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TECHNICAL REPORT ON

***IMPACT OF GENERAL PERMIT ON
CONCENTRATED ANIMAL FEEDING
OPERATIONS IN CONNECTICUT***



prepared for

***CONNECTICUT DEPARTMENT of
ENVIRONMENTAL PROTECTION***

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Prepared By:

Wright-Pierce
700 Plaza Middlesex
Middletown, Connecticut 06457

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EXECUTIVE SUMMARY

OVERVIEW

The State of Connecticut's agricultural sector provides significant direct and indirect social and economic benefits. Through the production of crops and livestock, and through the full range of farm support services, the agricultural industry generates \$2 billion annually for the Connecticut economy (Working Lands Alliance, 2000). Some 370,000 acres, or approximately 12% of the total state land area, is used or controlled by farms in the state, and a total of approximately 50,000 people are employed by the agricultural community (Connecticut Agricultural Businesses Cluster, 2001; Connecticut Farmland Trust, 2002).

Agricultural livestock production is a significant component of Connecticut's agriculture, and includes operations for dairy cows, beef cattle, chickens, horses, hogs, sheep and goats. Agricultural operations help to support hundreds of other businesses in the state, including animal feed, banks, insurance, equipment, truck and tractor suppliers, veterinary services, fuel, telephone, power, construction, and many others. Much of the animal-related farming occurs in Animal Feeding Operations (AFOs), defined as facilities that hold animals for controlled production. So-called Concentrated Animal Feeding Operations (CAFOs) represent a subset of AFOs, namely, those with specific numbers and types of animals. This report addresses waste management at specific types of AFOs.

FUNCTION OF AND NEED FOR THE CAFO GENERAL PERMIT

The Connecticut Department of Environmental Protection (DEP) uses a system of General Permits to regulate a variety of activities in the state with the potential to pollute soil, water and/or air quality. AFOs have the potential for such adverse environmental effects. At these facilities, farmers hold animals, require continuous supplies of feed and water, and manage waste products (wastewater and agricultural wastes). Recognizing these potential effects, the DEP has recently prepared a draft *General Permit for Concentrated Animal Feeding Operations* (hereinafter referred to as the General Permit). The intent of the General Permit is to ensure the proper management of agricultural waste and process wastewater discharges from specific CAFOs throughout the state. The General Permit will trigger CAFOs to be regulated through general size criteria (numbers and types of animals) and through farm-specific designation by the Commissioner of DEP.

The General Permit will authorize discharges from CAFOs provided that farmers conduct various activities, including:

- Development of a Comprehensive Nutrient Management Plan (CNMP) that addresses the collection, storage, treatment and land application of agricultural waste;
- Submission of the CNMP to the DEP for approval;
- Keeping the CNMP current, and maintenance of the CNMP at the site;
- Implementation of interim management measures before the CNMP is fully implemented;

- Implementation of the CNMP;
- Notification of the DEP in the case of noncompliance with the CNMP; and,
- Maintaining records and reports of specified activities at identified intervals.

The CNMP will significantly increase costs at all permitted CAFOs in the state. The main elements of a CNMP will include, as applicable: managing animal outputs (manure and wastewater) and implementing systems for collection, storage, transfer and treatment; evaluating sites and following procedures for land application; record keeping; managing inputs to animals (feed); disclosing other waste utilization options; and management of stormwater.

Animal-holding farms in Connecticut utilize imported feed, and by their operations generate large quantities of manure which is high in nutrients that require proper management. An analysis of animals and farmland in Connecticut indicates that a total of 8,000 tons of nitrogen (N, as N) and 4,550 tons of phosphorus (P, as P₂O₅) are produced annually in the state from animal operations; and 30% of the N and 43% of the P are surplus nutrients if it is assumed that all cropland is “open” to manure spreading.

Therefore, a significant nutrient surplus already exists in Connecticut, and this surplus will be exacerbated by the implementation of CNMPs by permitted CAFOs across the state.

FACILITIES AFFECTED AND FINANCIAL IMPLICATIONS

A typical dairy farm in Connecticut influences employment and economy well beyond the immediate limits of the home farm. Farms with 200 milking cows may manage over 300 acres of fields. Fields may lie in neighboring towns. Direct and indirect economic benefits may accrue to many areas. As a result, the Connecticut dairy farm has a significant zone of influence. Although not through the same processes, Connecticut poultry farms also influence the economy well beyond the limits of the farm site. This is because poultry farms must utilize neighboring farm fields for agronomic land application of agricultural wastes. The Connecticut dairy farms that are currently accommodating manure from poultry operations will, in future, have little to no capacity to take in manure from poultry farms. In fact, many dairy farms will be dealing with a significant nutrient surplus upon implementation of the General Permit requirements. In the future, therefore, the off-farm waste management approach may not be an option for many dairy and all poultry farms, forcing those facilities to seek out alternative solutions.

The Connecticut Department of Agriculture (DOA) database on agricultural livestock farms indicates that nine AFOs will be regulated as CAFOs due to numbers of animals. Of these, seven are poultry (egg production) facilities and two are dairy farms. This group is referred to as Type 1 CAFOs.

In addition, there are some 34 AFOs in the state that hold sufficient animals to trigger a review by DEP to determine whether these operations will be designated as CAFOs and will therefore require authorization under the draft General Permit. This group, all of which are dairy farms with 200 or more cows, is referred to as Type 2 CAFOs.

The implications of the General Permit on Type 1 and Type 2 CAFOs in Connecticut are substantial, encompassing direct costs and indirect costs that will vary depending on many factors, including farm type and size, animal handling procedures, location, construction constraints, and land availability. The types of capital costs that farmers face may include:

- Development of Comprehensive Nutrient Management Plans for nutrient management and waste management;
- Stormwater drainage control and treatment systems;
- Feed storage systems;
- Wastewater management systems;
- Manure handling and separation systems;
- Manure treatment systems and disposal systems;
- Fixed and/or mobile equipment for land application of manure and wastewater.

The types of ongoing operation and maintenance costs that farmers face may include:

- Field evaluations, investigations, sampling, analysis;
- Operation and maintenance of waste management systems;
- Off-site disposal of waste products;
- Documentation, record-keeping and reporting;
- Establishment of working relationships with property owners.

Detailed estimates of costs that regulated AFOs may incur are not available. However, site investigations at two dairy AFOs in Connecticut provide an early indication of the level of costs that dairy farms may face. These dairy farms, with approximately 200 to 300 milking cows, have already invested between \$250,000 and \$400,000 in capital costs for pollution control and nutrient management, and additional investment remains necessary. Incremental operational costs at each farm are not known.

Dairy farms in Connecticut that are Type 1 CAFOs, and those AFOs that may be designated as Type 2 CAFOs, will be faced with additional capital and operating costs associated with waste and nutrient management. At the same time, dairy farms in Connecticut are, like other dairy farms across the country, faced with prices for milk and milk products that have not increased in real dollars for decades. Some relief in the form of price support to milk producers was provided through the Northeast Dairy Compact, but that agreement expired in October 2001. Meanwhile, input costs for feed, supplies, and operations have steadily risen. Many dairy farms are operated at marginal profits, or at a loss. Therefore, capital and operating costs required for compliance with the CAFO General Permit will create an additional financial burden that will further diminish cost-benefit aspects of dairy farming in Connecticut.

Egg farms are faced with a different type of management challenge. A nutrient surplus is already created by egg farms that import nutrients in feed and do not have the land base to apply their manure to. This surplus will be exacerbated because egg farms currently dependent on other farmers for manure disposal will be faced with multiple cost impacts due to distance, disposal costs, and regulatory approvals. Some of those costs will be borne by the farmers that take the egg farm manure; however, most costs will be passed on to the producers. In some

cases, the farmers will be required to evaluate and develop totally new alternatives for waste management.

FUNDING SOURCES

A key aspect of this study is evaluation of the adequacy of existing financial support to Connecticut AFO producers for implementing waste management and nutrient management components of CNMPs. The most significant source is the federal USDA Environmental Quality Incentives Program (EQIP). EQIP was re-authorized in the 2002 Farm Bill and offers up to 75% cost sharing per farm. Connecticut NRCS indicates that contracted EQIP technical assistance for Connecticut farmers was \$629,364 for federal fiscal year 2001 and \$1,288,361 for federal fiscal year 2002. Connecticut NRCS staff administers the program and also provides technical planning and engineering assistance to contracted projects undertaken by farmers in Connecticut. This technical assistance is valued at 35% of the financial assistance amounts or \$218,527 for FY 2001 and \$450,926 for FY 2002. Thus the total value of EQIP assistance was \$849,641 for FY 2001 and \$1,739,287 for FY 2002. The amounts available for FY 2003 should be similar to FY 2002, although the funds available to Connecticut are based on national formulas and are subject to change.

Although the EQIP program can provide up to \$450,000 per farm at a cost-sharing percentage of 75%, the farmer remains responsible for obtaining the remaining 25%. Further, the farmer is faced with the tax implications of receiving EQIP funding as a taxable revenue stream. Additionally, investments made by the farmer in pollution control usually do not result in additional income to the farm.

State funding programs provide supplemental support to federal programs. The applicable state program is the Environmental Assistance Program (EAP), through which the Commissioner of Agriculture may reimburse farmers (up to \$40,000 per project with a minimum of 25% farmer's share) for part of the cost of compliance with an approved management plan. Legislation is currently pending that would reduce the farmer's cost sharing requirement to 10% (from 25%) and increase the maximum amount per project from \$40,000 to \$80,000.

Collectively, the federal and state financing programs provide capital support to farmers required to comply with the CAFO General Permit. However, none of these programs provides support for ongoing operations and maintenance.

Both federal and state levels of government also operate programs related to land preservation. These programs offer a limited degree of financial support to farmers. At the federal level, several programs are potentially applicable to AFOs in Connecticut. At the state level, land preservation for AFOs can potentially be compensated through the Farmland Preservation Program (also referred to as the Purchase of Development Rights Program). This program was established over twenty years ago, and has protected approximately 29,000 acres to date (Working Lands Alliance, 2000), representing about 7% of the total agricultural land in the state.

Land preservation programs can provide an important degree of assistance to AFO operations in Connecticut in terms of assisting with cash requirements for capital and operations. However, land preservation programs should not be viewed as sustainable income sources for farmers.

BENEFITS OF AFOs AND JUSTIFICATION FOR FINANCIAL ASSISTANCE

Additional costs for pollution control at Connecticut farms create a significant financial challenge. In general, due to wholesale milk pricing, dairy farms are not making enough income to offset the annual costs of operation, therefore added pollution control costs represent a further negative impact. Egg farms managing their waste disposal needs today will be faced with substantial cost increases in future due to hauling manure greater distance and greater complexity in treatment and disposal of surplus waste products.

Dairy farmers in Connecticut are already facing an economic crisis. The Working Lands Alliance has recently encouraged the state to consider a number of solutions, including restoration of the Dairy Compact, consideration of price support, and increasing state purchases of Connecticut-produced milk. Since the dissolution of the Dairy Compact, the base price paid to farmers for milk has been lower than the typical costs for production. It can be speculated that dairy farms faced with pollution control costs will have reduced economic viability, which could lead to farm closures or sales of farms for other land uses.

Existing federal and state funding programs for Connecticut farmers provide a degree of needed support. However, many farms are in a crisis due to the fundamental inadequacy of prices received for wholesale products. Funding programs and loans do not support uneconomic farming operations. As a result, farming economics must be improved as a first step. The federal and state programs are essential components to addressing farming economics, therefore, maintaining cost sharing programs at a minimum of 75% as a foundation to build and leverage additional funding is critical. In parallel, however, substantial additional financial support mechanisms are required to assist farmers in addressing the added costs that will be associated with the pollution control and manure management requirements of the CAFO General Permit.

Connecticut AFOs offer substantial benefits to the state of Connecticut going well beyond direct measurable economic effects. Those benefits are reviewed in order to highlight and help to justify financial support that would work in concert with other existing financing programs to assist AFO operators to comply with the requirements of the proposed General Permit. The major benefits include:

- Direct and indirect economic benefits arising through direct employment, taxation, and purchases of supplies and services;
- Maintenance of the land base in a non-developed state and prevention of urban sprawl;
- Provision of an important component of the state's tourism industry;
- Creation of a mixed economy that is resilient and able to withstand variations in commercial and industrial activities;
- Support of local commerce, reducing transportation costs and impacts for long-distance shipment of foods to Connecticut from outside the region; and
- Enhancement of the security of the food supply.

Substantial published research in New England has repeatedly illustrated that the cost of provision of municipal services to productive farms is less than the tax revenues received by the municipalities. By contrast, research shows that the cost of municipal services for residential land uses is often greater than the tax revenues obtained. Therefore, there is an argument to be made that, on strictly financial terms, the conversion of farmland to residential development is not cost-beneficial to municipalities. Further, public support for maintenance of Connecticut's farmland preservation has been demonstrated in recent statewide surveys.

The importance of productive farms to the quality of life in the state cannot be understated. Groups in Connecticut have formed that are focused on arresting the loss of farmland in the state. When considering public support, servicing costs, and quality of life issues, it is clear that maintenance of lands for CAFOs is in the best interest of many Connecticut residents. In view of this, a financial support program to assist farmers in complying with emerging CAFO General Permit requirements is judged to be essential.

Federal and state funding programs can be incorporated into an overall plan for funding support for qualified farmers in Connecticut; however, such programs do not necessarily provide sufficient cost-sharing to transform uneconomic dairy farms into sustainable operations. Some of the alternative funding sources discussed in the report will need to be implemented in order to help farms in Connecticut remain sustainable. Provided that farmers have the ability and resources to implement the control measures that are required by the General Permit, its implementation will enhance long-term farm sustainability.

Options for a financial assistance program are wide ranging and include:

- Price support programs for farm products, such as milk or eggs;
- Statewide bond issue to raise a fund for grants or loans;
- Modification of the Clean Water Fund to encompass grants and loans for pollution control systems at farms;
- Premiums, preferential purchasing, and standard specifications for waste by-products from domestic operations;
- Combinations of the above.

SHORT-TERM RECOMMENDATIONS

Education and Awareness

- Use this report to educate farmers, local, state, and federal officials, and elected representatives about the nutrient surplus in Connecticut and its potential for being exacerbated.
- Use this report to educate local, state and federal officials and elected representatives of the requirements of the General Permit, including the requirements for Comprehensive Nutrient Management Planning, the operational and financial implications to Connecticut farmers, the current crisis in dairy operations and the need for additional funding sources.

- Develop a coalition of farmers, state farm agencies, federal farm agencies, and non-governmental organizations to support the implementation of the CAFO General Permit as a means to help make agriculture sustainable in Connecticut.

Permit Finalization

- Develop a timetable for issuance, finalization and implementation. Finalize the draft CAFO General Permit using input from the public and stakeholders. Prepare a DEP "white paper" to be distributed statewide in advance of issuance.
- Develop a brief and concise Guidance Document that supports the CAFO General Permit, building on information presented in this report. Make the Guidance Document available at the time the General Permit is issued.

Funding Programs

- Support legislation being proposed by the Department of Agriculture to increase funding under the Environmental Assistance Program to the level of 90% of the project cost.
- Urge the representatives of the state legislature to develop and implement appropriate revenue enhancement mechanisms that would be used to fund CAFO improvements and provide support for ongoing operations and maintenance. This program could be managed by the DOA.
- Request that EPA designate a portion of the Section 319 Clean Water Act funds to be directed to agricultural pollution control and waste management projects resulting from CNMP for the CAFO General Permit.

LONGER-TERM RECOMMENDATIONS

In addition to the Short-Term Recommendations presented above, the following longer-term recommendations are put forward:

Education and Awareness

- Support the development of ideology within local, state and federal agencies that agricultural is a preferred land use from the perspective of controlling the municipal costs of community services while providing economic, environmental and social benefits.
- Continue to work with the coalition of farmers, state farm agencies, federal farm agencies, and non-governmental organizations to support the implementation of the CAFO General Permit as a means to help make agriculture sustainable in Connecticut.

Permit Implementation

- Develop a program and conduct reviews of all potential Type 2 CAFOs in Connecticut. Identify which operations will be designated as CAFOs to be permitted under the General Permit.
- Develop the "Land Application Risk Management" training program to be sponsored by DEP with NRCS and the University of Connecticut Soil Test Lab. The purpose of the

training is to assist operators and certified Conservation Planners in the decision-making processes associated with managing nutrients and nutrient surplus as the CNMP is implemented.

