NOVA SCOTIA

ENVIRONMENTAL FARM PLAN

THE FRENCH DUCK

BIANCA AND PIERRE-LUC SEVIGNY

Findings Report from the On-Farm Environmental Review

2019

CANADIAN AGRICULTURAL PARTNERSHIP

NSFA FEDERATION OF AGRICULTURE

NOVA SCOTIA

Canada

On-Farm Environmental Review – Findings Report

Farm Name:	**The French Duck**
Farm Owners:	**Bianca and Pierre-Luc Sevigny**
Date of Review:	**May 16, 2019**

The findings and recommendations presented in this report are based on our review of your operation and practices compared to our interpretation of relevant legal requirements and current acceptable management practices for Nova Scotia agriculture. However, it is important to note that current farming practices and therefore potential environmental risks will change throughout the year. In addition, our assessment is based on the management and operating methods of the current farm owner and management of the operation.

Our recommendations suggest some possible solutions to correct, prevent or minimize potential environmental risk. It does not provide information and/or advice on how to comply with all provisions of environmental acts and regulations that apply to the agriculture industry. This report does not replace the reading of environmental acts, regulations, and guidelines or seeking advice from a lawyer or an environmental expert. Amendments may be made to acts and regulations after the preparation of this document therefore reference should be made to the most recent official version of acts and regulations. Although every attempt has been made to identify and evaluate environmental risk, some potential risks may have been missed. As such it is not, nor is it intended to be, a comprehensive environmental risk assessment.

If you have any concerns about the recommendations contained herein, contact the undersigned for additional information.

Original Signed

June 18, 2019

Date

Cory Roberts, P.Ag.
Program Coordinator, NS Environmental Farm Plan

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1.0 Scope

The goal of the Nova Scotia Environmental Farm Plan (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 on-farm environmental review concentrated on assessing the risk of contaminating water resources. Resources that support wildlife habitat and possible nuisance concerns were also identified. The on-farm environmental review was conducted on the mixed livestock farm located in West Petpeswick, Halifax County. The assessment team included one of the farm owners, Bianca Sevigny and Environmental Farm Plan Coordinator, Cory Roberts.

Numerous factsheets have been included in this report as additional resource material. Those factsheets, and many more, can be found on the Nova Scotia Federation of Agriculture's website at www.nsfa-fane.ca/efp.

2.0 Introduction

The Nova Scotia Federation of Agriculture has developed the on-farm environmental review phase in cooperation with the NS Department of Agriculture. Each participant, including the farm owner, is involved in identifying potential areas of environmental risk, defining actions to minimize risk and locating resources to assist in the implementation of the action plan.

A checklist, based on current legal requirements and accepted management practices for Nova Scotia agriculture, was used to conduct the on-farm environmental review. During the on-farm environmental review, we assessed your farm operation for the environmental risks of water contamination associated with:

- Water use and management
  - Water source
  - Watercourses and ditches
- Nutrient management
  - Manure storage and handling
  - Fertilizer storage and use
- Waste handling and disposal
- Pesticide management
- Fuel storage and handling
- Crop production
- Soil management
- Livestock production

This report is designed to present the findings of an on-farm environmental review conducted at your farm on May 16, 2019. We have provided an environmental action plan that identifies some possible solutions to correct, prevent or minimize any impacts associated with current activities that may present an actual or potential environmental risk.

3.0 Definitions

Environmental risk: the chance of having an impact on the environment. For the purpose of this review, there are four levels of environmental risk ratings:

Low: no action needed
Slight: remedial action possible but not essential
Moderate: remedial action should be taken
High: remedial action is required

Watercourse: a watercourse may include the following: stream (with a defined channel bottom greater than 50 cm (20 inches) wide), brook, river, lake, creek, pond, estuary or salt water body

Riparian Zone: is a transitional area that exists between a watercourse and the surrounding drier upland

Eutrophication: is the depletion of oxygen in water bodies caused by the accelerated growth of algae or aquatic plants due to increased fertility

4.0 Review Findings

4.1 Program Expectations

The farm owners recognize that environmental concerns are an important component of the overall farm business plan. Minimum separation distances for new facilities were identified as the primary area of environmental concern prior to the on-farm environmental review. The farm owners are open to suggestions for areas of improvement.

The expectations from participating in the Environmental Farm Plan Program include:

- Complying with environmental laws, regulations, guidelines and currently accepted management practices for Nova Scotia agriculture
- Being environmentally responsible by assessing areas of environmental risk and identifying practical solutions to minimize risk; practicing due diligence
- Addressing environmental concerns by prioritizing action items
- Maintaining good community relations
- Being an environmental steward

Participation in the Environmental Farm Plan program is required for gaining access to federal and provincial funding programs as well as some other financial agency funding. An Environmental Farm Plan is an important component of a successful farm business plan.

4.2 Farm Profile

An inventory of farm resources includes:

- A 7.5 acre parcel of forested land was purchased and a portion of that land will be cleared for the farm. A barn and a small abattoir will be constructed. A horse pen, an arena and a small pasture are planned. Small mobile enclosures for rabbits and pigs as well as a duck enclosure are also planned.
- At the time of the on-farm review, there were no livestock on the farm. The management plan projects 70 ducks, 50 chickens, 4 goats, 10 rabbits, 6 feeder pigs, and up to 5 horses within a couple years. Manure generated on the farm will be stored, composted and used on the farm.
- There is no tile drainage on the farm.
- The soils on the property are well drained sandy loam (Halifax series). Most of the farmland has a moderate slope.
- A brook that originates in the wetland west of the property runs along the eastern edge of the property before emptying into the Petpeswick Inlet. Towards the northwest, the property borders approximately 100 m of Petpeswick Inlet.

No productive agricultural land is located within a designated watershed or public water supply area.

The farm owner indicated that there was an old nail factory on the farm property in the past. Little additional information is known.

