

# Required Agricultural Practices Quiz

*Created by the Orleans County Natural Resources Conservation District in partnership with  
the VT Agency of Agriculture, Food and Markets and University of Vermont Extension.  
Funded by the VT Clean Water Fund.*

Thanks to our advisory farmers for working with us to develop the quiz.

# Introduction to Required Agricultural Practices (RAP) Quiz

## **Who is the RAP Quiz for?**

The RAP Quiz is a convenient, engaging tool geared towards Vermont livestock farmers and service providers.

## **What is the objective?**

To give you information about the relevant agricultural standards that will control and reduce agricultural non-point source pollution from field and farm production areas. This tool doesn't provide an exhaustive explanation of the RAPs. Rather, it reviews topics for farm operators.

# Introduction to Required Agricultural Practices (RAP) Quiz

## What topics will be discussed?

- Classification of farm sizes
- Farmstead management
- Field management
- Nutrient and manure management
- Additional content for Small Farm Operators on certification, nutrient management planning, inspections and variances
- Additional content for Medium/Large Farm Operators on compliance and incident reporting, nutrient management planning and variances

## Why are you taking this quiz?

This course is approved by the Agency of Agriculture for 2 hours of required water quality education for farmers. At the end, you will be able to print a certificate of completion and have the option to send it directly to the Agency of Agriculture for credit.

All large, medium and certified small farm operations need 4 hours of training every five years. (Don't know the size of your operation? We'll help you on the next page)

# Introduction to Required Agricultural Practices (RAP) Quiz

The Required Agricultural Practices defined farm size categories for Vermont, listed below.

On the next page, you will be asked to choose the size of your farm to direct you to information about the RAPs specific to your size operation.



Non-RAP Operations



Small Farm Operations



Certified Small Farm Operations



Medium Farm Operations



Large Farm Operations

# Module 1 – Vermont Agricultural & VT Clean Water Act

Topics Covered in this Module:

- Vermont's Agricultural Heritage & its importance in our economy
- Water quality and agriculture in Vermont – why the Required Agricultural Practices (RAPs)

# Module 1

## Vermont's Agricultural Heritage

Vermont has a rich agricultural heritage. After the native Abenaki tribes, European settlers began cultivating the land in the 1700s. In 1910, Vermont was home to 32,709 farms covering about 75 percent (4.7 million acres) of the state's land base.

Today, farmers manage about 20% (1.25 million acres) of the state's land base, with dairy, maple, apple, diversified vegetable, crop and non livestock operations all contributing to the state's agricultural economy and pastoral landscape.

Fun Fact: Dairy is valued by all Vermonters. A 2014 poll showed that more than 90% of Vermonters believe that dairy farms are important to the state and add beauty to Vermont.

# Module 1

## Vermont's Agricultural Community

This historical land use is a characteristic of Vermont and the working land is especially valued, but significant land use changes have led to poor soil and water quality, stream channel modification as well as loss of floodplain function and riparian corridor habitat. These changes have caused more sediment and nutrient inputs to Vermont's waterways over time. As humans have changed the landscape and our land use has affected our environment, Vermont state government has created environmental regulations to help protect the land and water.

One of Vermont's legislative efforts for environmental protection is Act 64, passed in 2016. Dubbed the Vermont Clean Water act, this legislation created regulations encompassing all sectors from road storm water management to forest lands and agriculture to improve water quality in Vermont.

Fun Fact: There are 7,100 miles of rivers and streams and 812 lakes and ponds covering at least five acres in the State of Vermont.

# Module 1

## Water Quality Problems in Vermont

### Nutrient and Sediment Runoff

Phosphorus is an essential nutrient for plant growth. It becomes a water quality problem when sediment runoff is transported into waterways. Because phosphorus clings to sediment and can be dissolved, when sediment laden runoff is transported into lakes it stimulates excessive growth of cyanobacteria (also called blue-green algae).

#### Related effects of phosphorus in surface water:

- It can turn the water green with cyanobacteria and can be toxic to pets and people.
- It can decrease the economic, ecological and recreational value of our lakes and ponds.

Not so Fun Fact: Harmful cyanobacteria blooms are becoming an increasingly common occurrence across the U.S. and around the world, with 21 states reporting blooms at 147 locations between May and September 2013.

**To address the impacts of agriculture on water quality in Vermont, Act 64 mandated an update of the Accepted Agricultural Practices, established in 1995, to the Required Agricultural Practices (RAPs) now in effect.**



# The Required Agricultural Practices Module 1

**The Required Agricultural Practices (RAPs establish practices and management strategies to which all farms must be managed to reduce the impact of agricultural activities to water quality.**

Articles in Act 64 that the VT Agency of Agriculture addressed with the RAPs :

- ✓ Define a small farm;
- ✓ Establish requirements for the Small Farm Certification Program;
- ✓ Establish standards for livestock exclusion from surface water;
- ✓ Make soil health recommendations and establish standards for soil conservation such as cover crop;
- ✓ Establish requirements for perennially vegetated buffer zones between annual croplands and the top of the bank of an adjoining surface water;
- ✓ Establish nutrient management planning standards for small farms; and
- ✓ Ensure that cropland on the farm be cultivated in a manner that results in an average soil loss of less than or equal to the soil loss tolerance for the prevalent soil, known as 1T.

Fun Fact: Of all total state waters, 195 waters or segments of waters are list impaired in 2015, 115 waters or segments of waters are stressed, and at least 56 waters in the State are altered due to aquatic nuisance species.

# The Required Agricultural Practices

## Understanding Point vs. Non-point Source Pollution

**Non-point source pollution** is pollution that can reach surface water or groundwater indirectly or in a diffuse manner. This includes surface runoff over a large land area.

**Point source pollution** originates from a direct source, something you “can point to” such as a pipe or culvert. Under the RAPs, farms are not allowed to discharge agricultural wastes to surface waters through a discrete conveyance such as a pipe, ditch, or conduit. For example, pipes containing milk-house waste cannot outlet into a ditch or stream.

The **RAPs focus mainly on non-point source pollution**, addressing field and production area runoff. Farms are required to reduce runoff to prevent agricultural wastes from draining to surface or groundwater. For example, this may include diverting clean rainwater from a barnyard area to reduce runoff. The goal is to minimize runoff originating from the areas of concentrated nutrients.



*Non-point source  
pollution - field runoff  
carrying sediment*



*Point source pollution  
- culvert pipe*

# Module 1 – QUIZ

1. Which nutrient source is considered non-point source pollution?

a.



b.



2. The RAPs require:

- a. Liquid manure storage
- b. Management strategies for agricultural waste to prevent surface & groundwater pollution
- c. New barnyards

3. True or False: Pipes, ditches or conduits that carry agricultural waste cannot lead to surface water (rivers, lakes etc.).

- a. True
- b. False

4. The RAPs must be followed by:

- a. Only Large Farm Operations
- b. Most farms
- c. Any farm that meets the definition of a Small Farm Operation or greater

# Module 2 – Farm, Pasture and Field Management

In Module 2, we will outline farm production areas, field and pasture management and associated agricultural non-point source pollution.

Topics covered in this module:

- Farmstead management
- Field management
- Nutrient and manure management

## Think like a raindrop – where does the water on your farm go?

The best way to address and prevent runoff issues is to think about where the runoff goes on your farm after a good rainstorm. It's all about keeping clean water clean and keeping dirty water stored and/or treated. When you consider conservation on your farm, barnyard, fields and pastures, take into account where rain water concentrates, flows and where that flow might enter the local stream.

