

# 2008 Act 78 Report

## 1) An assessment of the adequacy of agricultural waste storage and land application of manure on farms in Vermont

The ban on the spreading of manure between the dates of December 15 and April 1 was a provision included in the original Accepted Agricultural Practices Regulations (AAPs) put forth in 1995. The aim of the ban is to prevent the application of manure to frozen or snow covered ground, when there is an increased potential for the runoff of manure from the application site. The original AAP regulations allowed for exemptions to the spreading ban to be granted only in emergency situations such as structural failure of the storage structure or lack of storage with impending discharge of manure likely. Under the current AAPs (revised in 2006) exemptions may now be granted for specific management needs. For example, in December 2006, weather conditions remained favorable for spreading past the cutoff date of December 15. In those cases, farmers were allowed to continue spreading in order to maximize their manure storage capacity.

Over the past five years (2003 to 2008) the number of exemptions requested has fluctuated and has usually correlated with the weather conditions experienced in the fall of that year (the fall of 2005 was particularly wet). Wet weather during autumn months creates a double hardship in that the fields are too wet to take spreading equipment out on and the manure storage structure continues to fill up. These structures fill up not only with manure, but with direct addition of rainfall along with runoff from rooftops, barnyards and other impervious surfaces, that is directed to the pit. The result is that the farmer goes into the ban, which lasts for 107 days, without sufficient storage for the manure that will be generated during that period.

### Exemptions Granted by Year

Year	Number of exemptions granted	Number of exemptions denied
2003 - 2004	36	1
2004 - 2005	11	
2005 - 2006	47	2
2006 - 2007	46	
2007 - 2008	23	

In order to grant an exemption, an Agricultural Resource Specialist (ARS) or Agency of Agriculture field agent meets with the farmer to assess his/her needs. Information is collected in order to accurately calculate how much manure will be generated during the remaining days of the ban in order to determine how much manure must be removed from the structure to restore the needed storage capacity. The ARS or field agent also works with the farmer to select the fields that are most appropriate for spreading. Field characteristics evaluated include soil type, slope, and proximity to surface water. If a farm has a nutrient management plan, that is also used in the selection of fields for spreading.

When meeting with the farmer, the ARS or field agent also evaluates other alternatives to spreading. The farmer may be able to stack the manure, if it can be managed as semi-solid manure, or may have a satellite pit that manure can be transferred to. In those cases, the request

for an exemption may be denied. If stacking is the management option selected, the farmer will also be assisted in the selection of sites that are most appropriate for stacking, using criteria similar to those used in the selection of fields for spreading.

Exemptions are not intended to allow the farmer to continue to spread throughout the ban on a daily basis. A farmer is typically approved to spread for 3 to 5 days. Specific restrictions such as significant setback distances to water, property boundaries and ditches, are built in to the exemption approval to protect water quality, and application rates are kept as low as possible given the available acreage. The target application rate for an exemption is 4,000 gallons per acre; not to exceed 6,000 gallons per acre; while agronomic application rates can range from 8,000 to 10,000 gallons per acre. The final exemption approval is designed with as many precautions as possible to protect water quality, while still enabling the farmer to restore the storage capacity needed to properly manage their manure for the duration of the spreading ban.

Outreach is conducted annually to remind farmers of the ban and to encourage them to draw down their storage structures in a timely manner. Articles on the winter spreading ban and how to request an exemption are included in the Agency's publication "Agriview" starting in early fall and targeted contact is made with those individuals that have been granted exemptions in past years.

**2) An assessment of the extent of the financial and technical resources required to implement successfully the state agricultural water quality program, including the number of nutrient management plans required, the number of waste storage facilities that require upgrading, and an estimate of the appropriations necessary to fund state assistance programs**

A) Small Farm Operations (SFOs)

See Question 7.

B) Medium Farm Operations (MFO)

Two additional farms submitted a Notice of Intent to Comply (NOIC) in 2008 bringing the total NOICs received to 157. However, as two Medium Farm Operations (MFOs) went out of business during the year, the total number of MFOs remains at 155.

*I. Projected MFO Needs - Based on Initial Facility Evaluations*

The Agency began conducting Initial Facility Evaluations (IFE) in the fall of 2007 to ensure compliance with the General Permit for Medium Farm Operations (MFO GP) and these continued throughout 2008. Through this process, the Agency has been able to better evaluate improvements needed to successfully implement the MFO portion of the agricultural water quality program.

This year, as in previous years, the Agency estimated the cost of compliance for the 5 major permit requirements/components including containment and/or treatment of:

- Manure Storage;
- Silage Leachate;
- Barnyard Runoff (including clean water diversion); and
- Milkhouse Waste.

And development/update of a:

- Nutrient Management Plan.

Silage leachate was predicted to be a major obstacle in previous Act 78 Reports and has been confirmed as the area of greatest observed permit deficiencies through the IFE process. In addition, deficiencies, lack or improper runoff containment, have been observed in barnyard areas. Using the rate of observed deficiencies in silage leachate containment/treatment, barnyard runoff containment/treatment, and nutrient management plans, projections were made assuming these rates remain consistent through all remaining IFEs.

Using this process, the cost of meeting these three permit conditions is estimated at \$2,726,000 (see below for a summary of these costs). The cost of improving silage leachate systems and barnyard runoff control systems alone is estimated to be approximately \$2,682,000.

The cost of improving manure storage and milkhouse waste systems could not be calculated based on IFE violations because all systems evaluated were found to meet permit requirements.

