
Act 78 – Section 16 Annual Report – 2008

In January of each year, the Agency of Agriculture, Food and Markets shall submit an annual report to the House and Senate Committees on Agriculture, the House Committee on Fish, Wildlife, and Water Resources, and the Senate Committee on Natural Resources and Energy concerning the status of the state animal waste permit program.

The report shall include:

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

In this installment of the Act 78 Report for the Vermont Legislature, the Agency of Agriculture, Food & Markets (AAFM) has used updated farm information collected through regulatory and outreach programs to assess the ability of Vermont's livestock farmers to manage waste using land application. Over the past year the state's number of dairy farms has declined, with 1,100 shipping dairies statewide, and an adult cow population of approximately 140,000. The total utilized agricultural land base has remained constant, hovering around 440,000 acres. Below is the Agency's baseline soil test data which is used to track field indicators related to soil phosphorus (P) loss potential, crop P fertility needs, and field soils potential P saturation. The soil test baseline data will allow the Agency to monitor how fields are responding over time to various manure management scenarios, and whether the current utilized Vermont agricultural land base is still adequate for the amount of livestock waste generated annually. This report also presents data demonstrating the level at which the Agency's water quality programs have directly assisted farmers on the implementation of Nutrient Management Planning (NMP), and the design, installation, and maintenance of a wide range of Best Management Practices associated with concentrated sources of waste in farm production areas.

1-A) Soil Test Base Lind Data

The Agency's baseline soil test data catalogs several key indicators that relate to the potential of soils to contribute nutrients to waters of the state. The baseline soil data shows that a significant percentage (21%) of fields sampled had a "low" soil test P level, indicating that crop yield would be significantly improved with more P and/or an increase in the organic matter percentage of the soil, both of which directly correlate to soil fertility and productivity. For the soil test baseline, the Agency has also included; Aluminum (Al), soil acidity (pH), organic matter (OM), and the Vermont Phosphorus Index (PI) rating. The soil

test P and AI levels are the primary soil indicators used in computing a field’s Phosphorus Index rating. The Phosphorus Index rating is a field specific environmental assessment tool (run annually) that is used to rate a field’s “potential” to lose phosphorus through surface runoff and erosion. The higher the Phosphorus Index rating, the greater potential the field has in losing P through the physical and chemical processes associated with surface runoff and erosion. Two things the Vermont Phosphorus Index does not do are predict the annual amount of P that could potentially leave the field edge, or how far the P will travel once it becomes mobile. The Index is essentially a qualitative risk assessment tool that compares fields on a relative scale with the goal of aiding farmers in more easily identifying Critical Source Areas on the landscape where alternative field management practices could dramatically reduce surface runoff and erosion potential.

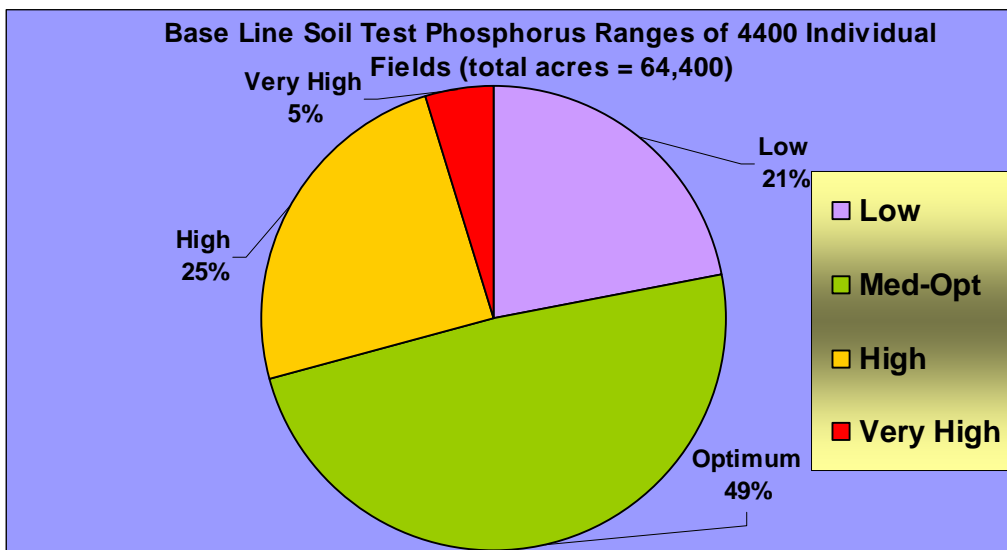


Figure 1– Soil analysis was performed using Modified Morgan’s Extractant. Soil test categories are from the UVM Nutrient Recommendations for Field Crops in Vermont. Total acreage = 64,400. Median soil test Phosphorus level = 4.4 ppm. Approximately 211 samples fell in the “excessive” range, and 979 samples fell in the “low” range. Samples that are “medium-optimum” are in the most desirable range related to economic crop return and environmental field indicators.

Total Acreage Sampled	Corn Acreage Sampled	Hay Acreage Sampled	Average % Organic Matter	Average Soil Test pH	Average Soil Test AI (ppm)	Average field Phosphorus Index Rating
64,440	23,100	39,290	4.3	6.5	45	Medium

Table I. Soil Environmental Indicators - Baseline Data

The Agency Phosphorus Index baseline data shows that a minority of fields in Vermont have a “high” or “very high” rating, suggesting that the majority of agricultural land does not need a significantly reduced manure application to lower a field’s potential to contribute P to surface waters of the state. However, AAFM analysis also shows that approximately 595 (20%) of all fields (not acres) currently recorded have a “High” or “Very High” phosphorus index rating. This significant portion of fields should be considered Critical Source Areas on the landscape and receive the most attention when planning alternative field application and management practices.

1-B) Soil Test Reimbursement

The Agency has reimbursed farmers for field soil testing on a majority of the reported perennial and crop acreage, plus roughly 2,000 acres of “unknown crop” land, accounting for a total of 64,440 acres sampled and reimbursed statewide. All certified soil testing labs provide macro and micro nutrient content. Most soil tests include OM analysis, although it is not required, farmers value this information, and the Agency uses this information to assess the adequacy of the agricultural land base for manure application.