Not so Fun Fact : According to the National Climate Assessment report "The Northeast has experienced a greater recent increase in extreme precipitation than any other region in the United States; between 1958 and 2010, the Northeast saw more than a 70% increase in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events)."



This heavy use area in a pasture has severely eroded the banks of a small stream, and therefore it does not meet the RAPs.



# Farms Facility Runoff

*Farmsteads hold a lot of nutrients that can become pollutants if they make it to surface water.*

## **Think about water flow at your facility:**

- Is your roof water collected or diverted from dirty areas?
- Is your silage leachate treated? Leachate can contain extremely high levels of nutrients.
- Does any upslope water come onto the farmstead?
- Is your farm located on sandy or gravelly soils or close to the water table or bedrock?
- Is the water from your production area stored or treated?

**Monitor the areas on the farm that have the highest potential to affect water quality, such the examples shown here.**



If this drains to a surface water it would be out of compliance but if it drains into a grass field then it would be in compliance with the RAPs.



Silage leachate, like that seeping here, contains high levels of nitrogen and phosphorus. The RAPs state this leachate cannot discharge to surface water or groundwater

# Managing Manure Storage Systems

With thousands of farms across Vermont that are covered under the RAPs, there are also many waste management systems to fit each farm operation. It is important to note that **the RAPs do not require liquid pits for manure storage**. They do, however, require manure storage to be managed properly to prevent impacts to water quality.

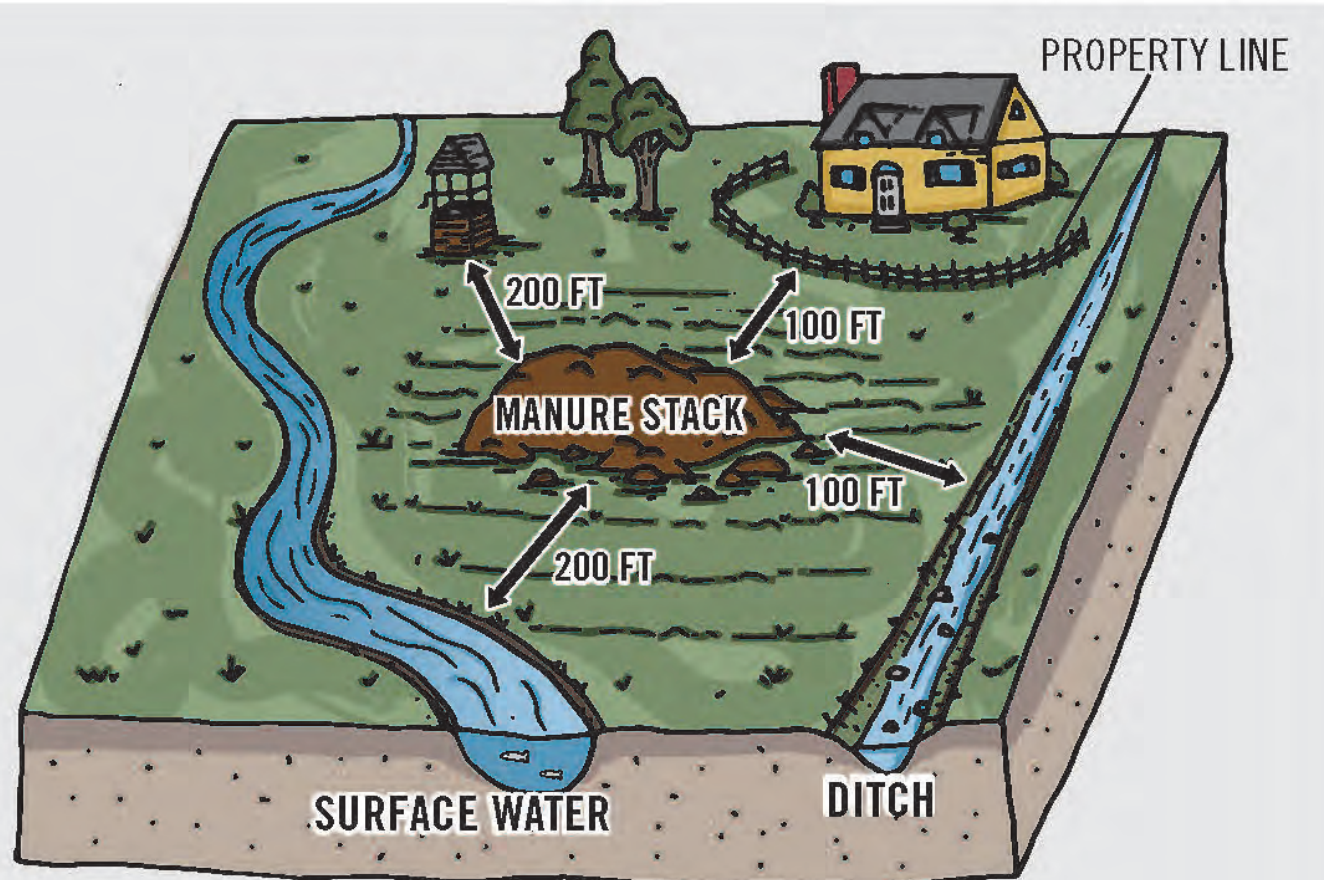
## Guidelines in the RAPs:

- All components of waste management systems must be managed and maintained to prevent leaks or overflows to surface water or across property boundaries at all times.
- Maintain the integrity of the structure and provide adequate volume of storage.
- Field stacked manure shall consist of a stackable material that is no less than 20% solids and be able to stack four feet high.

Fun Fact: Did you know that a typical Holstein milking cow produces 115 pounds (14 gallons) of manure a day? That adds up to 21 tons (5,110 gallons) per year!

# Manure Stack Siting

Placing manure stack sites according to these setbacks helps ensure that nutrients will not make it to a nearby waterway.



**Manure Stacking Setbacks**



# Farm Waste Storage Infrastructure

New waste storage facilities or modifications must be designed according to the USDA Natural Resources Conservation Service (NRCS) standards or an equivalent standard certified by a professional engineer licensed in the State of Vermont.

Waste storage facilities are farm assets and according the RAPs should be properly operated and maintained:

- ✓ Never let the Manure reach 6" from the top for concrete pits, 12" from the top for earthen pits.
- ✓ Do not allow spillage and runoff from loading areas to flow into streams, road ditches or other water conveyance channel.
- ✓ Remove any woody plants from the embankment.
- ✓ Remove solid manure and sand bedding when the buildup exceeds 18" for earthen pits and 6" for concrete lined pits

Fun Facts: In Orleans County there were 15 manure pits installed from 2012 - 2015.

# New Waste Storage Facilities

Install new waste storage facilities within the setbacks outlined in the diagram to comply with the RAPs.

You can also contact Vermont Agency of Agriculture for statewide zoning information.



# Animal Mortalities

There are a three common strategies for easy management, water quality, and neighbor relations on most farms. According to the RAPs, mortalities must be managed within 48 hours.

