environment Act or more than an amount specified by an approval, regulation or standard. If 100 L or more of furnace oil, used oil, gasoline or diesel fuel is spilled, call 1-800-565-1633. This number is for the Maritime Regional Office Canadian Coast Guard Fisheries and Oceans Canada. It is a 24-hour telephone number with an Environmental Emergency Responder on call to respond to all environmental emergencies.

7.3 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.

8.0 Pesticide 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.

8.1 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 NSECC pesticide certification exam. The required passing grade is 75%. There are two options for completing the [exam](#): i) participating in a pesticide safety course and subsequently writing the exam or ii) obtaining the appropriate pesticide safety educational material 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 and Climate Change office.

TIP

During the 5-year period in which a pesticide applicator certificate is valid, points can be accrued for participating in NSECC 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).

NSECC 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.



Figure 3. Chemical Storage sign available from the EFP program

8.2 Pesticide Storage

It is important to locate all pesticides in a building or container that prevents and contains any spills during storage. Old freezer or other rigid container could be used for storing small quantities of pesticides. The building/storage area should be insulated, and temperatures and moistures levels should be maintained based on product requirements.

Pesticides should be stored in their original, labelled containers and all herbicides, fungicides, and insecticides should be separated within the pesticide storage area. Flammable materials (e.g. other farm chemicals such as paints, lubricants, solvents, fuels etc.) and combustible liquids should be stored 1.5 meters from pesticides. Pesticides must also be stored separately from all food, animal feed, veterinary supplies, seed and personal protective equipment and should be stored separately from fertilizers.

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**).

Ensure the storage building or container is locked, and a [Chemical Warning sign](#) (**Figure 3**), including an emergency contact list and telephone numbers, is posted on the outside door or on top of the container. The local fire brigade should be made aware of the location, type and general quantity of pesticides stored on the farm.

Table 7. Minimum separation distances for pesticide storage			
Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Pesticide Storage	30 m (100 ft)	30 m (100 ft)	30 m (100 ft)

8.2.1 Temperature and age of pesticides

The manufacturer age of pesticides and atmosphere temperature can affect its toxicity. In general, 2–3 years is the unofficial expiry date and manufacture warranty of most pesticides. It is good practice to label the date and year on the container when you

purchase pesticides and only buy what you need so you are not left with a stockpile of outdated pesticides. Rotate containers with old dates to the front and the newly purchased products to the back.

Proper temperature for storing pesticides is important for human and environment safety. Follow storage recommendations for each pesticide product to ensure effectiveness. Some product labels state to not store above 38°C (100°F) for extended periods of time and to not store below 6°C (20°F). Some pesticides when they freeze and thaw can alter the longevity of the product.

8.2.2 Pesticide Storage Building

For farms working with and storing large quantities of pesticide, a designated storage building may be needed. 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 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.

8.2.3 Shipping container

Although a shipping container can provide appropriate storage of chemical products, it needs to be modified to reduce both environmental risks and health and safety concerns:

The floor of the storage area should be made of an impermeable material with a sill or dyke at the entrance to contain small spills inside the structure.

Proper ventilation is essential as volatile fumes escaping from pesticide containers can buildup in the storage area. The storage area should have no windows and should be ventilated to the outside.

RESOURCE: [NSECC – Pesticide User Storage](#)

8.3 Spill Kits

To minimize the impact of a pesticide spill, the components of spill kit should be assembled. A pesticide spill kit should contain rubber boots, chemical resistant coveralls, chemical resistant gloves, a felt tipped permanent marker, 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 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.

8.4 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. Maintain minimum separation distances from wells, watercourses and ditches when filling a sprayer and mixing pesticides (**Table 8**).

Table 8. Minimum separation distances for filling sprayer and mixing pesticides			
Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Pesticide Mixing	30 m (100 ft)	30 m (100 ft)	30 m (100 ft)

8.5 Pesticide Application

It is important to observe weather conditions prior to and during application as conditions may change depending on the time of day (**Table 9**).