- Develop a fact sheet for a de minimus quantity of materials that would constitute a reportable spill in order to minimize unnecessary reporting.
- DEP, in cooperation with NRCS and University of Connecticut Extension, should develop a fact sheet to be given to third-party recipients of manure that will be used on lands that are not under control of the Permitted CAFO Operator.
- Develop a compliance form letter to be submitted by the permittee on an annual basis certifying implementation of CNMP.
- Support the work of the Cooperation Extension Service in assisting the farmers to implement the requirements of the CAFO General Permit.
- Develop a General Permit for composting agricultural waste to encourage composting which in turn would redistribute nutrients to help reduce the surplus.
- Monitor the implementation success of the CAFO General Permit. Make corrections and refinements to the General Permit as experience is gained. Develop a record-keeping information database for maintenance and retrieval of all data arising from the General Permit reporting.

Funding Programs

- Support the Connecticut Agricultural Business Cluster's ongoing project to develop a statewide approach for the effective, cost efficient and environmentally sound use of agricultural wastes.
- Urge the federal legislators to modify the tax statutes that require EQIP funds and other federal and state program funds to be reported as taxable income to farmers.
- Urge the state legislators to modify the tax statutes that require Environmental Assistance Program funds and other federal and state program funds to be reported as taxable income to farmers.
- Identify and develop additional funding sources within watersheds, such as through Trout Unlimited, watershed associations, lake associations, water utilities, and river groups. Work with watershed coordinators at CT DEP.
- Explore the use of EQIP Funds for regional manure handling facilities.
- Support the DOA Farmland Preservation Program as a means of encouraging the sustainability of farming in Connecticut.
- Support funding for Farm Research Groups, where farmers help identify and solve problems.
- Identify and provide proponents with access to funding for demonstration projects for management of the manure nutrient surplus that arises as farms implement CNMPs and waste management programs. Give priority to projects that are developed as a result of the work completed by Connecticut Economic Research Center in cooperation with the Connecticut Academy of Science and Engineering and the Department of Agriculture.

Alternative Funding Opportunities

- Evaluate the scope and viability of a statewide bond issue that could be used for raising funds to help CAFOs become sustainable, with a goal of supporting potential regional, manure-handling facilities and demonstration projects.
- Evaluate the opportunity to modify the Clean Water Fund mechanisms that would allow such funds to be directed to single-farm and/or regional waste management projects for multiple farms.
- Evaluate the opportunity for state agencies to establish preferential purchasing of Connecticut-based products. This could include premium payments as well as specifications requiring the use of Connecticut-generated manure byproducts.
- Should these or other opportunities appear viable, lobby the agencies and legislators to implement programs.

SECTION 1

INTRODUCTION

1.1 BACKGROUND

Connecticut has a diverse and dynamic agricultural sector that contributes substantial social, environmental, employment and economic benefits to the residents of the state. The state has approximately 4000 farm businesses, and the state's farms collectively produce over \$1 billion in sales. Economic statistics published by the United States Department of Agriculture (USDA) indicate that total statewide farm cash receipts place Connecticut a close third in the region (behind Vermont and Maine). Farms in Connecticut holding animals for production (Animal Feeding Operations, or AFOs) represent a significant proportion of gross farming receipts.

However, most AFOs, including those in Connecticut, have the potential to create environmental contamination in air, soil and waters of the state. AFOs are intensive feeding and holding facilities where the objective is controlled production. This requires the use of large quantities of animal feed and water. Agricultural wastes, including wastewater, process water, milking parlor waste (at dairies), and manure are generated, containing organics, suspended solids, nutrients and pathogens. Land application is commonly practiced as a manure management method, but as a result of the substantial nutrient importation there may be insufficient land available under the control of the farm for agronomic application rates. Due to the contamination potential, both national and state regulatory programs are evolving toward more rigorous requirements.

At the state level, the Connecticut Department of Environmental Protection (DEP) develops and enforces programs that help to maintain a healthy environment for all residents. Such programs may be voluntary and/or regulatory in nature. A major component of the DEP regulatory program is the General Permit Program, with 35 permits currently in force addressing a wide variety of activities with liquid and solid discharges. The General Permits issued by DEP create a framework under which regulated activities are typically required to register their operations with DEP, and provided that the operations follow the conditions, the operations are permitted.

The DEP has recently developed a proposed *General Permit for Concentrated Animal Feeding Operations* (hereinafter referred to as the General Permit). The latest draft of the CAFO General Permit was issued on April 2, 2003, and it forms the foundation of this report. It is provided in its entirety as **Appendix A**.

As a specific subset of AFOs, CAFOs typically reflect a greater number of animals on a given farm. The triggers that establish CAFOs are defined explicitly in the CAFO General Permit and are discussed further in Section 2 of this report. The CAFO General Permit establishes four Types of CAFOs that are regulated as follows:

- Type 1 are triggered immediately upon issuance of the General Permit;
- Type 2 may be triggered at a future date once they are evaluated by DEP;

- Type 3 are constructed in the future (after the General Permit is issued) and
- Type 4 are those that are designated by the Commissioner.

The intention of DEP is to issue the draft General Permit to this regulated community along with supporting technical and economic information. This report provides an evaluation of the potential impact of the General Permit on Connecticut's farming industry, highlighting the benefits of increased regulatory control, identifying funding mechanisms, and summarizing the value of AFOs to the state.

The past several decades have seen substantial changes in the animal production industry as a result of domestic and export market forces, technological changes and industry adaptation. The result is that on a national and a state scale, the trend in animal feeding operations is towards greater numbers of animals on fewer and fewer farms. The environmental effects of this trend have recently been the subject of discussion in mainstream media (for example, the Hartford Courant, November 25, 2002).

A recent dairy industry review states that average farm size is rising, with 39% of year 2001 nationwide milk production from herds bigger than 500 head, as compared to only 29% four years before. The same review indicates that only 325 farms in the entire country produced almost 13% of all milk produced in the United States (National Milk Producers Federation, 2002).

Developments at AFOs in Connecticut are generally characteristic of those at AFOs nationwide: the number of farms is decreasing, while the number of animals held at each farm is increasing. The majority of AFOs in Connecticut are dairy farms, however, the total number of dairy farmers is in a persistent downward decline. In 1989 there were 357 dairy farmers in Connecticut, whereas in 1993 this number had decreased to 304 (University of Connecticut, 1995). As discussed later in this report, the Connecticut Department of Agriculture's database indicates that there are 255 farms with dairy cows on them as of 2002. Available information also shows that milk production per cow is increasing; therefore, despite the drop in numbers of dairy farms, the quantity of milk produced has remained relatively constant.

As farms become larger and more animals are held at each farm, the water use, feed consumption, and waste production become more significant, which in turn increases the pollution potential at the farm. Further, as nutrient-based manure application requirements are implemented, the land area potentially required by each AFO for manure management will increase, shifting to locations farther from the AFO itself and requiring alternative management methods.

1.2 EMERGING FOCUS ON AGRICULTURE

Over the past several decades, surface water pollution from various point sources has been substantially decreased across the country, including in Connecticut. Hundreds of point-source wastewater discharges from municipal and industrial sources have been subjected to ever-increasing levels of treatment and control brought about by environmental regulatory programs. Non-point source pollution is also becoming more important statewide and nationally. Programs

for the control of pollution in stormwater are also being expanded; an example is the pending implementation of the NPDES Phase 2 stormwater program which will regulate stormwater quality from municipalities and industrial operations of many types.

As these pollution control programs have been put into force and the requisite investments have been made, and as the pollution control from readily identifiable point sources has been achieved, the importance of managing environmental risks from the agricultural sector has become much more widely recognized. Reflecting on public, agency and industry concerns, the United States Environmental Protection Agency (USEPA) and the United States Department of Agriculture (USDA) published the *Unified National Strategy for Animal Feeding Operations* (USDA and USEPA, 1999). The *Unified National Strategy* is based on a national performance expectation for all AFO owners and operators, and presents a series of actions to minimize public health impacts and to improve water quality, while supporting the long-term sustainability of livestock production throughout the country. The goal of the *Unified National Strategy* was to encourage the implementation of technically and economically feasible Comprehensive Nutrient Management Plans (CNMPs).

Regulatory activities at a national level are applied in different ways in the states, depending upon program delegation. The State of Connecticut is a delegated state with regard to NPDES permits and approvals. In other words, the state has the authority to implement EPA NPDES requirements. In Connecticut, the DEP has long recognized the importance of minimizing the impact on air, soil and water quality from industrial and commercial activities, while maintaining those activities as sustainable and healthy contributors to employment and economic activity in the state. The DEP now intends to expand its well-established General Permit program to address the agricultural sector. In this regard the CAFO General Permit has been drafted and its implications are now under detailed review. The DEP recognizes that the CAFO General Permit cannot be implemented without sound economic support.

1.3 PURPOSE AND SCOPE OF THIS REPORT

This report has been developed under the direction of DEP, with input and advice from the CAFO Advisory Committee established in April 2000 and comprising representatives from:

- University of Connecticut Cooperative Extension;
- Natural Resources Conservation Service of USDA;
- Farm Service Agency of USDA;
- USEPA;
- Agricultural consultants;
- The dairy and poultry farming community;
- Connecticut Farm Bureau;
- DEP; and,
- Connecticut Department of Agriculture.

The purpose of this report is to define on-farm costs of compliance with the CAFO General Permit, and to define the benefits of compliance and the value of AFOs to the state. Organization of the report is as follows:

- Section ES provides a concise stand-alone Executive Summary.
- Following this Introduction (Section 1), Section 2 provides background information on AFOs in Connecticut, drawing from a statewide database, and highlighting relevant technical and environmental issues.
- Section 3 presents the CAFO General Permit and describes its implications.
- Section 4 defines the anticipated impacts of the CAFO General Permit on the farming community in Connecticut, addressing both capital and operating costs, taking into consideration the dairy and poultry AFOs that may be affected.
- Section 5 summarizes the anticipated benefits to farmers associated with compliance with the CAFO General Permit, as well as the benefits to the state as a whole.
- Section 6 presents and comments upon the funding mechanisms that may be available to farmers to assist them in addressing the requirements of the CAFO General Permit.
- Section 7 identifies the value of AFOs to the State of Connecticut, considering direct and indirect impacts.
- Section 8 presents recommendations for next steps.
- Appendix A provides the full text of the CAFO General Permit.
- Appendix B provides examples of potential regional pilot or demonstration projects for off-farm manure management.

SECTION 2

BACKGROUND INFORMATION ON ANIMAL FEEDING OPERATIONS IN CONNECTICUT

This section of the report provides a summary of Animal Feeding Operations in Connecticut, as a means of providing the background for the discussion which follows in Sections 3 (the CAFO General Permit), Section 4 (Impacts of the CAFO General Permit), and Section 5 (Benefits of Compliance). The sources and distribution of farm-related nutrients (with the emphasis on nitrogen and phosphorus) are discussed in order to provide the context for evaluating impacts of nutrient management requirements.

2.1 DEFINITION OF ANIMAL FEEDING OPERATIONS

For the purposes of this report, the definition of an Animal Feeding Operation is based on the CAFO General Permit (described in Section 3 and reproduced fully in Appendix A). An AFO is a lot or facility where (i) animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. This definition is consistent with definitions developed and applied nationwide by the USEPA (EPA, 2000; EPA, 2002).

2.2 AFOs IN CONNECTICUT

The inventory discussed in this subsection and used throughout this report is based upon a “*Connecticut farms database*” provided to Wright-Pierce on November 1, 2002 by the dairy division of the Connecticut Department of Agriculture (DOA). The database itself is maintained and updated regularly by DOA for the purposes of inventory and communication with farmers in the state. While not all of the information is provided for every farm, the database provides a useful starting point for quantifying the numbers and sizes of AFOs in Connecticut, with the goal of estimating how many may be designated as CAFOs under the CAFO General Permit.

The “*Connecticut farms database*” is not presented as a complete inventory of farms in Connecticut. As discussed in the Introduction, there are thousands of farms and farm-related businesses in the state. The database is used as a starting point for identifying AFOs and CAFOs only. The database includes some 546 farms, almost all of which are farms holding animals. The majority of farm types identified in the database are dairy (255). Closer evaluation of the database indicates that farm type may not always be stated as “dairy”, even when dairy cows are present. An evaluation of the data illustrates that there are in fact some 255 farms with dairy cows present.

The farms listed in the DOA database are identified by owner, name, and other contact information. However, for the purposes of this report, they are identified by location and category only, as it is not the intention of the authors to highlight specific operations that might be subjected to future regulations. Based on the criteria established in the CAFO General

Permit, some farms will be defined as CAFOs and will face mandatory compliance whereas other farms will be evaluated by DEP on an individual basis to determine if they pose a threat to water quality.

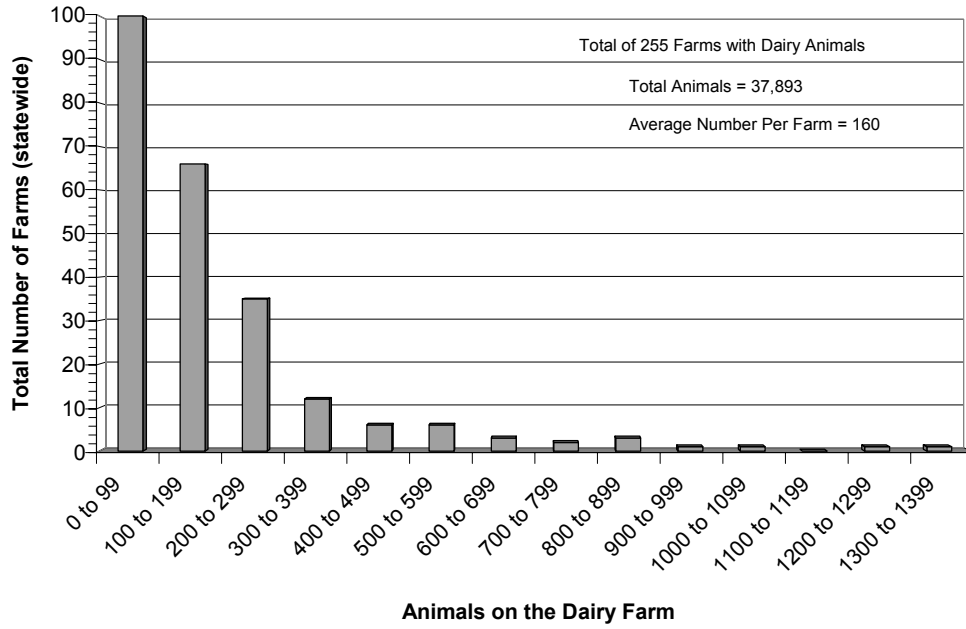
The DOA farms database does not list farms as AFOs consistent with the AFO definition above, however, review indicates that of the total 546 farms, approximately 94% appear to be animal-holding facilities, with the remainder generally as “fruit & vegetable” farms. The majority are dairy farms with total numbers of animals ranging from 1 to 1300. Animals at dairy farms are not distinguished between milkers, dry cows, and heifers. A lesser number of AFOs are swine-holding facilities, poultry facilities, and beef facilities.

2.3 NUMBERS OF ANIMALS ON DAIRY FARMS IN CONNECTICUT

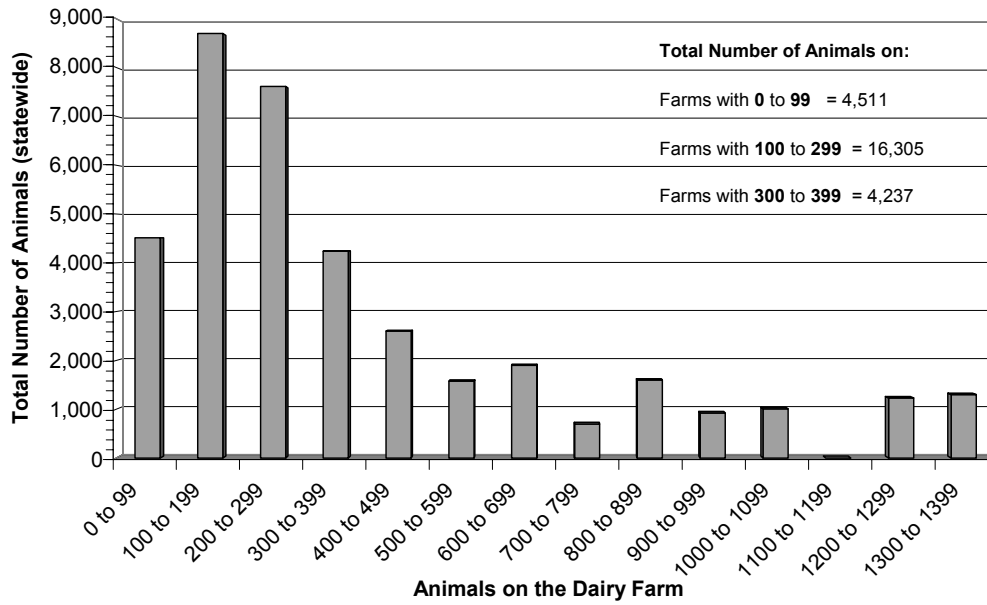
The DOA database has been evaluated to examine the numbers of animals held on dairy farms in Connecticut. The database indicates that there is a total of 37,893 cows held on all farms in Connecticut. With 255 farms holding dairy cows, the average number per farm is 160 cows.