- 2) An assessment of the financial and technical resources required to implement 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;

Statistics:

- **Number of Shipping Dairy Farms in Vermont = 1,100**
- **# of cows estimated on all Vermont dairy farms = 140,000**
- **# of acres needed for manure application based on 2 acre/cow = 280,000**
- **Total crop acreage on all Vermont dairy farms (annual & perennial) = 450,000**

In response to the Legislature’s request for an estimate of the financial needs on all Medium Farm Operations (MFOs) to meet the newly adopted state water quality standards, the Agency has calculated estimates for the main waste management systems associated with a farm production area. This year the Agency gained an improved understanding of all MFO financial needs, primarily from an increased Agency presence on MFOs in conjunction with the implementation of the state General Permit. During the initial General Permit Notice of Intent to Comply (NOIC) submission period (Feb–Aug, 2007), the Agency observed a significant reduction in the number of actual MFOs (based on animal threshold limits) in comparison to estimates used in previous Act 78 reports. The 2007 reported costs were based on an estimate of 200 MFOs in Vermont; however, Vermont currently only

has 155 MFOs. This reduction is due to several factors, including farmer's desire to stay under the animal number threshold that requires coverage under the Medium Farm General Permit, difficult field conditions in 2006, and difficulty in locating and purchasing affordable forage and grains.

The total cost for MFO & SFO manure & milkhouse waste storage, silage leachate treatment, barnyard area runoff/clean water diversions, and nutrient management planning for ALL livestock operations in Vermont (excluding Large Farm Operations) = \$56,128,500

The total cost for ALL of the above water quality related improvements for the 155 MFOs using \$350/cow for manure storage = \$8,800,700

2-A) Vermont's 155 MFOs Best Management Practice needs:

of adult animals on MFOs = 53,000 (avg. 1400 lbs/animal)

- This is an **11,000 cow reduction** from the 2007 Act 78 estimate.

of heifer & youngstock on MFOs = 31,200 (avg. weight 400-1100 lbs.)

- This is a **1700 cow increase** over the 2007 Act 78 estimate.

Total animals (young & adult) on Vermont's 155 MFOs = 84,200

This is a **9,300 total cow reduction** from the 2007 Act 78 estimate.

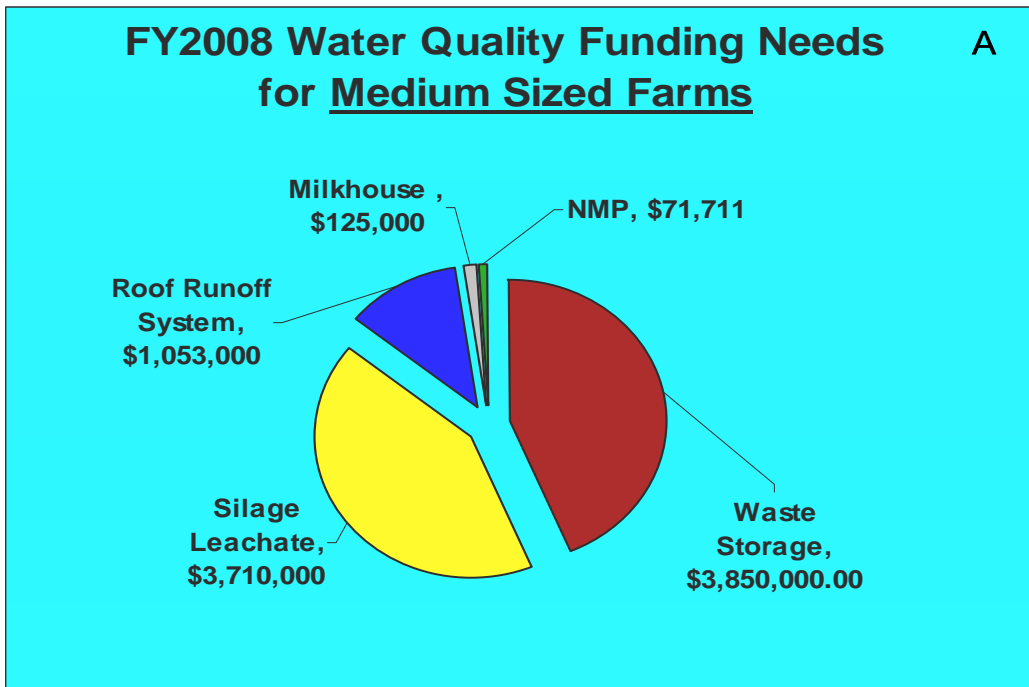
- On 155 MFOs there are approximately 73,200 total animals with adequate manure storage.
- On MFOs there are approximately 11,000 total animals that are in need of improved manure storage capacity.
 - The cost of creating storage at \$350/cow = \$3,850,000
 - The cost of creating storage at \$450/cow = \$4,950,000

For most MFOs there are large enough cow numbers to have a \$350 per cow manure storage cost, however the per cow price used for the SFO calculation (\$450/cow) has also been provided.

Table 2: MFO Best Management Practice cost and needs estimate

Best Management Practice	Number	Cost per farm for implementation	Total Cost for all farms to have BMP
Manure Storage	11,000 animals without	\$350	\$3,850,000
Milkhouse Waste	5 farms	\$25,000	\$125,000
Clean Water Diversion/Barnyard Runoff	81 farms	\$13,000	\$1,053,000
Silage Leachate	106 farms	\$35,000	\$3,710,000
Nutrient Management Plan	6 farms - 4,235 acres	NA	\$71,711

Current NMP development cost: \$9/acre, \$15/soil test, \$35/manure test, \$5000 for 3 years of updates.