Table 9. Determining optimal spraying conditions (Adapted from: “How Weather Conditions Affect Spray Applications” (OMAFRA))		
Wind speed	Spraying conditions	Observations
2 to 3 km/h	Avoid fine sprays	Smoke drift indicates wind direction
3 to 10 km/h	Ideal spraying	Light breeze felt on the face, leaves rustle
10 to 15 km/h	Good spraying if low drift technology is used	Leaves and twigs in constant motion, dust rises
15+ km/h	Do not spray	Small trees and branches sway

Use caution when spraying in wind speeds greater than 10 km/h and implement the following drift reducing methods (drift mitigating nozzles, larger droplets, slower forward speeds, shrouds or deflectors and/or reduce the distance to the target).

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

- Ensure that the person applying pesticides has a current pesticide applicators license or is directly supervised by someone with a current license. Ideally, all people handling pesticides should complete the pesticide applicators course.

- 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).
- 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.

Table 10. Minimum separation distances for pesticide application			
Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Pesticide Spraying	10 m (33 ft)	5 m (15 ft)	3 m (10 ft)

- 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 important to acknowledge pesticide label recommendations and exercise caution when rinsing herbicides, as even small over-applications can cause plant injury and water pollution.

It is important to maintain a pesticide applicators license to understand how to properly mix, apply and store pesticides. There are a variety of industry training opportunities to collect recertification points to maintain a valid certification. The Nova Scotia Federation of Agriculture’s weekly e-news (Fridays) or the Nova Scotia Department of Agriculture Weekly Update (Mondays) highlight upcoming opportunities.

Jim Jotcham offers in-person exam-preparation courses and points workshops throughout the year. His contact is marbicon@eastlink.ca and Cell/Text (902) 679-9964.

8.6 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 required.

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.

8.7 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.

9.0 Fuel Storage and Handling

Small quantities of fuel are often stored in jerry cans. 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.

9.1 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.

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.

9.1.1 Regulated Tanks

Certain fuel storage tanks are regulated in Nova Scotia under the petroleum management regulations pertaining to the Environment Act. Regulated tanks include all underground fuel tanks and above ground tanks having a volume greater than 4000L. These regulations require tank owners to register storage tanks with Nova Scotia Environment and Climate Change. These regulations also detail how tanks are to be constructed, installed, operated, and monitored. All storage tanks regulated under the Petroleum Management Regulations are required to be installed by a certified installer. The Regulations require ongoing diligence to reduce or identify instances of leakage or loss from petroleum storage systems before they impact the environment or human health or safety.

9.2 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.

Table 11. Minimum separation distances for fuel storage			
Activity	Minimum Separation Distances		
	Wells	Watercourses	Ditches
Fuel Storage	30 m (100 ft)	30 m (100 ft)	30 m (100 ft)

9.3 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.

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.

9.4 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.

9.5 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 jerry cans 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 summertime. 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.

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 always be available 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.

10.0 Soil and Crop Management

Soil is one of the most valuable resources on a farm and to sustain its long-term productivity it requires special management considerations. Soil features such as soil structure, organic matter content, soil moisture and soil organisms 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.

10.1 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.

Perennia has created [Farm Data Tools](#) which included a Soil Survey Viewer. This soil series map is a responsive web-based map that producers can use to identify their soil series and the properties associated with that series simply by clicking on a location and reading the pop-up (free account required).

10.2 Soil Organic Matter

Soil organic matter binds soil particles together improving soil health and reducing erosion potential. It can also retain water and nutrients within the soil and is a source of nitrogen and other nutrients through the growing season. It is important to monitor 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 all help increase organic matter levels in the soil.

10.3 Soil Health

Soil health refers to the ability of a soil to function over time. In agriculture the main purpose of soil is to produce crops. Soil health focuses on the physical, chemical, and biological components of soil and how they affect plant productivity. By testing soil health parameters, we can better understand the limitations a soil may cause production or other areas where the soil could be performing better. A typical soil test considers only the chemical properties of soil, the nutrients and pH. Including the physical and biological properties gives a more complete picture of the situation.

Soil health testing currently is not performed on a commercial scale in Nova Scotia but can be measured by the PEI analytical lab. The test includes:

- Soil texture
- Soil organic matter
- Active carbon (a measure of small particles of carbon, can indicate changes in overall soil carbon earlier)
- Soil respiration (microbial activity)
- Soil aggregate stability
- Available water capacity (how much water soil can hold)
- Biological nitrogen availability (predicts how much plant-available nitrogen soil can supply without fertilizer)
- Phosphorus saturation
- Soil pH and nutrients

Soil health also involves the sustainability of the soil; it's ability to function in the future. It is good practice to measure soil health every few years to see if measures are improving over time.