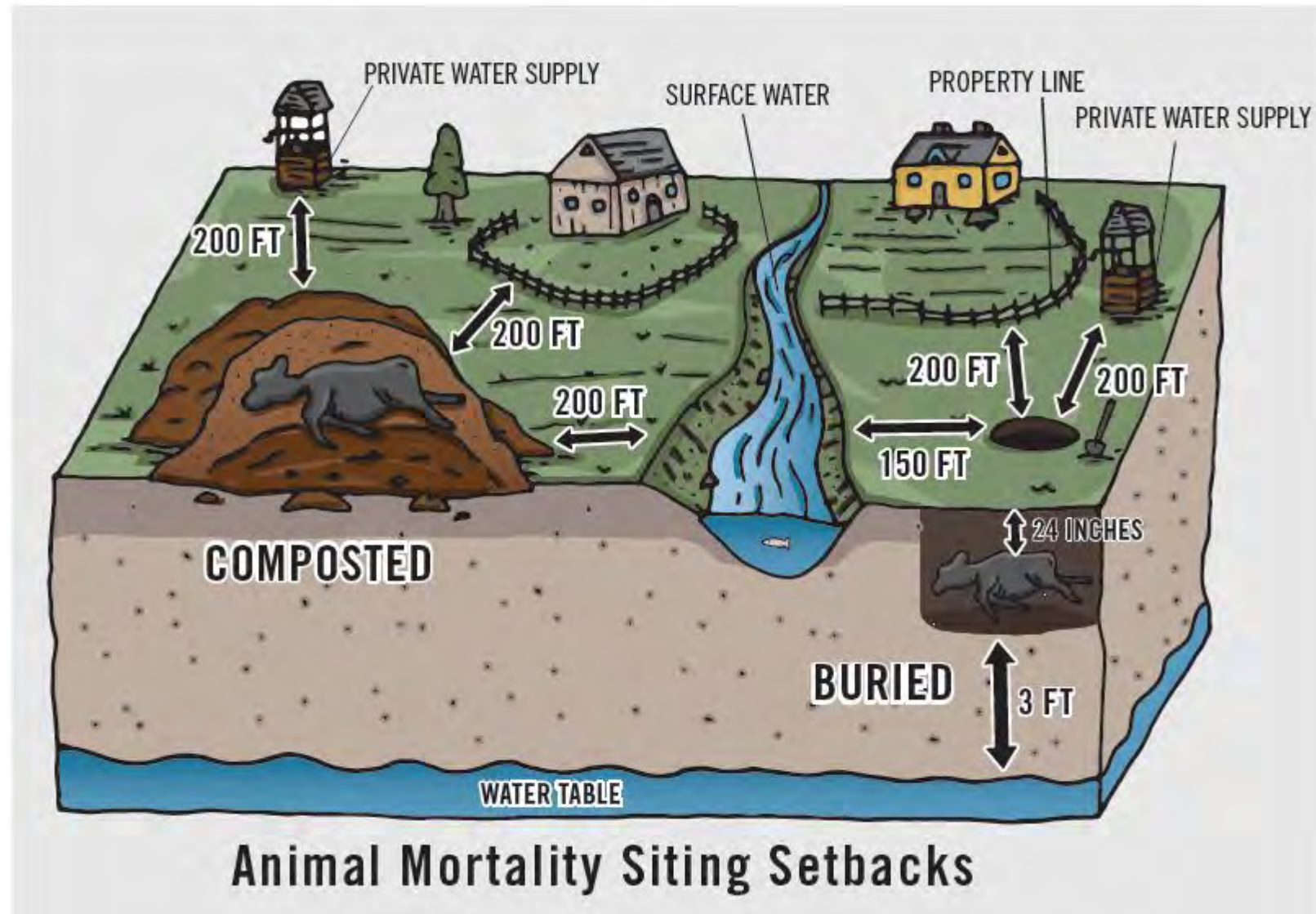
- Burying
- Composting
- Back 40 disposal\*

*\*"Back 40 disposal" means leaving mortalities to decompose away from the farmstead and fields. This method is only suitable for small farms with few mortalities to manage.*

# Animal Mortality Siting Setbacks

**Composting and burying mortalities complies with the RAPs. The diagram shows site location requirements where they will not impact water quality.**

*\*Back 40 mortalities must also be disposed where they will not impact surface or groundwater quality to comply with the RAPs.*





# Livestock Exclusion from Surface Water

One major myth about the RAPs is that you must fence livestock out of all surface water. This is incorrect, because some pastures meet the standards without exclusion. However, there are circumstances where you need to fence livestock out of surface water.

## **You must fence your livestock out of surface water if:**

- There is inadequate vegetation on the streambank
- The banks are unstable or eroded with bare soil showing
- The area is in or a near production area where animals loiter, like barnyards or holding areas, main laneways to pasture or round bale feeding areas. These areas should also be managed to prevent runoff from reaching surface water

Otherwise, livestock access to surface water is allowed.



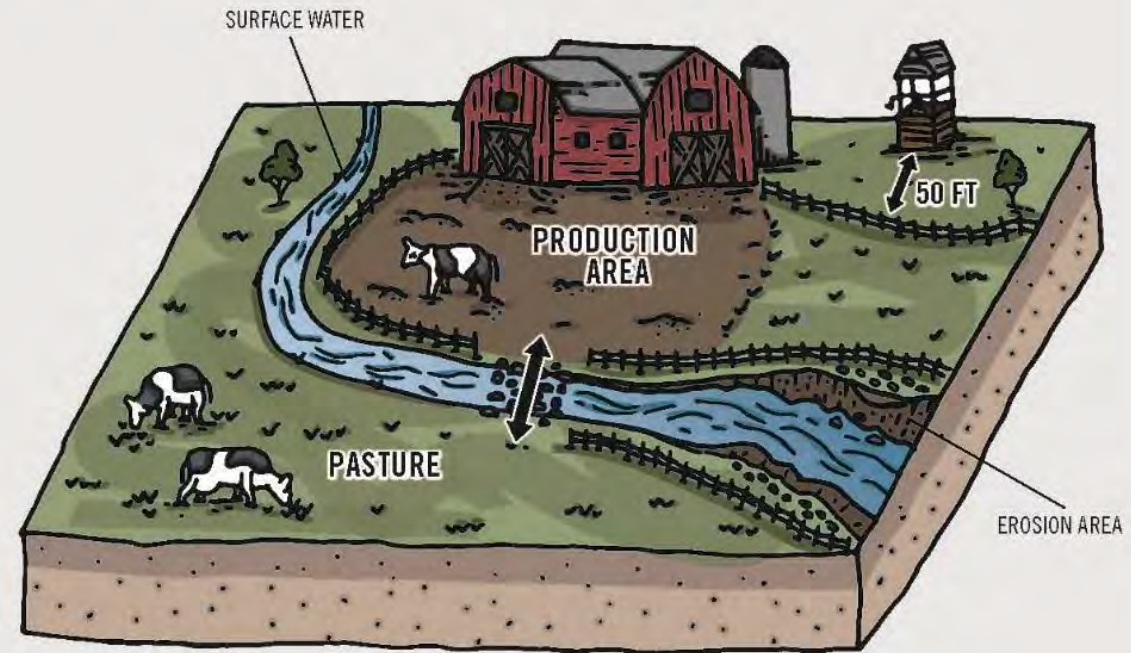
The animals in this pasture need to be fenced out of the stream because there is inadequate vegetation due to heavy use.

Fun Fact: The amount of water a cow requires increases by one quart for every degree over 50 degrees F.

# Livestock Exclusion

RAPS allow for animals to have access to surface waters if they are not in production areas and if there is no evidence of excessive impacts to soil and water quality.

## LIVESTOCK EXCLUSION



LIVESTOCK SHALL BE EXCLUDED FROM SURFACE WATERS IN PRODUCTION AREAS (BARNYARD AND HEAVY USE AREAS) EXCEPT AT LIVESTOCK CROSSINGS OR WATERING AREAS

# Module 2 – Farmstead Management QUIZ

1. True or False: The RAPs require ALL streams, ditches, and surface waters to have livestock fenced out.
  - a. True
  - b. False
2. Livestock will need to be fenced out of the stream in one of these areas. Which one?