**Medium Farm Operations  
Initial Facility Evaluation (IFE) Status and Projected Farm Needs**

Number of Medium Farm Oper	155
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Observed Deficiencies**	Area of Concern		NMP
	Silage Leachate	Barnyard Runoff	
<b>Number of MFOs</b>	9	4	1
Percent of MFOs	25%	11%	3%

Projected Needs	Needed Improvement		NMP Incentive Grant
	Silage Leachate Treatment	Barnyard Runoff Treatment	
<b>Number of MFOs</b>	39	17	<b>Number of MFOs</b> 4
Mature Animals/Farm***	350	350	Acre/Farm**** 615
Implementation Cost/Animal	\$88		Development Cost/Acre \$9
Implementation Cost/Farm		\$66,900	Development Cost/Soil Test (per test/20 acres) \$15
Design Cost/Farm	\$7,500	\$3,000	Development Cost/Manure Test (2/farm) \$35
			Update Cost/3-Years \$5,000
<b>Total Cost</b>	\$1,494,000	\$1,188,000	<b>Total Cost</b> \$44,000

**\$2,726,000** Without Manure Storage Estimates

\*157 NOICs (Notice of Intent to Comply) received/2 farms out of business

\*\*As documented during the Initial Facility Evaluation

\*\*\*based on an average-size MFO as documented through NOIC submission (350 mature animals/615 acres)

## II. Projected MFO Needs - Additional Engineering Staff Estimates

In order to assess the financial need for manure storage and milkhouse waste containment/treatment, engineering staff estimates were generated based on requests for technical assistance and on-farm evaluations. These observations were extrapolated to include all MFOs and a total program financial need was estimated. Using this method, manure storage needs are estimated at approximately \$7,500,000 and milkhouse waste containment/treatment need is estimated at approximately \$1,200,000 (see below for a summary of these costs).

In addition, engineering staff estimated the cost of upgrading silage leachate systems and barnyard runoff containment to USDA-NRCS/State engineering standards. As this goes beyond MFO GP requirements (silage leachate and milkhouse waste systems are not required to meet design standards) the total potential need increased from 39 farms to 125 farms for silage leachate systems and from 17 to 20 farms for barnyard runoff containment. As a result, the estimated financial need for these two systems on MFOs increased to \$3,630,000 and \$1,398,000 respectively.

The total MFO program need, less nutrient management plan development and update, is estimated at \$13,648,000 using this method.

### Medium Farm Operations Engineering Staff Estimated Farm Needs

Number of Medium Farm Oper	155
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Projected Needs	Needed Improvement					
	Improved Manure Storage	Silage Leachate Treatment		Barnyard Runoff Treatment	Milkhouse Waste Treatment	
<b>Number of MFOs</b>	75	25	50	50	20	40
Mature Animals/Farm		400	400	200		
Implementation Cost/Animal		\$75	\$50	\$88		
Implementation Cost/Farm	\$90,000				\$66,900	\$25,000
Design Cost/Farm	\$10,000	\$10,000	\$10,000	\$5,000	\$3,000	\$3,000
<b>Total Cost</b>	<b>\$7,500,000</b>		<b>\$3,630,000</b>		<b>\$1,398,000</b>	<b>\$1,120,000</b>

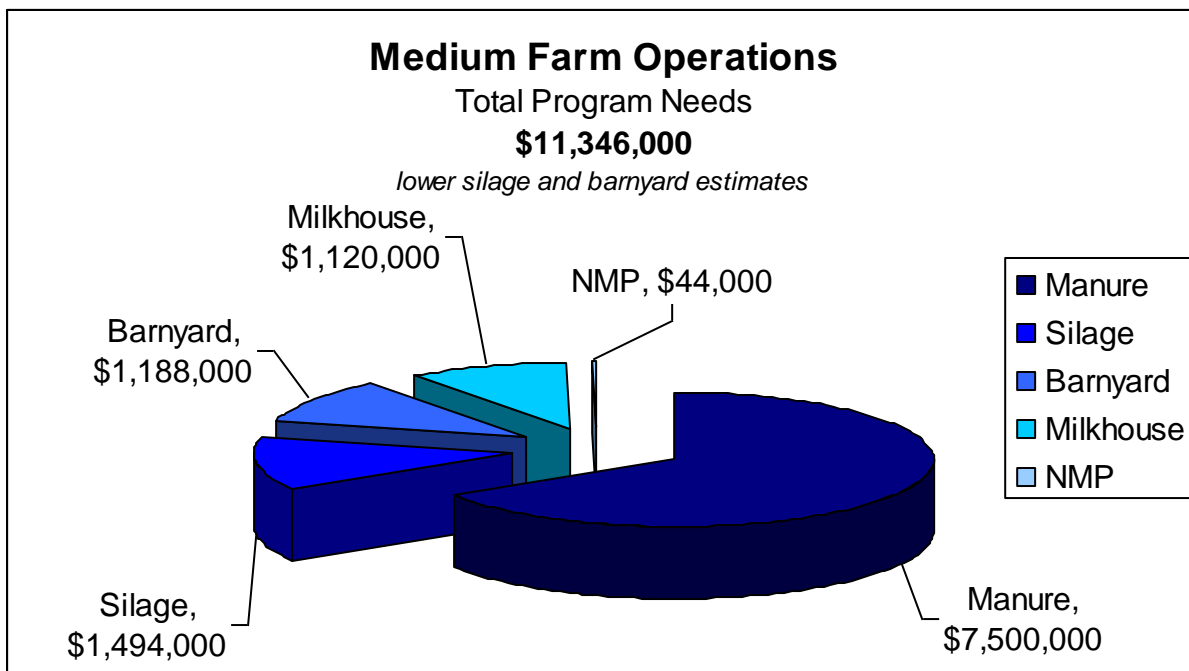
**\$13,648,000**

*Structural Systems Only*

\*157 NOICs (Notice of Intent to Comply) received/2 farms out of business

## III. Projected MFO Needs - Total Estimated

Using these combined approaches, with two overlapping estimates for silage leachate containment/storage and barnyard runoff containment/storage, the total MFO program financial need estimate is \$11,346,000 to \$13,692,000.



With refined data, projected needs have increased since last year. Manure storage improvement costs increased the most as compared to last year's reported estimates. Barnyard runoff and milkhouse waste containment/treatment also increased over last year's estimates as did the projected NMP development/update financial need. Silage leachate containment/treatment costs decreased slightly.

In total, the estimate program need increase \$2,536,000 to \$4,882,000 over last year's projected need of \$8,810,000.