10.4 Soil Structure

Soil structure is important because it determines the ability of the soil to hold and conduct water and air necessary for plant root activity. All crops need a good root system to be productive. Compaction occurs when a 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 yield. Soil structure and compaction can be improved by implementing the following practices:

- Monitor organic matter levels – high levels can help prevent compaction and erosion
- Applying solid manure and compost should also 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

RESOURCE: [Compaction fact sheet](#)

10.5 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.

10.6 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 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.

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.

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.

RESOURCES: [Maritime Pasture Manual](#)
[Forage factsheets](#)

10.7 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.
- 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.
- Planting a cover crop (see below), such as winter rye.
- When row crops are harvested before October 1st, a cover crop will usually have time to become established.

If a cover crop has not had time to get established by November 1st, then hay mulch should be applied. It is recommended that hay mulching be implemented 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 also recommended that mulching be done across the slope to ensure that there are no wheel ruts up and down the slope that would allow water to collect and cause more severe erosion in the wheel tracks.

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, but also occurring at a rapid and unsustainable rate.

10.8 Cover Crops

A cover crop is a crop that is planted to cover and protect the soil when other crops are not growing.

This protects soil from erosion by wind or rain. There many additional benefits of cover crops depending on which crop is grown. Cover crops can break up soil compaction, fix nitrogen, increase phosphorus availability, and break pest cycles.

The choice of cover crop species should consider:

- How it fits into the exiting rotation (i.e., won't encourage pests for future crops)
- Timing of cash crop harvest
- Equipment available to seed and terminate the cover crop
- What other issues you would like the cover crop to address.

An on-line [cover crop decision tool](#) is available for eastern Canada from Perennia Food and Agriculture and can help determine which cover crop is right for you.

10.8.1 Cover Crops in Silage Corn

Growing silage corn can increase the risk of soil erosion especially where the soil is left exposed with little crop residue after harvest. Each consecutive year that silage corn is grown, the risk of soil erosion generally increases. Growing cover crops in silage corn has the benefit of reducing nutrient and soil loss over the winter, adding organic matter and improving soil health, suppressing weeds, and possibly adding an additional source of forage for livestock. There are several different cover crop options available, each with its pros and cons. Variables include cover crop species and variety, seeding rate and timing and termination strategies.

RESOURCES [Under Cover: Integrating Cover Crops into Silage Corn Systems by UVM Extension](#)

The Perennia [On-Farm Climate Action Fund](#) website has many great cover crop resources. Here are a few select, but browse the site for more content, including videos and podcasts.

[Fall Cover Crop Species Selection and Management](#)

[Incorporating Cover Crops in Greenhouse Soils](#)

[Nitrogen Credits from Legume Cover Crops](#)

10.9 Tillage

Annual cropping systems tend to have higher management intensity, more soil disturbance and less return of residues. This leads to depletion of soil carbon and reductions in soil health and system resiliency in the face of climate change.

No till/zero tillage cropping systems involve eliminating all tillage operations, and placing seed, fertilizer or manure with minimal soil disturbance. Reduced till, also referred to as minimum tillage or conservation tillage, is a reduction in tillage from what was conventionally practiced. This is harder to define, because the degree of reduction can vary over time. Strip-till is a conservation system that combines the benefits of conventional tillage with the soil-protecting advantages of no-till by disturbing only the

portion of the soil that is to contain the seed row. Each row that has been strip-tilled is usually about eight to ten inches wide, while still giving residue cover for the soil between the rows.

The benefits of reducing or eliminating tillage practices are well documented. They include:

- increased crop yield associated with moisture conservation, reduced erosion, improved soil organic matter, and better management of nutrients, crop residue, and pests;
- reduced labour and equipment costs associated with doing less tillage;
- environmental benefits, including improved soil and water quality, biodiversity, and reduced greenhouse gas emissions.