A.



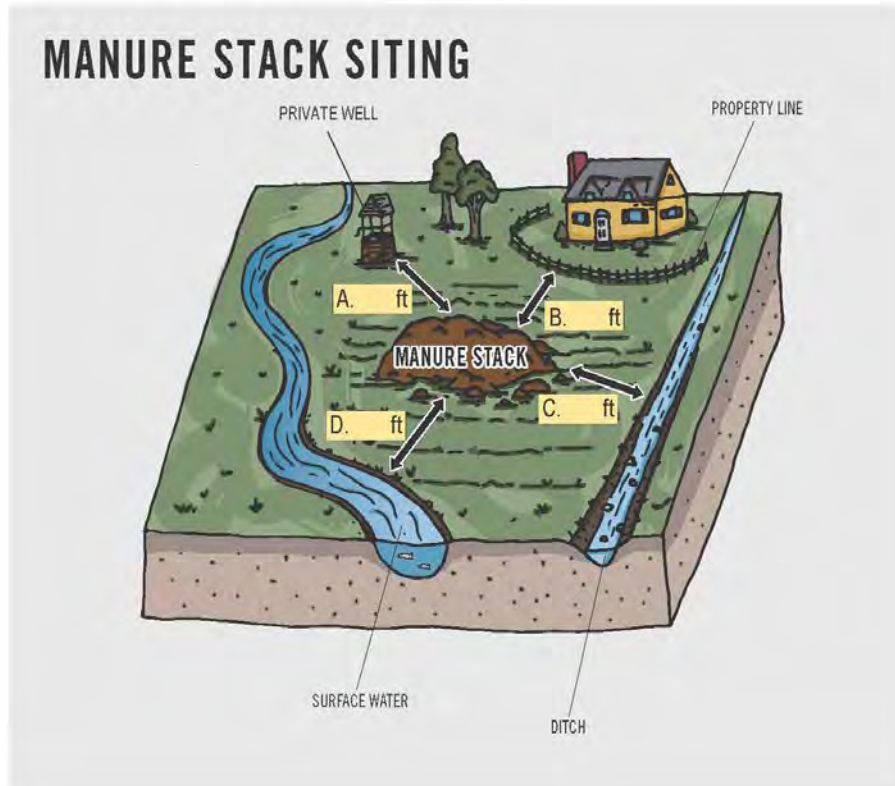
B.



3. Is it required for farms to have a liquid manure storage system?
  - a. Yes
  - b. No
4. Under the RAPs, can you field stack manure?
  - a. No
  - b. Yes, manure can be stacked within setbacks and if it meets stack requirements

# Module 2 – Farmstead Management QUIZ

5. How far does a manure stack need to be from surface water?
- a. 100 ft
  - b. 200 ft



6. Why do the RAPs require manure to be managed properly within setbacks from surface water?
- a. To prevent manure from reaching surface water
  - b. To keep the smell down
  - c. To make management harder
7. What is the goal of mortality disposal location setbacks from rivers and wells?
- a. To attract animals
  - b. To keep mortalities out of sight from neighbors
  - c. To ensure mortalities will not negatively impact water quality



# Field Management

## Keep Your Valuable Soil by Minimizing Soil Erosion!

Agricultural soils are a critical resource for Vermont's prosperity. Farmers are striving to manage croplands to prevent gully erosion and eliminate associated sediment discharges.

**The RAPs state that cropland shall be cultivated in a manner that retains soil in the field and promotes soil health** while minimizing visible erosion into buffer strips, across property boundaries, or that creates gully erosion. The RAPs recommend using management strategies that may include the establishment of grassed waterways, filter strips etc.

**Maintaining a protective cover of vegetation on the ground that slows down and diverts water from erodible areas is the best way to keep soil healthy and functioning while preventing runoff and erosion.**

Fun Fact: In 2016, 1,990 acres of annual cropland was planted with cover crops in Orleans county alone.

# Field Management for Annual Crops

Annual crop fields, such as corn, are the most vulnerable to erosion as they are often bare during the winter months. During this time the soil is not held by roots, but there are many strategies being used to help keep soil covered and prevent soil loss through erosion.

**Efforts to reduce runoff also helps improve the soil's ability to function** through building organic matter, improving soil aggregate structure, increasing soil biological activity, and reducing compaction. These soil enhancements will be essential to improving your overall soil health including efficient farm nutrient cycling.

Fun Fact: Cover crops increase water infiltration and reduce runoff that can carry away soil.

# Types of Erosion

There are three main types of erosion caused by water generally in the form of precipitation. If you see signs of any type of erosion on your field, it shows that soil loss is occurring.

**Sheet and Rill erosion** –Erosion that is generally spread out over the field. Rain moves soil downhill in sheets or in many small channels.

**Ephemeral gully erosion** – This erosion is when you have a channel that is 18 inches or deeper. You cannot drive equipment through these channels and they have well defined sidewalls with unstable banks. These indicate there is a large amount of runoff coming off of your field quickly. All areas of gully erosion should be addressed with appropriate conservation practices.

**Gully erosion** – Erosion is when you have 18 inch or deeper channel that you cannot drive equipment through and have well defined sidewalls with unstable banks. These indicate there is a large amount of runoff coming off of your field quickly. All areas of gully erosion should be addressed with appropriate conservation practices.

Not so Fun Fact: Ephemeral gullies like the one in this photo, that have re-formed for a few years, can strip the soil from an area 100 feet wide around the gully.

# Minimizing Erosion on Cropland

When planning for field management to meet the RAPs keep these three principles in mind to minimize erosion:

- 1) Keep soils covered
- 2) Minimize soil disturbance
- 3) Improve your soil organic matter

Following these three principles also increases the soil's ability to function by:

- ✓ Increasing infiltration rates
- ✓ Increasing water holding capacity
- ✓ Decreasing erosion
- ✓ Increasing the soil's ability to hold nutrients

Fun Fact: a comparison study in Vermont found that there was no significant difference between yields in no-till and conventional till corn fields. This demonstrates that a farmer can grow no-till without yield losses and be successful with good management practices.

# Field Management Strategies for Water Quality

- **Grassed waterways** are natural or constructed channels established with suitable vegetation for safe water disposal. Grass waterways are often installed in areas where ephemeral gully form.
- **Contour cropping and strip cropping** is preparing the soil, planting and cultivating crops around a hill rather than up and down the hill. Contouring reduces sheet and rill erosion on sloping cropland.
- **Cover crops** limit disturbance of the soil surface. Cover crops are planted after commodity crops are harvested.
- **Conservation tillage** increases plant residue on the soil surface. Crops are planted and grown in narrow slots or tilled strips established in the untilled seedbed of the previous crop.
- **Conservation crop rotation** is growing a planned sequence of various crops on the same piece of land for a variety of conservation purposes.

Fun Facts: Farming sloping cropland on the contour can reduce soil loss by as much as 50 percent.

# Module 2 – Field Management Quiz

1. True or False: Agricultural soils are an asset, striving to improve cropland soil health and eliminate associated runoff benefits your land base.

- a. True
- b. False

2. Fields most vulnerable to erosion are:

- a. Annual crops
- b. Hay fields
- c. Forest
- a.

3. Does the management of the field shown below meet the RAPs? If not, why does it not meet?

- a. No, it does not meet the RAPs because there is gully erosion.
- b. Yes, this field management does meet the RAPs



4. Select all strategies that are beneficial for soil health and erosion prevention.

- a. Cover crop
- b. Gullies in bare soil
- c. Conservation tillage

# Vegetative Buffers

## Ditch and Surface Water Buffers

Buffers filter soil out of cropland runoff, which keeps sediment out of streams and protects water quality.