Figure 2-1 and 2-2 illustrate the distribution of cows on dairy farms. As shown on Figure 2-1, the majority of farms hold less than 100 animals. The second most common size is farms with 100 to 200 animals. Figure 2-2 indicates the occurrence of animals by dairy farm sizes. Most dairy animals in the state are held on farms in the range of 100 to 300 animals. The information also shows that more than twenty percent of the dairy cows are housed on the ten largest dairy farms.

**FIGURE 2-1
CONNECTICUT DAIRY FARM SIZES**



**FIGURE 2-2
NUMBER OF DAIRY ANIMALS ON CONNECTICUT DAIRY FARMS**



2.4 TYPICAL DAIRY FARM IN CONNECTICUT

To aid the discussion of both economic benefits and environmental impacts, a brief description of a typical dairy farm in Connecticut is given below.

The average number of dairy cows held on a Connecticut dairy farm is 160. The majority of dairy farms have 100 or fewer animals; however, of the total of nearly 37,900 cows in the state, some 16,300, or 43%, are held on farms with 100 to 300 cows. Thus, a discussion of a 200 - 300 cow dairy farm is reasonably representative. Such a farm in Connecticut may comprise the following components:

- The home farm, with land area sufficient for barns, feed storage, water supply systems, offices, warehouses, milking parlor, vehicle parking and maintenance areas, waste management systems, and other ancillary facilities; in total, this land area may be 50 to 100 acres or more;
- At the home farm or at another farm, heifer raising facilities, including feed storage, water supply, waste management systems, and other ancillary facilities;
- If heifer raising facilities are not part of the farm, arrangements with other farms for obtaining stock;
- Fields that are being worked as cropland (corn and grass), other fields, pastures and woodland (perhaps 600 total acres, with lands in one or more towns and in some cases in other counties); the distance to fields managed by the farm may be 20 to 30 miles maximum, and the farm may be managing individual fields of up to 50 to 60 in number;
- Some croplands that may be in the Farmland Preservation Program;
- Arrangements with neighboring farms for accepting manure for landspreading, if the land available by the farm itself is insufficient for agronomic application.

The typical dairy farm creates economic, employment and tax impacts well beyond the immediate home farm. Such a single dairy farm may affect the economy of many Connecticut towns.

2.5 ENVIRONMENTAL IMPACTS OF CONFINED ANIMAL PRODUCTION

In order to lay the groundwork for discussing the need for and implications of the CAFO General Permit, the environmental implications of confined animal production are introduced in point form below. These are based on recently-published sources, most particularly the *Agricultural Waste Management Field Handbook*, Part 651 of the NRCS National Engineering Handbook. The major potential pollution sources are given in Table 2-1.

**TABLE 2-1
LIVESTOCK PRODUCTION ACTIVITIES AND POTENTIAL POLLUTION SOURCES
(AFTER EPA, 2000)**

Activity	Potential Pollution Outputs
Feed storage, loading and unloading	<ul style="list-style-type: none"> - dust emissions - unusable or spilled feed - leachate from silage and other material storage - nutrient-contaminated runoff
Housing of animals	<ul style="list-style-type: none"> - animal waste - waste bedding - air emissions (such as odors, methane, ammonia) - washwater from flushing and washdown of housing areas
Milking of animals (dairy farms)	<ul style="list-style-type: none"> - process wastewater - animal waste - washwater from flushing and washdown of milking areas
Feeding of animals	<ul style="list-style-type: none"> - animal waste - air emissions (such as dust, methane) - spillage and discard of feed - nutrient-contaminated runoff
Watering of animals	<ul style="list-style-type: none"> - animal waste - water contaminated with animal waste - damage to streambanks and riparian zones by animal movement

The focus of this report and the CAFO General Permit is on pollution prevention and nutrient management, primarily related to control of potential contamination of surface waters and groundwaters.

2.6 CONFINED ANIMAL PRODUCTION AND MANURE NUTRIENTS

The majority of AFOs in Connecticut are dairy and poultry (egg production) facilities. Across the United States, it is estimated that there are some 1.3 million farms with livestock, of which 238,000 are considered AFOs. A very large number of these AFOs are livestock and poultry facilities (USEPA, 2001; USEPA, 2002). Manure from livestock and poultry can provide valuable organic material and nutrients for crop and pasture growth. Ideally, a single farm could jointly manage animal waste and plant nutrients within its operation, thereby reducing the need for off-site waste management and, as well, reducing or eliminating the use of commercial fertilizers on the farm. However, depending on many variables, including farm size, land availability, proximity of land to water, land slope, crops raised, nutrient content of soil and climate conditions, farms may be unable to apply manure nutrients at optimum rates, requiring export of waste and nutrients from the operation.

The fundamental problem that arises, therefore, both nationally and in Connecticut, is that there is typically a **surplus of nutrients** generated from AFOs, and this nutrient surplus must be managed in an environmentally and economically feasible manner. This surplus creates the need

for off-farm solutions, by land application on available cropland, and/or by alternative means of waste management.

The paragraphs below comment on the implications of manure nutrient export on both a national and a statewide basis.

National Manure Nutrient Production

A recently-published national study (USDA, 2001) investigated the national manure nutrient production and the capacity of cropland and pastureland to assimilate nutrients. At a national level, based on the analysis, approximately 1.2 million tons of recoverable nitrogen and 0.7 million tons of recoverable phosphorus were produced in 1997. This study found that most farms (78% for nitrogen and 69% for phosphorous) have adequate land on which it is physically feasible to apply the manure produced on-farm at agronomic rates.

However, the national study also reported that manure produced on operations that cannot fully apply it to their own land at agronomic rates accounts for 60% of the nitrogen and 70% of the phosphorous. The implication is that nutrients may currently be over-applied to existing farmland, potentially creating nutrient contamination in surface waters and/or groundwaters. To prevent such contamination, substantial quantities of manure must be moved to other farms, and/or managed by alternative means, in many locations. As nutrient management becomes more critical and receives a higher degree of attention, this requirement for nutrient export will only increase nationwide.

Connecticut Manure Nutrient Production

Work conducted in Connecticut illustrates a **significant nutrient surplus** problem that mirrors the nationwide study reported on previously. This surplus is most evident with phosphorus, but is also reflected in an analysis of nitrogen.

A statewide analysis of manure nutrient production was prepared by the Cooperative Extension Department at the University of Connecticut (Meinert, unpublished data). This analysis utilized 1997 US Census data and animal numbers by county to calculate fertilizer nutrients from manure generated in Connecticut. The analysis then utilized 1997 cropland census data to estimate how much of the nutrients could theoretically be utilized in the each of the Connecticut counties as well as statewide.

The analysis by Meinert showed that Connecticut's estimated animal population (cows, heifers, sheep, lambs, hogs, pigs, horses, goats and poultry) could produce, in aggregate, approximately 8,000 tons per year of nitrogen, 4,500 tons per year of phosphorus (as P₂O₅), and 5,800 tons per year of potassium (as K₂O). In total the estimated value of these nutrients (if used to replace chemical fertilizer) is approximately \$7 million based on current (2002) nutrient values.

Statewide, all farm animals produce an estimated 15.9 million pounds (nearly 8,000 tons) of nitrogen and 9.1 million pounds (4,550 tons) of phosphorus annually. The analysis conducted by Meinert, which assumed all cropland could actually accommodate manure nutrient

application, nonetheless determined that there would be a theoretical annual surplus of 4.8 million pounds (2,400 tons) of N and 3.9 million pounds (1,950 tons) of P. It is noted from the analysis that the dairy and poultry industries together account for nearly 80% of these nutrient loads.

Since all farm fields are not necessarily “open” to manure nutrient application, the analysis discussed above results in a low estimate of the surplus. In fact, it is reasonable to assume that at least three-quarters of the land base would be “closed” to nutrient application, based on experience in the Blackberry River watershed (discussed below). Therefore, the nutrient surplus could be much greater than 2,400 tons of N and 1,950 tons of P per year.

Litchfield County Soil and Water Conservation District Study

A recently-published study of the Blackberry River Watershed (Litchfield County Soil and Water Conservation District, 2002) demonstrates the challenges associated with agronomic application of manure to farmlands in one area of the state. The study examined a 29,805 acre watershed in the northwest corner of Connecticut. The Canaan Valley Agricultural Cooperative was invited to take part in a pilot project to use GIS for managing nutrient-rich farm wastes on a watershed level. All participating farms were situated within the Blackberry River Watershed, and their fields comprised most of the agriculture in the watershed.

The objective was to identify and assess possible locations within the watershed that could serve as a disposal point for nutrient rich farm wastes, and to assess fields for nutrient content status. The study found that 953 acres were considered “open”, that is, they could potentially accept waste. This area represented 65% of the agricultural fields. However, of the 953 acres, only 167 acres, or 18% of the open agricultural fields, have the capacity to handle more phosphorus. Therefore, in this watershed, the ability to manage nutrient-rich farm waste is significantly limited.

2.7 NUTRIENT SURPLUS IMPLICATIONS

At a national, statewide and local level, AFOs import and produce nutrients that must be managed in an economically and environmentally sustainable manner. The nutrient surplus must be addressed in the context of Comprehensive Nutrient Management Planning. This is addressed in the balance of the report.

SECTION 3

THE GENERAL PERMIT AND IMPLICATIONS

The CAFO General Permit has been prepared to establish an environmental regulatory framework for selected AFOs in Connecticut. Previous sections of the report have identified the context of livestock production farming in Connecticut, defined AFOs, and introduced the critical issue of the nutrient surplus created through concentrated livestock farming. This section describes the CAFO General Permit and its direct regulatory implications on CAFOs. Section 4 then addresses the financial and operational impacts in greater detail.

3.1 CAFO GENERAL PERMIT ORGANIZATION

The draft CAFO General Permit is the foundation regulatory instrument for development and implementation of nutrient management and pollution control activities at specific AFOs in Connecticut. It is provided in its entirety in **Appendix A**.

This General Permit will function as other such permits in Connecticut, administered by the DEP as a tool for authorizing discharges at specific types of operations. The facilities that are covered by the permit will be authorized to conduct the activities specified in the permit *once they have met all applicable conditions of the permit*.

Once issued and in force, the CAFO General Permit will serve as a statewide permit authorizing wastewater and agricultural waste discharges at specific AFOs in Connecticut. Table 3-1 lists the conditions that are set out in the CAFO General Permit with brief descriptions of each.

**TABLE 3-1
CONDITIONS ESTABLISHED BY THE CAFO GENERAL PERMIT**

Condition	Title	Coverage
(a)	Effluent Limitations	Limits discharge of agricultural waste or process-generated wastewater
(b)	Comprehensive Nutrient Management Plan (CNMP)	Requires development, submittal, approval, and implementation of a CNMP addressing the management of animal waste, land application, records, feed management, other waste utilization, and stormwater management
(c)	Monitoring Requirements	Requires permittee to monitor and inspect structural management practices and requires permittee to maintain records of land application
(d)	Requirements for Land Application not under control of the Permittee	Requires permittee to maintain records regarding manure or manure products that leave the permitted operation
(e)	Reporting and Record Keeping Requirements	Requires permittee to provide annual letter to DEP certifying implementation of CNMP; requires records to be maintained for at least five years
(f)	Recording and Reporting Violations	Requires permittee to notify DEP of actual or anticipated noncompliance with the General Permit
(g)	Regulations of State Agencies	Lists the other regulations that are incorporated into the General Permit
(h)	Reliance on Registration	Indicates that the Commissioner of DEP relies on the registration information provided by the permittee
(i)	Duty to Correct and Report Violations	Requires permittee to correct violations of a condition of the General Permit
(j)	Duty to Provide Information	Requires permittee to provide information that may be requested by the Commissioner of DEP
(k)	Certification of Documents	Personal statement by the responsible individual
(l)	Date of Filing	Defined as the date the document is received by DEP
(m)	False Statements	False statements may be punishable as a criminal offense
(n)	Correction of Inaccuracies	Requires permittee to correct any inaccuracies in submissions
(o)	Transfer of Authorization	The authorization under the General Permit is non-transferable
(p)	Other Applicable Law	Nothing in the General Permit eliminates applicability of other laws
(q)	Other Rights	Maintains State of Connecticut rights, subject to all public and private rights, does not create the presumption that the General Permit should or will be renewed

3.2 SUBGROUP OF AFOs DEFINED AS CAFOs

The General Permit defines AFOs and CAFOs. The General Permit defines an Animal Feeding Operation (AFO) as:

...a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

The regulatory instrument then goes on to define a Concentrated Animal Feeding Operation (CAFO) in three categories as follows:

...an “animal feeding operation” that meets any of the three following criteria:

a. Operations that stable or confine a number equal to or greater than the numbers of animals specified in any of the following categories:

1. 1,000 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs,
2. 1,000 veal calves,
3. 700 mature dairy cattle whether milked or dry,
4. 2,500 swine each weighing 55 pounds or more,
5. 10,000 swine each weighing less than 55 pounds,
6. 500 horses,
7. 10,000 sheep or lambs,
8. 55,000 turkeys,
9. 82,000 laying hens,
10. 125,000 chickens other than laying hens,
11. 5,000 ducks (outdoor operations),
12. 75,000 ducks (indoor operations).

b. Proposed new operations at a new location which will generate more than 1000 gallons per day of process-generated wastewater or which stable or confine greater than or equal to the numbers of animals specified in the following categories:

1. 300 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs,
2. 300 veal calves,
3. 200 mature dairy cattle whether milked or dry cows,
4. 750 swine each weighing less than 55 pounds,
5. 3,000 swine each weighing less than 55 pounds,
6. 150 horses,
7. 3,000 sheep or lambs,
8. 16,500 turkeys,
9. 37,500 chickens other than laying hens,
10. 25,000 laying hens,
11. 1,500 ducks.

c. Any other animal feeding operation that the Commissioner designates as a CAFO.

Therefore, the CAFO General Permit effectively creates four categories of CAFOs, as listed in Table 3-2.

**TABLE 3-2
CATEGORIES OF CAFOs CREATED BY THE GENERAL PERMIT**

Type	CAFO type	Criteria
Type 1	Existing AFO, defined as a CAFO	Criteria (a), definition
Type 2	Existing AFO, potentially triggered as a CAFO	Criteria (b), reviewed by DEP
Type 3	New AFO, defined as a CAFO	Criteria (b), definition
Type 4	Existing or new AFO, designated by Commissioner	Criteria (c), designation

3.3 CONNECTICUT AFOs TRIGGERED BY THE CAFO GENERAL PERMIT

The database provided by DOA has been reviewed to identify farms that may be Type 1 or Type 2 farms per the CAFO General Permit. Clearly, the database is not of any particular use with regard to identifying farms of Type 3 or 4, as those types are defined as new operations, or any existing operations designated by the Commissioner.

Type 1 CAFOs

The database identifies numbers of animals present at 415 farms. Table 3-3 lists the nine AFOs that are triggered as Type 1 CAFOs based on the definitions in the CAFO General Permit. For the purposes of developing this list, the number of mature cows at dairy farms has been assumed to be 67% of the total number of animals at dairy farms, allowing for 33% of the animals as replacement stock. As indicated in the table, a total of nine farms are triggered as Type 1 CAFOs, seven of which are poultry farms and the remainder being dairy farms.