Equipment innovations and industry extension research should allow the adoption of these practices to continue to increase. While not all soils, landscapes or crops may be conducive to no-till, farms should be able to implement reduced tillage practices in many cropping systems.

10.10 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, but also 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.

10.11 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 4**). 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.

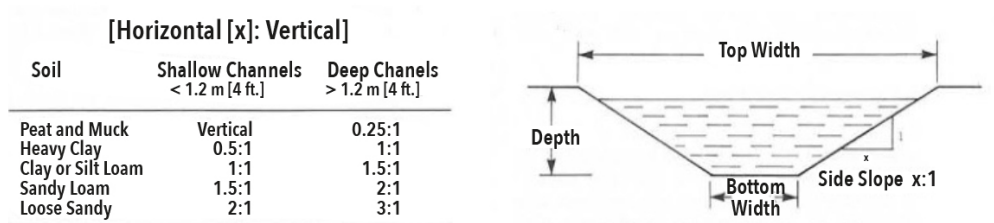


Figure 4. Recommended open ditch side slopes (left) and a typical open ditch cross section.

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.

RESOURCE: [Farm Drainage in the Atlantic Provinces](#)

10.12 Environmental Guidelines for Leased Land

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

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.

11.1 Rotational Grazing

Implementing rotational grazing practices can improve soil health on your farm. It allows regrowth of plants, minimizing soil erosion, and can store more carbon in the soil by encouraging root growth. Nutrients from the manure is distributed throughout the pasture, improving organic matter. Any grazing system can look different across farms depending on livestock size, grazing acres, and pasture composition.

The Perennia [On-Farm Climate Action Fund](#) website has many great resources on rotational grazing, including factsheets and videos.

11.2 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.

11.3 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.

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

RESOURCE: [Integrated Fly Management](#)

11.4 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.

11.4.1 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.

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

11.5 Livestock access to watercourses

Direct livestock access to watercourses and ponds has often been the traditional method of watering livestock in the province due to the general abundance of surface water sources. While this method may be suitable for small herd numbers, both animal and environmental problems can occur. Due to the potential for stream bank damage, siltation and water quality concerns caused by livestock watering from surface water supplies, all livestock should be fenced from watercourses. Several alternative livestock watering systems are available, such as gravity flow, solar powered pumps and well pipelines.

A pasture pipeline is a viable alternative when the farm has a good supply of water from a dug or drilled well as these systems can cover a large area of the farm.

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. The following management practices should be implemented:

- 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)

RESOURCES: [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](#)
[Installing a Solar Powered Livestock Watering System](#)

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 worth exploring before purchasing any new electrical equipment.

[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.

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

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

13.0 Neighbour Relations

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.

Approaches include, but are not limited to:

- join/attend local fairs, markets, hubs
- use social media to update neighbors on farming activities and for storytelling
- gather contact information
- host a public event

TIP

Contact Public Trust Coordinator at the NSFA office to learn about Meet Your Farmer and Open Farm Day programs.

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

14.0 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

14.1 Agricultural Biodiversity Conservation Plans

The Nova Scotia Department of Natural Resources created the Agricultural Biodiversity Conservation (ABC) Plan Program to help farmers become more aware of the biodiversity on their farms and the various ways they are supporting biodiversity.

Currently, for farms within Kespukwitk/Southwest Nova Scotia Priority Place, ABC plans involve having a technician complete an on-farm Ecological Resource Assessment involving the mapping out of the various existing wildlife habitats on the farm. At the end of the assessment, landowners receive a comprehensive tailored plan for their property identifying the various ways the farm supports biodiversity, along with recommendations on ways to further enhance biodiversity on the farm at no cost to the farm owner. The plan also identifies potential funding sources and partnerships that could assist in implementing additional practices or landscape features that are recommended.

14.2 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.

14.3 The Habitat and Biodiversity Assessment Tool (HBAT)

The Canadian Forage and Grassland Association (CFGGA) has developed an online tool customized for use in Nova Scotia as a source of conservation information for farmers interested in habitat stewardship. The tool is specifically designed as an extension-and-awareness approach that is based on the potential for species to occur in the area and

avoids releasing sensitive information about actual species-at-risk observations. The tool helps producers become more aware of practices they can undertake, or may already be doing, to help native plant and animal species. The output is a producer-friendly report on what practices are relevant on the farm for conserving habitat and which conservation programs are available to support action.