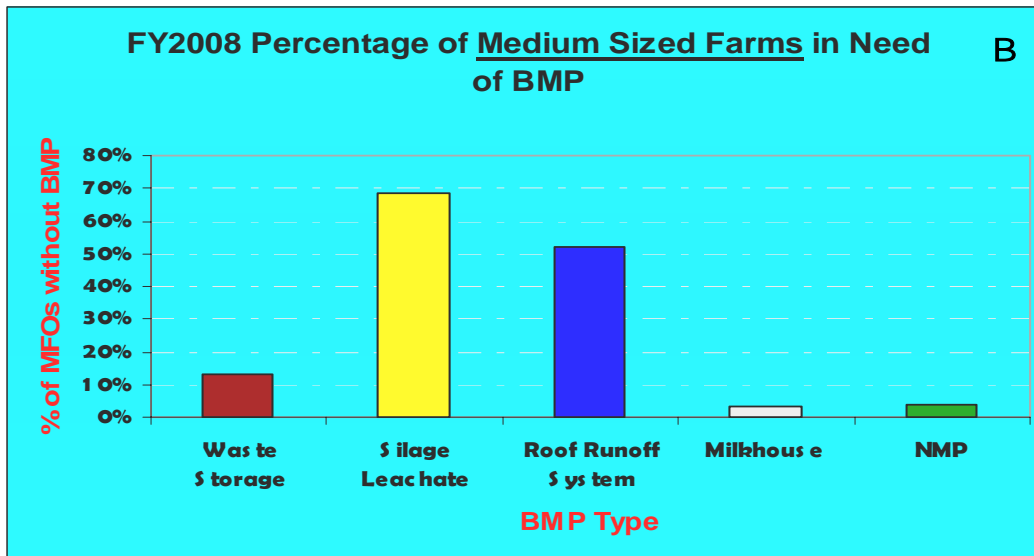


Figure 2 – (A) Demonstrates the various costs for individual water quality improvements required on all 155 MFOs. (B) Shows the percentage of MFOs without the required waste treatment practices.

2-B) Vermont’s SFO Best Management Practice Needs

Accurately assessing the financial needs of Vermont’s Small Farm Operations (SFOs) in meeting the current MFO General Permit water quality regulations is a constant hurdle due to the wide variety of operational practices employed on smaller farms. This years report uses general assumptions from limited data in order to estimate the total SFO financial needs for production area structures. Estimates have been adjusted from the 2007 Act 78 report to account for the relatively large change in construction material costs associated with these practices and the Agency’s development of more low cost alternatives to traditional waste containment structures provided by the USDA–NRCS programs.

There are roughly 70,884 adult dairy animals on Vermont’s 933 dairy SFOs. Approximately 50% of all SFO adult animals need increased storage capacity.

Best Management Practice	Number	Percentage of total	Cost per farm for implementation	Total Cost for all farms to have BMP
Manure Storage	35,442 cows	50%	\$450/cow	15,950,000
Milkhouse Waste	35,442 cows	50%	\$125/cow	\$4,430,250
Clean Water Diversion/Barnyard Runoff	53,163 cows	75%	\$335/cow	\$17,810,000
Silage Leachate	280 farms	30%	\$18,500	5,178,150
Nutrient Management Plan	606 farms	65%	Farm acreage	\$3,959,400

Table 3: SFO Best Management Practice cost and needs estimate

**** There is no calculation for SFO manure storage using a \$350 per cow storage rate because SFOs do not have enough animal numbers to reduce construction costs on a per cow basis. ****

Total cost for all SFO water quality related BMPs = \$47,327,800

The silage leachate treatment structural estimate is based on the assumption that many SFOs do not use feed bunks for storage, and instead use alternative forage practices that do not require water quality related structural improvements (pasture, wrapped hay bails, etc.). The percentage of SFOs in need of clean water diversion and roof runoff structures has been reduced from the 2007 Act 78 report estimates due to recently completed projects and an increase in USDA–NRCS federal EQIP contracts.

The percentage of SFOs in need of a current NMP has been reduced from 95% in the 2007 Act 78 report to 65% in this year’s report. This reduction is a result of many SFOs beginning NMPs through the Agency’s NMP Incentive Grant Program and various public grants offered to develop NMPs for SFOs in Vermont. The 2008 reimbursement costs associated with the NMP incentive grant program are; \$9/acre, \$15/soil sample, \$35/manure sample, and up to \$5,000 for 3 years of annual updates

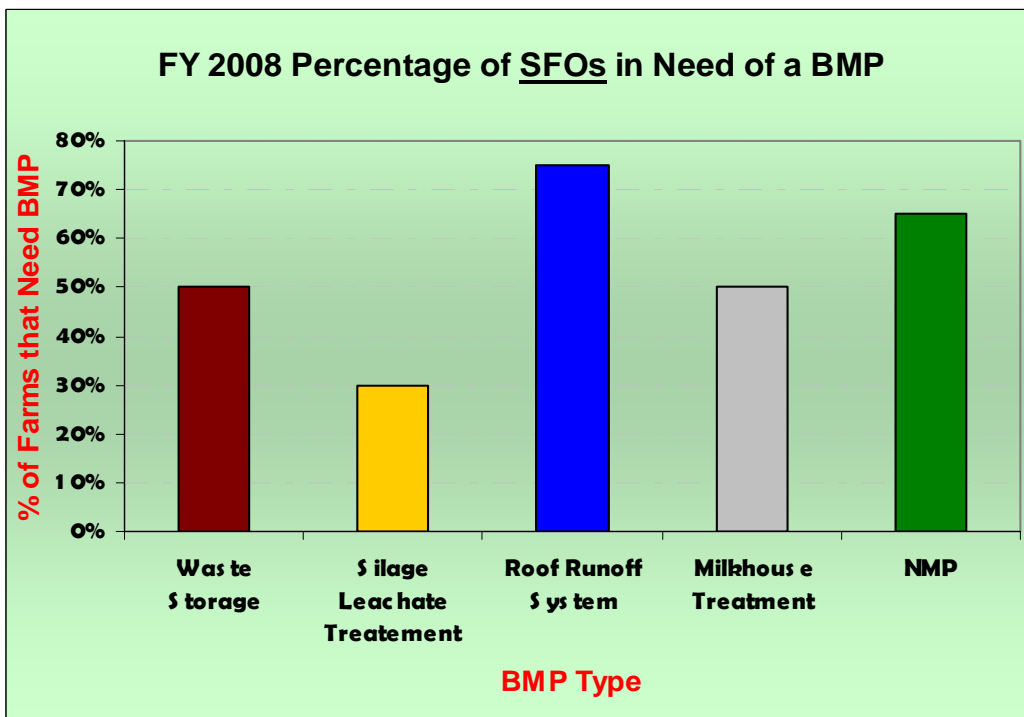
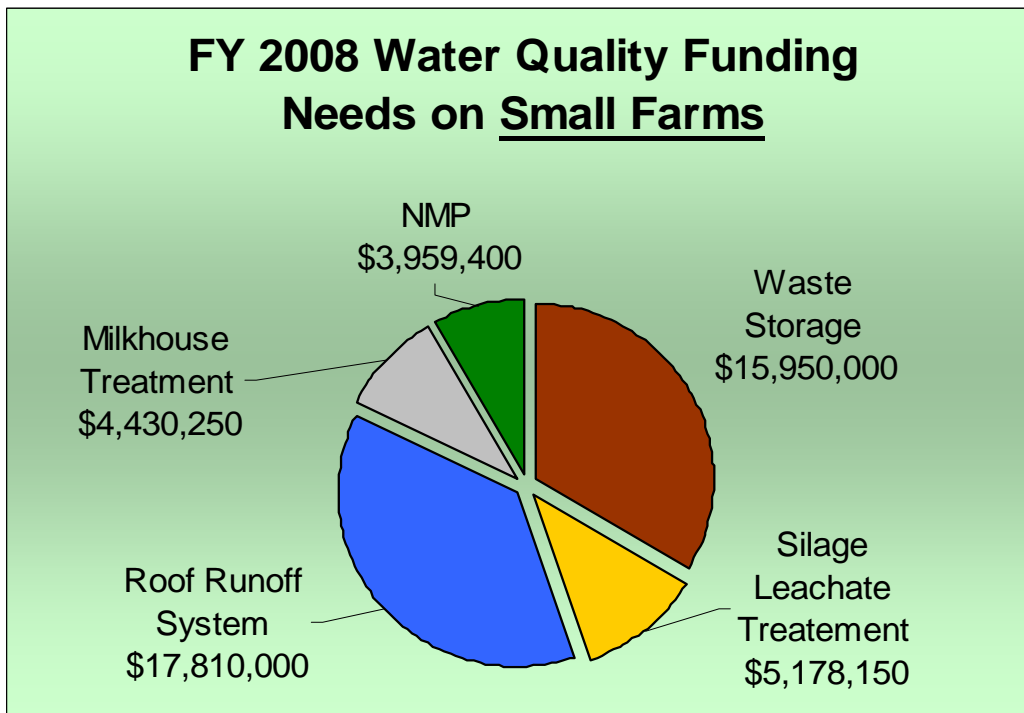