**TABLE 3-3
TYPE 1 CAFOs TRIGGERED BY THE GENERAL PERMIT**

Type of Operation	Database Number	Town	Number of Animals
Dairy Farm	279	North Canaan	Dairy – 1300, Beef – 30, Horses – 1
Dairy Farm	155	Woodstock	Dairy – 1231
Poultry Farm	19	Bozrah	Layers – 1,200,000, Growout – 400,000
Poultry Farm	32	Bozrah	550,000
Poultry Farm	344	Lebanon	1,300,000
Poultry Farm	308	Franklin	440,000
Poultry Farm	309	Hebron	210,000
Poultry Farm	310	Colchester	150,000
Poultry Farm	311	Lebanon	220,000

Type 2 CAFOs

The farms database has been reviewed to identify those AFOs that are triggered as potential CAFOs by criteria (b) in the CAFO General Permit. These AFOs are listed in Table 3-4. As

with the development of the list for the Type 1 CAFOs, the number of mature cows at dairy farms has been assumed to be 67% of the total number of animals present at dairy farms. A total of 34 farms are potentially triggered as Type 2 CAFOs, all of which are dairy operations.

**TABLE 3-4
TYPE 2 CAFOs POTENTIALLY TRIGGERED BY THE GENERAL PERMIT**

Type of Operation	Database Number	Town	Number of Animals
Dairy Farm	135	Columbia	300
Dairy Farm	261	New Preston	300
Dairy Farm	45	North Stonington	300
Dairy Farm	81	Wallingford	300
Dairy Farm	217	Thompson	305
Dairy Farm	229	Lebanon	320
Dairy Farm	86	Wallingford	320
Dairy Farm	246	Woodstock	320
Dairy & Fruit Farm	302	Thompson	342
Dairy Farm	56	Baltic	350
Dairy Farm	278	North Canaan	Dairy-350, Beef-6
Dairy Farm	276	Washington	350
Dairy Farm	185	Ellington	380
Dairy Farm	300	Woodstock	400
Dairy Farm	214	Coventry	425
Dairy Farm	132	Hebron	425
Dairy Farm	66	Lebanon	Dairy-450, Horse-1
Dairy Farm	240	North Branford	450
Dairy Farm	265	North Canaan	Dairy-450, Beef-2
Dairy Farm	130	Canterbury	500
Dairy Farm	41	North Stonington	500
Dairy Farm	90	Scotland	500
Dairy Farm	248	Hampton	Dairy-510, Beef-1, Horses-4
Dairy Farm	353	Woodbury	Dairy-565, Swine-30
Dairy Farm	89	Franklin	580
Dairy Farm	42	North Franklin	600
Dairy Farm	280	Storrs	630
Dairy Farm	123	Union	670
Dairy Farm	333	Sterling	700
Dairy Farm	153	Ellington	800
Dairy Farm	49	North Canaan	800
Dairy Farm	277	North Canaan	800
Dairy Farm	154	Union	924
Dairy Farm	150	Ellington	1010

Other AFOs without Animal Number Information

The database reviewed for this project also lists a number of facilities without providing the numbers of animals. Therefore, depending on the numbers of animals present, these facilities may be Type 1, Type 2, or non-triggered CAFOs. In total, some 128 facilities have no data on numbers of animals. It is noted that of this 128, only 11 are dairy farms, and the majority are indicated as sheep or goat operations.

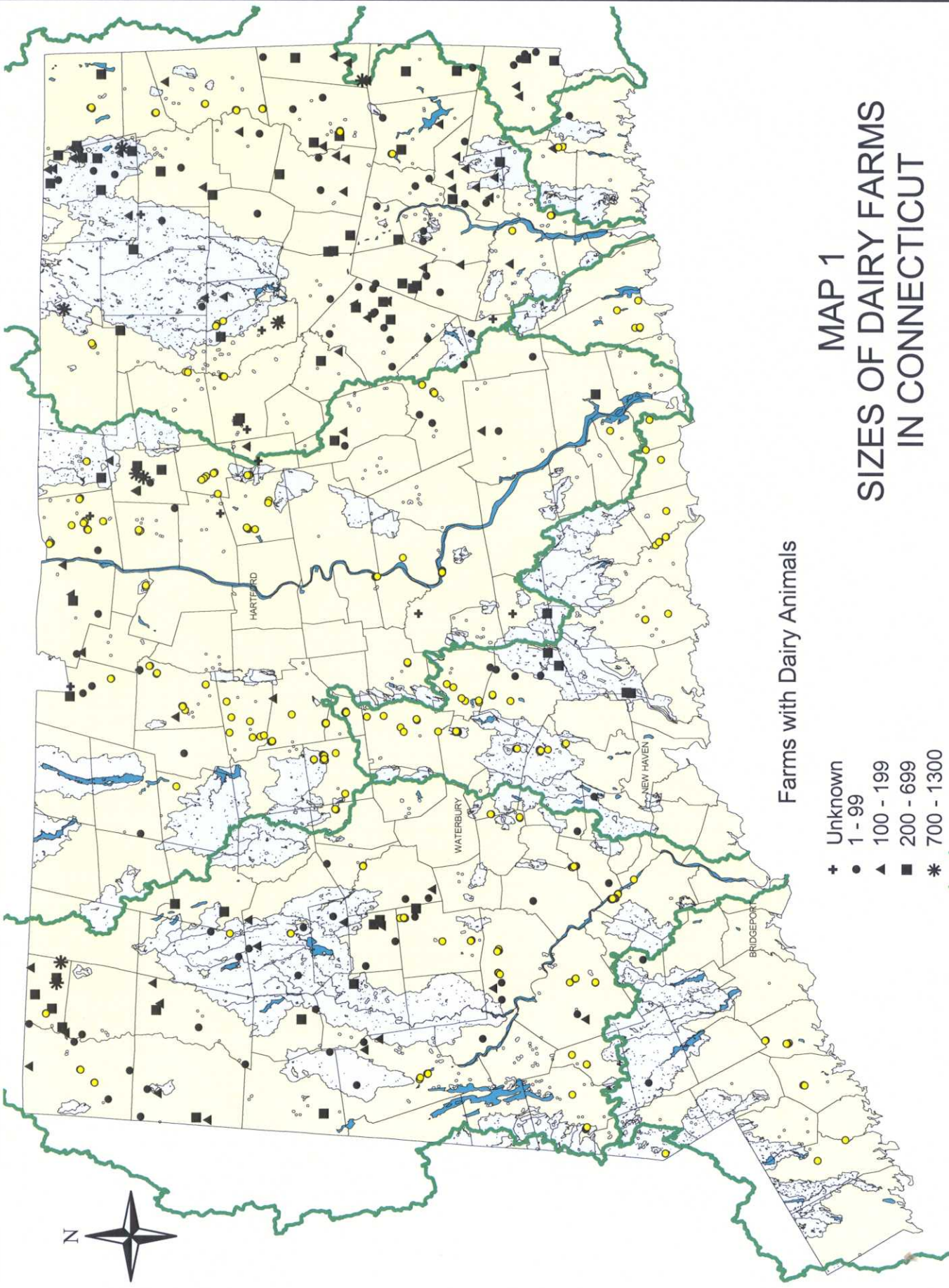
3.4 REGULATORY IMPLICATIONS

The CAFOs described previously and listed in Tables 3-3 and 3-4 will be subject to regulatory implications. Once the CAFO General Permit is issued and in force, Type 1 CAFO operators will be required to register with the DEP within 60 days. These facilities will be required to prepare a Comprehensive Nutrient Management Plan (CNMP), discussed in further detail in Section 4, within one year. Within 30 days of development of the CNMP, the permittee will be required to submit it to the DEP. Once the CNMP is approved, the permittee will be required to implement the CNMP in accordance with the schedule contained in the plan or in accordance with any alternate schedule approved by the DEP.

Once the CAFO General Permit is issued and in force, the DEP will evaluate all existing Type 2 potential CAFOs over a three to five-year time frame. Through the course of that evaluation, the DEP will determine if the AFOs thus evaluated will be designated as CAFOs. As new facilities are developed, if they are Type 3 CAFOs, the DEP will evaluate them in the same manner. As well, the DEP will retain the ability to designate *any size* AFO as a Type 4 CAFO.

Once a facility is designated as a Type 2, 3 or 4 CAFO, the permittee will be required to follow the steps identified above for Type 1 CAFOs.

Maps have been prepared of the state of Connecticut illustrating dairy farm sizes and distribution of CAFOs throughout the state. Map 1 illustrates the 255 farms with dairy animals on them in the state, shown by size classes and by location. Map 2 then illustrates the 43 CAFOs in the state that have been identified as Type 1 and potential Type 2 CAFOs.



Farms with Dairy Animals

- + Unknown
- 1 - 99
- ▲ 100 - 199
- 200 - 699
- * 700 - 1300

- Major Surface Watershed Boundary
- Large Community Supply Wells
- Public Water Supply Watersheds

MAP 1 SIZES OF DAIRY FARMS IN CONNECTICUT





- Type 1 CAFO (9)
- ▲ Type 2 CAFO (34)

- Major Surface Watershed Boundary
- Large Community Supply Wells
- Public Water Supply Watersheds

MAP 2 CAFO FARMS TYPE 1 AND TYPE 2



SECTION 4

IMPACTS OF THE GENERAL PERMIT

This section provides a discussion of the technical and financial impacts of compliance with the CAFO General Permit. The statewide applicability of the General Permit is presented in Section 3, identifying nine Type 1 and 34 potential Type 2 CAFOs. The technical and financial impacts of compliance are widely variable, depending on farm location, size, type, animal operations, planting and cropping, land base, land available for manure spreading, soil conditions, drainage conditions, receiving water proximity, neighboring land uses, and many other local factors. However, an attempt has been made to develop an understanding of the range of potential technical and economic impacts that may be applicable in Connecticut. This section presents the results.

4.1 APPROACH TO THIS SECTION

When issued by DEP, the CAFO General Permit will establish 17 conditions. These conditions ((a) through (q)) are listed in Table 3-1 and briefly defined. Conditions (a) through (f) apply specifically to the regulation of CAFOs in Connecticut. The remaining 11 conditions are more general or administrative in nature (common to all General Permits issued by DEP in Connecticut). Accordingly, the presentation approach taken in this section is based on the following six conditions that are written to address CAFOs, namely:

- (a) Effluent Limitation
- (b) Comprehensive Nutrient Management Plan (CNMP)
- (c) Monitoring requirements
- (d) Requirements for land application activities not under the control of the permitted CAFO operator
- (e) Reporting and Record Keeping Requirements
- (f) Recording and Reporting Violations

Conditions (g) through (q) relate more to administrative and legal aspects, addressing topics such as other state regulations, duty to correct and report, certification, date of filing, false statements, correction of inaccuracies, transfer, and other rights. For reference, the CAFO General Permit is provided in its entirety in **Appendix A**.

The CAFOs regulated by the General Permit are briefly summarized as follows:

- Existing AFOs in Connecticut that will be triggered as CAFOs once the General Permit is issued and in force are two dairy farms and seven poultry farms. These are referred to as **Type 1 CAFOs**;
- Some 34 existing AFOs will be reviewed by DEP over a three- to five-year time frame. Of the 34 AFOs, all are dairy farms. Depending on the results of the reviews, some of those AFOs may be designated as CAFOs, referred to as **Type 2 CAFOs**;

- New AFOs brought into operation after the CAFO General Permit is in place will automatically be designated as **Type 3 CAFOs** if they exceed certain specified size characteristics; and,
- **Type 4 CAFOs** are those AFOs designated by the Commissioner of DEP as CAFOs. These can be any size AFO anywhere in the state.

It is evident that most of the AFOs in Connecticut that may be identified as CAFOs for the purposes of the General Permit are dairy farms, and the second most common are poultry farms. The discussion that follows is presented to address the majority of the affected or potentially affected farms, that is, (1) dairy farm operations and (2) poultry farm operations.

4.2 GENERAL PERMIT CONDITION (a): EFFLUENT LIMITATION

The first condition of the CAFO General Permit states:

...there shall be no discharges of agricultural wastes or process-generated wastewater except:

- (A) when catastrophic or chronic rainfall events cause an overflow from a waste treatment or storage facility designed, constructed, maintained and operated to contain all agricultural wastes and process-generated wastewater plus the runoff from a 25 year, 24-hour rainfall event, **or**
- (B) in accordance with an approved CNMP.

In effect, Item (A) establishes that all CAFOs must have an approved CNMP for day-to-day discharges of stormwater and process-generated wastewater. Item (A) also allows for discharges arising from overflows of waste treatment or storage facilities from catastrophic or chronic rainfall events, both of which are defined in Section 2 of the General Permit.

This condition does not define the quality requirements for discharges; rather, it establishes that effluent can be discharged in accordance with a CNMP and in accordance with specific events. Therefore, this is a *performance-based regulation* rather than a quality- or mass-loading based limitation.

Item (B) specifies that there will be no discharge from the farm without an approved CNMP being developed, approved and implemented. Such a plan allows for process-generated wastewater and stormwater discharges under controlled and predictable conditions. The permit therefore allows legal discharges, and provides protection for farmers who develop and follow a CNMP.

4.3 COMPREHENSIVE NUTRIENT MANAGEMENT PLAN

Condition (b)(1) states that a site-specific Comprehensive Nutrient Management Plan (CNMP) shall be reviewed and approved by a Certified Conservation Planner. The CNMP is to be prepared in accordance with the NRCS *Technical Guidance for Developing Comprehensive Nutrient Management Plans*. The General Permit also notes that “Best Professional Engineering Judgement” may be used in the design of waste collection, storage and treatment facilities.

The website for this Technical Guidance document is:

http://www.nrcs.usda.gov/programs/afo/cnmp_guide_index.html

The CNMP is to be prepared **within one year** of a Type 1 CAFO being identified through issuance of the General Permit; and **within one year** of a Type 2, Type 3 or Type 4 CAFO being designated by the Commissioner of DEP. Within 30 days of the development of the CNMP, the permittee shall submit the CNMP to DEP’s Water Management Bureau, Hartford. Once the CNMP is approved by DEP, the permittee must implement the Plan in accordance with schedules laid out therein. In effect, the CNMP is the foundation upon which compliance with the CAFO General Permit is achieved.

4.3.1 Main Elements of a CNMP

The details of CNMP elements are listed in Condition (b)(1)(3). As quoted directly from the NRCS technical guidance document, the objective of a CNMP is:

“...to document the AFO owners/operators plan to manage manure and organic by-products by combining conservation practices and management activities into a conservation system that, when implemented, will achieve the goal of the producer and protect or improve water quality.”

Table 4-1 lists the main CNMP elements and identifies the subsection of this report in which each is addressed. Section 4.4 then provides a summary of impacts of the CNMP.

**TABLE 4-1
MAIN ELEMENTS OF A COMPREHENSIVE NUTRIENT MANAGEMENT PLAN**

Item	Name	Description	Addressed in
(A)	Animal Outputs	Manure and process wastewater collection, handling, storage, treatment, transfer, utilization	4.3.2
(B)	Evaluation and Treatment of Sites	Evaluation and treatment of sites proposed for land application and utilization	4.3.3
(C)	Land Application	Land application procedures based on current standards	4.3.4
(D)	Records	Records of CNMP implementation	4.3.5
(E)	Inputs	Inputs to animals, i.e., feed management	4.3.6
(F)	Other activities	Other waste utilization activities or options including but not limited to off-site transfers or composting operations	4.3.7
(G)	Stormwater	Management and control of stormwater to minimize contact with the production area	4.3.8

4.3.2 Animal Outputs

Item (A), Animal Outputs, is the component of the CNMP that may result in one of the largest investments on behalf of the permitted CAFO operator. Management of animal outputs requires the collection, handling, storage, treatment, transfer and utilization of manure and process wastewater.

Scope

This element addresses the components and activities associated with the production facility, feedlot, manure and wastewater storage and treatment structures and areas, and any areas used to facilitate transfer of manure and wastewater. In most situations, addressing this element will require a combination of conservation practices and management activities.

The CAFO operator must provide for adequate collection, storage, and/or treatment of manure and organic by-products that allows land application in accordance with NRCS-CT Nutrient Management Policy and the conservation practice standard for Nutrient Management (Code 590) (NRCS, 2002a). Collection, storage, treatment, and/or transfer practices shall meet the minimum requirements as addressed in NRCS-CT conservation practice standards for Waste Storage Facility (Code 313), Waste Treatment Lagoon (Code 359), Manure Transfer (Code 634), and Heavy Use Area (Code 561); or, alternatively, these practices can be based on the application of Best Professional Engineering Judgement.

Standards and requirements related to animal output management create, for many farmers in Connecticut, significant changes in operation, resulting in significant investments for new capital infrastructure. Table 4-2 identifies the major aspects, highlighting rationale and implications for farmers.