14.4 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](#).

Wild bees, and other insects are significant for pollinating many crops and supporting biodiversity. Population declines over the years have been caused by habitat loss, climate change, disease, and pesticide exposure. Given the critical role bees have in the agricultural sector, checking pesticide labels for specific pollinator protection requirements and minimize pesticide drift are some examples farm owners can adopt to help reduce harm to bees.

Restoring and enhancing pollinator habitat can have positive impact to their population. Pollinators, like other species, need habitat (food, water, and nesting sites). Consider leaving unmanaged land around agricultural fields and riparian zones. Create habitat with pollinator-friendly flowers, especially native species, in the yard or in field margins. Ensure water sources are scattered throughout the landscape. Additional resources on plant selections and how to minimize impacts of pesticides on pollinators, visit [Pollinator Partnership Canada, Agricultural Guides](#) and [Selecting Plants for Pollinators](#).

14.5 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 both the provincial and federal legislation, which governs what individuals can do to them and their habitat. The list of [species at risk](#) in Nova Scotia 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 are important components of the Biodiversity Program within the provincial Department of Natural Resources. The status of wildlife species is determined through both a provincial and national status assessment process. Species listed through the provincial process, by the Nova Scotia Endangered Species Working Group, are then legally protected under the provincial Endangered Species Act. Species listed through the national process, by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) 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. In Nova Scotia, recovery teams have been actively developing and updating recovery plans for all listed species.

14.6 Agroforestry

Agroforestry in Nova Scotia refers to land management practices that integrate trees, crops, and livestock to create more sustainable and diverse agricultural systems. It combines forestry and agriculture to enhance productivity, biodiversity, and environmental health. In Nova Scotia, agroforestry can help improve soil fertility, reduce erosion, and increase carbon sequestration, which benefits both the environment and the economy. Key agroforestry practices in Nova Scotia include:

1. **Alley cropping:** Growing crops between rows of trees to improve soil health and increase yields.
2. **Windbreaks:** Planting trees to protect crops and livestock from wind, reduce evaporation, and improve microclimates.
3. **Silvopasture:** Integrating livestock with trees and forage crops to optimize land use and improve animal welfare.
4. **Riparian buffers:** Establishing tree and shrub buffers along water bodies to protect water quality and enhance wildlife habitats.

Agroforestry in Nova Scotia is gaining attention to diversify farming operations, enhance resilience to climate change, and contribute to sustainable land management practices. However, challenges include the need for education and knowledge transfer for farmers, as well as access to suitable land and financial support. The province's mild climate and abundant natural resources make it well-suited for agroforestry practices.

14.6.1 Silvopasture

Silvopasture is an agroforestry practice or system that allows for the integration of woodlands, forage and livestock through grazing. It has the potential to increase water retention for forages, create shade for the forage and livestock and provide cooler temperatures during the grazing season. In addition, silvopasture can increase the carbon sequestration in the soil and vegetation in the system. Silvopasture requires intensive management to allow for favourable tree and forage growth while also optimizing grazing for livestock. Silvopasture is more than just livestock grazing wooded areas and like a traditional rotational grazing system, livestock need to be moved frequently to ensure adequate rest and recovery for both optimal forest growth and adequate forage for the animals.

14.7 Nuisance Wildlife

Farmland provides habitat to a variety of species; however, wildlife can pose a significant threat to crop and livestock production through various means, including foraging, trampling and predation. Common wildlife nuisance includes deer, bears, birds, and rodents. Identifying the type and cause of wildlife species is important to optimise prevention and control measures. Understanding why they are there may not be as obvious but likely searching for food or cover. Several strategies to help mitigate against wildlife damage are outlined below.