#### C) Large Farm Operations (LFOs)

Through individual assessments, engineering staff estimates a \$650,000 Large Farm Operation financial need. This represents the improvement of 4 manure storages and 4 silage leachate containment/treatment systems.

**Large Farm Operations  
Engineering Staff Estimated Farm Needs**

Projected Needs	Needed Improvement			
	Improved Manure Storage	Sludge	Leachate Treatment	Treatment
Number of LFOs	4	2	1	1
Mature Animals/Farm		2,000	2,000	1,000
Implementation Cost/Animal		\$25	\$32	\$46
Implementation Cost/Farm	\$90,000			
Design Cost/Farm	\$10,000	\$10,000	\$10,000	\$10,000
<b>Total Cost</b>	<b>\$400,000</b>		<b>\$250,000</b>	

**\$650,000**

**3) The status of rulemaking for the medium farm general permit**

The General Permit for Medium Farm Operations (MFO GP) was issued effective February 13, 2007. MFOs had 180 days to submit a Notice of Intent to Comply (NOIC) and to date, 157 NOICs have been received (though 2 farms are no longer in business). The Agency is currently conducting Initial Facility Evaluations (IFE) to verify compliance with the MFO GP.

A new MFO GP is planned for 2012 as the current permit expires February 12th of that year.

**4) The status of any pending or proposed rulemaking for large farms or Accepted Agricultural Practices**

The original Large Farm Operation (LFO) Rules were revised and the current LFO Rules became effective November 28, 2007 following extensive public outreach, public hearings, and approval by the Legislative Committee on Administrative Rules. The goals and outcomes of the LFO Rule revision are detailed in last year's Act 78 report. There is no further rule making planned for the LFO program at this time.

Accepted Agricultural Practices are statewide restrictions designed to reduce non-point source pollution from agricultural operations through implementation of improved farming techniques and land management practices rather than investments in structures and equipment. Accepted Agricultural Practices are intended to reduce, not eliminate, pollutants associated with common agricultural activities. The AAPs have been in place since 1995 and were significantly revised in 2006. AAPs require, among other things, buffers along surface water and around wells, management of production areas to prevent discharges, standards for manure storage, application and management, minimum streambank standards, soil testing and standards for the protection of ground water quality.

AAPs apply to all farm operations, regardless of type or size. The Agency routinely investigates complaints relative to the AAPs and often initiates investigations to address AAP violations. Over 1,000 investigations have been conducted since 1995. During the calendar year of 2008, the Agency has conducted 178 investigations on farms regarding AAP issues. In 23 instances

violations were confirmed, resulting in an 87% compliance rate for those ag operations investigated. These violations resulted in the issuance of 9 administrative penalties, 12 corrective action letters, one cease and desist order, and 2 letters of warning. In addition, the Agency issued 3 final orders and 6 assurances of discontinuance to resolve cases that went to hearing.

The Agency continually compiles suggestions and ideas for future AAP Rule revision.

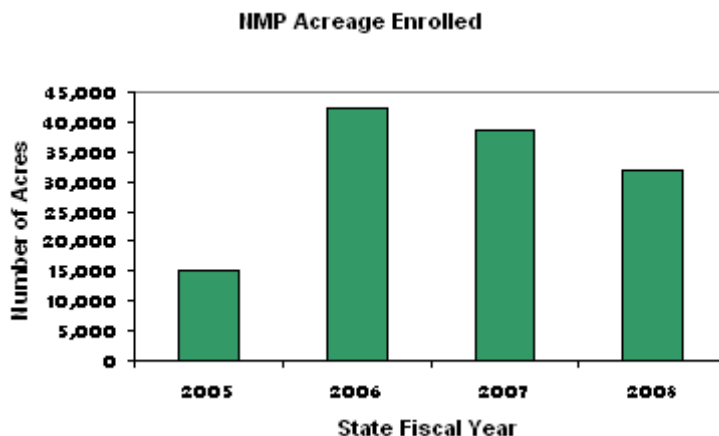
### **5) A summary of the year-to-date funding of the nutrient management planning by the Agency of Agriculture, Food and Markets**

The NMP program was established in 2005 to meet the expected demand for Nutrient Management Plan development created by the new Medium Farm Operations Rules, the amendments to the Accepted Agricultural Practices, and the anticipated revisions to the Large Farm Operations Rules. All of these regulatory programs changes have been finalized, and all now require some form of a nutrient management plan depending on the size of the farm. The Nutrient Management Plan Incentive Grants (NMPIG) program helps cover the upfront costs of hiring a consultant to develop a NMP, and the first three years of updates that are made to the plan.

Since its inception in 2005, the program has been a very popular program for the farming community. It requires a farmer to turn in an application stating the number of acres they intend to develop a NMP for. The Agency then reviews the acreage and approves the eligible acres under a contract that covers the initial development costs and three years of update maintenance costs. Payments are only made after the Agency has reviewed and approved the NMP plan and/or the updates.

From FY 2005 through 2008, 236 contracts have been approved to receive funding for implementing NMPs on more than 128,000 acres statewide. The total state funding allocation for these contracts equals \$2,078,833, which includes the cost of development and then three years of update maintenance costs. So far 136 contracts totaling roughly 78,678 acres have completed the process of developing a nutrient management plan and were reimbursed for the plan development costs. Of these, 49 contracts have completed at least one annual update and received the first reimbursement payment from the Agency. In 2008, 60 contracts were approved for funding pending the approval of the final nutrient management plan. A total of \$579,751 was allocated to these 60 plans, which again includes the development and update payment amounts.

This program has been very successful in enrolling a number of farms, partly because as of April 2008 all medium and large size farms were required to operate under a nutrient management plan.



To meet this demand, the commercial realm has increased the capacity to create NMPs and created more efficient processes to collect and assimilate the data into uniform plans. It is expected that NMPs will arrive at the Agency on a regular basis in the next year as much of the NMP work is currently in progress by commercial enterprises and farmers. However, with more than 1,078 farms in Vermont, there is still plenty of need for the NMP incentive grant program as only 236 contracts have been enrolled in the program.