4.3 Water Use and Management

It is important to protect surface and ground water supplies by ensuring contaminants are kept away from drinking water sources. Manures, fertilizers, fuels, pesticides and other chemicals 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 wells when storing or using these materials. A *Minimum Separation Distances for Agricultural Activities* factsheet is included with this report.

Another important consideration that is sometimes overlooked is the location of other wells, including your neighbour's and any abandoned or unused wells, in relation to your farm property. An effort should be made to identify the status, location and well type (i.e. drilled or dug) for any neighbouring properties in close proximity to agricultural production.

4.3.1 Water Source

There are no wells on the farm property. The farm owner indicated she was interested in the possibility of constructing a new well in the future. Under the Well Construction Regulations, in the province of Nova Scotia, anyone constructing or repairing a water well must have a

certificate of qualification from Nova Scotia Environment. A searchable list of currently certified well drillers and diggers, as well as pump installers is available online at: http://www.novascotia.ca/nse/cms/Search.asp.

Water quality

It is important to continue to test your water supply at least annually to ensure that the Canadian Drinking Water Guidelines are met (*Table 1*).

Table 1. Canadian Drinking Water Guidelines.

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

Drop on Water factsheets

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

Drinking Water Interpretation Tool

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

4.3.2 Watercourses and Ditches

A brook that originates in the wetland west of the property runs along the eastern edge of the property before emptying into the Petpeswick Inlet. Towards the northwest, the property borders approximately 100 m of Petpeswick Inlet.

Riparian Buffers

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

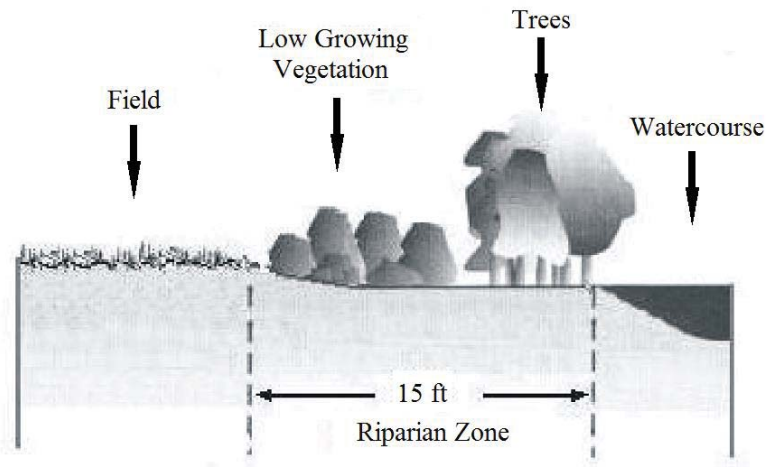


Figure 1. Recommended riparian zone width for forage production.

Pond Construction

The farm owners may construct a new pond. A Nova Scotia Environment (NSE) permit is required for water storage that exceeds 25,000 m^3 or if wetlands or watercourses will be impacted during construction.

Watercourse Alteration

Effective October 1, 2014, the submission requirements for some watercourse alterations have changed from applications for approval to notifications. Watercourse alterations refer to activities that alter the bed or bank of a fresh water body, such as installing a crossing. Activities that do not alter the bed or bank of a watercourse will not require any submission to NSE. While approvals will still be required for some watercourse activities, notifications can now be submitted for others. Additional information is available on the NSE website: http://novascotia.ca/nse/watercourse-alteration/ or contacting a regional office: Digby, Yarmouth & Shelburne Counties - Yarmouth Office - 902-742-8985

Wetlands

Wetlands provide important environmental benefits, such as maintaining and improving water quality and quantity, reducing flood damage and providing wildlife habitat. Since 2007, any alteration of a wetland (i.e. filling, draining, flooding or excavating) requires a Wetland Alteration Approval from Nova Scotia Environment.

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. The Wetlands of Nova Scotia map is available on-line: https://nsgi.novascotia.ca/plv/. Wetlands are often located on farm properties, although no wetland features were identified on the map for the main farm property (Appendix C). It is important to note that additional areas can still be deemed 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: HRM - Bedford Office - (902) 424-7773

Actions:

- ✓ Contact a certified well driller/digger to construct a new well to increase the water supply for the farm
- ✓ Ensure that the well is located in an area away from any sources of contamination
- ✓ Ensure minimum separation distances are maintained from wells, watercourses and ditches
- ✓ Establish and maintain riparian zones and buffer strips along watercourses

Additional Information:

The following factsheets have been included with this report:

- ***Well Water Protection***
- ***Minimum Separation Distances for Agricultural Activities***
- ***Before you construct a water well***
- ***Changes to the Watercourse Alteration Program: What are the New Regulatory Requirements***

4.4 Waste Handling and Disposal

The farm is under development and does not currently generate waste. Some observations and important points regarding waste handling and disposal for future reference are:

- Small volumes of used oil 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 an oil spill. Used oil should be returned to the place of purchase or taken to an establishment with a used oil furnace (i.e. most car dealerships) for disposal.
- Used oil filters should be well-drained and stored in an UN approved transport drum for pick-up by an Environmental Services company. Recently announced changes to environmental regulations will require industry to have recycling programs for used oil, filters and containers by January 1, 2020.
- Old batteries should be taken back to the point of purchase or your local Enviro-Depot for a refund.
- There are no used tires on the farm. Used automotive tires should be taken to a tire retailer for disposal, while agricultural tires should be taken to the landfill.
- Some old appliances and scrap metal were observed on the site of the new farm. Scrap metal should be sorted and stored in a single location on the farm until it is taken to a metal recycling facility.

- When livestock are raised on the farm, used needles should be placed in a designated sharps container. When this container is full, contact your local veterinarian or Waste Management Authority for proper disposal.
- Empty livestock medication and vaccine bottles should be wrapped in newspapers and disposed of in the regular garbage like broken glass.