- **Guards:** having dog(s) or donkey(s) can help with scaring wildlife away from young.
- **Deterrents:** using a variety of scare devices (sounds and repellents) and taking prompt action can give you the best results. For example, once deer have an established habitat, they will be more difficult to discourage and become used to regular, frequent sounds.
- **Herd livestock into pens at night.**
- **Remove or modify:** Remove or modify environmental factors that is attracting the nuisance wildlife. Some examples include, securing livestock feed, modifying accessible compost and/or garbage, and covering opening in doors, windows with wire mesh.
- **Fencing:** Depending on your farm and cost, a fence could be used to keep livestock out of crops. The three strand electric fence system (Gallagher) has been tested and proven to keep deer out. Fencing out bears can be difficult
- **Hunting:** Allow hunting during the open seasons. Encourage your neighbours to also allow hunting during open seasons on their property.

A conservation officer may issue a Nuisance Wildlife Permit to kill wildlife if scaring or other methods have been unsuccessful. Any wildlife destroyed must be reported to the Department of Natural Resources within 24 hours. Any wildlife remains must be disposed of in a manner that is approved by Department staff.

Farmers with nuisance Canada geese, sandhill cranes or other migratory birds must contact the Canadian Wildlife Service (CWS). Although migratory birds are protected under federal law, farmers can obtain permits from the CWS to use “acceptable deterrent techniques”, such as sterilizing eggs or discharging firearms to protect their crops.

For more information on licences and nuisance wildlife techniques, contact your local Lands and Forestry office [Department of Natural Resources](#)

The Canada–Nova Scotia Wildlife Compensation Program is delivered by the Nova Scotia Crop and Livestock Insurance Commission. For information on compensation for loss of crop or livestock, visit the [Wildlife Compensation | NS Crop and Livestock Insurance Commission](#).

RESOURCES: [When White-tailed Deer Become a Nuisance](#)
[Biodiversity Landowners Guide](#)

15.0 Industry Contacts

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

7 Atlantic Central Dr
East Mountain NS B6L 2Z2

Phone: (902) 893-2293

Web: www.nsfa-fane.ca

Nova Scotia Department of Agriculture

[Regional Offices](#)

[NSDA Funding Programs](#)

Perennia

Web: www.perennia.ca

Kentville Location:

28 Aberdeen St
Kentville NS B4N 2N1

Phone: 902-678-7722

Fax: 902-678-7266

Email: info@perennia.ca

Food & Beverage Innovation Centre (Bible Hill):

173 Dr Bernie MacDonald Dr
Bible Hill NS B6L 2H5

Phone: 902-896-8782

Fax: 902-896-8781

Email: innovation@perennia.ca

Field Services/Food Safety Services (Bible Hill):

Phone: 902-896-0277

Fax: 902-896-7299

Email: info@perennia.ca

Plant Health Lab

David Huestis Innovation Pavilion
Acadia University
6 University Ave
Wolfville NS B4P 2R6

Phone: 902-300-3825

Email: planthealthlab@perennia.ca

Web: [Plant Health Lab Services](#)

Nova Scotia New Farmer

Web: nsnewfarmer.ca

Nova Scotia Department of Environment and Climate Change [Regional and District Office Locations](#)

Nova Scotia Department of Natural Resources

[Field Offices](#)

Divert NS

35 Commercial St, Suite 400
Truro NS B2N 3H9

Web: divertns.ca

Phone: (902) 895-7732

Toll-free: 1-877-313-7732

Fax: (902) 897-3256

Email: (General Inquiries): info@divertns.ca

Efficiency Nova Scotia

Web: [www. efficiencyns.ca/programs-rebates/
agriculture-programs](http://www efficiencyns.ca/programs-rebates/agriculture-programs)

Contact:

Kraig Porter, On-site Energy Manager

Phone: 902-470-3590

Email: kporter@efficiencyns.ca

Cleanfarms

Web: cleanfarms.ca

Phone: 1-877-622-4460

Email: info@cleanfarms.ca

Ducks Unlimited Canada – Atlantic Region

Web: ag.ducks.ca/programs/atlantic-canada/

Phone: 1-866-252-3825

Email: du_amherst@ducks.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 your Environmental Farm Plan. 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(s) 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 a NMP).
- Fertilizer and manure spreaders should be regularly calibrated.

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).

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).

(cont'd)

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 (**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.

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 passed the pesticide applicators course.
- 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.
- When applying pesticides, adequate separation distances should be maintained from wells (30 ft), watercourses (15 ft) and agricultural ditches (10 ft). It is important to read pesticide labels carefully as some pesticides have different separation distance requirements.