Figure 3 – (A) Demonstrates the various costs for individual water quality improvements needed on all dairy SFOs in Vermont. (B) Shows the percentage of SFOs without the required waste treatment structures.

3) The status of the Medium Farm General Permit

The Agency strives to have a seamless regulatory program that protects water quality while maintaining farm viability. The development of the state's three-tiered approach to water quality creates a logical progression of regulatory oversight to help any farm as it grows in size. The Large and Medium Farm Operations in Vermont are held to a higher standard of regulation associated with both the production and field areas of the farm. Small farms in Vermont continue to be regulated by the Accepted Agriculture Practices (AAPs). However, many small farms have begun to voluntarily implement newly developed NMPs that go beyond the AAP regulations for field management.

In response to federal Concentrated Animal Feeding Operations (CAFO) rules for MFOs and under the direction of the Vermont Legislature, the Agency developed a water quality regulatory program and promulgated rules in April 2006. The MFO Rules require all MFOs to seek coverage under a statewide general permit. The MFO General Permit was signed into law by the Secretary of Agriculture in February, 2007.

MFO farmers had six (6) months to seek coverage under the General Permit, by submitting a form to the Agency. To date, all identified MFOs have submitted their farm's "Notice of Intent to Comply" (NOIC). Upon submission of the NOIC the Agency has 18 months to conduct a compliance inspection of the farm.

During the NOIC submission process several farms previously identified as "potential MFOs" submitted NOICs and indicated that their farms did not reach the animal number threshold that triggers permit coverage (over 200 adult dairy cows). The FY2007 Act 78 report estimated roughly 200 MFOs in Vermont, but poor field conditions in the summer of 2006, concerns over MFO permit compliance, and various market forces have forced several farms to keep herd sizes below the MFO animal threshold.

The General Permit for Medium and Small Farm Operations in Vermont represents a level of farm management above and beyond the Accepted Agricultural Practices (AAPs). The General Permit meets and exceeds the technical standard requirements of the federal Confined Animal Feeding Operation (CAFO) rules.

The General Permit prohibits any direct discharges of agricultural waste to waters of the state. It also requires all MFOs to operate under a Nutrient Management Plan (NMP) that meets all state requirements as defined in the General Permit. The NMP requirements exceed the USDA-NRCS NMP-590 standard for Vermont, and go a step further by requiring each NMP to also complete a production area assessment to

identify areas that may be more likely to cause an unintended discharge during a significant storm event.

In addition to strict production area requirements, the General Permit outlines several water quality requirements related to field management under the guidelines of the farm NMP. Below are a few key NMP components:

- Maintaining a 25-foot permanent vegetated buffer on all fields adjacent to surface waters of the state.
- Animals must be fenced out of streams associated with this production area.
- All manure must be applied at appropriate agronomic rates, with consideration of application timing related to crop growth and the total field crop budget on an annual basis
- The time to incorporation once manure and/or fertilizer application has occurred.
- Field by field calculation of the Vermont Phosphorus and Nitrogen Leaching Indices, both of which act as water quality risk assessment tools that identify critical source areas on the landscape that may have a high risk of contributing nutrients to both surface and ground water.

4) The status of any pending or proposed rulemaking for:

4-A) Accepted Agricultural Practices (AAPs)

Accepted Agricultural Practices are statewide restrictions designed to reduce non-point pollutant discharges 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 900 investigations have been conducted since 1995. Since 2006 the Agency has conducted 201 investigations on farms regarding AAP issues. In 22 instances violations were confirmed. These violations resulted in 20 separate enforcement actions ranging from Corrective Action Written Warnings to Cease and Desist Orders to Administrative Penalties. The Agency has also sought court injunctions to enforce the AAP rules.

4-B) Large Farm Operations (LFOs)

The Agency completed the formal process for revising the LFO Rules in November, 2007. After holding public hearings on draft rule changes during this summer, the Agency submitted a final draft of proposed rule changes to the Legislative Committee on Administrative Rules (LCAR). LCAR held its own hearing on the proposed LFO Rules changes October 31, 2007. The Committee heard testimony, and ultimately voted in favor of the LFO Rules moving forward. The revised “LFO Rules” became final on November 28, 2007.