To protect surface water from eroded sediment, the RAPs require farmers to maintain a vegetative buffer zone of perennial vegetation between croplands and the **top of the bank** of adjoining surface waters (streams etc.) and **ditches**.

### Important definitions in determining buffer width:

Ditch means a constructed channel for the collection of field runoff water or shallow groundwater and its conveyance to an outlet.

Top of Bank means the point along the bank of a surface water or ditch where there is an abrupt change in slope and where the surface water is generally able to overflow the banks and enter the adjacent floodplain.



*This 25 ft vegetated buffer from top of bank catches soil from the runoff from the annual corn field before it drains into the river.*

# Managing Vegetative Buffers

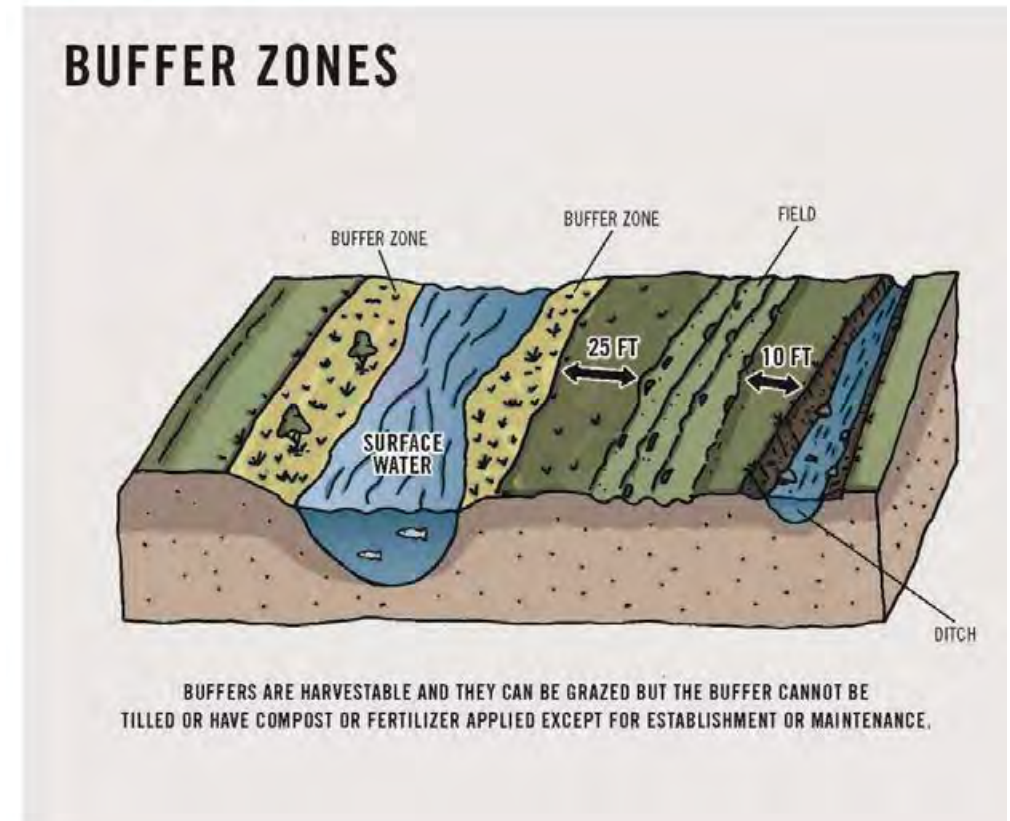
## Ditch and Surface Water Buffers

### How wide should my buffer be?

- **Surface waters** (streams, ponds, lakes etc) need a 25 ft buffer from cropland
- **Surface inlets or inlets of open drains** need a 25 ft buffer from cropland
- **Ditches** need a 10 ft buffer from cropland (however, if it is determined to potentially transport significant waste or nutrients to surface water your ditch may need a wider buffer)

### How do I manage my buffer?

- ✓ Vegetative buffers must have perennial vegetation
- ✓ Buffers can be harvested and spread with fertilizer (for maintenance and establishment, according to nutrient management recommendations)
- ✗ Buffers cannot be tilled (other than for establishment or maintenance)
- ✗ Buffers cannot have manure or agricultural wastes spread on them





# Buffer Width and Field Management

Vegetative buffers are dependent on field management strategies to be effective. Farmers that use strategies to hold soil on the field along with buffers affect the buffer width needed to protect water quality.

**Buffer widths are subject to change**, as wider or narrower buffers may be needed to adequately protect surface water in different management settings.

The RAPs state that exceptions to the required vegetative buffer zone widths may be considered upon request on a site-specific basis, but a buffer zone can never be less than 10 feet in width.

**NOTE: Sometimes channelized streams can look like ditches, but they are surface waters and need a 25 ft buffer.** Characteristics of surface waters include no grass growing on bottom, bank erosion, a sand/gravel/cobble bottom or a “natural” channel shape upstream.

# Managing Floodplain Fields

Floodplains are areas that are susceptible to being inundated by water from any source. This land often has soils classified as “frequently flooded”. Areas with frequently flooded soil experience regular occurring floods under usual weather conditions.

The RAPs state that annual crop land in floodplains are to be managed with specific seasonal practices. These suggested practices aim to minimize erosion.

## **Find out which of your fields have frequently flooded soils!**

After the quiz, be sure to follow the frequently flooded soils link to print maps of where frequently flooded soil is on your land.

# How should I manage my frequently flooded fields?

Fields with frequently flooded soils require additional protection to minimize soil erosion and to protect adjacent waterways from receiving excess nutrients. Here are the main guidelines to follow:

- An extended **winter spreading ban** on frequently flooded land (October 16 – April 14) ensures that manure is not on the field during seasons where flooding is most likely.
- **Manure or other agricultural wastes** applied to frequently flooded annual cropland shall be injected or otherwise incorporated within 48 hours of application. Incorporation within 48 hours is not required if you use no-till management.
- **Cover crops** are required on annual croplands subject to frequent flooding. Cover crops must be broadcast by October 1. Cover crops must be drilled or otherwise incorporated by October 15.
- If annual crops cannot be harvested prior to October 15, then 30% crop residue, growing directly in the soil, must remain in order to limit soil loss.

Fun Fact: Phosphorus that is tilled or injected in is more efficiently taken up by the plant root system than P top dressed on the surface; it is also less susceptible to loss in surface runoff.

# Module 2 – Field Management Quiz

1. Vegetated Buffers must contain:

- a. Pumpkins
- b. Corn
- c. Perennial vegetation

2. Surface water, like the river in this photo, requires perennial vegetative buffer. How wide does the buffer need to be?

- a. 100 ft
- b. 25 ft
- c. 10 ft



3. The ditch in this photo requires a perennial vegetative buffer. What is the minimum buffer width needed?

- a. 10 ft
- b. 50 ft
- c. 25 ft



5. Can you spread manure in these vegetative buffers?

- a. No
- b. Yes

6. Can you harvest these vegetative buffers?

- a. Yes
- b. No

7. True or False: Floodplain Rules are for all annual crops fields susceptible to being flooded and classified under the USDA Soil Class 'Frequently Flooded'.

- a. True
- b. False

8. Which of these rules for annual cropland with frequently flooded soils is Wrong?

- c. Extended winter manure spreading ban- October 16 to April 14.
- d. Cover crops are required by Oct 1 for broadcast and Oct. 15 for drilled or otherwise incorporated.
- e. Manure applied must be injected or incorporated within 48 hours unless you have no-till management.
- f. Fields must be converted to hay.