Continued emphasis on the importance of nutrient management is needed by all agricultural field technical assistants to increase the level of water quality protection in Vermont. Enrollment in the NMP program was lagging in 2008, indicating that the bulk of MFO and LFO sized farms have developed their NMPs and are no longer seeking out the program. There are still a number of small farms that could benefit from a NMP that meets the state incentive program standards. From the MFO surveys done in 2004, many farms were found to be just below the 200 dairy cow limit to be regulated as an MFO. These farms could and should develop NMPs, especially if they are planning to expand, or merging with other family farms. However there are also many small farms that do not need this elevated level of planning as the amount of nutrients they produce and the available land base to allocate those nutrients is more than in balance. As small farms decide to develop NMPs that meet the State standard, they will need financial assistance. The unit costs for an NMP is typically higher for small farms, and the economic return is smaller thus the incentive program is vital to reaching a goal where all farms have an enhanced management plan in place.

**6) A summary of Agency efforts to develop educational program and conduct public hearings to inform farmers in Vermont of the requirements of this act, the proposed General Permit for Medium Farm Operations, and the status of the federal regulations for Concentrated Animal Feeding Operations**

Over the last three years the Act 78 report has detailed the extensive public outreach that was done to inform farmers about the development of the various state mandated regulatory programs. The Agency has continued to conduct meetings throughout the state to update farmers and the public about the General Permit for Medium Farm Operations (MFO GP). In 2008, a greater emphasis was placed on individual farm visits in order to prepare the medium farm community for inspections which have been taking place over the last year and will continue into 2009. Individual technical assistance and outreach has occurred not only to inform farmers of their production area requirements, but also for those requirements on land base in the form of nutrient management plan review and implementation. Feedback from the farming community and increased compliance during farm visits and inspections is showing that the previous years efforts to educate farmers about new regulations have been successful.

In the future, the Agency will continue to work with the farming community to answer questions and provide technical assistance to help farmers meet requirements under both the MFO GP and the updated LFO Rule.

**7) An assessment of the impact of the state agricultural water quality program on small farms in Vermont, including the number of small farms voluntarily entering the program and the number of farms required to obtain a state animal waste permit**

To date, no Small Farm Operations (SFOs) have voluntarily sought coverage, or have been required by the Agency, to seek coverage under the General Permit for Medium Farm Operations

or an Individual Permit. In order to better evaluate the needs of these farms statewide, the Agency continues to do survey work.

In 2008 the Agency conducted over 200 visits to Small Farm Operations (SFOs) and began conducting informational surveys in Franklin County and northern lake watersheds. By the close of the calendar year approximately 80 small farms were surveyed in the Rock River and St. Albans Bay watersheds. Data collected included animal numbers, animal type, waste management, crop types and cropping acreage. In addition, many of the farm visits provided technical assistance and education about Agency programs.

As in past years, this data has been used to make general assumptions in order to estimate SFO financial needs. Estimates are based on improvements needed for small farms to meet the General Permit for Medium Farm Operations' 5 major permit requirements/components including containment and/or treatment of:

- Manure Storage;
- Silage Leachate;
- Barnyard Runoff (including clean water diversion); and
- Milkhouse Waste.

And development/update of a:

- Nutrient Management Plan.

These estimates have again been adjusted from last year's report to account for changes in construction and design costs, however, this year's program cost estimate (\$27,936,000) is lower than last year as there are less farms potentially needing production area improvements (as has been observed by engineering field staff). Manure storage and barnyard runoff containment/treatment accounted for the majority of the reduction. The projected cost of improving milkhouse waste storage/treatment also decreased. However, silage leachate collection/treatment costs increased and nutrient management plan development remained essentially level.

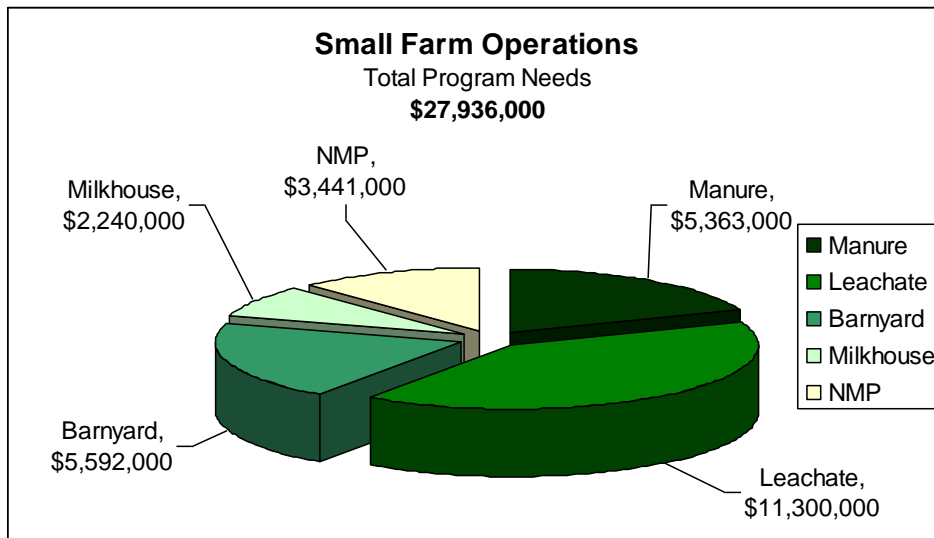
**Small Farm Operations  
Estimated Farm Needs**

Projected Needs	Needed Improvement				NMP Incentive Grant
	Improved Manure Storage	Silage Leachate Treatment	Barnyard Runoff Treatment	Milkhouse Waste Treatment	
<b>Number of SFOs</b>	75	500	80	80	<b>Number of SFOs<sup>a</sup></b> 488
Mature Animals/Farm		200			Acre/Farm <sup>**</sup> 234
Implementation Cost/Animal		\$88			Development Cost/Acre \$9
Implementation Cost/Farm	\$61,500		\$66,800	\$25,000	Development Cost/Soil Test (per test/20 acres) \$15
Design Cost/Farm	\$10,000	\$5,000	\$3,000	\$3,000	Development Cost/Manure Test (2/farm) \$35
					Update Cost/3-Years \$5,000
<b>Total Cost</b>	<b>\$5,363,000</b>	<b>\$11,300,000</b>	<b>\$5,592,000</b>	<b>\$2,240,000</b>	<b>Total Cost</b> \$3,441,000

<sup>a</sup>Projected need based on survey extrapolation

<sup>\*\*</sup>Average landbase as documented in 2008 survey of the Rock River watershed

**\$27,936,000**



**8) A summary of the financial and technical assistance provided to farms, including the type and amount of assistance awarded according to farm size**

In 2008, VAAFM staff made more than 2,000 visits on farms with farmers to provide technical assistance and enforce regulatory requirements.