Cleanfarms

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 (www.cleanfarms.ca).

Burning Restrictions

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

Municipal Waste Information

For more waste disposal information or for questions related specifically to your municipality, contact your regional waste authority. The phone number for the regional waste authority for HRM is: 311 or 1-800-835-6427. Each region also has coordinators that will come out to your farm and provide recommendations to improve waste disposal and recycling practices. To arrange a farm visit, the coordinator for the regional waste authority for Halifax is Laurie Lewis - (902) 490-7176; lewisr@halifax.ca

The risk of water contamination due to waste disposal is low for both ground and surface water.

Septic

There are no septic systems on the farm.

Actions:

- ✓ Place household garbage, recyclable packaging and green bin organic wastes at the curbside for collection
- ✓ Store used oil in small plastic containers with tight fitting lids and return to the point of purchase or to a garage with a used oil furnace regularly

- ✓ Return automotive tires to a tire retailer
- ✓ Take used batteries to the Enviro-Depot for a refund
- ✓ Take scrap metal and old appliances to a metal recycler
- ✓ Consult with a veterinarian or the CleanFARMS program for options for disposal of expired, unused or unwanted livestock medications
- ✓ Place used needles in a designated sharps container and dispose of with a vet, a pharmacy or contact your regional waste authority for alternative disposal options
- ✓ Check the provincial burn status website for up to date restrictions on burning brush and untreated wood

4.5 Nutrient Management

The main objective of a crop production system should be to establish and maintain a fertile soil. This can be accomplished by using practices that maintain or build organic matter, by balancing available nutrients with crop requirements and by encouraging biological activity within the soil. A nutrient management plan (NMP) is a tool that can help achieve a balance between farm productivity and efficient use of applied nutrients. A NMP has not been completed for the farm and soil fertility testing has not been completed.

A NMP would optimize use of available on-farm nutrient sources and focus on nutrient cycling through the use of legumes, plough down crops and crop rotations. The use of other soil amendments may be recommended to correct soil deficiencies and improve fertility. Tools used in developing a nutrient management plan include soil analysis, manure/compost analysis and spreader calibration. NMP's are based on a certified nutrient management planner's knowledge of crop inputs and requirements and provide producers with three years of fertility and crop rotation recommendations.

Compost Testing

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

pH and Liming

The availability of nutrients to plants is influenced by soil pH. Soil pH levels in the range of 6 to 7 are desirable for most crops. As the soil pH decreases, the nutrients available to plants decline. In order to produce a viable crop in an environmentally sustainable manner, it is important to ensure that pH is managed at a level to maximize inputs and minimize the risk to the environment from leaching and runoff. Limestone should be added to those fields with pH levels below the desired range in order to ensure that nutrients in the soil are available to the plant (*Figure 2*). An updated soils report is required to confirm present levels.

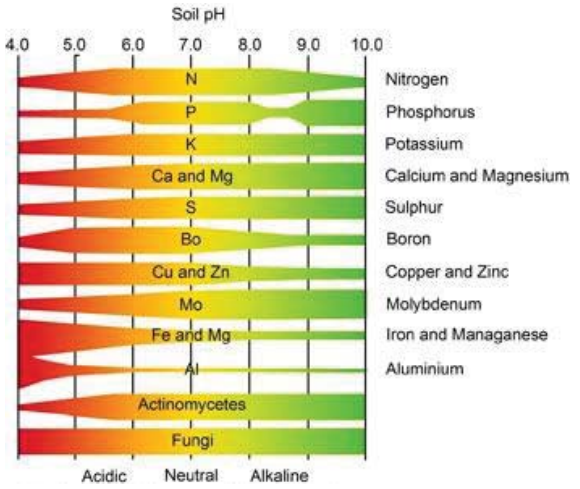


Figure 2. Soil pH and nutrient availability.

Nutrient Applications

Fertilizer

Fertilizer application rates should be based on the recommendations in a NMP or a current soil test report. Fertilizer should only be applied to meet crop nutrient requirements not supplied by soil reserves, manure or compost applications and possible legume residuals. If fields have high or excessive phosphorous levels, chemical fertilizers containing phosphorous may not be required to successfully grow a crop and should not exceed the crop removal rate.

Manure and Compost

A NMP would determine which fields would benefit from manure or compost applications and would make recommendations on the rate required to meet crop needs without applying excess.

Record Keeping

All nutrient (fertilizer, lime, manure/compost, biosolids etc.) application records, should be documented in a cropping record book for future reference.

Horse Manure

Based on the nature and quantity of bedding used in horse barns, horse manure can be quite high in carbon. Adding some nitrogen fertilizer to the manure may be required to ensure that the finished compost is balanced and not tie up nitrogen in the soil when applied. The type and quantity of fertilizer added would depend on the nature of the manure and bedding. If composting of the manure is undertaken, an analysis of the manure should be conducted.

Actions:

- ✓ Contact a certified NMP specialist to prepare a NMP for the farm

- ✓ Follow recommendations in your NMP or base nutrient applications on recommendations in a current soil test report
- ✓ Test fields for soil fertility at least once every three years
- ✓ Include manure / compost analysis as a component of the NMP and test manure / compost at least once every three years
- ✓ Maintain a log of all nutrient applications on fields

Additional Information:
The following factsheets have been included with this report: • ***Nutrient Management Plans which includes a list of Certified Nutrient Management Planners*** • ***How to Take a Field Soil Test*** • ***Understanding the Soil Test Report*** • ***How to Take a Compost Sample*** • ***Understanding a Compost Test Report*** The Environmental Farm Plan Office has soil sampling probes that can be signed out for use in sampling your fields - Call: 1-902-893-2293

4.5.1 Manure and Compost Storage

At the time of the on-farm review, there were no livestock on the farm and no manure was being generated. The farm owner indicated that the farm intends to compost the majority of manure produced from the various livestock on-farm.