The goals of the Agency in addressing changes to the LFO Rules were:

1. To create a seamless regulatory process for livestock operations that may, in the future, choose to move from one size operation to another (small to medium to large). By aligning the words in the definition of what constitutes a large farm with the way that MFOs are defined, the Agency has eliminated potential confusion or inadvertent lapses in coverage of some farms under the agricultural water quality program.
2. To shift additional responsibility to the permittees for operating and maintaining structures and practices that are required to properly manage nutrients.
3. To comply with a recently implemented state law that requires the Agency to formally consult with ANR during the application review process.
4. To carry out a legislated option for the Secretary to develop regulatory criteria for siting and setback for new barns. This siting language applies to applications for a new barn, herd expansion, and other LFO farm structures related to the project. This new section requires the Secretary to consider: adjoining and neighboring land uses; waters of the state on or near the proposal; likely ability to comply with AAPs and groundwater protection requirements with regard to the proposed location; the permittee’s history of compliance with the Rules; and the ability to comply with standards for: odor; noise; traffic; insects; flies; and other pests.

The setback language applies to applications for farm structures on new or expanding large farm operations. In towns with no zoning, the minimum setbacks for all farm structures is 100 feet back from the center line of a public road and 100 feet back from any abutting property line.

The following setback language applies to towns with or without zoning:

- a) The Secretary may increase the 100 feet setback from the center line of a public road or on abutting property line if there are unique physical site conditions that

impact: odor, noise, traffic, insects, flies, and other pests that the farm property will have on the abutting property. And,

b) The Secretary can grant adjustments from these setback requirements if there are unique physical characteristics of the site, not created by the applicant, that create unnecessary hardship, and that the farm property cannot be efficiently managed in strict conformity with the setback.

5. To provide for an advisory group to present recommendations to the Secretary for new facilities. This new requirement for an advisory group review applies to proposals to construct new LFO barns, and the Secretary may require an advisory group review for a proposed expansion of an existing barn. The law defines the members of the advisory group as follows: the Secretary of Agriculture or Agency's representative; Secretary of Natural Resources' representative; farmer appointed by the Office of the Governor; and a representative appointed by the legislative body of the municipality in which the proposed LFO facility would be located.

6. To provide detail of the Agency's options and processes for implementing new groundwater investigations and enforcement activity.

7. To update technical references in the LFO Rules to be current with technical practices that the USDA-NRCS occasionally revises. The LFO Rules use NRCS standards for many procedures and activities, and these references needed to be updated.

Other outcomes of the LFO Rules revisions:

In addition to meeting the goals described above, the outcome of the revised LFO Rules also addresses, and in some cases exceeds, standards of the federal Confined Animal Feeding Operation (CAFO) regulation which governs farm operations waste storage and nutrient management. Several examples of this success include:

1. The LFO Rules are more stringent than federal CAFO Rules in that the federal rules do not cover groundwater. The Agency now has authority to protect groundwater as part of the Agricultural Water Quality program spelled out in state statute.

2. The LFO Rules require a permit to be issued prior to building a barn, which protects the farmer's investment. Under the CAFO Rule, barn construction may be started, and it is still possible that the permit would not be issued.

3. The Agency enforces a winter manure spreading prohibition, whereas the CAFO Rule allows year-round spreading.

4. The USDA Natural Resources Conservation Services has revised practice codes or standards, which are referenced in the rule. The Agriculture Agency uses Natural Resources Conservation Services standards for many procedures and activities.

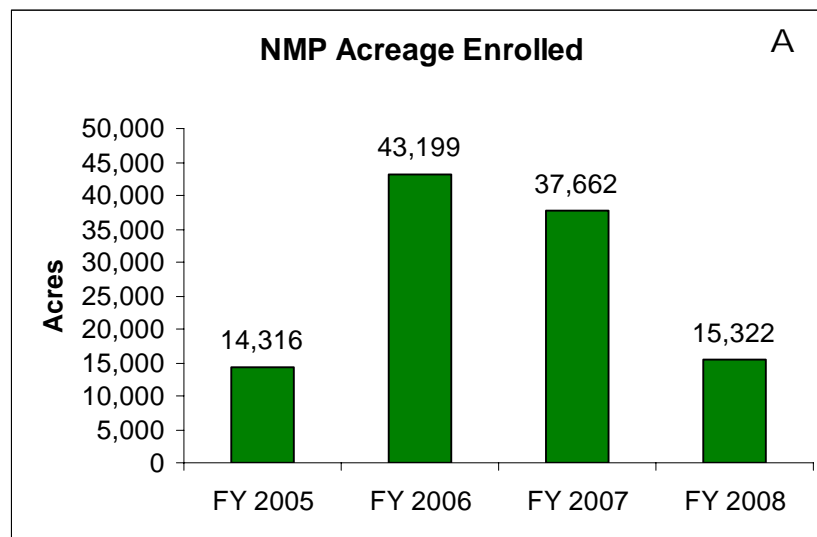
5. The federal regulation contains no standards for nutrient management.

6. The LFO program requires individual permitting of all LFOs, whereas the federal program only requires permitting of a CAFO with a known discharge. Therefore, no nutrient management information is required unless there is a discharge.

7. The LFO program has engineering standards for waste management structures. Specifically, there are standards for feed storage (leachate collection, storage, and treatment), milkhouse waste, lagoons, stacking sites, and compost sites.

5) A summary of the yearly funding of the nutrient management planning by the Agency of Agriculture, Food and Markets;

FY2008 data only represents half of the fiscal year to date.



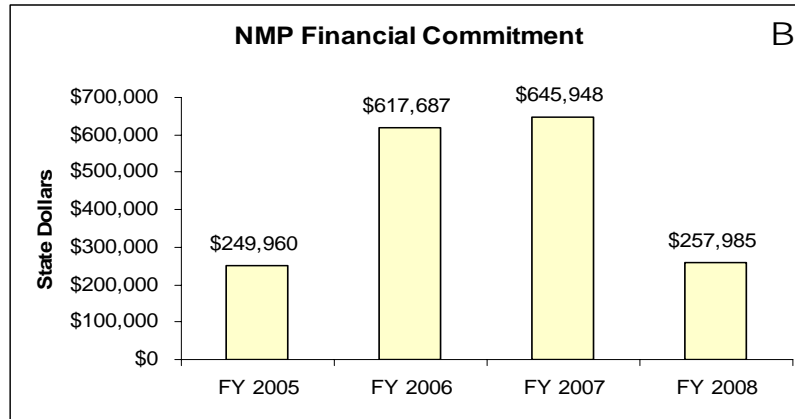


Figure 4 – (A) Shows the acreage enrolled in the program from FY2005 to FY2008. (B) Shows the increase in dollars committed to developing NMPs on all farms in Vermont between FY2005 and FY2008.