TABLE 4-2
MAJOR ASPECTS OF ANIMAL OUTPUT MANAGEMENT

Item	Description	Rationale	Implications
No winter spreading of manure	Limits spreading to certain months of the year	Prevents direct runoff to receiving waters	Requires storage of manure for as much as 6 to 8 months
Phosphorus-based application rates	Requires consideration of phosphorus when applying manure to land	Prevents nutrient enrichment of receiving waters	Requires more lands with suitable P levels in soils, expanding need for offsite lands and alternative management options
Application of manure at agronomic rates	Requires measurement, testing, evaluation and planning of lands to be used for manure application	Prevents nutrient enrichment of receiving waters	Requires more planning, testing, evaluation by farmers, and expands need for offsite lands and alternative management options

Seasonal Limitations and Storage Requirements

Based on the NRCS-CT Nutrient Management Policy, nutrient application should be timed with plant nutrient uptake characteristics. Waste must be incorporated using specific timetables for cultivated land based on the stage of the particular crop. Quoting directly,

“Nutrients shall not be applied during periods when flooding, frozen, snow-covered, or saturated soil conditions can reasonably be expected (typically November through March), or when the potential for surface runoff, soil compaction, and/or creation of ruts is high or when weather forecasts indicate these conditions are likely.”

The direct implication is the requirement for storage of manure for at least five months of the year. If storage facilities are uncovered, the precipitation input must also be accounted for in the design of the storage facility.

Infrastructure

On Connecticut dairy farms, infrastructure for manure and by-product management can include:

- Systems for collection of process-generated wastewater and manure in barns and milking parlors;
- Scrapers, hoppers, tanks, piping, and pumps for collection and movement of manure to storage and treatment systems;
- Manure solids separation equipment;
- Solids storage, handling and mixing equipment;
- Liquid effluent storage systems, most typically lined earthen basins;
- Portable pumps, trucks, piping, and spreading equipment;
- Optional equipment for digestion of solids, including generation of biogas for heating and for electric power generation;
- Optional equipment for composting of solids;
- Optional equipment for converting solids to value-added materials;
- Processed solids storage areas.

Costs of Compliance

Examples from Connecticut Farms

A site-by-site survey of all Type 1 and Type 2 CAFOs in Connecticut is not presently available, therefore it is not possible to estimate which facilities are presently in compliance with this element of the CNMP and which ones will require additional capital investments for waste management. However, some recent experience at Connecticut AFOs with collection, handling, storage, treatment, transfer and utilization of manure and process wastewater is discussed with the use of selected examples below:

- At a dairy farm in North Canaan milking approximately 210 cows, investments in waste management collection, treatment, storage and distribution equipment have exceeded \$300,000 over the past four years. These investments have included collection, pumping, digestion, lagoon, piping, and related equipment. Additional investments are planned.
- At a dairy farm in Lebanon milking approximately 300 cows, investments in waste management, collection, treatment, storage and distribution equipment have exceeded \$200,000 over the past three years. These investments have included collection, pumping, separation equipment, lagoon, piping and trucks. As well, additional investments are planned.
- At an egg production facility in Lebanon with about 1 million layers, the operators are required to spend a substantial amount per ton for the offsite management of manure. At

this facility, manure is being transported distances of 40 miles or greater.

Both dairy farm examples indicate that the cost of waste management equipment at dairy farms in Connecticut can be substantial, with an estimated minimum of over \$200,000 for collection, storage and distribution equipment for a farm with 200 milking cows. This capital cost would be higher for the inclusion of digestion, with an added capital of \$100,000 to \$150,000 for a farm with 200 milking cows.

Cost Guidance from New York Watershed Agricultural Council

As additional guidance on potential project costs, relevant information from the New York Watershed Agricultural Council (WAC) has been obtained and reviewed. This information, obtained December 10, 2002, is titled the *Cost Guideline Policy* and provides an indication of potential costs of dairy farm waste management costs, based on the actual installed costs on member farms over the past nine years. The WAC reviews and supports projects in the New York City water supply watershed in order to address the requirements of the USEPA's Filtration Avoidance Determination. Based on the *Cost Guideline Policy*, the allocation of capital costs by Animal Unit is:

- Low potential environmental impact on farm: \$900 per Animal Unit
- Medium potential environmental impact on farm: \$1,200 per Animal Unit
- High potential environmental impact on farm: \$1,500 per Animal Unit

The "environmental impact" ratings are established based on a matrix of parameters addressing factors that can influence the impacts of AFOs, such as erodibility of land, distance from watercourses, mortality rate, cropping system, milkhouse waste handling system, density, and others.

Based on the WAC *Cost Guideline Policy*, using an Animal Unit conversion of 1.43 (700 mature dairy cattle equivalent to 1,000 Animal Units), and adopting the "medium potential environmental impact" category, the capital cost of farm improvement of a 200-cow dairy farm would be in excess of \$340,000, whereas for a 300-cow dairy farm it would approach \$430,000. While these numbers may provide some guidance for Connecticut farms, it must be noted that the WAC policy does not require seasonal storage of manure; this results in an increased capital cost for a farm in Connecticut where seasonal storage is required.

In summary, the available information shows that the costs of manure management are substantial. However, costs are highly dependent on the nature of the farm and its ability to utilize onsite lands for management of manure.

4.3.3 Evaluation and Treatment of Sites for Land Application

Scope

This element addresses evaluation and implementation of appropriate conservation practices on sites proposed for land application of manure and organic by-products from AFOs. On fields where manure and organic by-products are applied to satisfy agronomic nutrient requirements, it is essential that runoff and soil erosion be minimized to allow for plant uptake of these nutrients.

An understanding of the present land use of these fields is essential in developing a conservation system to address runoff and soil erosion adequately.

Current Situation

The current situation in Connecticut with regard to land application sites for dairy farm AFOs is wide-ranging. In some cases, farms have sufficient field acreage for application of manure at agronomic rates. In other cases, operating dairy farms are already receiving manure from off-site for application on fields, without the benefit of full knowledge of the agronomic needs of the soil, or without full knowledge of the excess nutrients that may be applied. In still other cases, farms may have insufficient field acreage available for land application of all manure generated, and require off-site solutions to avoid over-application of nutrients to the land.

Poultry farms in Connecticut utilize feed shipped in from out-of-state sources, therefore nutrients are imported without any associated local crop utilization. The application of poultry manure fields owned by other farmers to farm fields is occurring with virtually all of the poultry manure being managed in Connecticut, because the poultry operations do not own or operate lands that can be used for manure application.

Based on the nutrient surplus (discussed in Section 2), once the regulated dairy farms in Connecticut have established and implemented CNMPs, the poultry farms will face a more critical situation with regard to manure disposal, because the land available around the poultry farms for land application will be reduced in availability. Therefore, **the documented nutrient surplus will become more significant** and will require the poultry farms to find new offsite disposal solutions, in addition to land application. New solutions will likely include alternative technologies and options for beneficial use of waste products.

Nutrient Requirements for Proper Land Application

Historically, land application of manure has been based primarily on the nitrogen content of the manure and the nitrogen requirements for good growth of a crop. Research and evidence collected over the last decade have pointed toward the critical importance of considering and addressing the amount of phosphorus applied to soils when manure is used to meet the nitrogen needs of a crop. Accordingly, in Connecticut, NRCS-CT and the University of Connecticut have collaborated in the preparation of Nutrient Management Policy for Connecticut that addresses nitrogen and phosphorus. The policy limits manure applications to a field based on both the nitrogen and the phosphorus content of manure and the amount of phosphorus in the soil. As a result, lower application rates must be used in cases where phosphorus governs.

Based on this policy, on agricultural land where manure is utilized as a source of nutrients, the agronomic range for phosphorus must be considered. Where a surplus of nutrients exists, the land base must be increased, the nutrient source(s) decreased, and/or wastes treated and/or transferred to others. When manure is used as a nutrient source, the soil phosphorus shall be tested and used to determine whether the application standard is to be based on nitrogen or phosphorus.

Based on University of Connecticut's guidance, manure application rates are limited as follows:

- **Nitrogen-based:** N-based manure application is recommended on fields where the soil test phosphorus level is "below optimum."
- **Phosphorus-based:** P-based manure application is recommended on fields where the soil test phosphorus level is "optimum."
- **No manure application:** No manure application is recommended on fields where the soil test phosphorus level is "above optimum."

Required Activities

In the context of a CNMP, the evaluation and treatment of sites for land application involve the following steps as described in the NRCS *Technical Guidance*:

- An on-site visit is required to identify existing and potential natural resource concerns, problems, and opportunities for the lands being considered for land application.
- The CNMP must identify the potential for nitrogen and phosphorus losses from the site.
- At a minimum, the conservation system developed will address the NRCS Quality Criteria for water quality. Soil erosion is addressed to reduce the transport of manure nutrients within or off of a field to which manure is applied. Typical NRCS conservation practices, and their corresponding NRCS conservation practice standard code number, used as part of a conservation system to minimize runoff and soil erosion are:
 - Conservation Crop Rotation (Code 328)
 - Residue Management, No Till and Strip Till (Code 329A)
 - Residue Management, Mulch Till (Code 329B)
 - Residue Management, Ridge Till (Code 329C)
 - Contour Buffer Strips (Code 332)
 - Cover Crop (Code 340)
 - Residue Management, Seasonal (Code 344)
 - Diversion (Code 362)
 - Windbreak and/or Shelterbelt Establishment (Code 380)
 - Riparian Forest Buffer (Code 390)
 - Filter Strip (Code 393)
 - Grassed Waterway (Code 412)
 - Prescribed Grazing (Code 528A)
 - Contour Strip Cropping (Code 585)
 - Strip cropping, Field (Code 586)
 - Terrace (Code 600)
- For land application, the farmer is required to document the following:
 - Land application areas on aerial photos.
 - Individual field maps with setbacks, buffers, waterways, and other planned conservation practices marked.
 - Soils information such as features, limitations, and capability for each field.

- Conservation practice design information.
- Identification of sensitive areas such as sinkholes, streams, springs, lakes, ponds, wells, gullies, and drinking water sources.
- Other site features of significance, such as property boundaries.
- Identification of operation and maintenance (O&M) practices and/or activities.

Costs of Compliance

Farmers will be responsible for the preparation of a CNMP. In most situations, this will require the farmer to use the services of a consultant certified in CNMP preparation. The General Permit provides the definition of a Certified Conservation Planner in this regard. Experience gained on farms elsewhere in New England indicates that a farmer can benefit from establishing an ongoing relationship with a certified person. That individual will fully understand and assist in the long term implementation of the CNMP. If the consultant is retained for a number of years, the estimated costs to the farmer are **\$12 to \$14 per acre per year**; if, however, the consultant is used only one time, the cost per acre may be higher. Guidelines used by the New York Watershed Agricultural Council suggest that CNMPs may require **\$4,000 to \$5,000** for a 600-acre farm, not including laboratory analysis. The cost guidance used by WAC is \$300 per plan plus \$7 per acre for the nutrient spreading analysis, not including laboratory analysis. Therefore, a 600-acre farm, based on this formula, would require \$4,500 plus laboratory fees; however, this does not include the annual costs of updating the plan.

Compliance with this element of the CNMP will require, for some farms, substantial planning and field investigation to support the development of a sustainable plan for manure management and land application. Many of the activities listed under *Required Activities* above are not now formally conducted by Connecticut farmers, and farmers may not be familiar with them.

In cases where the fields to be utilized for manure management are under the control of the permittee, the permittee will need to set these funds aside for evaluation. In cases where the fields are not under the control of the permittee, this responsibility will fall to the controlling party, and those costs may or may not be passed onto the generator of the manure.

4.3.4 Land Application

Scope

This element addresses the requirements for land application of all manure and organic by-products. Land application of manure and organic by-products is the most common use of manure because of the nutrient and organic matter content of the material. Land application procedures must be planned and implemented in a way that minimizes potential adverse impacts to the environment and public health.

As identified in the NRCS *Technical Guidance for Developing Comprehensive Nutrient Management Plans*, the criteria for nutrient management are that the operator must:

- Meet the NRCS Nutrient Management Policy as contained in the NRCS GM 190, Part 402, May 1999, and clarified by the National Instruction, Nutrient Management -Policy Implementation, Title 190, Part 302, October 2000.

- Meet criteria in NRCS conservation practice standard Nutrient Management (Code 590) and, as appropriate, Irrigation Water Management (Code 449).
- Develop a nutrient budget for nitrogen, phosphorus, and potassium that includes all potential sources of nutrients.

In order to develop the nutrient budget, the permitted operator must document the following:

- Planned crop types, cropping sequence, and realistic yield targets.
- Current soil test results for specified parameters, typically Nitrogen, Phosphorus and Potassium.
- Manure and organic by-product source testing results, if any are available.
- Form, source, amount, timing, and method of application of nutrients, by field.

Additional considerations associated with CNMP development and implementation should be addressed. Based on experience gained in Connecticut, these considerations are:

- Air Quality: Offsite odors should be minimized. AFO operators/owners should consider the impact of selected conservation practices on air quality during the CNMP development process. Air quality on land application sites may be impaired by excessive dust, odors and other gaseous emissions. Ammonia emissions from animal operations may be deposited on surface waters through precipitation, increasing the nutrient load. Soil incorporation of manure and organic by-products on land application sites can reduce gaseous emissions.
- Pathogens: Although the CNMP refers heavily to nutrients, all CAFO operators/owners should consider the impact of selected conservation practices on pathogen control during the CNMP development process. Pathogenic organisms occur naturally in animal waste. Exposure to some pathogens can cause illness in humans and animals, especially for immune-deficient populations. Many of the same conservation practices used to minimize nutrient movement from animal operations, such as leaching, runoff and erosion control, are likely to minimize the movement of pathogens.

Costs of Compliance

Costs of land application can vary widely, being highly dependent upon costs of transportation, which relates to distance of fields from manure production sites. Land application costs are also influenced by the type of material being applied (liquid or solid) and the type of equipment used for application.

Experience in Maine (Kersbergen, University of Maine, pers.comm.) shows that the cost of manure application can be estimated by the hour, with a third party typically charging \$60 to \$70 per hour. Approximately 15,000 to 20,000 gallons per hour can be applied, or 60 tons of solids per hour. However, the transportation of manure to application sites is not included in this estimate, and would be entirely dependent on local conditions and locations of fields for application.

4.3.5 Records of CNMP Implementation

Scope

It is important for AFO owners/operators to document and demonstrate implementation activities associated with the CNMP. Documentation of implementation and management activities provides valuable benchmark information that the AFO owner/operator can use to adjust the CNMP to meet production and natural resource conservation objectives. It is the responsibility of AFO owners and/or operators to maintain records that document the implementation and management of CNMPs.

Documentation specified in the NRCS *Technical Guidance for the Development of Comprehensive Nutrient Management Plans* includes:

- Annual manure tests for nutrient content for each manure storage containment
- Current soil test results, in accordance with Nutrient Management Code 590
- Application records for each manure or commercial fertilizer application event, including:
 - Containment source or type and form of commercial fertilizer
 - Field(s) where manure or organic by-products are applied
 - Amount applied per acre
 - Time and date of application
 - Weather conditions during nutrient application
 - General soil moisture condition at time of application (i.e., saturated, wet, moist, dry)
 - Application method and equipment used
- Crops planted and planting and/or harvesting dates, by field name and number
- Records that address manure and wastewater storage containment structures:
 - Dates of emptying, level before emptying, and level after emptying
 - Discharge or overflow events, including level before and after event
- Transfer of manure off-site or to third parties:
 - Manure nutrient content
 - Amount of manure transferred
 - Date of transfer
 - Recipient of manure
- Activities associated with emergency spill response plan
- Records associated with any reviews by NRCS, third-party consultants, or representatives of regulatory agencies:
 - Dates of review
 - Name of reviewer and purpose of the review
 - Recommendations or follow-up requirements resulting from the review
 - Actions taken as a result of the review
- Records of maintenance performed associated with operation and maintenance plans
- Nutrient application equipment calibration
- Changes made in the CNMP

Costs of Compliance

A specific set of instructions for documentation of the CNMP should be produced in the CNMP itself and be a deliverable of the Plan. In some cases, farms in Connecticut have begun participating in nutrient management programs, and have become familiar with record-keeping requirements. However, in many cases the farmers are not familiar with record-keeping requirements of this type, and these activities will represent a change in both behavior and time needs. Therefore the impact of record-keeping associated with a CNMP will be variable depending on the situation. For the purposes of cost estimation, an annual cost of record-keeping of \$5,000 to \$10,000 per year is adopted, not including the costs of laboratory analysis.