Concrete Pad Composting / Manure Storage Construction

A concrete pad with push walls should be constructed to facilitate manure handling and composting. The pad would act as barrier between the manure and soil and would make cleaning up (and turning) 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 2*).

Covered Composting Structure

In order to produce quality compost, the farm owners should consider a covered composting structure. A covered structure would allow better control over the amount of moisture in the compost, thereby decreasing composting times, reducing leaching and run-off and potentially increasing the nutrient retention.

Table 2. Compost / Manure Storage Minimum Recommended Separation Distances.

Property lines or provinvcial hwys: .....50 m (165 ft)
Off-farm dwellings / wells:.....100 m (330 ft)
Watercourses – lakes, rivers, brooks
(solid manure) .....100 m (330 ft)
(liquid/semi-solid manure).....50 m (165 ft)
Ditches.....20 m (66 ft)

Adapted from the Nova Scotia Manure Management Guidelines (2006).

Runoff from compost / manure storage pad

Precipitation runoff from the solid manure storage should drain to a grassed area. Research has indicated that grassed vegetative filter areas of at least 300 ft in length provide adequate treatment of precipitation runoff from manure storage.

Farmyard Run-off

Farmyard runoff, e.g. washwater, urine and contaminated water from manure storages, livestock yards and feed storage areas, must be managed to prevent it from contaminating surface water or leaching to groundwater impacting water quality from increased nutrients, i.e. nitrates and phosphates, and/or biological contamination from bacteria, viruses and parasites. The amount of possible runoff can be minimized by directing all clean water away from the farmyard before it is allowed to come into contact with potential contaminants. Surface water flowing from higher elevations should be diverted by installing berms, ditches (and culverts) or grassed waterways.

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.

4.5.2 Manure and Compost Application

When manure is applied to fields, ensure that soil conditions are adequate to prevent compaction and practices are followed to minimize run-off. For example:

- Whenever possible, manure should be incorporated into the soil.
- Manure should not be applied on frozen, snow covered or excessively wet ground because if applied under these conditions, the manure provides little nutrient value and is prone to runoff, which could lead to pollution of watercourses. In general, conditions from December 1st to April 1st are unfavorable for manure applications.

- Multiple applications that supply only the nutrients required for specific periods of crop growth are recommended.
- Apply manure to upland fields adjacent to watercourses and with a slope greater than 5% during the growing season (June to September).
- Maintain a minimum separation distance from wells of 30 m (100 ft) on clay and/or loam soils and 60 m (200 ft) on sandy and/or gravelly soils when applying manure.

Actions:

- ✓ Consult with an agricultural engineer to discuss design options and siting for a manure storage and composting structure
- ✓ Construct a concrete pad with a push wall(s) for manure storage and composting
- ✓ Ensure that minimum separation distances from wells, watercourses, ditches, roads, buildings and property lines are observed when siting the manure storage / composting structure
- ✓ Ensure that the design of the manure storage allows for at least 7 months of manure production to be stored
- ✓ Ensure that run-off from the pad drains onto a vegetated field that is at least 100 m (300 ft) in length to ensure adequate treatment
- ✓ Construct eaves troughs on the barn to reduce run-off from farm yard
- ✓ Follow best management practices when applying manure

Additional Information:

The following factsheets have been included with this report:

- ***Manure Management Guidelines***
- ***On-Farm Manure Management Through Composting***
- ***A List of Consulting Engineers***

4.5.3 Fertilizer Storage and Use

At the time of the on-farm review, chemical fertilizers had not been used and although not opposed to their use, the farm owner expected manure and compost would provide sufficient nutrients for crop production. If fertilizers are used, 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. Ensure that fertilizer is loaded into the spreader at least 30 m (100 ft) from all wells and watercourses.

Minimum Separation Distances

In order to protect surface and ground water resources, adequate separation distances should be maintained when handling and applying fertilizers. The spreader should be loaded 30 m (100 ft) from wells and watercourses and spreading of fertilizer should occur no closer than 10 m (33 ft) from wells and watercourses.

Spills

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

Action:

- ✓ Ensure the guidelines on the proper handling and application of fertilizers are followed

4.6 Pesticide Management

At the time of the on-farm review, the farm owner indicated that she did not intend to use pesticides.

4.7 Fuel Storage and Handling

Small quantities of fuel will be 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.

Actions:

- ✓ Inspect jerry cans periodically and replace if there are signs of wear or damage
- ✓ Keep absorbent material available where fuel is stored to clean up any spills

4.8 Soil Management

Crop production will consist of permanent pasture.

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

Soil organic matter binds soil particles together improving soil tilth and reducing erosion potential. Soil organic matter 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.

Soil structure is important because it determines the ability of the soil to hold and conduct water, nutrients 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 and manage organic matter levels since 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

Pasture

Perennial pasture 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. Based on the small pasture area planned, it will be important to monitor stocking rates to prevent overgrazing. Fencing areas of the pasture off in rotation to allow pasture to regenerate may prevent overgrazing leading to exposed soil.

Pasture Renovation

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.

Drainage

The farm owner indicated that drainage is an issue in some areas on the property. It is important to construct and maintain surface ditches as needed on the farm. In situations where open ditches are required to transport large volumes of water, they should be carefully planned to avoid ditch bottom and side slope erosion (*Figure 3*). If high water volumes are expected,

fieldstone can be used to line portions of the ditch and 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.