The Nutrient Management Plan Incentive Grant Program (NMPIG) was developed to assist farms with nutrient management plan development and implementation, and to provide grants to establish nutrient management education programs for the farming community. The goal is to provide sufficient cost-share assistance as well as technical support to Vermont farms regardless of their size or livestock type.

5-A) NMPIG Program Progress

Since 2005, the NMP cost-share program has had great success in enrolling farmers. To date, 205 farms have signed up to receive cost share to implement a NMP on their farm. These 205 NMP development contracts cover more than 110,500 acres statewide. Of these 205 farms, 83 have completed the process of developing their nutrient management plan. Specific information pertaining to those plans has been recorded to measure the affect of nutrient management plans on lowering potential risks associated with agricultural land water quality indicators. The type of information recorded includes the number of acres with nutrient management plans, soil test phosphorus, aluminum, pH, organic matter, and the Vermont Phosphorus Index rating for fields contained in each NMP. With this information being tracked over time, the Agency hopes to begin to see an increase in acreages managed under a NMP, an optimum soil test phosphorus level on all fields, a reduction in fields rated high and very high in the Phosphorus Index, and an increase in the acres managed to the tolerable soil loss rate, all of which are indicators of sound management that will result in less soil erosion into streams.

The number of farms participating in this program continues to grow, yet these farms represent only a fraction of the total number of farms in the state that could implement a NMP to address water quality issues. Continued emphasis on the importance of nutrient management is needed to strengthen the program and protect water in the State.

- 6) A summary of Agency efforts to develop educational programs 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 two 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 conducted several meetings and public hearing in every county of the state for both the proposed rule and proposed permit concerning the Medium Farm Operations General Permit. The Large Farm individual permit program also held several public meetings to inform farmers of changes to the LFO rules during the 2007 legislative session. On February 13th, 2007, the Medium Farm Operations Rule and Permit became law, and based on the receipt of all identified MFOs Notice of Intent to Comply permit applications, the Agency feels the previous year's efforts to educate farmers about new regulation has been successful. During 2008 and into the future, the Agency will continue to work with the farming community to answers questions and provide technical assistance to help farmers meet new requirements under both the new MFO general permit and the updated LFO regulation.

6-A) LFO Technical Assistance Opportunities and CAFOs

AAFM completed on-site inspections of all permitted LFOs during the spring and early summer of 2007. Some of these resulted in recommendations being made to improve operations, and some resulted in penalties with compliance schedules to remedy operations or structures. Each permitted LFO received at least one additional follow up visit during the summer to ensure necessary operational changes and continued compliance under their individual permit. Many of the permitted farms also received significant technical assistance throughout the summer and fall to help improve waste treatment system structures that had become outdated. At this time, all but one of the farms has remedied all aspects of the enforcement document provided to them after initial early summer visits. This last farm has received funding and is in the process of resolving the structural deficiencies of the current waste management system.

6-B) Joint AAFM & Department of Environmental Quality Inspections

The Vermont Department of Environmental Conservation (VT DEC) initiated formal inspections this year, as the Agency of Natural Resources (ANR) is the state's delegated authority for the federal Concentrated Animal Feeding Operation (CAFO) program. The VT DEC staff introduced themselves and the federal program to the farmers, answered the farmers' questions, and documented their observations. Due to state water quality law, permission of the farmer was required for the VT DEC staff to enter the property. Only one large farm operator denied access to VT DEC. With this one exception, the initial inspections were successful and helpful for the farmers. VT DEC also conducted follow up visits to affirm that required improvements had been completed.

6-C) Environmental Protection Agency (EPA) Farm Inspections

For the first time in Vermont, the United States Environmental Protection Agency (EPA) conducted inspections on four of the state's permitted large farms. EPA selected the sites, and all four were located in the northern Lake Champlain Basin. No more than 24 hours' notice was given to the farms. No violations were observed. Vermont is now on schedule to have several farms inspected each year by federal EPA enforcement staff.

6-D) Continued compliance with Vermont's Large Farm Permit

The LFO coordinator continues to work with farmers who are interested in obtaining an LFO permit for future expansions. With the MFO program and its staff providing outreach and education to farmers that were not part of the initial large farm universe, the Agency now has additional, earlier opportunities to connect with farmers who may be considering consolidation, expansions, and construction.

No new large farm facilities were permitted this year, but many amendments were sought and issued. However, one permitted dairy LFO, which has been operating near or below the LFO threshold for some time, decided to formally withdraw from the LFO program. Simultaneously, the farm submitted an NOIC seeking coverage under the state's general permit for MFOs. At this time, permitted LFOs consist of 16 dairy producers, one egg producer, and one beef producer.

- 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 small farms required to obtain a state animal waste permit;

In 2007, the Agency did not partake in any specific Small Farm Operation (SFO) informational survey as presented in the 2008 Act 78 report. However, the Agency continue to provide technical assistance to small farms and continues to focus on the funding needs of the state's small farm operations. This year's report has taken information from a survey of Addison County small farms conducted in the summer of 2006 and information obtained from farm visits during the 2007 season, to better estimate the financial needs for all SFOs to meet current water quality structural requirements under the state's General Permit.

The difficulty in estimating the cost of bringing all small farms up to standards now required for MFOs is the diverse management that occurs on small farms. The Agency has estimated small farm average herd size and acreage; however, there are significant financial differences in bringing a 30 cow dairy or a 165 cow dairy up to standards.

The cost estimate presented in section 2-C have been reduced from last year's due to both continued improvements on many small farm structures during the 2007 season, and a better understanding of the various needs on smaller livestock operations (roughly below 50 animals).