**A) Best Management Practice and Alternative Manure Management Programs**

The production area has the greatest potential for discharges on a farm because the majority of the manure, silage, and milkhouse waste is stored there. The cost to install structures that prevent discharges is much greater for the production area compared to field practices. The Best Management Practice (BMP) and Alternative Manure Management (AMM) programs were established to help defray the farmer's costs and improve water quality by installing a myriad of practices designed in accordance with state and federal water quality standards and regulations. The BMP Program is closely tied to the funding program offered by the USDA Natural Resources Conservation Service known as the Environmental Quality Incentives Program (EQIP). This state and federal partnership increases the overall funding a farmer can receive and maximizes the value of the state funding provided to farmers by matching it with federal funds. The AMM projects are demonstration projects designed to develop new waste management technologies that will help to reduce pollutants leaving the production area or minimize impacts such as odor to adjacent landowners.

The BMP Program contracted 290 projects in FY2008 for a total state allocation of \$1,300,000 on farms of all sizes throughout Vermont. These BMP practices range from fencing for livestock exclusion from water sources to constructing manure storage and silage leachate treatment systems. In addition to the BMP practices and funds, five AMM projects were funded in FY2008 for a total of \$262,500. These five projects include the construction of two anaerobic digesters, a custom manure injection unit, a GPS injection technology system, and a algae photo-bioreactor system. Preliminary planning has begun on five additional anaerobic digesters, which hopefully by 2009 will mean 14 systems statewide able to provide approximately 2 mega watts of power sufficient to power 1,000 homes.

### Production Area Practices

Farm Size	Grants Awarded *	Unfinished Practices	State Dollars Committed	Finished Practices	State Dollars Spent	Total Practices	Total State Dollars
Small	17	86	\$310,657	5	\$98,732	91	\$409,389
Medium	17	64	\$268,418	9	\$178,781	73	\$447,200
Large	7	30	\$118,071	6	\$139,641	36	\$257,712
Total	41	180	\$697,146	20	\$417,155	200	\$1,114,300

### Field Area Practices

Farm Size	Grants Awarded *	Unfinished Practices	State Dollars Committed	Finished Practices	State Dollars Spent	Total Practices	Total State Dollars
Small	13	44	\$101,982	7	\$9,471	51	\$111,453
Medium	10	27	\$72,697	0	\$0	27	\$72,697
Large	3	12	\$24,873	0	\$0	12	\$24,873
Total	26	83	\$199,552	7	\$9,471	90	\$209,023

### Total Practices

Farm Size	Grants Awarded *	Unfinished Practices	State Dollars Committed	Finished Practices	State Dollars Spent	Total Practices	Total State Dollars
Small	18	130	\$412,639	12	\$108,203	142	\$520,842
Medium	17	91	\$341,115	9	\$178,781	100	\$519,897
Large	10	42	\$142,943	6	\$139,641	48	\$282,585
Total	45	263	\$896,698	27	\$426,625	290	\$1,323,323

\* Farms having both Production Area and Field Area Practices are counted in each respective table

### Grants Approved

Farm Size	Grants Awarded	Unfinished Practices	State Dollars Committed	Finished Practices	State Dollars Spent	Total Practices	Total State Dollars
Small	1	2	\$100,000	0	\$0	2	\$100,000
Medium	0	0	\$0	0	\$0	0	\$0

Large	3	1	\$50,000	2	\$112,500	3	\$162,500
Total	4	3	\$150,000	2	\$112,500	5	\$262,500

**State Funds Allocated**

FY 2008	\$1,800,000
Alternative Manure Management	<u>\$0</u>

**Total State Funds Allocated** **\$1,800,000**

**State Funds Committed**

Best Management Practices	\$1,323,323
Alternative Manure Management	<u>\$262,500</u>

**Total State Funds Committed** **\$1,585,823**

**Total State Funds Remaining** **\$214,177**

<b>Production Area Practices</b>	<b>Total Practices</b>
Animal Mortality Facility	5
Animal Trails and Walkways	12
Compost Facility	2
Field Waste Storage Area	1
Heavy Use Area Protection	28
Roof Runoff Management	18
Waste Facility Cover	3
Waste Storage Structure	27
Waste Transfer	48
Waste Treatment - Milk House Waste	6
Waste Treatment - Silage	<u>50</u>
<b>Total Production Area Practices</b>	<b>200</b>

**Field Area Practices**

Access Road	9
Diversion	2
Fence	29
Grade Stabilization Structure	1
Lined Waterway or Outlet	3
Pipeline	7
Pond	3
Pumping Plant (Water Control Structure)	3
Stream Crossing	2
Subsurface Drain	9
Watering Facility	7
Underground Outlet	<u>15</u>
<b>Total Field Area Practices</b>	<b>90</b>
 <b>Alternative Manure Management Practices</b>	
Anaerobic Digester	2
Alternative Manure Custom Injector Technology	2
Photobioreactor System for Algae	<u>1</u>
<b>Total Alternative Manure Management Practices</b>	<b>5</b>

#### B) Farm Agronomic Practices Program (FAP)

The goal of the Farm Agronomic Practices (FAP) Program is to provide Vermont farms with state financial assistance for the implementation of soil-based practices that improve soil quality, increase crop production, and reduce erosion and agricultural waste discharges.