[Horizontal [x] : Vertical]

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

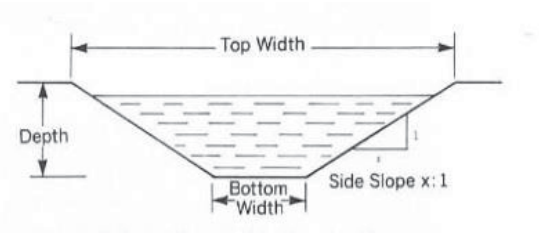


Figure 3. Recommended open ditch side slopes (left) and a typical open ditch cross section (right).

In some cases, wet areas may also need to be addressed with subsurface drainage. Install tile drainage and construct ditches as needed to provide appropriate outlets for subsurface drainage systems. After the installation of any additional tile drainage, periodically check the outlets in the ditch to ensure soil erosion and any accumulated sediment does not cover the tile outlets.

Actions:

- ✓ Fence pasture into paddocks, monitor stocking rate and rotate livestock to avoid over grazing
- ✓ Consider alternatives to tillage, such as frost seeding or no-till seeding when renovating pastures
- ✓ Install tile drainage and construct surface ditches to address drainage issues

Additional Information:

- ***Soil Conservation Practices***
- ***Managing Pasture for Profit***
- ***Improving Pastures by Overseeding Legumes***
- ***Surface Drainage***
- ***Subsurface Drainage***

4.9 Livestock Production

At the time of the on-farm review, there were no livestock on the farm. The management plan projects 70 ducks, 50 chickens, 4 goats, 10 rabbits, 6 feeder pigs, and up to 5 horses within a couple of years.

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

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 included *On-Farm Livestock Mortality Management* booklet.

Rodents

The farm owners mentioned that rodents aren't a problem on the farm. Rodents are attracted to livestock feed and may become a bigger issue when livestock numbers increase.

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.

Flies

The farm owner(s) mentioned that flies weren't a problem on the farm. 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.

Livestock watering

Livestock will be supplied water in their enclosures and will not have access to watercourses.

Pastured Pigs

The pigs will have access to a small wooded area. It will be important to monitor where pigs are pastured as they can create large areas of bare ground, which could result in erosion. Steep slopes and erosion prone soil should be avoided. Monitor stocking densities and rotate the pigs frequently to maintain vegetative cover and reduce erosion. Establishing paddocks that follow the contour of the land and implementing grassed buffers along the paddock are practices that have proven effective for erosion and runoff control. Ensure that vegetative buffers are established between pig paddocks and any nearby watercourses. Feeding and watering areas should also be managed to prevent water accumulation and wallowing.

Abattoir

There are plans to construct a small abattoir on-farm. The farm owner indicated that blood and offal will be disposed of through municipal organics (green bin) collection. Wash water will drain into a septic tank that will be periodically pumped. The farm owner indicated that a constructed wetland may be built to handle the overflow from the septic tank. Engineered wetlands are a viable alternative to a conventional wastewater treatment system and have been utilized as secondary treatment for several types of farm wastewater. *A Constructed Wetlands for the Treatment of Agricultural Wastewater in Atlantic Canada* publication has been included with the report.

Actions:

- ✓ Bury deadstock at least 30 m (100 ft) from watercourses and wells and at least 60 cm (2 ft) deep OR compost
- ✓ Implement management strategies to deal with flies and rodents
- ✓ Implement strategies to avoid excessive soil disturbance and erosion from pastured pigs
- ✓ Consult with an agricultural engineer for siting and design of a constructed wetland to treat abattoir waste

Additional Information:

- ***On-Farm Livestock Mortality Management***
- ***Conservation Practices in Outdoor Hog Production Systems***
- ***Integrated Fly Management for Livestock Farms***
- ***NSSPCA – Adopt a Barn Cat Program***
- ***Constructed Wetlands for the Treatment of Agricultural Wastewater in Atlantic Canada***

4.10 On-Farm Energy Use

There are an increasing number of opportunities for farm owners to improve energy efficiency on the farm. Funding is available for energy efficiency audits and to implement energy efficiency options. Pay-back times vary depending on the technology, but the potential for energy savings is definitely worth exploring before purchasing any new electrical equipment. Efficiency Nova Scotia offers rebates on several business and agricultural technologies. (https://efficiencyns.ca/product-area/agriculture-technologies/).

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

- Identify energy efficiency opportunities

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

Across the province, farmers are learning how they can save energy, lower operating costs and realize the non-energy benefits of energy efficiency. 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 (902) 470-3590, (902) 872-1191 or by email at kporter@efficiencyns.ca or agriculture@efficiencyns.ca.

Action:

- ✓ Consider energy efficient technologies when replacing old or constructing new infrastructure

Additional Information:

The following factsheets have been included with this report:

- ***Efficiency NS: Agriculture Technologies***

4.11 Nuisance

Conflicts between farming and non-farming neighbours do occur. Fortunately, conflicts with neighbours can often be avoided by taking a few preventative measures. Ensure that you stay informed about changing legislation. Periodically review your Environmental Farm Plan and current farming practices to ensure best management practices are being implemented on your farm. Strive to develop a good relationship with neighbours by being active within your community and by reducing the number of potential nuisance events.

Identifying potential nuisance sources is an important first step. Some possible sources of nuisance complaints include:

- loose animals - maintain fences
- flies - tarp manure pile if identified as problem
- odours - manure storage and/or application
- manure and soil on the road - continue to keep manure and soil off the road surface
- operation of farm machinery on early mornings, weekends or holidays

It is important to handle nuisance complaints from neighbours in a friendly manner and to make every attempt to resolve the problem cooperatively. There have been no complaints made by neighbours about the operation and Nova Scotia Environment, RCMP or Department of Fisheries and Oceans has not visited the farm regarding farming practices.

4.12 Wildlife Habitat

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

Agricultural Biodiversity Conservation Plans

Peter Austin-Smith, a Biodiversity Stewardship Coordinator with the Nova Scotia Lands and Forestry, is currently providing Agricultural Biodiversity Conservation Plans for individual farms. These plans identify current and potential activities that support biodiversity within the farm operation and include a biodiversity assessment and a riparian health assessment of the farm. Participation is voluntary and there is no cost for the plan or obligation to implement any of the recommendations. For more information, please contact Peter at 902-679-6733.