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

8-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 568 projects in FY2007 for a total state allocation of \$1,736,000 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. These values also include eight AMM Projects for FY2007. These eight projects include the construction of two anaerobic digesters, a roller solids separator, a post digestion and separation settlement basin, a rotary drum solids processor, and a silage leachate waste water treatment strip. Preliminary planning has begun on three additional anaerobic digesters, a sand settling lane, two milk house waste water treatment systems, and a number of silage leachate waste water treatment

**Vermont Agency of Agriculture, Food & Markets
Best Management Practice Cost Share Program
Fiscal Year 2007**

Production Area Practices

Farm Size	Contracts Awarded *	Unfinished Practices	State Dollars Committed	Finished Practices	State Dollars Spent	Total Practices	Total State Dollars
Small	29	62	\$240,877	8	\$200,955	70	\$441,832
Medium	14	62	\$414,711	5	\$55,043	67	\$469,754
Large	0	0	\$0	0	\$0	0	\$0
Total	43	124	\$655,588	13	\$255,998	137	\$911,586

Field Area Practices

Farm Size	Contracts Awarded *	Unfinished Practices	State Dollars Committed	Finished Practices	State Dollars Spent	Total Practices	Total State Dollars
Small	34	282	\$269,190	10	\$38,233	292	\$307,423
Medium	14	123	\$149,994	7	\$17,282	130	\$167,277
Large	1	0	\$0	1	\$9,822	1	\$9,822
Total	49	405	\$419,184	18	\$65,337	423	\$484,522

Total Practices

Farm Size	Contracts Awarded *	Unfinished Practices	State Dollars Committed	Finished Practices	State Dollars Spent	Total Practices	Total State Dollars
Small	42	344	\$510,067	18	\$239,189	362	\$749,256
Medium	17	185	\$564,705	12	\$72,326	197	\$637,031
Large	6	0	\$0	1	\$9,822	1	\$9,822
Total	65	529	\$1,074,772	31	\$321,336	560	\$1,396,108

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

**Vermont Agency of Agriculture, Food & Markets
Alternative Manure Management Cost Share Program
Fiscal Year 2007**

Contracts Approved

Farm Size	Contracts Awarded	Unfinished Practices	State Dollars Committed	Finished Practices	State Dollars Spent	Total Practices	Total State Dollars
Small	0	0	\$0	0	\$0	0	\$0
Medium	1	1	\$25,000	1	\$25,000	2	\$50,000
Large	5	0	\$0	6	\$290,211	6	\$290,211
Total	6	1	\$25,000	7	\$315,211	8	\$340,211

**Vermont Agency of Agriculture, Food & Markets
Best Management Practice / Alternative Manure Management Dollars Summary
Fiscal Year 2007**

State Funds Allocated	
FY 2007	<u>\$1,800,000</u>
Total State Funds Allocated	\$1,800,000
 State Funds Committed	
Best Management Practices	\$1,396,108
Alternative Manure Management	<u>\$340,211</u>
Total State Funds Committed	<u>\$1,736,319</u>
 Total State Funds Remaining	 <u><u>\$63,681</u></u>

Production Area Practices	Total Practices
Animal Mortality Facility	1
Animal Trails and Walkways	29
Closure of Waste Impoundments	7
Compost Facility	3
Heavy Use Area Protection	21
Roof Runoff Management	18
Structure for Water Control	2
Waste Facility Cover	8
Waste Storage Structure	16
Waste Transfer	22
Waste Treatment - Milk House Waste	1
Waste Treatment - Silage	<u>9</u>
Total Production Area Practices	137
Field Area Practices	
Access Road	22
Brush Management	1
Conservation Cropping System	38
Critical Area Planting	3
Diversion	35
Fence	110
Grade Stabilization Structure	2
Grassed Waterway	5
Lined Waterway or Outlet	8
Milkhouse Wastewater Infiltration Area	2
Pasture & Hayland Planting	28
Pipeline	48
Pumping Plant (Water Control Structure)	6
Riparian Forest Buffer	1
Spring Development	4
Stream Channel Stabilization	1
Stream Crossing	21
Streambank and Shoreline Protection	5
Subsurface Drain	8
Tree/Shrub Establishment	5
Trough or Tank	42
Underground Outlet	24
Waste Water Treatment Strip	1
Well	1
Windbreak/Shelterbelt Establishment	<u>2</u>
Total Field Area Practices	423
Alternative Manure Management Practices	
Manure Digester Storage Tank	3
Silage Leachate High Flow-Low Flow System	2
Solid/Liquid Waste Separation Facility	1
Solids Separator	<u>2</u>
Total Alternative Manure Management Practices	8

Table 7 – All FY 2007 BMP cost share sorted by Technical Practice Code

8-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)

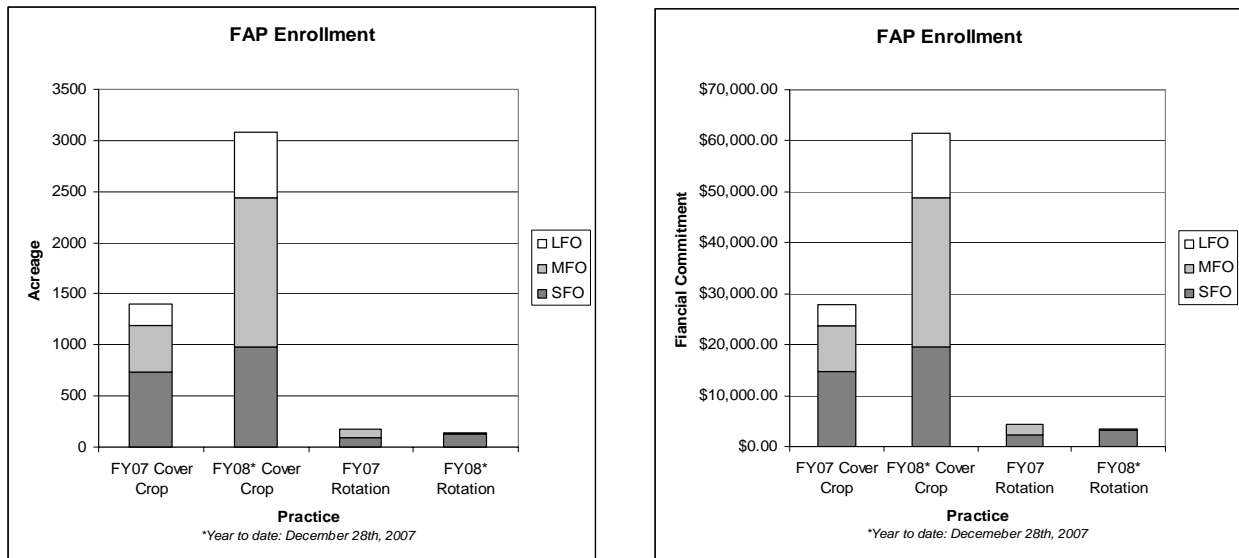
Each of these practices helps to lower erosion, therefore limiting phosphorus transport to surface waters, improves soil quality, and can help increase crop production.