# Nutrient Management Planning

## Which farms need a Nutrient Management Plan (NMP) to meet the RAPs?

All Vermont farm operations must have soil and manure tests to determine nutrient application rates.

The RAPs state that all Certified Small Farm Operations and all permitted Medium and Large Farm Operations need a field-by-field nutrient management plan consistent with the federal USDA NRCS Nutrient Management Practice Code 590.

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD  
**NUTRIENT MANAGEMENT**  
(Ac.) CODE 590

### DEFINITION

Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.

### PURPOSE

To budget, supply, and conserve nutrients for plant production.  
To minimize agricultural non-point source pollution of surface and groundwater resources.  
To properly utilize manure or organic by- products as a plant nutrient source.  
To protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen), and the formation of atmospheric particulates.  
To maintain or improve the physical, chemical, and biological condition of soil.

# Nutrient Management Planning

## **A nutrient management plan is a useful farm plan.**

By using nutrients more efficiently based on plant production, environmental conditions and utilization of agronomic conservation practices, farmers can optimize yield goals, minimize inputs and reduce risk of non-point source pollution.

## **A nutrient management plan can help you:**

- **Improve** farm economics
- **Gain** an understanding of farm environmental features and considerations
- **Inform** your neighbors
- **Have better public relations**, because with more knowledge, farmers like you will have more the leverage in your community

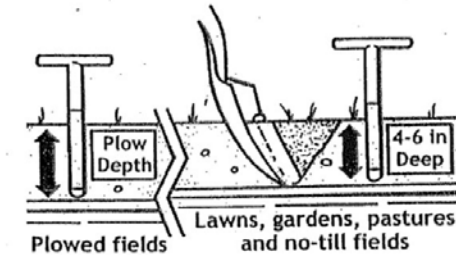
# Soil Sampling for Nutrient Management

**The reliability of a soil test to determine the average current nutrient status of a field is only as good as the sample you take.** Taking good representative soil samples gives you information on what each field needs. This will help guide you in determining manure and fertilizer applications, maintaining soil health, and set yield goals.

All fields where manure or fertilizer is spread should be soil sampled at least once in every five years and sent to a lab that used Modified Morgan's solution.

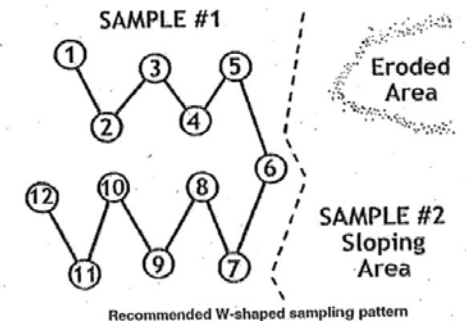
Fun Fact: 33% of annual cropland on Vermont dairy farms had high to excessive levels of phosphorus. Only 7% of Vermont's perennial cropland had high to excessive phosphorus. (According to acreage sampled by VT Conservation Districts between 2014 – 2016)

## HOW TO TAKE A SOIL SAMPLE



Recommended sample intensity for "uniform" fields.		
Field Characteristics	Field Size (acres)	Suggested sample number*
Fields tested more than 4 yrs ago and fields tested in the responsive range	All fields	1 sample/5 acres
Non-responsive fields tested within the past 4 yrs	5-10	2
	11-25	3
	26-40	4
	41-60	5
	61-80	6
	81-100	7

\*10 cores/sample minimum.



1. Discard any plant material.
2. Be sure to collect and mix all cores in a clean plastic bucket.
3. Completely fill plastic bag with soil sample and mark field # on bag.

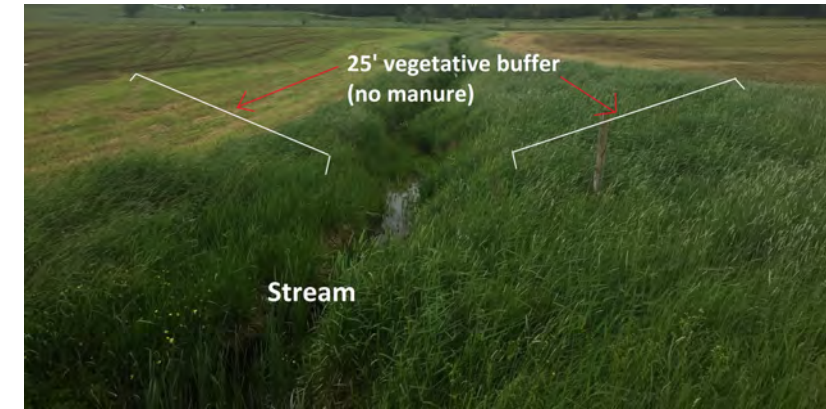
# Spreading Manure and Nutrients

## Spreading Manure

Application rates must be based on cropping, current soil test results, realistic yield goals and must not exceed UVM guidelines or industry practice recognized by the university.

### Where NOT to spread to follow the RAPs

- Within permanent vegetated buffers. However, when establishing or maintaining, fertilizer or compost is allowed consistent with nutrient management plan.
- Between the dates of Vermont winter spread ban: December 15 – April 1.
- When field conditions could let nutrients or manure run off: frozen, snow covered or saturated ground.
- Where manure could leach to groundwater: on top of bedrock, within 100 feet of wells.
- Setbacks from down-gradient surface waters, surface inlets, wells, sinkholes, and springs or other sensitive areas



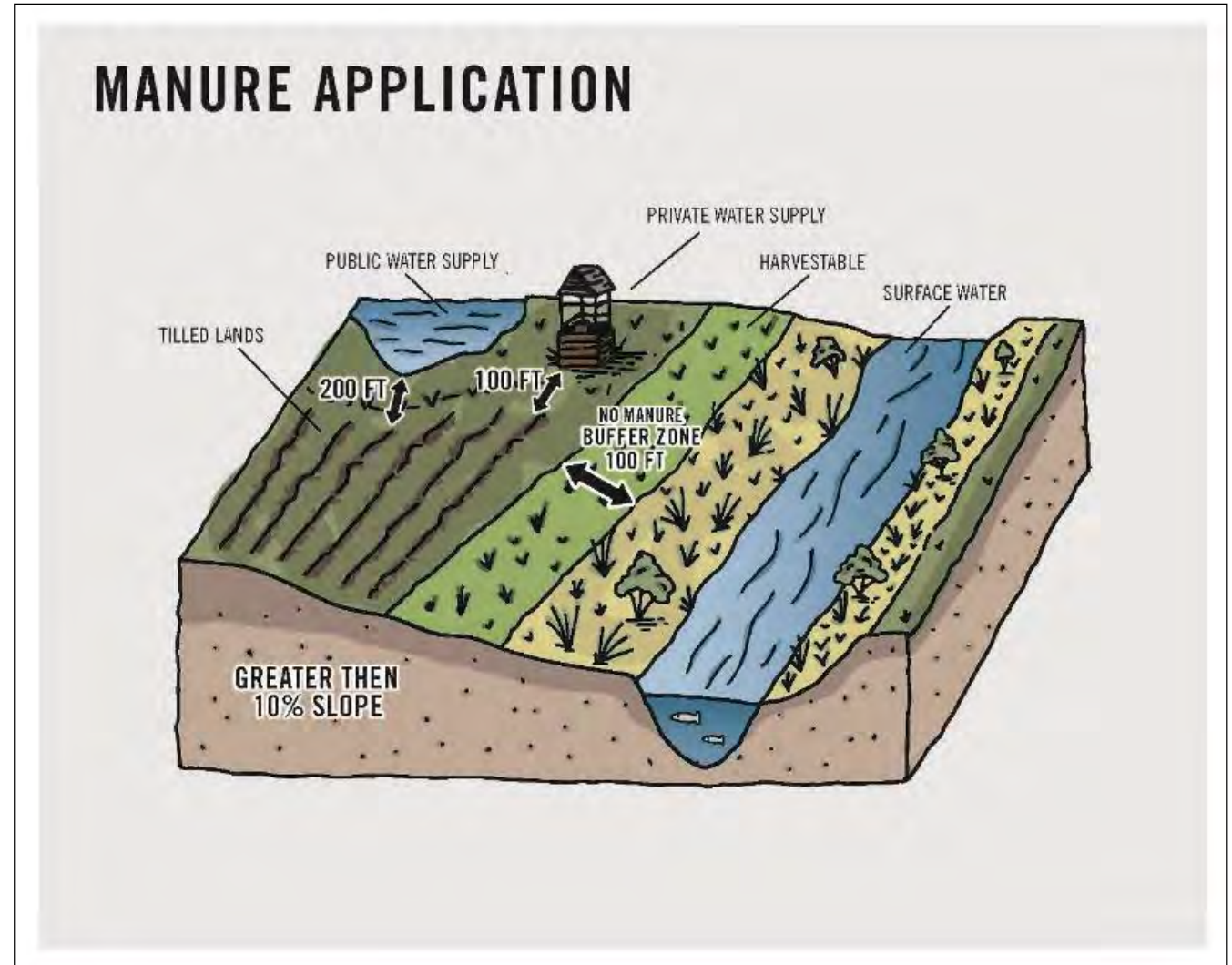
Fun Facts: Recommendations for Phosphorus rates listed on soil test results forms are based on a combination of the available P soil test and reactive Al.