While this program is available to all farms statewide, it is of particular importance to Medium Farm Operations (MFOs) and Large Farm Operations (LFOs), both of which must implement a state required Nutrient Management Plan (NMP) which meets the USDA-NRCS '590' standard. In addition, any farm, including Small Farm Operations (SFOs), receiving state or federal financial assistance for waste management system improvements must also implement a '590' NMP.

Phosphorus primarily enters surface water attached to soil particles and one of the primary functions of a NMP is to identify critical sources areas on the landscape, such as fields with excessive erosion, and prescribe practices to remediate the resource concern. The FAP program provides financial assistance to implement these soil-based practices including:

- cover cropping - establishment of a seasonal (winter) cover on annual cropland
- conservation crop rotation- growing a rotation of grain and forage in a recurring sequence on the same field
- strip cropping - management of row crop such as forages, small grains, and/or fallow land in a systematic arrangement of equal width strips across a field

- cross-slope tillage - a system of crop rows on planned grades (with the contour of the field)

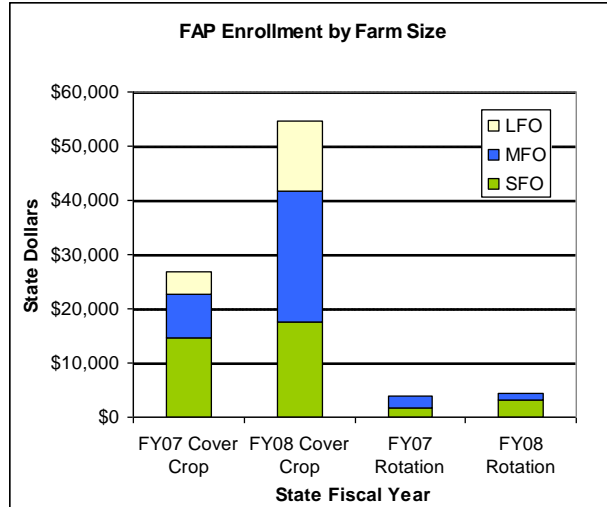
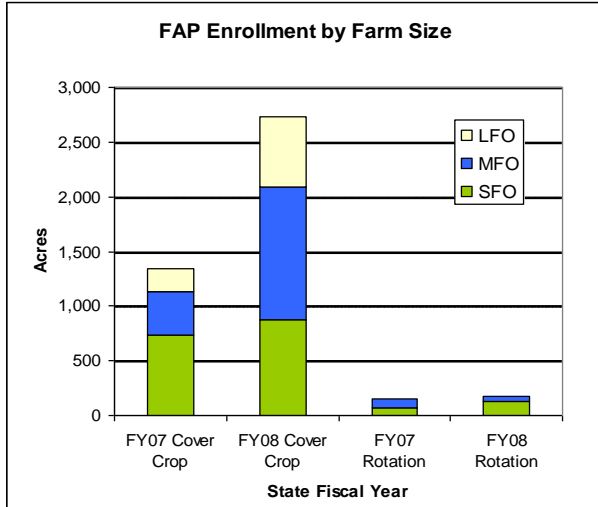
Each of these practices helps to lower erosion, therefore limiting phosphorus transport to surface waters, improves soil quality, and can help increase crop production.

Demand increased for cover cropping with 24 farms implementing this practice in FY2008 (up from 17 in FY2007). Cover crop coverage increased from 1,345 acres (FY2007) to 2,728 acres (FY2008) and the financial commitment for this practice increased from \$26,897 (FY2007) to \$54,561 (FY2008).

Applications for conservation crop rotation are also expected to exceed last year's demands as many fields are typically rotated in the spring. The four farms that used conservation crop rotation (FY2007) covered 154 acres for a financial commitment of \$3,858. FY2008 enrollment provides for the conservation crop rotation of 178 acres; a \$4,470 financial commitment.

The FAP Program also encourages continued implementation of nutrient management plan update/maintenance (\$2/acre and up to \$1000/year) for farmers not currently enrolled in the NMPIG program.

## **Detailed Itemization of FAP Program**



**FY2007 and FY2008 enrollment, acreage, and financial commitment by farm size and practice**

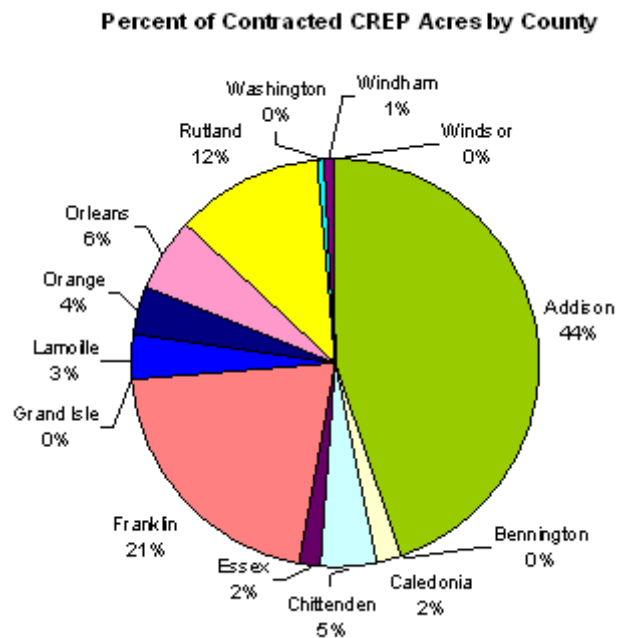
C) Conservation Reserve Enhancement Program

The goal of the Conservation Reserve Enhancement Program (CREP) is to encourage agricultural landowners to voluntarily install conservation buffers. These buffers are designed to treat the farm field runoff and protect adjacent waterways from sediment, phosphorus, nitrogen, bacteria, and pesticides among other things that flow in surface and shallow groundwater. Floodplains are highly productive agricultural lands, hence the reason they are often farmed intensively. In order to reasonably expect the farming community not to farm the land adjacent to streams, CREP has been established to provide compensation for planting these buffers. CREP covers the costs associated with planting the buffer, installing practices such as fencing and watering that may be needed when livestock are present, and provides a rental payment for the land while it is under contract. The rental and incentive payments paid in the program were established to cover the cost of lost production.