4.3.6 *Inputs to Animals*

Scope

Feed management is a means of reducing pollutant discharges as well as to reduce the nutrient content of manure. From the perspective of reducing pollutant discharges, feed management efforts focusing on improved efficiency of feeding are valuable. On dairy farms in Connecticut, these efforts can include, but not be limited to, such capital investments as:

- Covering feed bins to reduce water contact and minimize leachate generation;
- Covering silage and haylage storage areas to reduce water contact; and,
- Installation of drainage and stormwater collection systems.

These activities are conducted in order to conserve feed (use it more carefully and reduce wastage) and to preserve feed quality by minimizing contact with surface waters.

Feed management activities may also be used to reduce the nutrient content of manure that may result in less land being required to agronomically utilize the manure. Feed management activities may be dealt with as a planning consideration and not as a requirement that addresses specific criteria.

Specific feed management activities to address nutrient reduction in manure may include phase feeding, amino acid supplemented low crude protein diets, and/or the use of low phytin phosphorus grain and enzymes, such as phytase or other additives.

Feed management can be an effective approach to addressing nutrient production and the nutrient surplus problem. However, it also is recognized that feed management may not be a viable or acceptable alternative for all AFOs. A professional animal nutritionist should be consulted before the farmer can develop recommendations associated with feed ration adjustment.

Costs of Compliance

Costs of feed management have not been estimated for CAFOs in Connecticut. The costs would be expected to be widely varying depending on local conditions. A review of farm improvement programs funded by NRCS-CT shows that of a total of nearly 50 projects listed, at least five

included elements to improve feed management.

4.3.7 Other Activities

Scope

Activities in addition to land application of manure are a potentially significant component of CNMPs for CAFOs in Connecticut. At present, the nutrient excess evaluation (discussed earlier in this report) indicate that today there is a **significant surplus of nutrients generated statewide**. Once CNMPs are brought into place and implemented, the nutrient surplus problem will be exacerbated. Therefore, even if all cropland were available for land application purposes, there would be insufficient land to accommodate the manure generated statewide. **In effect, alternative means of manure management will be essential.**

Activities already occurring in Connecticut include:

- On-farm digestion at two dairy farms to produce stabilized solids with potential value for alternative uses, as well as to produce steam and electrical power for on-farm use;
- Plans for on-farm composting of dairy manure to produce a product for potential horticultural use;
- Solids separation of dairy manure at many dairy farms, creating a solid byproduct that can be used to replace bedding requirements, and which may have viable offsite markets;
- Production of alternative consumer products from dairy farm manure, such as plant pots for use in nursery potting; and,
- At poultry farms, off-site transfer of manure to local and regional dairy farms for land application.

The digestion of manure does not alter the nutrient content, although it does modify the distribution of nutrients between the liquid and solid fractions of the waste. Post-digested waste is more readily utilized offsite because it has been stabilized and is typically less odorous.

Additional manure management activities that could potentially be applicable in Connecticut include:

- Increased use of on-farm digestion to reduce odors, to create power for on-farm use, create power for sale to the grid, and create heat for on-farm use;
- Increased use of on-farm composting to produce products for horticultural uses off-farm;
- Development and operation of regional digestion or composting projects to accommodate manure generation on a multi-farm basis;
- Drying of solids to create offsite pellets that can be combusted.

As many of these alternatives to conventional manure management activities have not been fully developed or refined, industry standards do not always exist that provide for their consistent implementation. Except for the NRCS conservation practice standard Composting Facility (Code 317), NRCS does not have conservation practice standards that address these other utilization options.

This element of a CNMP should be presented as a consideration for the AFO owner and/or operator in the decision-making process. No specific criteria need to be addressed unless an alternative utilization option is decided upon by the AFO owner/operator. When an AFO owner and/or operator implements this element, applicable industry standards and regulations must be met.

Costs of Compliance

The costs of undertaking other manure utilization activities are entirely dependent on local and regional conditions and cannot be estimated in advance of the preparation of a CNMP for a farm or group of farms. At this time it is not practical to provide a range of costs. However, it is emphasized that certain on-farm or offsite uses may generate some revenue that can offset costs. For example, the generation of energy can reduce power purchase costs for farmers. In addition, composted manure could be sold at a retail or wholesale level, provided markets for the material are available.

4.3.8 Stormwater Management and Control

Scope

The management and control of stormwater at AFOs is an essential aspect of minimizing the potential for transport of water-borne pollutants to off-site surface waters and/or groundwaters. The basic objectives of stormwater management at these types of facilities are (1) to minimize or eliminate the contact of rainfall and snowmelt with feed, animal waste, and other potential sources of contamination of sediment, nutrients and/or pathogens; and (2) to control the movement of stormwater in a manner that is predictable and manageable. Objective (1) is achieved through the separation of stormwater or elimination of the contact of stormwater with wastes. Objective (2) is achieved through installation of control and discharge structures to ensure that there is no uncontrolled discharge to receiving waters.

The types of infrastructure required for stormwater management at AFOs in Connecticut include, but are not limited to:

- Clean water exclusion activities, including:
 - Cover for animal holding areas
 - Cover for heavy use areas
 - Cover for feed storage areas
 - Covering waste storage areas
- Runoff collection and treatment systems
- Filter strips for treatment of overland flow
- Separation of stormwater from waste-contact areas and non-waste-contact areas
- Roof drains to stormwater discharge systems
- Paving, curbing, and stormwater collection infrastructure in travelled ways
- Collection basins for stormwater, leading to infiltration systems or controlled overflows

Costs of Compliance

Dairy farms in Connecticut have undertaken a variety of stormwater management activities. Visits to several dairy farms in 2002 showed the types of infrastructure as listed above. Costs were highly dependent on local conditions, including (but not limited to) farm size, layout, topography, land slopes, soil types, proximity to receiving waters, and other factors. As a result, costs of compliance for this CNMP element cannot be predicted on a statewide basis for all CAFOs.

Review of the data compiled by NRCS-CT for funding support to farms installing pollution control and site management infrastructure shows that, over the past five-year period, at least five farms in Connecticut have invested in stormwater management infrastructure. The total project investment (from NRCS data) is approximately \$300,000 for five farms, or an average of \$60,000 per farm.

4.4 SUMMARY OF IMPACTS OF THE COMPREHENSIVE NUTRIENT MANAGEMENT PLAN

Previous subsections have identified the complexity and potential costs of compliance with the CAFO General Permit requirement for a CNMP. The results of this discussion are summarized in two tables below, as follows:

- Table 4-3 summarizes the issues for dairy farms; and,
- Table 4-4 summarizes the issues for poultry farms.

TABLE 4-3
RELATIVE COMPLEXITY AND COST OF IMPLEMENTING A COMPREHENSIVE NUTRIENT MANAGEMENT PLAN
AT DAIRY FARMS IN CONNECTICUT

Item	Name	Relative Complexity	Cost
(A)	Animal Outputs	Requires planning, design, construction, implementation and operation of manure and process water systems. Depending on local conditions, this can be the most complex element of the CNMP.	For a 200-cow dairy farm, capital cost may be up to \$500,000; operating costs may be significant. Additional costs if manure digestion is included. Offsite management will create additional costs.
(B)	Evaluation and Treatment of Sites	The CNMP needs to be developed. The site evaluation requires field investigation and testing. The farmer may already have conducted some of this evaluation but more effort may be required. NRCS and University of Connecticut may assist with this evaluation.	Plan development may require at least \$4,000 to \$5,000 per farm. Initial costs are related to the evaluation of lands for potential suitability for landspreading of manure. On an annual basis, tests will be required to evaluate nutrient content and suitability. NRCS and University of Connecticut may assist with this evaluation.
(C)	Land Application	Requires land application to be conducted in accordance with NRCS standards. Requires storage of waste products for those months of the year that land application is not allowed. Until alternatives are developed to deal with the nutrient surplus, farmers will need to utilize risk management planning to effectively manage nutrients. For some farmers this may require changes in timing, location and methods of land application.	Capital: depends on equipment needs but may exceed \$65,000 for a spreader truck. Operating costs depend on distance to lands for application. Available data suggests that the cost of application can be \$1 per ton for solids; however, this does not include transportation costs.
(D)	Records	Record-keeping activities are an essential element of the CNMP. Although not a highly complex activity, it requires a well-organized approach and may be a significant change for many farmers.	Capital: minor costs. Operating costs: incorporated in other operating costs at the facility, but may require a substantial change to present record-keeping activity. Farms may need to set aside \$5,000 to \$10,000 per year for record-keeping.
(E)	Inputs	Feed management may require improvements to storage, handling and distribution systems for feed.	Capital: depends on local conditions. Operating costs: depends on local conditions.
(F)	Other activities	In cases where farms have insufficient land base to agronomically apply manure to the land, off-site transfers will be required. Further, interim measures will be required for on-farm management of manure before off-site solutions are available. Farmers will need to establish working arrangements with other farms that are not AFOs. Other alternatives must be evaluated, such as regional digestion, regional composting, alternative uses, and regional treatment facilities.	Costs of other activities, such as off-site transfers, will depend on local conditions and arrangements established with other farm owners, third parties, regional facilities, or other options. Costs could be substantial.
(G)	Stormwater Management	Stormwater management may require minor to substantial site modifications depending on local conditions.	Capital: highly dependent on local conditions; can exceed \$100,000. Operating costs: depends on complexity of system installed.

**TABLE 4-4
RELATIVE COMPLEXITY AND COST OF IMPLEMENTING A COMPREHENSIVE NUTRIENT MANAGEMENT PLAN
AT POULTRY FARMS IN CONNECTICUT**

Item	Name	Relative Complexity	Cost
(A)	Animal Outputs	Off-site transfer of manure will be required in all cases. On-site or local treatment of process wastewater will be required. Requirements for wastewater management will be dependent on local conditions and the costs cannot be predicted.	Capital costs, if any, will relate to installation of additional manure storage capacity (if required), upgrading of process wastewater handling and treatment systems (if required). These capital costs will be locally dependent and cannot be predicted. Operating costs will depend on local conditions.
(B)	Evaluation and Treatment of Sites	Not directly applicable to poultry farms as off-site transfer of manure will be required. However, costs may be passed on to poultry farmers.	Not directly applicable to poultry operations; however, costs may be passed along to poultry farmers.
(C)	Land Application	Not directly applicable to poultry farms as off-site transfer of manure will be required; however, costs may be passed on to poultry farmers.	Not directly applicable to poultry operations; however, costs may be passed along to poultry farmers.
(D)	Records	The permittee will be required to maintain records of all activities related to manure and process water management. This should not be highly complex for a poultry operation.	Expected to require minimal capital and operating costs.
(E)	Inputs	Feed management at poultry operations is typically highly controlled and should not require major modifications.	Costs depend on measures taken. If the farmer selects feed additives to manage the nutrient surplus, additional costs will be incurred.
(F)	Other activities	Poultry operations will need to transfer manure off-site for land application, or to other alternative management options. Other activities will need to be implemented to address the needs generated. Technologies may include composting, digestion, or combinations of solutions. Regional solutions may need to be evaluated to address the needs of poultry operations and dairy operations jointly.	Manure management by third parties will be essential for poultry operations. The costs of third party manure management will be locally dependent and cannot be predicted. However, a nutrient surplus, already existing, will be exacerbated once farms that have been able to take poultry manure are limited due to their own agronomic needs. Costs of solutions will be site specific and could be substantial.
(G)	Stormwater	Stormwater management should not create a significant additional cost to poultry operations since all operations are already under cover.	Incremental capital costs are expected to be minimal for poultry operations since all such operations are already under cover.

4.5 OTHER REQUIREMENTS OF THE COMPREHENSIVE NUTRIENT MANAGEMENT PLAN

In addition to the requirements of the CNMP reviewed above, the CAFO General Permit lists six requirements applicable to all CNMPs at permitted CAFOs. Each is discussed in the following paragraphs in terms of impacts on dairy and poultry farmers.

4.5.1 Condition (b)(4): Maintenance of Records on Site

Permittees are required to maintain the approved CNMP and associated records on site and to make these documents available to the DEP during on-site inspections. This condition has a minimal impact on permitted CAFO operators as long as records are available.

4.5.2 Condition (b)(5): Interim Management Measures

Permittees are required to implement ***any management measures deemed necessary*** by the DEP prior to full implementation of the CNMP. This condition provides wide latitude to the DEP to establish the pollution control and/or nutrient management requirements that may be needed while the permitted CAFO operator is developing new or improved systems in accordance with the schedule defined in the CNMP. The financial implications of this condition cannot be readily predicted on a statewide basis as they are site-specific.

4.5.3 Condition (b)(6): Implementation of the CNMP

The implementation of the CNMP is to be in accordance with the schedule in the plan approved by the DEP, ***or any alternate schedule*** approved by the DEP. This condition establishes that compliance depends on achieving a schedule for design, construction, and operation of pollution control measures at farms.

4.5.4 Condition (b)(7): Keeping the CNMP Current

Permittees are required to amend the CNMP if any one of the following occurs:

- There is a change at the site which has the potential to cause pollution of receiving waters;
- Actions required by the CNMP fail to prevent pollution of receiving waters; or,
- The Commissioner of DEP requests modification of the CNMP.

In any of the above situations, the permitted CAFO operator is required to prepare an amended CNMP within 60 days. The implications of this condition are potentially substantial. However, it is suggested that DEP may benefit by preparing some guidance for CAFO operators to assess the degree of change to a site, or the degree of pollution prevention, that are applicable to require the preparation of an amended CNMP.

4.5.5 Condition (b)(8): Failure to Prepare or Amend CNMP

This condition establishes that should a CAFO operator not prepare a CNMP, or update a CNMP, the operator will still retain the responsibility for implementing actions required to prevent water pollution and comply with all conditions of the CAFO General Permit.

4.5.6 Condition (b)(9): Notification of Noncompliance with CNMP

The permittee is required to notify the DEP in the event that noncompliance with *any requirement* of the CNMP is expected or has occurred. The permittee is to take steps to ensure that noncompliance or delay is avoided or minimized. Similar to Condition (b)(7), the DEP may benefit by preparing some guidance for CAFO operators to assess the degree of noncompliance which would trigger notification requirements.

4.6 OTHER REQUIREMENTS OF THE CAFO GENERAL PERMIT

Conditions (c) through (f) of the CAFO General Permit establish additional requirements for permitted CAFO operators. Conditions (g) through (q), administrative in nature, are also mentioned.

4.6.1 Condition (c): Monitoring Requirements

Condition (c) establishes that the permittee must monitor and inspect all structural management practices in accordance with the operation and maintenance plan of the CNMP. Once structural management practices are in place, monitoring and inspection are straightforward because the inspection of equipment and infrastructure will be established as regular activities at dairy farms and poultry farms in Connecticut, as specified in the CNMP. As required in the Operations and Maintenance plan, this condition also establishes that the permittee must maintain land application records.

4.6.2 Condition (d): Requirements for Land Application Activities not under the Control of the Permitted CAFO Operator

This condition relates to off-site transfer of manure or manure products. The permittee is required to maintain records of quantities of manure or manure products that leave the permitted CAFO site. Should any quantities exceed 50 yd³ on an annual basis, the name and address of the recipient is to be recorded. The recipient of quantities exceeding 50 yd³ is to be informed of the responsibility to properly manage the land application of manure. It is anticipated that information factsheets will be prepared by DEP that can be used by farmers to distribute to recipients of manure for off-site transfer and management.

4.6.3 Condition (e): Reporting and Record Keeping Requirements

This condition establishes that the permittee provide to the DEP a letter certifying that the permittee is implementing the requirements of the CNMP. Further, it establishes that all records required by the CAFO General Permit and the CNMP shall be kept on-site for at least five years.

4.6.4 Condition (f): Recording and Reporting Violations

This condition is reproduced in its entirety as follows:

The permittee shall, within 2 hours of becoming aware of the circumstances, and at the start of the next business day if he or she becomes aware of the circumstances outside normal business hours, notify the commissioner of any actual or anticipated noncompliance with the terms and conditions of this general permit and shall submit a written report to the commissioner within five days thereafter. Such report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate and prevent recurrence of the noncompliance. Actual or anticipated noncompliance may include, but not be limited to, a leak, breach, overflow or other structural failure of a storage facility not caused by a catastrophic event but due to improper operation, maintenance or design; or a discharge due to manure releases related to the improper handling of liquid or solid manure.

The implications of this condition are potentially substantial to all permitted CAFO operators in Connecticut. The DEP may wish to develop a “de minimus” quantity of materials that would constitute a reportable spill in order to minimize unnecessary reporting.