Invertebrate Conservation

Over the past several years, declines in populations of managed and native bees and other pollinators have raised concerns as to the potential impact on agricultural crop production. The Nova Scotia Beekeepers Association is asking industry and individuals to consider implementing pollinator conservation practices from the *Xerces Society for Invertebrate Conservation.* The website has various resources available: https://xerces.org/.

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 (farmbiodiversity.ca). 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.

Additional Information:
• ***A Biodiversity Landowner's Guide***

5.0 Summary

It is evident in this environmental risk assessment that the farm owners are familiar with environmental issues and have implemented various environmental improvements that are of benefit to the business, environment and community.

Several potential areas of environmental risk were identified during the on-farm environmental review. The potential risks of contaminating surface and well water are summarized in *Appendix A*. To assist you in addressing the potential environmental risks associated with your farming practices, an Environmental Action Plan has been prepared and included as *Appendix B*. A copy of *Appendix A & B* is required for the Department of Agriculture's Soil and Water Sustainability funding program.

It is the responsibility of the farm owners to implement the suggested actions. The EFP Program Coordinator will be available to assist you in implementing the action plan.

Appendix A: Potential for Ground and Surface Water Contamination

Facility or Activity	Potential for Ground Water Contamination	Potential for Surface Water Contamination
Waste disposal	-	-
Septic system	-	-
Manure storage	-	-
Fertilizer storage	-	-
Pesticide storage	-	-
Fuel storage	-	-
Livestock watering	-	-
Applied livestock manure	-	-
Applied fertilizer	-	-
Applied pesticides	-	-
Soil erosion	-	-

Environmental Risk Ratings:

Low	No remedial action required	**Slight**	Remedial action possible but not essential
Moderate	Remedial action should be taken	**High**	Remedial action required

Notes:

Risk ratings are based on: a) how quickly water will move into and through the soil, b) depth to water table, c) the distance to the nearest well water source, d) soil texture and organic matter content, e) topography (steepest or longest slope), f) the distance to the nearest surface water source and g) cropping practice

No risk ratings have been assigned based on the fact that the farm was in the development stages at the time of the on-farm review.

Appendix B: Environmental Action Plan

Issue	Possible Solutions	Priority	Funding	Resources
New well construction	Contact a certified well driller/digger to construct a new well to increase the water supply for the farm	Within the Next 5 Years	✓	Searchable list of well drillers and diggers: http://www.novascotia.ca/nse/cms/Search.asp
	Ensure that the well is located in an area away from any sources of contamination	Within the Next 5 Years		*Before you Construct a Water Well factsheet*
Surface and ground water protection	Ensure minimum separation distances are maintained from wells, watercourses and ditches	Within the Next Year		*Minimum Separation Distances for Agricultural Activities factsheet*
	Establish and maintain riparian zones and buffer strips along watercourses	Within the Next Year	✓	*Agricultural Riparian Buffer Zones factsheet*
Household garbage and recyclables	Place household garbage, recyclable packaging and green bin organic wastes at the curbside for collection	As Applicable		For County specific information: https://www.novascotia.ca/nse/waste/muncollection.asp
Used motor oil	Store used oil in small plastic containers with tight fitting lids and return to the point of purchase or to a garage with a used oil furnace regularly	As Applicable		
Used tires	Return automotive tires to a tire retailer	As Applicable		
Used lead-acid batteries	Take used batteries to the Enviro-Depot for a refund	As Applicable		

Issue	Possible Solutions	Priority	Funding	Resources
Scrap metal and appliances	Take scrap metal and old appliances to a metal recycler	Within the Next 6 Months		
Expired or obsolete livestock medications	Consult with a veterinarian or the CleanFARMS program for options for disposal of expired, unused or unwanted livestock medications	As Applicable		www.cleanfarms.ca
Farm sharps	Place used needles in a designated sharps container and dispose of with a vet, a pharmacy or contact your regional waste authority for alternative disposal options	As Applicable		
Burning restrictions	Check the provincial burn status website for up to date restrictions on burning brush and untreated wood	As Applicable		
Nutrient Management Planning	Contact a certified NMP specialist to prepare a NMP for the farm	Within the Next 5 Years		*Nutrient Management Planning factsheet*
	Follow recommendations in your NMP or base nutrient applications on recommendations in a current soil test report	Within the Next 5 Years		
Soil fertility testing	Test fields for soil fertility at least once every three years	Within the Next Year		

Issue	Possible Solutions	Priority	Funding	Resources
Manure / compost testing	Include manure / compost analysis as a component of the NMP and test manure / compost at least once every three years	Within the Next 5 Years		
Record keeping	Maintain a log of all nutrient applications on fields	aa		
Manure storage / composting	Consult with an agricultural engineer to discuss design options and siting for a manure storage and composting structure	Within the Next 3 Years	✓	*List of Consulting Agricultural Engineers*
Manure storage / composting	Construct a concrete pad with a push wall(s) for manure storage and composting	Within the Next 3 Years	✓	
Solid manure storage	Ensure that minimum separation distances from wells, watercourses, ditches, roads, buildings and property lines are observed when siting the manure storage / composting structure	Within the Next 3 Years		*NS Manure Management Guidelines*
Solid manure storage	Ensure that the design of the manure storage allows for at least 7 months of manure production to be stored	Within the Next 3 Years		
Run-off control	Ensure that run-off from the pad drains onto a vegetated field that is at least 100 m (300 ft) in length to ensure adequate treatment	Within the Next 3 Years		