Contracts can be for 15 or 30 years and a buffer can be comprised of either trees and/or grasses. The minimum buffer distance is 25 feet for grass and 35 feet for trees, and the expected P reduction from surface runoff is roughly 75%.

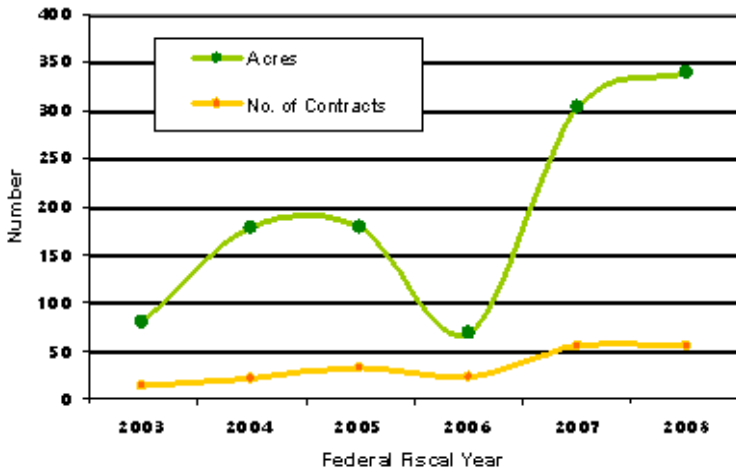
At the close of the 2008 fiscal year, total CREP enrollment reached 1,829 acres, which can be estimated to cover over 300 miles of streambank assuming average buffer widths. For contracts with livestock exclusion, more than 0.5 million acres of fence have been planned since the programs inception in 2003. For all of these CREP projects, the state has spent \$1,148,746, which is matched 4:1 with Federal funds from the USDA Commodity Credit Corporation.

Addison county is still the area with the most CREP contracts, and Franklin county is the



runner up (Chart 1). Franklin county was the top producing county in 2008 with over 123 acres. These acres are representative of a targeted effort to enroll more acres in watersheds that flow into St. Albans and Missisquoi Bays. Initially enrollment in these regions was slow, however there is currently a waiting list of interested applicants.

**CREP Enrollment Trends**  
**Statewide CREP Enrollment**

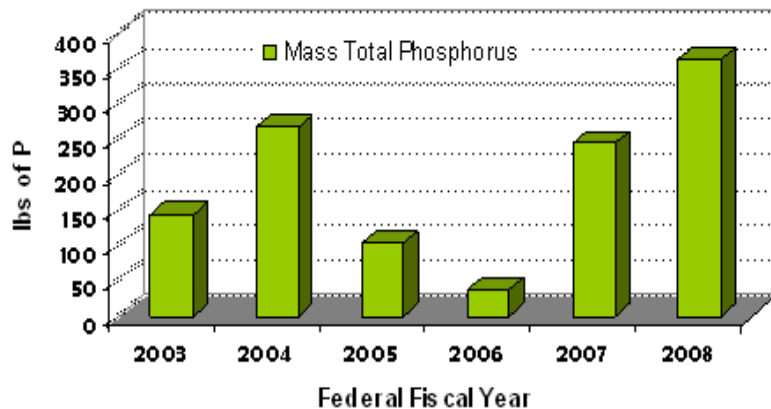


The most popular landuse type that is enrolled in CREP includes pasture and permanent hayland with more than 1,450 acres (Figure 1). Cropland enrollment in 2008 was the highest number of acres in any one year for a total of 82 acres. Overall enrollment was up 10% from 2007. This was a positive increase which shows the changes to the soil rental rates in 2006 were very successful. During the changes in soil rental rates, enrollment was down significantly as rates were suspected to doubled in value and thus participants were advised to hold off on enrollment until the changes were made.

Overall small farm operations (SFOs) account for 72% of the total contracts, MFOs are 26% and LFOs the remaining 2%. In 2008, 41 of the enrolled farms were SFOs, 13 MFOs and 1 LFO. Typically SFO enrollment had ranged from 9 to 28 farms per year, making the increase in the number of SFOs enrolled in 2008 quite significant. MFO and LFO enrollment have not significantly changed according to previous years.

Although the CREP program is a targeted program to reduce phosphorus losses from the edge of fields, it is very difficult to determine the exact amount of phosphorus reductions occurring. By using data collected in Vermont by the University of Vermont Extension, some very general assumptions can be made. It could be possible that over 360 pounds of phosphorus has been kept from entering surface water just in 2008. Overall since the beginning of CREP an estimated 1,500 pounds of phosphorus may have been trapped by CREP buffers (Figure 2).

**CREP Phosphorus Reduction Estimate**  
**Estimated Mass Total Phosphorus Reduction from Crop Lands Enrolled in CREP**



\*This chart was developed using William Jokel's Vermont Buffer Study which showed a 3.93lb/acre reduction in TP

This estimation was developed by reviewing buffer runoff studies performed by Bill Jokela on a farm in Addison county. He was able to quantify cumulative phosphorus reductions from vegetative buffers on cropland and thereby create a per acre reduction value. This data was then extrapolated to estimate the potential reductions on the total crop land acres in CREP.

#### D) Vermont Agricultural Buffer Program

The Agency of Agriculture was granted the authority in 2006 to begin a new conservation practice program called the Vermont Agricultural Buffer Program. The goal of this program is to plant harvestable grass buffers on cropland to help remove nutrients through the uptake of the grasses, and reduce the amount of feed that might otherwise be brought onto the farm. To date this program has one participant in a 0.6 acre contract along the Connecticut River. The program has not been very popular due to the reduced payments compared to CREP, with the state being the only financial partner, it is not as lucrative as CREP to the participant. Secondly, the USDA cannot offer blanket approval that land enrolled in the Vermont Agricultural Buffer Program will be eligible for CREP, which could limit a landowners conservation options in the near future.