4.6.5 Conditions (g) through (q)

The remaining conditions listed in the CAFO General Permit are legal and administrative in nature, and are common to other General Permits issued, administered and enforced by the DEP.

SECTION 5

BENEFITS OF GENERAL PERMIT IMPLEMENTATION

Previous sections of this report discuss the rationale, purpose, and impacts of the CAFO General Permit on the AFOs in Connecticut that will be regulated. The question of benefits to farmers deserves attention. In addition to the strict regulatory compliance, how can adhering to the requirements of the CAFO General Permit benefit livestock production facility owners and operators in Connecticut? This section comments on the benefits arising to CAFO owners and operators, and to the state as a whole. The approach is to comment on specific environmental and economic benefits that will arise from proper manure and nutrient management. Section 5.1 addresses benefits to farmers, while Section 5.2 addresses benefits at a statewide level.

5.1 BENEFITS TO CONNECTICUT FARMERS

In Connecticut, the implementation of CAFO regulations will induce benefits environmentally, socially, economically, and aesthetically. Taking into consideration the local and regional conditions in Connecticut, and integrating the comments of members of the CAFO Advisory Committee during the preparation of this report, the potential benefits of implementation are briefly summarized below.

- **Compatibility with neighboring land uses** will be enhanced as CAFO operations are improved environmentally. Odor issues may be reduced as pollution control facilities are installed and operated properly. In a small number of cases, digestion has been employed as an odor control method which, although costly, is a proven means of reducing off-site odor impacts. Drainage control will improve local water quality conditions.
- **Sustainability of farming activities** will be improved as measures for pollution control and manure management are brought into place consistent with state and federal regulatory initiatives. This in turn will help to maintain the viability of the farming base in Connecticut.
- **Electrical energy and heating costs** may be reduced at operations where anaerobic digesters are installed for manure treatment.
- **Costs of financing and refinancing** may be reduced at facilities where lending institutions are potentially concerned about unfunded or unaddressed environmental liabilities. As well, the ability of the farmer to obtain financing for pollution control or other farm improvement projects may be enhanced.
- **Costs of future liabilities** may be reduced by elimination of environmental contamination risks. While these are extremely difficult to quantify, such future liabilities can be the largest costs of environmental contamination, since clean-up “after-the-fact” is inevitably more costly than pollution control at the source.

- **Costs of lawsuits** may be reduced as nuisance problems, such as odor, are managed more effectively.
- **Marketing benefits** may arise to farmers who choose to take advantage of the compliance with regulations as a “labeling” aspect of products.
- **Revenue potential** may accrue to farmers who sell value-added products where markets can be developed, and who generate power that can be sold to the electrical grid.

5.2 GENERAL BENEFITS TO THE STATE OF CONNECTICUT

A variety of environmental, social and economic benefits will arise as farmers implement waste and nutrient management programs consistent with the General Permit. Some of these benefits will be manifested directly on the farming operations. Others, however, will result in benefits to residents and taxpayers of the State of Connecticut. Those benefits are presented below.

- **Surface water quality improvement** will arise from proper management of stormwater runoff, manure management, process water management, and discharge controls. This improvement in turn will result in less impairment of downstream watercourses and water resources, including streams, lakes and coastal environments. Enhancements to recreation, aquatic life, fisheries, and shellfisheries may arise. At a national level, EPA (2001) states that agriculture is the leading contributor to identified water quality impairments in rivers and lakes. Clearly, activities to reduce discharges to surface waters will improve this situation.
- **Drinking water supply watersheds** will be better protected as the potential from farming-related impacts, such as contamination with pathogens from wastes, are reduced.
- **Protection of groundwater resources** will be improved as wastewater storage facilities are installed, reducing or eliminating the potential for leaching of liquids containing nutrients or pathogens into the soils and potentially into local or regional groundwater. Many AFOs in Connecticut are situated close to rural houses or housing developments in rural or suburban areas, and many of those residents rely on groundwater for a supply source. In fact, on a statewide level, as of 1990, approximately 37% of residents rely on groundwater sources for drinking water. Groundwater quality protection will be beneficial to those supply users.
- **Economic spinoffs** will result from the continuation of sustainable farming operations.
- **Sustained and potentially increased property values** will likely occur along streams, lakes and ponds where water quality improvement or enhancement results from reduced pollutant loadings.

SECTION 6

FUNDING ASSISTANCE MECHANISMS

Other sections of this report discuss the need for a CAFO General Permit, the implications and cost impacts of the General Permit, and the benefits to farmers associated with compliance. As noted in Section 4, the financial implications to poultry and dairy farmers in Connecticut may be substantial. Therefore, it is essential to identify and review available funding assistance mechanisms that can assist permitted CAFO operators in implementing CNMPs.

6.1 OVERVIEW AND APPROACH

The CAFOs in Connecticut that will be affected by the requirements of the General Permit comprise dairy farms and poultry operations. From the perspective of economics and funding of pollution control requirements, these two types of operations are quite dissimilar:

- The dairy farms which are Type 1 or Type 2 CAFOs generally comprise many separately-owned, small to medium-size family businesses, with the number of mature or dry milking cows at each operation ranging from 200 to over 900. Most dairy farms comprise operations with a land base that has the potential to accommodate land application of some portion of the manure generated by the animals.
- The poultry operations are 7 out of 43 Type 1 and Type 2 CAFOs, and are collectively owned by a single corporate entity. In no cases do the poultry operations include a land base with the potential to accommodate manure management. These operations already generate a surplus of nutrients, and as their neighboring dairy farms implement General Permit requirements, the management of this nutrient surplus will become more difficult and expensive for the poultry operations, requiring greater manure hauling distances and alternative manure management solutions.

Dairy farms that are CAFOs will need to incorporate CNMPs in their operations. Those dairy farms accommodating manure from poultry operations will eventually have little to no capacity to take in manure from poultry farms. In fact, many dairy farms will have a nutrient surplus upon implementation of CNMPs.

As a result of these dissimilarities between dairy and poultry operations, the pollution control funding requirements facing the dairy and poultry operations are also dissimilar. For compliance with the CAFO General Permit, the dairy operations will be required to invest in capital works for site drainage, stormwater management, manure management, land application, feed management, and other infrastructure. On the other hand, the regulated poultry operations, which currently store manure indoors until it is shipped off-site for disposal, will be faced with changes in costs related to the per-ton or per-yd³ charges for off-site management of manure. Therefore, the dairy farmers are faced with the requirement to obtain funds for capital works, as well as additional operational cost increases. The poultry operations will be faced with additional operational cost increases, and may also require capital investments. All CAFOs will

have an interest in investigation of regional treatment alternatives and beneficial use opportunities.

This section of the report focuses on the dairy farmers. This is not to suggest that the poultry operations will not be faced with significant additional costs; but that the requirement for small businesses to obtain funding for capital works is a critical factor in the success of the CAFO General Permit.

Section 6.2 briefly discusses the economics of dairy farming in Connecticut. This sets the tone for the following sections that address sources of financing for dairy farmers:

- Section 6.3 discusses federal sources;
- Section 6.4 discusses state sources;
- Section 6.5 discusses private sources;
- Section 6.6 discusses tax credit programs;
- Section 6.7 discusses alternative sources of funds or credits.

6.2 ECONOMICS OF DAIRY FARMING IN CONNECTICUT

It is beyond the scope of this report to evaluate in detail the economics of dairy farming in Connecticut. However, as background to discussion of funding sources for pollution control equipment and investment, a summary of the economics of the dairy industry is provided.

In terms of context, at a national level, milk and milk product production have been increasing while the number of dairy farms has been decreasing. From 1980 to 2000, total U.S. milk production rose from approximately 130 billion pounds/year to over 165 billion pounds per year (National Milk Producers Federation, undated). In contrast, from 1985 to 1999, the total number of dairy farms in the U.S. has dropped from 270,000 to nearly 110,000. Newer dairy farms have anywhere from 500 to 600 dairy cows or more, compared to the 50 or so that was more common in the past. The total number of dairy cows in the country has dropped over the past fifty years; but due to improved breeding, feeding and animal care, cows today can produce up to four times as much milk as their predecessors of fifty years ago, with a productive cow yielding up to 25,000 pounds of milk annually.

In Connecticut, the dairy farms identified in the DOA database (discussed earlier in this report) range in reported size from 1 to 1300 cows. The average number of cows on dairy farms is 160. Regardless of size, dairy farms in Connecticut are faced with wholesale prices for milk and milk products that have not significantly increased in real dollars for decades. Meanwhile, the input costs for feed, feed additives, supplies, equipment, fuel, electricity, and other operation and maintenance costs have steadily risen (National Milk Producers Federation, undated). The outcome is that many, if not most, of the dairy farms in the state are operating at marginal to zero levels of profitability.

Milk prices for Connecticut dairy farmers were supported through the Northeast Dairy Compact from 1997 to 2001. During that period, the Compact, an agreement between five states and

ratified by the U.S. Congress, established a “floor” price for wholesale milk at \$16.94 per hundredweight. The Dairy Compact expired October 1, 2001 primarily due to opposition from the dairy processing industry and from Midwestern congressmen (Boston Globe, November 11, 2001). Before its expiration, the U.S. Congress held hearings to consider replacement legislation that would have both extended the Northeast Dairy Compact, and created a new Southeast Dairy Compact for a number of southern U.S. states. That initiative failed.

At this time, there is no Compact in place, nor is there any federal legislative proposal for one. However, the 2002 Farm Bill does establish a Milk Price Support Program that provides a federal payment each month that is equal to 45% of the difference between \$16.94 and the Boston Class I price. This program is limited to the first 2.4 million pounds of production for a producer annually (USDA, 2002, *Farm Bill Conference Summary*).

Dairy farmers interviewed for this project indicated that the milk price being received as of late 2002 remains insufficient, even taking into consideration the additional payments of the Milk Price Support Program as an income supplement. The price for milk as of the end of October 2002 is approximately \$12.60 per hundredweight. A breakeven price for a Connecticut dairy farm with 300 milking cows is in the order of \$13.50 per hundredweight (Chesmer, 2002). In effect, the CAFO dairy farms in Connecticut are therefore bringing in less revenue than it costs to operate and maintain the farm and service debt. The obvious result is that dairy farms in Connecticut are likely to require funding support to assist them in designing, constructing and implementing pollution control equipment.

The economic crisis facing the dairy farmers in Connecticut has recently been highlighted in a position paper issued by the Working Lands Alliance (Working Lands Alliance, 2002). The position paper recommends that the state consider a number of solutions, including restoration of the Northeast Dairy Compact, consideration of other price support models, increasing state purchases of milk at a premium, supporting diversification of Connecticut dairy farming, and labeling of milk sources to allow the consumers to identify Connecticut-produced dairy products.

It can be speculated from the above discussion that some Type 1 or Type 2 CAFOs in Connecticut will be faced with pollution control costs that will reduce their economic viability. This could lead to farm closures or sales of farms to be converted to other land uses. Sources of funding are addressed in the following subsections.

6.3 FEDERAL SOURCES OF FUNDING FOR DAIRY FARMS

Federal funding sources are identified in Table 6-1 below. Only those programs with potential applicability to Connecticut are listed. Information has been obtained from NRCS publications, DEP staff, CAFO Advisory Committee members, and publications (Working Lands Alliance, 2000; USEPA, 2002).

**TABLE 6-1
POTENTIAL FEDERAL FUNDING SOURCES FOR
DAIRY FARMS IN CONNECTICUT**

Program	Through	Details	Applicability*
EQIP and NRCS Technical Support	USDA	The EQIP fund program was reauthorized in the 2002 Farm Bill. The program funds of up to 75% cost sharing per farm project for pollution control, feed management, manure management, and environmental improvement. Allocation per farm project during the period 2002 to 2007 is up to \$450,000. As a part of EQIP, NRCS staff provide technical assistance to farmers to help implement USDA programs.	Generally applicable, in common use in CT
Conservation Reserve Program (CRP)	USDA	The CRP was reauthorized in the 2002 Farm Bill. It is designed to provide rental payments to farmers who set aside conservation lands (buffers) in reserve. Rental payments are made for a 10-year period.	Limited applicability in CT
Agricultural Management Assistance (AMA)	USDA	Voluntary conservation program that provides cost-share assistance for various conservation practices, including feed and waste management facilities. Very limited funds available in CT for this program.	Limited applicability in CT
Farmland Protection Program (FPP)	USDA	Provides funding to protect land. This program was reauthorized in the 2002 Farm Bill at a level approximately 20 times greater than the previous farm bill.	Applicability in CT

*applicability to dairy farms in Connecticut

A key aspect of this study is evaluation of the adequacy of existing financial support to Connecticut AFO producers for implementing waste management and nutrient management components of CNMPs. The most significant source is the federal USDA Environmental Quality Incentives Program (EQIP). EQIP was re-authorized in the 2002 Farm Bill and offers up to 75% cost sharing per farm. Connecticut NRCS indicates that contracted EQIP technical assistance for Connecticut farmers was \$629,364 for federal fiscal year 2001 and \$1,288,361 for federal fiscal year 2002. Connecticut NRCS staff administers the program and also provides technical planning and engineering assistance to contracted projects undertaken by farmers in Connecticut. This technical assistance is valued at 35% of the financial assistance amounts or \$218,527 for FY 2001 and \$450,926 for FY 2002. Thus the total value of EQIP assistance was \$849,641 for FY 2001 and \$1,739,287 for FY 2002. The amounts available for FY 2003 should be similar to FY 2002, although the funds available to Connecticut are based on national formulas and are subject to change.

Although the EQIP program can provide up to \$450,000 per farm at a cost-sharing percentage of 75%, the farmer remains responsible for obtaining the remaining 25%. Further, the farmer is faced with the tax implications of receiving EQIP funding as a taxable revenue stream.

Additionally, investments made by the farmer in pollution control usually do not result in additional income to the farm.

6.4 STATE SOURCES OF FUNDING FOR DAIRY FARMS

State sources of funding are identified in Table 6-2 below. As with the federal sources, only those programs with potential applicability to dairy farms in Connecticut are listed. Information has been obtained from several sources, including DEP, DOA, CAFO Advisory Committee members, and published literature (Working Lands Alliance, 2000).

State funding programs provide supplemental support to federal programs. As listed in Table 6-2, the applicable state program is the Environmental Assistance Program (EAP), through which the Commissioner of Agriculture may reimburse farmers (up to \$40,000 per project with a minimum of 25% farmer share) for part of the cost of compliance with an approved management plan. Legislation is currently pending that would reduce the farmer cost sharing requirement to 10% (from 25%) and increase the maximum amount per project to \$80,000.

**TABLE 6-2
POTENTIAL STATE FUNDING SOURCES FOR
DAIRY FARMS IN CONNECTICUT**

Program	Through	Details	Applicability*
Environmental Assistance Program (EAP)	Connecticut Department of Agriculture	Reimburses qualified farmers for a portion of the cost of implementing approved farm resources management plans designed to protect water quality; can provide for funds that reach a maximum of 75% (proposed as of December 2002 to change to 90%) of project costs; typical cap per farm project is \$40,000, proposed to increase to \$80,000.	Highly applicable in CT, in common use
Farmland Preservation Program (FPP)	Connecticut Department of Agriculture	Designed to reduce conversion of farmland to development by allowing the state to purchase development rights to qualifying farmland when development rights are voluntarily offered for sale by the farm owner. Has protected 29,000 acres across Connecticut on 200 farms since its inception 25 years ago.	Highly applicable in CT

TABLE 6-2 (Cont.)

Program	Through	Details	Applicability*
Farm Enhancement Program	Connecticut Department of Agriculture	Provides cost sharing for farms that wish to diversify in products; up to \$40,000 in funds provided per farm per project	Highly applicable in CT
Open Space Program – Recreation and Natural Heritage Program	CT DEP	DEP acquires land in fee to be held as open space, designed to acquire land representing the state’s ecological diversity. This program does not maintain farmland in a working state.	Not highly applicable
Open Space Program – Protected Space and Watershed Land Acquisition Program	CT DEP	A grant program that matches funds for land acquisitions by municipalities, nonprofit land conservation organizations, and water companies. A conservation easement in favor of DEP is required for all property acquired through the program.	Not highly applicable
River Restoration Grant Program	CT DEP	Program for support of river restoration projects.	Not highly applicable
Supplemental Environmental Projects (SEP)	CT DEP	In the case of a Consent Agreement reached between a polluter and the DEP, the SEP funds can be directed to specific projects that may include pollution prevention and treatment facilities.	Potentially applicable depending on the local situation
Clean Water Act §319 Funds	CT DEP (with EPA funds)	Funds for nonpoint source pollution related projects; can be directed to implementation as well as to planning, education and outreach.	Applicable for certain project types
Clean Water Fund	CT DEP (with EPA funds)	Funds for point source pollution control projects; funds must be directed to municipalities; funds are for a grant and for a loan at 2% interest over 20 years; these would be applicable to farmers only insofar as a municipality was involved in a farm waste management project.	Not presently applicable to private projects

*applicability to dairy farms in Connecticut

Funds that arise from the potential federal and state funding sources discussed above are, in the case of grants, considered taxable income to farmers. Therefore, farmers are faced with tax liabilities when receiving federal or state grants from these programs.