Demand increased for cover cropping with 31 farms enrolling so far in FY2008 (up from 19 in FY2007). Cover crop enrollment increased from 1,398 acres (FY2007) to 3,079 acres (FY2008) and the financial commitment for this practice increased from \$27,950 (FY2007) to \$61,600 (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 five applications for conservation crop rotation (FY2007) covered 173 acres for a financial commitment of

\$4,355. FY2008 enrollment (to date) provides for the conservation crop rotation of 138 acres; a \$3,445 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.



Enrollment (number of farms)	FY07 Cover Crop	FY08* Cover Crop	FY07 Rotation	FY08* Rotation
SFO	10	14	3	2
MFO	7	14	2	1
LFO	2	3	0	0
Total	19	31	5	3

Figure 5 - Detailed itemization of the FAP Program showing FY2007 and FY2008 enrollment, acreage, and financial commitment by farm size and practice. The FY2008 program information is through December 28th, 2007.

8-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%.

To date, CREP enrollment has reached 1,771.2 acres, which can be estimated to cover nearly 300 miles of streambank assuming average buffer widths. The state has spent \$1,124,806.50 which is matched 4 to 1 with federal funds from the USDA. Enrollment in 2007 showed an increase in the past enrollment since 2003, and even though 2008 just began, its already on track to be greater than 2007. Enrollment in 2002 was abnormally high due to a backlog of participants waiting for the program to become available. Addison County is still the area with the most CREP contracts, however Franklin County is number two. Franklin County is on track to be the top producing county in 2008 as 16 contracts have already been completed, which matches the number of contracts Addison County enrolled in 2007. Despite a slow increase in enrollment in the northern Lake Champlain watersheds and the political and financial interests dedicated to the region, there is currently a waiting list of interested applicants. Several meetings have been held to figure out how to handle the backlog of individuals and the NRCS and the Agency of Agriculture have committed additional staff time specifically in this region which is expected to continue. This is a true testament of the time and energy all the interested parties in the watershed have contributed to educating landowners on the water quality concerns and the benefits that can be received by enrolling in CREP.

Pasture or permanent hayland comprise 61% of the land use enrolled in CREP while cropland is 39%. In 2007 there were 41 small farms, 13 medium farms, and one large farm that contracted and implemented CREP projects on their fields.

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

9-A) Background

In 1986, The Vermont Agency of Agriculture initiated the Pesticide and Groundwater Monitoring Program for pesticides and nitrates. This program has completed 21 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 1,593 private drinking water supplies in 184 towns representing each of Vermont's 14 counties. Farm wells account for 66% of all wells sampled and non-farm, neighboring wells account for 34%. For the five year period from 2003 to 2007, 618 drinking water wells were sampled. A total of 1,566 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 stimulated the merger of program priorities and water sampling activities between the Pesticide Program and the Agricultural Non-Point Source Control Program. The Agency now conducts surface and ground water sampling projects along with water quality investigations as part of a coordinated Agricultural Water Quality and Resource Management Program.

9-B) Nitrate and Herbicide Results

2007 – The program tested 181 wells and collected 234 samples. The results show that 108 of 181 wells tested had positive detections for nitrate. 40% of the wells tested had no detections for nitrate. 23 wells exceeded the drinking water standard of 10 ppm. This represents a short-term violation rate of 13%. The herbicide results show that 28 wells had positive detections for one or more herbicides. There was only 1 drinking water well with a detection of herbicide that exceeded a state or federal drinking water standard during 2007.

2003–2007 – The program tested 618 wells and collected 1,566 samples. 315 of 618 wells tested had positive detections for nitrate. 49% of the wells tested had no detections for nitrate. During this most recent five year period, 73 wells exceeded the drinking water standard of 10 ppm at some point during this time. This represents a long term violation rate of 12%. The herbicide results show that 71 wells had a positive detection for one or more herbicides. This represents a detection rate of 12% with the violation rate at less than 1%.

2003 - 2007	# Wells Sampled	# Wells Not Detected	# Wells w/ Detections		# Wells Above Standard
Herbicide Results	618	547	71		1
		(88%)	(12%)		(<1%)
	# Wells Sampled	# Wells Not Detected	# Wells Below 5 ppm	# Wells 5 - 10 ppm	# Wells Above 10 ppm
Nitrate Results	618	303	197	45	73
		(49%)	(32%)	(7%)	(12%)

Table 8 - Five Year Summary of Nitrate and Herbicide Results – data represents a total of 1,566 individual drinking water samples analyzed by the Agency

9-C) Program Status and Trends

A total of 63 new well sites were sampled during 2007. This represents a decrease in the number of new wells sampled for the year but an increase in the proportion of farm wells sampled. The trend that developed in recent years of sampling a larger percentage of non-farm wells has been reversed.

This occurrence is significant for two reasons:

- 1) The revised AAP Regulations (April 2007) and the new MFO General Permit (February 2007) have created additional opportunities for Agency of Agriculture and Natural Resource Conservation District staff to conduct on-farm assessments and provide technical assistance to farm operations for compliance with water quality requirements; and
- 2) The Agency has received a smaller number of requests for water sampling from non-farm well owners based on complaints that farm operations are contaminating groundwater.

To accomplish the mission of the AAP, MFO and LFO Programs, the active focus of the Agency's groundwater program has shifted to conducting water sampling related to pre/post construction evaluations of certified manure storage structures, barnyards and leachate collection systems. Groundwater sampling is also conducted to assess the effectiveness of nutrient management plans at preventing groundwater contamination from field application areas and crop production practices. These types of water quality sampling projects require a greater focus on the re-sampling and follow-up assessment of existing well sites as opposed to a focus on searching out new well sites.

The outreach efforts for AAP education and awareness conducted by the Natural Resources Conservation Districts are shifting to projects aimed at reaching non-dairy, livestock operations and practices. This initiative creates the opportunity to conduct farm assessments and groundwater testing for agricultural landowners that are required to comply with the AAPs but may not be aware of the conditions that apply to their operations.

The nitrate violation rate (the number of wells above the standard of 10 ppm) showed a 2% decrease for 2007. This improvement is reflected in both the one and five year data. The herbicide detection rate showed a 1% decrease for the 2007 data. This one year change is not yet reflected in the 5 year summary data.