Reactive Al is an indicator of a soil's ability to fix, or tie up, added phosphorus. Thus, low P-testing soils with high aluminum levels require greater amounts of added P to provide an adequate P supply to the crop and to raise soil test P.



# Manure Application

Manure application guidelines outlined in the RAPs also include staying back from important features such as public water supplies, wells, and on steep slopes.



# Module 2 – Nutrient Management QUIZ

1. True or False: You can potentially save money by developing and implementing a Nutrient Management Plan.
  - a. True
  - b. False
2. Who is required to have an Nutrient Management Plan that meets federal standards?
  - a. Everyone with livestock
  - b. Only large farms
  - c. Certified Small Farm, Medium Farm and Large Farm Operations
3. Select the conditions where you CANNOT spread manure:
  - a. Between December 15 and April 1
  - b. When the ground is frozen or snow covered
  - c. On bedrock
  - d. Less than 100 feet from a private water supply (see photo)
  - e. When it is pouring rain
4. Why is manure spreading restricted in these conditions?
  - a. To make life difficult
  - b. Because all of these conditions are very likely to allow manure to run off the field

## Additional Information for **Certified Small Farm Operations (CSFOs)**

Welcome to Module 3!

You are one of the many Certified Small Farm Operations (CSFO) in Vermont. In this Module, we will discuss how the RAPs apply to your operation. Did you know that in 2016, over 80% of all dairy farm operations in Vermont had less than 200 cows?

These topics will be covered in this module:

- Certification
- Water Quality Training
- Inspections
- Nutrient Management Planning
- Variances

# Certified Small Farm Operations (CSFOs)

## As a part of complying with the RAPs, all CSFO operators need to:

- Complete the 1-page **CSFO certification form annually** and send to the Agency of Agriculture by July 1, 2017. The certification form is just one step in compliance.
- Develop and implement a written NRCS 590 **Nutrient Management Plan**
- Obtain 4 hours of approved **water quality training** every 5 years (This quiz gives you 2 hours of training. Look for field workshops around the state for more opportunities)
- Be **inspected** by the Agency of Agriculture at least once every 7 years
- Comply with the standards set forth in the **Required Agricultural Practices (RAPs)**
- **Install** necessary pollution prevention measures on your farm beyond required RAPs

# Nutrient Management Plan Overview

## **590 Nutrient Management Planning**

A Nutrient Management Plan (NMP) is a working document that is useful to farmers.

### Standards included in your NMP:

- Phosphorus and Nitrate Leaching risk assessments
  - Soil and Manure Laboratory Analyses
- Nutrient application rates, timing, placement
  - A complete nutrient budget
  - Land Treatment Plan

# Developing a Nutrient Management Plan

## There are a few ways to develop a Nutrient Management Plan:

1. Take the 6 week, UVM “Digging In” NMP class to develop your own plan with the assistance of local Conservation District staff. Once a week, you learn about agronomics, how to use goCrop™ software and develop nutrient recommendations for your fields. In the end you would have an understanding of what your plan is, how to use it and how to update it.
2. Hire a Technical Service Provider to develop one for you. You would be responsible for collecting soil and manure samples, and would receive the NMP with all your information.
3. Write your own, if you feel confident in meeting the standards, go for it.

If you don't have a Nutrient Management Plan, grant funding is available to help you create one. See the resources after the quiz or contact your local Conservation District to hear about the opportunities near you.

Fun Fact: Almost 100% of farmers in the Digging In class said they would recommend the class to another farmer (2016 anonymous follow-up survey).

# The Land Treatment Plan

## **The first step is to a nutrient management plan is to create a Land Treatment Plan (LTP).**

The LTP includes a whole farm inventory, which identifies environmental concerns like potential waste runoff areas, conveyances and sensitive areas needing protection.

### **Other things in your LTP:**

- Soils information
- Locations where vegetative buffers for wells, ditches and surface water are needed
- Soil erosion calculations estimating tolerable amount of soil loss for each field from sheet and rill erosion based on field management, soil type and climate
- Phosphorus index telling you the estimated risk of each field for phosphorus runoff
- Estimated amount of stored manure (used to plan manure spreading)
- Maps of all the managed fields to help with management and planning
- Conservation plan that includes suggested management practices for meeting the 590 Nutrient Management standards and addressing any gully erosion



# NMP Nutrient Application Guidelines

## Farmers use their NMP to plan nutrient application

- Planned nutrient application rates for nitrogen, phosphorus, and potassium must **not exceed UVM guidelines**
- **At a minimum, determination of rate** must be based on crop/cropping sequence, soil test results, Nitrogen contributions from manure applications in the past two years, prior crop Nitrogen credits, VT Nitrogen Leaching Index, VT Phosphorus Index and realistic yield goals
- **Realistic yield goals** are based on historical yield data, soil productivity information, and level of management

\*Under the RAPs, all custom applicators are required to be certified and will be asking to see your application rates listed in your Nutrient Management Plan for guidance when spreading your fields.

# Record Keeping

## **Record Keeping is Required for Nutrient Management**

Keep records! Field-by-field records of the following must be kept for at least five years:

- Crop yields
- Date, location (which field) and spreading rate
- Weather and field conditions when spreading
- Weather the day before and after spreading
- Custom applicators will be keeping records, asking to use your NMP and they should provide you with records of their activity.

NOTE: The yield information will be especially important in developing next year's spreading recommendations. You can also use the goCrop™ iPhone app to keep records on the go, inputting them directly into goCrop™.

# Nutrient Management Planning Summary

The basic goals of Nutrient Management Planning are:

- To budget and supply nutrients for plant production.
- To minimize agricultural non-point source pollution of surface and groundwater.
- To properly utilize manure or organic by-products as a plant nutrient source.
- To protect air quality by reducing odors, nitrogen emissions, and the formation of atmospheric particulates.
- To maintain or improve the physical, chemical, and biological condition of soil.