Issue	Possible Solutions	Priority	Funding	Resources
Run-off control	Construct eaves troughs on the barn to reduce run-off from the farm yard	Within the Next Year	✓	
Manure application	Follow best management practices when applying manure	As Applicable		
Fertilizer storage	Ensure the guidelines on the proper handling and application of fertilizers are followed	As Applicable		
Fuel storage (jerry cans)	Inspect jerry cans periodically and replace if there are signs of wear or damage	As Applicable		
	Keep absorbent material available where fuel is stored to clean up any spills	As Applicable		
Pasture health	Fence pasture into paddocks, monitor stocking rate and rotate livestock to avoid over grazing	As Applicable	✓	
Pasture renovation	Consider alternatives to tillage, such as frost seeding or no-till seeding when renovating pastures	As Applicable		*Pasture renovation factsheets*
Drainage	Install tile drainage and construct surface ditches to address drainage issues	As Necessary	✓	
Deadstock disposal	Bury deadstock at least 30 m (100 ft) from watercourses and wells and at least 60 cm (2 ft) deep OR compost	As Applicable		*On-Farm Livestock Mortality Management booklet*

Issue	Possible Solutions	Priority	Funding	Resources
Flies and Rodents	Implement management strategies to deal with flies and rodents	As Applicable		
Pastured pigs	Implement strategies to avoid excessive soil disturbance and erosion from pastured pigs	As Applicable		
Abattoir waste	Consult with an agricultural engineer for siting and design of a constructed wetland to treat abattoir waste	As Applicable		List of Consulting Agricultural Engineers
Energy efficiency	Consider energy efficient technologies when replacing old or constructing new infrastructure	As Necessary		**Agricultural Equipment** https://efficiencyns.ca/product-area/agriculture-technologies/ **Kraig Porter** Roving Energy Manager Efficiency Nova Scotia Main: (877) 999-6035 agriculture@efficiencyns.ca

The ✓ indicates financial assistance is available for the recommended project. The following provides some initial information related to potential funding sources.

Program funding through Nova Scotia Department of Agriculture's new *Soil and Water Sustainability Program* may change from year to year. Please refer to the program website (https://novascotia.ca/programs/soil-and-water-sustainability/) or call the Programs office (1-866-844-4276) for more detail on eligible initiatives.

Additional funding program information (i.e. *Limestone Trucking Assistance Program* and *Vineyard Development and Expansion Program*) is available on the NSDA website: https://novascotia.ca/agri/programs-and-services/financial-funding/.

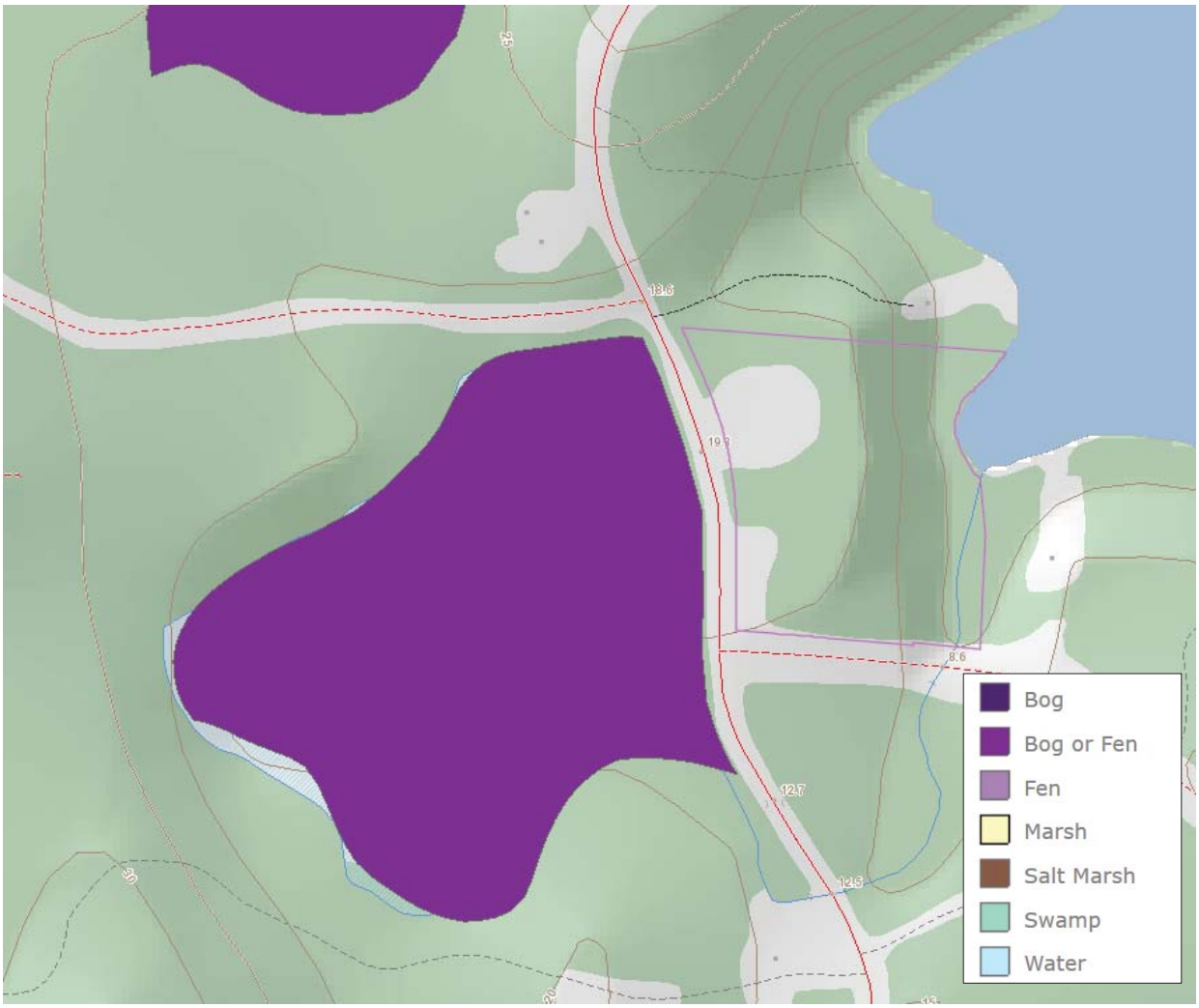
Additional funding for energy efficient products related to agriculture technology through Efficiency Nova Scotia is available. For eligible products, visit: https://efficiencyns.ca/product-area/agriculture-technologies/ or contact Kraig Porter, On-site Energy Manager, Efficiency Nova Scotia.