### **9) An assessment o the impact on the groundwater of the state of the implementation of the state agricultural water quality program**

#### A) Background

In 1986, The Vermont Agency of Agriculture initiated the Pesticide and Groundwater Monitoring Program for pesticides and nitrates. This program has completed 22 years of sampling groundwater for farm operators and their neighbors with drinking water supplies adjacent to agricultural lands. The Agency has sampled a total of 1,738 private drinking water supplies in 186 towns representing each of Vermont's fourteen counties. Farm wells account for 65% of all wells sampled and non-farm, neighboring wells account for 35%. The Agency has also conducted sampling at 22 public water systems. For the five year period from 2004 to 2008, 746 drinking water wells were sampled. A total of 1,542 individual water samples were collected and analyzed by the Agency of Agriculture.

The Pesticide and Groundwater Monitoring Program was founded to investigate the quality of drinking water on Vermont farms because of concern for the potential for groundwater contamination by pesticides. Results show the occurrence of nitrate in groundwater is far more common than the detection of pesticides. The recognition of nitrate in groundwater as a significant agricultural water quality concern in addition to the concerns for phosphorus and nitrate in surface water informs the Agency's approach to coordinated resource management on the farm. The Pesticide Regulatory Program and the Agricultural Non-Point Source Control Program now conducts surface water and groundwater sampling projects and water quality investigations as part of a coordinated Agricultural Water Quality and Resource Management Program.

#### B) Nitrate and Herbicide Results

**2008** In 2008, the Agency tested 229 drinking water wells and collected 283 samples. The results show that 136 of the wells tested had positive detections for nitrate (a 59% detection rate). 41% of the wells tested had no detections for nitrate. 24 wells exceeded the drinking water standard of 10 ppm. This represents a short-term violation rate of 10%. The herbicide results show that 36 wells had positive detections for one or more herbicides. For sampling conducted during 2008 there were no (0) drinking water wells with a detection of herbicide that exceeded a state or federal drinking water standard.

**2004-2008** For 2004 to 2008, the Agency tested 746 wells and collected 1,542 samples. 390 of the wells tested had positive detections for nitrate (a 52% detection rate). 42% of the wells tested had no detections for nitrate. During this five year period, 80 wells exceeded the drinking water standard of 10 ppm at some point in time. This represents a long term violation rate of 11%. The herbicide results show that 72 wells had a positive detection for one or more herbicides. This represents a detection rate of 10% for the reporting period. Again, there were no (0) drinking water wells with herbicide detections that exceeded a state or federal drinking water standard or health advisory.

**Five Year Summary of Nitrate and Herbicide Results**

<b>2004 - 2008</b>	<b># Wells Sampled</b>	<b># Wells Not Detected</b>	<b># Wells w/ Detections</b>		<b># Wells Above Standard</b>
<b>Herbicide Results</b>	719	647	72		0
		(90%)	(10%)		(NA)
	<b># Wells Sampled</b>	<b># Wells Not Detected</b>	<b># Wells Below 5 ppm</b>	<b># Wells 5 - 10 ppm</b>	<b># Wells Above 10 ppm</b>
<b>Nitrate Results</b>	746	356	249	61	80
		(48%)	(33%)	(8%)	(11%)

Data represents a total of 1,542 individual drinking water samples analyzed by the Agency.

C) Program Status and Trends

A total of 145 new well sites were sampled during 2008. This represents an increase in the number of new wells sampled for the year and the proportion of farm/non-farm wells remained steady. Approximately 18% of the wells in the sampling database (309 wells) are not characterized as belonging to farm or non-farm land owners. The land use and ownership status of these wells is being identified when the wells are re-sampled.

The active focus of the Agency’s groundwater sampling program is to test drinking water wells as part of farm inspections conducted for the Medium Farm Operation (MFO) Program. The initial round of farm inspections for compliance with the MFO General Permit is scheduled for

completion during the Spring of 2009. Water quality sampling at these sites is conducted by Agency of Agriculture staff affiliated with the MFO Permitting Program.

A continued focus of the Agency's groundwater program is to conduct sampling related to pre- and post construction evaluations of certified manure storage structures, barnyards and silage leachate collection systems funded through the NRCS EQIP Program and the State of Vermont BMP Cost Share Grant Program. The sampling at these sites is conducted primarily by the Agricultural Resource Specialists (ARS) through a contract agreement between the Natural Resource Conservation Districts (NRCDs) and the Agency of Agriculture.

The foundation of the Pesticide and Groundwater Monitoring Program was to conduct statewide survey sampling to establish a baseline for the impacts of agricultural practices on groundwater quality. Growth of the LFO and MFO Permitting Programs has created additional demand for practices funded by BMP Cost Share Grants and EQIP contracts. The effectiveness of these farm management programs has forced a shift in focus for the Agricultural Water Quality Monitoring Program away from background surveillance monitoring and towards increased site investigation and remediation.

Water quality sampling related to permit compliance and the evaluation of production area infrastructure often requires a greater focus on long term, repeated sampling of existing well sites as opposed to a focus on searching out new well sites. Although it contradicts the trend of recent years, the significant increase in the number of new well sites sampled during 2008 is attributed to inspection related water sampling at MFO farms that were not previously part of the Pesticide and Groundwater Monitoring Program.

The Agency and the NRCDs have identified specific situations where production area infrastructure practices have contributed to groundwater contamination. In Vermont, the detection of agricultural contaminants in groundwater is more commonly related to field practices and crop production areas. This reality highlights the importance of the nutrient management planning components of the Agricultural Water Quality Program.

In response to this experience, the Agency has expanded the water quality program to include groundwater and surface water sampling to assess the effectiveness of nutrient management plans at preventing and correcting groundwater contamination from field application areas and crop production practices. Site investigation projects that combine groundwater and surface water sampling are a critical part of the process to distinguish between production area and field practices as the source(s) of contaminants in groundwater.

The Agency is meeting the responsibility described by 6 V.S.A. Chapter 215, Section 4810 to promptly respond to complaints and investigate existing and potential detections of agricultural contaminants in groundwater. The Pesticide and Groundwater Monitoring Program is the mechanism for the Agency to accomplish this statutory mission.