**Following your NMP can boost productivity, save money on fertilizer, and improve water quality by reducing nutrient runoff into nearby surface water.**

Fun Fact: A Vermont study found that farmers in Addison County saved an average of \$101 per acre once they started following their Nutrient Management Plan

# Module 3 – Nutrient Management Planning Quiz

1. I worked through the UVM Digging In class and now have a Nutrient Management Plan. Do I need to do anything to update it?
  - a. Yes! - Update it yearly by adding records of spreading and crop yields, planning nutrient spreading on all fields, and getting a manure sample tested.
  - b. No
2. My Land Treatment Plan includes:
  - a. Maps of where your buffers and spreading setbacks are to use when spreading and harvesting
  - b. A conservation plan of management suggestions to reduce erosion and protect your soil
  - c. Soil fact sheets and soil test information
  - d. All of the above
3. True or False: It's ok for my planned nutrient application rate (for nitrogen, phosphorus, and potassium) to exceed UVM guidelines or other industry practice recognized by the University.
  - a. True
  - b. False
4. For my NMP record keeping, I need to record crop yields to:
  - a. Plan the amount of manure and nutrients needed on each field for next year's crop
  - b. Tell my neighbors about this year's great crop yields
5. The goals of a NMP are to:
  - a. Maintain or improve the soil.
  - b. Properly utilize manure or other waste as a plant nutrient source.
  - c. Budget, supply, and conserve nutrients for your crops.
  - d. All of the above
6. True or False: Custom applicators contracted to spread manure or agricultural wastes must be certified by the Secretary in order to operate in Vermont. They also will be asking to see your Nutrient Management Plan to guide spreading.
  - a. True
  - b. False

# Variances for Certified Small Farm Operations (CSFOs)

There are fourteen different types of variances built into the RAPs, including:

- manure stack siting,
- the winter manure spreading ban,
- site specific buffers,
- compost and mortality siting locations,
- floodplain field cover cropping and manure spreading,
- and more.

Variances are intended to address unforeseen situations, such as weather, that may impact compliance with the RAPs - despite thoughtful, preventative land management planning. Variances are a secondary step that may be available to farmers after evidence has shown that a variance is necessary as a last option.

If there is a site specific concern, call the Agency of Agriculture at 802-828-2431, to discuss what steps you may need to take to begin the variance process.

# Floodplain Fields Variance

One variance that has been created is for farm soils that are at the greatest risk for flooding and fall under the classification of USDA Soil Survey Flooding Frequency Classes.

**Farms with frequently flooded soils have requirements for cover cropping and also must comply with an extended winter manure spreading ban.**

**To apply for a variance for these requirements, farmers must fill out the Floodplain Planning Tool and submit it to the Agency.**

For more information, please visit their website at the end of the quiz.



## Floodplain Planning Tool

Submit Forms To VAAFM: at [AGR.WaterQuality@vermont.gov](mailto:AGR.WaterQuality@vermont.gov)  
Or Mail: Attn Jenn LaValley, 116 State St. Montpelier, VT 05620

This Floodplain Field Area Planning Tool is the first step in the Agency of Agriculture, Food and Markets variance process for management of frequently flooded soils. If your management practices will not meet the required dates outlined in the RAPs, please complete the following planning tools for each of your fields that contains a frequently flooded field area. The agency will contact you about a variance based on the information provided in this plan.

**Part A Ranking: For all the fields that include a frequently flooded field area, please identify the following risk factors for management considerations.**

1. Field Name	2. Soil Type	3. P Level (PPM)	4. Likelihood to Flood	5. Conservation Practices	6. Tile Drainage	7. Erosion Risk	8. Rank Floodplain Field Risk
Field 3C	Sandy Loam	7 ppm	Whole field every year	buffers, no-till, grassed waterway	yes	high	highest risk (10), lowest risk (1)

First Name:   
 Last Name:   
 Farm Name:   
 Email:   
 Cell Phone:   
 House/Barn Phone:   
 Address:

Circle Farm Type: SFO Small ☐  
 CSFO Certified Small ☐  
 MFO Medium ☐  
 LFO Large ☐  
 Farm Inspector: (If known)

Methods for including Maps: ☐ Check here to release your electronic FSA shapefiles of farm field boundaries to VAAFM for the purpose of variance consideration OR  
 Choose 1 ☐ Print and include your FSA maps; OR  
☐ Print maps of each of your fields from the ANR Atlas.

Signature:   
 Date:

Conflicts with the RAP dates for floodplain fields requires variance processes. If your dates do not meet those in the RAPs, submitting this planning tool will initiate a variance request process with the Agency of Agriculture, Food and Markets.

# Module 3 – Certification & Variances Quiz

1. True or False: Variances are intended to be implemented as an additional tool when even preventative, thoughtful land management cannot fulfill compliance with the RAPs in a certain time span.
  - a. True
  - b. False
2. The Floodplain Planning Tool is a variance for manure spreading restrictions and cover cropping dates which fields?
  - a. Continuous corn fields.
  - b. Fields that are wet most of the year and flood sometimes.
  - c. Fields that are determined to be 'frequently flooded' according to the USDA Soil Survey Flooding Frequency Classes AND are at the greatest risk of flooding.
3. Variances will be available for (in addition to others) which of the following?
  - a. The winter manure spreading ban.
  - b. Site specific buffers.
  - c. Compost and mortality siting locations.
  - d. All of the above
4. True or False: As a Certified Small Farm Organization, to fully complete the Certification Process, I need to submit a Certified Small Farm Organization Annual Certification Form every year, develop a NMP for my farm, get four hours of Agency Approved Water Quality Training every five years, have my farm inspected at least once every seven years, and be in compliance with the Required Agricultural Practices (RAPs).
5. True or False: I need to develop a Nutrient Management Plan (NMP) for my farm that meets federal standards.
  - a. True
  - b. False
6. True or False: I only need to submit a CSFO Certification Form once for the lifespan of my farm.
  - a. True
  - b. False



# Module 3 – RAP Quiz Exit Survey

1. How would you describe your experience taking the RAP Online Quiz?
  - a. Positive
  - b. Negative
  
2. How much did you learn about the RAPs or farm management for water quality from the RAP Online Quiz?
  - a. Nothing
  - b. Very little
  - c. Some knowledge
  - d. Understand fully
  
3. As a result of taking the RAP Online Quiz, do you intend to change or improve your farm management in any way?
  - a. Yes
  - b. No

# Congratulations!

**You have successfully completed the RAP Quiz!**

For more information on Vermont's Required Agricultural Practices or to see all of the photo and video content, please visit the RAP Online Quiz at [www.rapquiz.vacd.org](http://www.rapquiz.vacd.org). See our Resources page for further assistance and information. Completing this course will give you two Water Quality Training Credits.

To receive your water quality credits, send a copy of this certificate on the next page to the Agency of Agriculture, Food and Markets. Fill out your certificate and email to [AGR.WaterQuality@vermont.gov](mailto:AGR.WaterQuality@vermont.gov). Keep the hard copy for your records.



AGENCY OF AGRICULTURE, FOOD & MARKETS

## Certificate of Completion Awarded to:

\_\_\_\_\_  
Name

\_\_\_\_\_  
Date

**For Completing the  
Required Agricultural Practices Quiz and  
Earning Two (2) Water Quality Training Credits**

A stylized, handwritten signature in black ink, appearing to read "LD".

**Laura DiPietro**  
Director, Water Quality Division  
Agency of Agriculture, Food & Markets