* For farms that do not meet the income requirement for the **Soil and Water Sustainability Program**, the Small Farm Acceleration Program (https://novascotia.ca/programs/small-farm-acceleration/) was created to support the growth of small farms through the implementation of business planning and farm growth strategies. Funding assistance is available for projects identified in a Farm Growth Action Plan. Contact your regional Agricultural Resource Coordinator (ARC) or Business Development Officer for assistance.

Appendix C: Maps and Photos

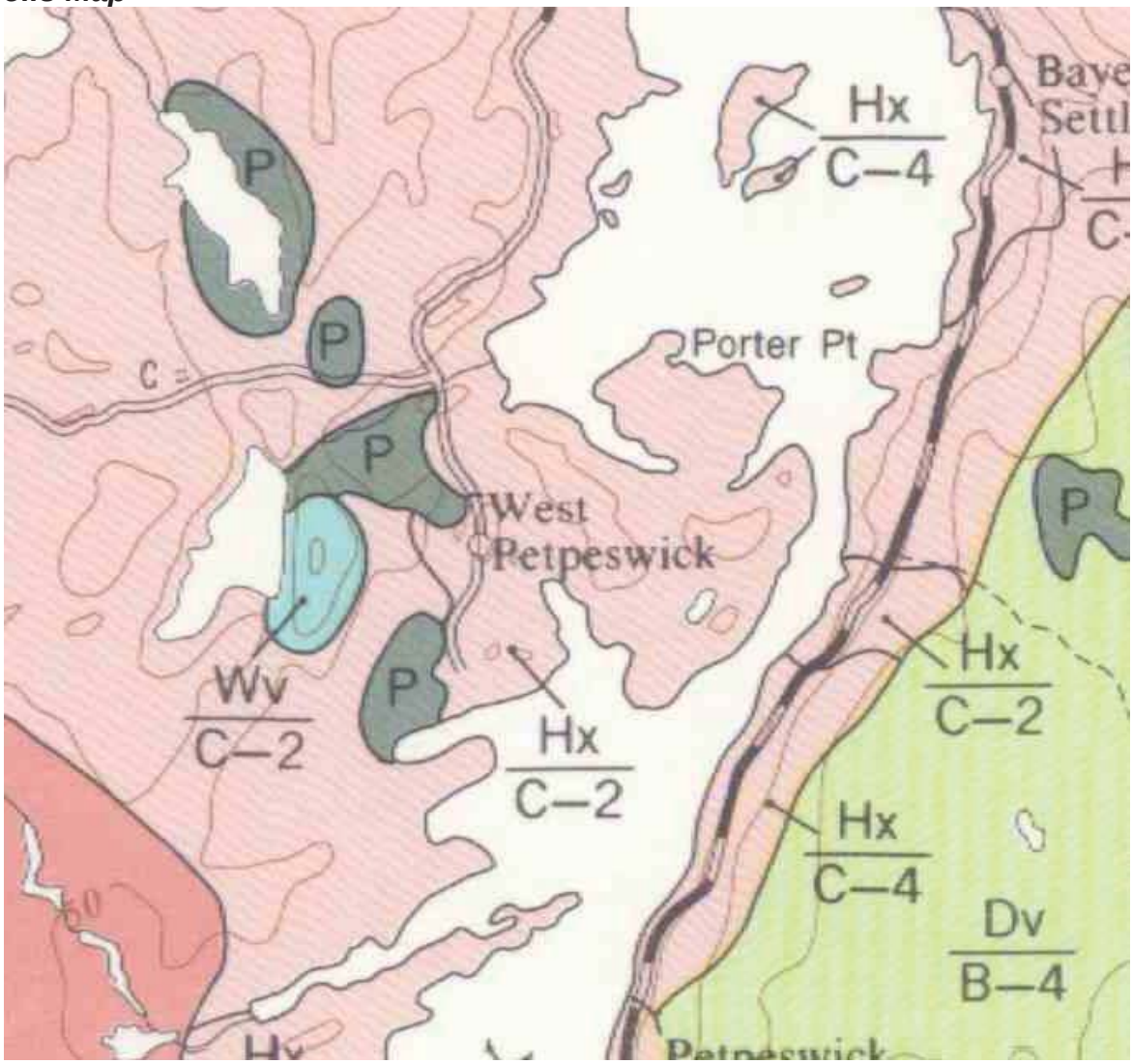
Wetlands Map

Wetlands in Nova Scotia can be identified using the Provincial Landscape Viewer. The following is a map for your main farm property. Topographic maps and aerial images are available using the viewer: https://nsgi.novascotia.ca/plv/.



Aerial Photo
Available online at: https://gis8.nsgc.gov.ns.ca/

Soils Map



LEGEND

SOIL SYMBOL AND COLOUR	SERIES	SURFACE AND SUBSOIL	DRAINAGE	TOPOGRAPHY	STONINESS
Hx	Halifax	brown sandy loam over yellowish sandy loam	good to excessive drainage	gently undulating to gently rolling	moderately stony

County Soils Maps available online at: http://sis.agr.gc.ca/cansis/publications/surveys/ns/index.html