The federal and state programs can be incorporated into an overall plan of funding support for qualified farmers in Connecticut; however, such programs do not necessarily provide sufficient cost-sharing to transform uneconomic dairy farms into sustainable operations. Further, these programs do not provide support for ongoing operations and maintenance.

6.5 PRIVATE FUNDING SOURCES

Private sources of funding for farmers are often lending agencies. Farms obtain needed funds through negotiation of loans from lending agencies. It is beyond the scope of this project to evaluate the viability of private funding sources for individual farms. However, it is a fundamental premise that banks and other lending institutions will lend to businesses with positive cash flow and suitable equity to backstop loans. Put simply, in order to lend to dairy farms, the returns on milk production must equal or exceed the costs of that production.

Private water utilities, Lake Associations, Watershed Associations, and similar watershed-based organizations may also have an interest in providing supporting funds to AFOs for pollution control efforts.

6.6 POLLUTION CONTROL TAX CREDIT PROGRAMS

The State of Connecticut has a tax credit program that provides some degree of relief to CAFO operators related to the purchase and installation of pollution control equipment. Specifically:

- *PS 99(3) – Tax Exemptions for Certain Water Pollution Control Equipment:* Certain water pollution control equipment has been designated as approved by the DEP for use, incorporation or consumption in water pollution control facilities. Policy PS 99(3) sets out the procedures for purchasing equipment such that it will be exempt from sales and use taxes in Connecticut. These exemptions will reduce the net costs to farmers who are purchasing and installing certain equipment.
- *CERT-124 – Certificate for Purchases of Tangible Personal Property Incorporated Into or Consumed in Water Pollution Control Facilities:* The certificate is to be used by the purchaser to claim exemption from sales and use taxes under Connecticut General Statutes §12-412(21). This may also be used to certify exemption from municipal property tax under §12-81(51).

6.7 ALTERNATIVE SOURCES OF FUNDING

Alternatives to the traditional sources of funding described in the previous subsections have been considered in the course of this project. Those alternatives are discussed below.

- **Providing revenue enhancement programs for milk and egg farmers.** Such programs would have multiple goals. A fundamental goal would be to ensure that farmers obtain adequate revenue to address increasing costs of their production. A parallel goal is to assist these farmers in addressing pollution control requirements at dairy farms, at poultry farms, and/or for regional projects addressing the manure management needs of groups of farms.

One previous revenue enhancement program for dairy farmers, the Northeast Dairy Compact, which expired in October 2001, is an example of this type of funding alternative.

- **Statewide bond issues.** Other states in New England have utilized Environmental Bonds to raise funds for farm pollution control projects. For example, the voters of the State of Maine recently passed an Environmental Bond that included \$1.5 million for support of nutrient management projects at farms throughout the state. The State of Connecticut could consider such bond issues as a viable mechanism for raising funds that would help CAFOs remain sustainable. A statewide public survey published in October 2000 showed that 92% of those surveyed felt that tax dollars should pay for preservation of farmland in the State. This provides a strong indication of the degree of public support for farming, and suggests potential support for bond issues related to farm operations.
- **Modification of the Clean Water Fund mechanisms.** Discussions with the DEP during this project indicate that the Clean Water Fund, which draws upon funds authorized under the Clean Water Act, is presently available to qualified municipalities for pollution control projects in Connecticut. Through grants and loans to municipalities, central wastewater treatment facilities are partially funded via the Clean Water Fund. Such a funds direction mechanism should be evaluated to determine its potential applicability to single-farm and/or regional waste management projects. For example, if a group of farms was potentially interested in a regional digester project, how could Clean Water Fund resources be accessed? Based on the present structure this access is not available.
- **Preferential purchasing of Connecticut-based products.** State agencies in Connecticut could establish preferential purchasing policies for dairy and poultry products that are produced in the state. This could provide a sustainable sales mechanism. As well, the agencies could establish premium payments, as was suggested recently in a position paper by the Working Lands Alliance (2002) for liquid milk purchases. State agencies could also establish specifications that would require the use of Connecticut-generated manure byproducts, such as compost, on construction projects.
- **Third-party investments in resource recovery projects.** Projects established to recover energy and resources from waste disposal can be viable projects for third parties to invest in, develop and operate. As an example, the Connecticut Economic Resource Center (CERC) is presently evaluating the potential for agricultural byproducts to be processed to generate methane and electrical energy which can, as a minimum, offset some of the energy demand at farms, and potentially provide electrical energy to the Connecticut grid (Connecticut Economic Resource Center, 2001). Manure generated at poultry farms in Connecticut may require alternative third-party management mechanisms when the CAFO General Permit is fully implemented and all CAFO designated dairy farms are following CNMPs. This will likely increase the return for third parties to consider providing these services to the poultry industry.

6.8 SUMMARY OF IMPLICATIONS

A variety of state and federal funding sources are available for Connecticut farmers. Qualified farmers may use these funds to improve diversity, quality and quantity of products. However, even considering existing funding programs, the basic economics of dairy farming in Connecticut remain poor. With respect to implementing the CAFO General Permit, farmers will require additional funding support to help their operations remain sustainable. Some of the alternative sources of funding discussed in this report will need to be developed and implemented in order to sustain the Connecticut farming industry.

SECTION 7

BENEFITS OF ANIMAL FEEDING OPERATIONS TO THE STATE OF CONNECTICUT

The additional costs for pollution control at Connecticut CAFO farms will create financial challenges for farmers. In general, due to wholesale milk pricing, dairy farms are not making enough income to offset the costs of operation, therefore added pollution control costs represent a further negative impact. Egg farms managing their waste disposal needs today will also be faced with substantial cost increases in the future due to hauling manure greater distances and greater complexity in proper disposal of surplus waste products.

At the same time, these facilities provide substantial benefits to the state of Connecticut going well beyond the direct measurable economic effects. The various economic, environmental and social benefits are presented and discussed below. Consideration of these benefits helps to justify financial support that would work in concert with other existing financing programs to assist CAFO operators to comply with the requirements of the proposed General Permit.

Major areas of benefit created by sustainable CAFOs include:

- Maintaining Connecticut land in a farming use, that serves as a buffer against sprawl and is more economical for municipalities to service;
- Supporting the state economy through jobs, tax revenue, businesses, and tourism; Providing a wide variety of environmental and social benefits; and,
- Providing a fresh and secure locally produced food source.

7.1 MAINTAINING FARMLAND AND CONTROLLING THE COSTS OF COMMUNITY SERVICES

Lands used or controlled by farms comprise approximately 370,000 total acres in Connecticut (Connecticut Farmland Trust, 2002). The dairy farmers in Connecticut utilize upwards of 100,000 acres of land for feed crops, pasture and grazing (Working Lands Alliance, 2002). This does not include additional land under dairy farmer management that is forested. Alone, this 100,000 acres represents over 25% of the state's total farmland. The Connecticut Farmland Trust, an organization whose goals include protecting Connecticut's remaining farmland for agricultural use by current and future farmers, states that farmland in the state is disappearing at a rate of 9,000 acres a year, and this estimate of farmland loss is repeated in several other publications.

The reasons that this farmland is removed from farming uses are multifold, and include:

- Farmers cannot afford to support their ongoing operations, and elect to sell part of the land base to raise needed cash.

- Farmers are approached by developers to sell their land for residential purposes, and the temptation of selling is too high to resist due to substantial financial offers.
- Farmers who may be retiring from farming do not have children or relatives who wish to take over the business, and selling the farm becomes the only available option.
- Third-party purchase of farms, with the intention of continuing the farming operation, is less likely while the net returns (particularly in dairy farming) are so low.

Farmland that is converted to residential use in Connecticut is entirely unlikely to return to farming use. On the other hand, the maintenance of land in farming has multiple benefits:

- Farmland supports the provision of fresh, local food, and the use of local products enhances security of supply;
- Farming is a part of the Connecticut and New England heritage;
- Jobs and spin-off benefits are created and supported;
- Diversity of land use is sustained;
- Farmland provides a buffer against sprawl and contiguous urban areas.

In a financial sense, the maintenance of land in farm, forest and open land uses can be more beneficial to municipalities than having that same land converted to residential uses. The municipal costs of community services that are provided to different types of land uses can be evaluated and compared. These Costs of Community Services (COCS) studies have been conducted in at least 83 communities in the United States (American Farmland Trust, 2001).

COCS studies consistently demonstrate that owners of farm, forest and open lands pay more in local tax revenues than it costs local government to provide services to their properties. Residential land uses, in contrast, are a net drain on municipal coffers, since it costs local governments more to provide services to homeowners than residential landowners pay in property taxes.

Table 7-1 shows the costs of community services, expressed in costs in dollars for each dollar received by municipalities in taxes, for each of the three land use types: residential, commercial/industrial, and farm/forest/open space. These data, compiled from a total of 27 communities in Connecticut, Massachusetts, Rhode Island and New Hampshire, were excerpted from American Farmland Trust, 2001. They illustrate that the costs of servicing farmland and commercial/industrial land ranges from \$0.12 to \$0.94 for each dollar received in taxes. Meanwhile, the available data show that the costs of servicing residential land ranges from \$1.02 to \$1.46 for each dollar received in taxes.

Summarizing in terms of median results, the costs of servicing farmland and commercial/industrial land are seen to be about one-third those of servicing residential land.

**TABLE 7-1
COSTS OF COMMUNITY SERVICES BY LAND USE TYPE**

Town	Residential	Commercial/Industrial	Farm/Forest/Open Space
<i>Connecticut</i>			
Bolton	\$1.05	\$0.23	\$0.50
Durham	\$1.07	\$0.27	\$0.23
Farmington	\$1.33	\$0.32	\$0.31
Hebron	\$1.06	\$0.47	\$0.43
Litchfield	\$1.11	\$0.34	\$0.34
Pomfret	\$1.06	\$0.27	\$0.86
<i>Massachusetts</i>			
Agawam	\$1.05	\$0.44	\$0.31
Becket	\$1.02	\$0.83	\$0.72
Deerfield	\$1.16	\$0.38	\$0.29
Franklin	\$1.02	\$0.58	\$0.40
Gill	\$1.15	\$0.43	\$0.38
Leverett	\$1.15	\$0.29	\$0.25
Middleboro	\$1.08	\$0.47	\$0.70
Southborough	\$1.03	\$0.26	\$0.45
Westford	\$1.15	\$0.53	\$0.39
Williamstown	\$1.11	\$0.34	\$0.40
<i>New Hampshire</i>			
Deerfield	\$1.15	\$0.22	\$0.35
Dover	\$1.15	\$0.63	\$0.94
Exeter	\$1.07	\$0.40	\$0.82
Fremont	\$1.04	\$0.94	\$0.36
Groton	\$1.01	\$0.12	\$0.88
Stratham	\$1.15	\$0.19	\$0.40
Lyme	\$1.05	\$0.28	\$0.23
<i>Rhode Island</i>			
Hopkinton	\$1.08	\$0.31	\$0.31
Little Compton	\$1.05	\$0.56	\$0.37
Portsmouth	\$1.16	\$0.27	\$0.39
West Greenwich	\$1.46	\$0.40	\$0.46
Median	\$1.08	\$0.34	\$0.39
Range	\$1.02 to \$1.46	\$0.12 to \$0.63	\$0.23 to \$0.94

Source: American Farmland Trust, 2001

Note: Figures expressed as dollar of costs of providing services for every dollar received in municipal taxes.

The financial data from these studies are a snapshot in time of costs versus revenues for each type of land use. They do not predict future costs or revenues or the impact of future growth. Further, these studies are not intended to judge to overall "public good" or long-term merits of any land use or taxing structure. Regardless of these limitations, the data in Table 7-1 clearly demonstrate that residential development does not necessarily lower property taxes by increasing the tax base, because the costs of servicing that development typically exceed the tax revenues received.

Two non-profit organizations in Connecticut have attempted to increase the awareness of farmland losses and, at the same time, promote the preservation of farmland for current and future farmers. The Working Lands Alliance (www.workinglandsalliance.org) is a coalition that works to preserve farmland which has regular meetings, promotes legislative action, and helps to sponsor awareness activities. The Connecticut Farmland Trust (www.ctfarmland.org) was formed in 2002 to help protect remaining farmland, enhance agricultural diversity, and assist stakeholders in protecting agricultural land.

Considering the diminishing farming land base in Connecticut, the growth of non-governmental groups that are focused on arresting that loss, and the true costs of servicing land in residential use, it is clear that the maintenance of lands for CAFOs is widely thought to be in the best interest of many Connecticut residents.

7.2 ECONOMIC BENEFITS

The dairies and egg farms in Connecticut generate substantial economic benefits in the state:

- Collectively these farms represent an "anchor" to support numerous other in-state support businesses;
- Thousands of direct jobs are created on farms;
- Thousands of indirect jobs are supported through related businesses, such as equipment suppliers, feed supply, veterinary services, construction, machinery supply, electricity, gas and fuels, water, and other utility services;
- Tax revenues accrue to municipalities and to the state and federal governments from farm businesses;
- Tax revenues accrue to the state and federal governments from payroll taxes, personal income taxes and business taxes;
- Employees of farms and support businesses obtain and spend some of their money locally, directly and indirectly supporting hundreds of other Connecticut businesses; and,
- Agri-tourism opportunities are enhanced, generating revenue for farms and local communities.

Published estimates in Connecticut suggest that the overall economic impact of agriculture is over \$2 billion per year. While the impact of CAFOs as a subset has not been evaluated, it is clear that dairies and egg farms are a significant part of this picture. The direct and indirect economic impacts could be evaluated through an economic model; however, such modeling is not a part of the scope of this project.

Nonetheless, the economic benefits are substantial and, provided that CAFOs are sustained as ongoing businesses, these benefits are sustainable underpinnings of the Connecticut economy. As a corollary benefit, these businesses help to provide a diversity of economic activity that makes the state economy more resilient to "ups and downs" in the economy of other commercial and industrial sectors.

7.3 ENVIRONMENTAL AND SOCIAL BENEFITS

A wide variety of environmental and social benefits accrue to Connecticut residents through sustained farming in the state. Environmentally, the production of food in the state helps to reduce the transportation costs of food imports. Socially, the support of local businesses and farm markets provides a vibrant social fabric that is characteristic of the New England "way of life." Further, sustained farming provides a more mixed economic base that is more resilient and can withstand variations in commercial and industrial activity.

These types of benefits are readily understood by the general public, but are often quite difficult to quantify. The following subsections provide a qualitative discussion in an attempt to define relative importance of each benefit to the state of Connecticut.

Connecticut-Grown Products

The Connecticut DOA has developed the "Connecticut Grown Program" as an ongoing initiative to increase the demand for Connecticut products within and outside the region. This program is also intended to increase farm numbers and production, help to diversify farm products and farm uses, and help to educate consumers about Connecticut products. Support for the Connecticut Grown Program reflects a statewide understanding of the social and economic benefits of farming.

The Connecticut Grown Program helps increase the involvement of non-farm people. Activities such as "pick-your-own" fruits and vegetables, hay rides, and farm tours all increase the level of public awareness of farm products and participation in farm activities. This in turn heightens awareness of the prevalence and importance of farming across the state. As well, the program increases the sustainability of farms by supporting local purchasing (discussed further below).

Aesthetic Features and Cultural Identity

The picturesque backdrop of many Connecticut farms provides a visual atmosphere enjoyed by residents and visitors alike. The traditional "rural" image of barns, silos and tilled fields provides a background for many communities in the state. This is an aesthetic image that many Americans hold of southern New England, which supports the attractiveness of the region as a desirable place to work and live. In turn, the attractiveness supports the value of properties.

Most Americans are aware that less than 100 years ago, small family farms were prevalent throughout the country, and the majority of the country's population lived on those farms. On a regional basis, much of New England has successfully sustained family farms, even though the

nationwide trend of disappearance continues. The cultural identity associated with family farming is strong in the American psyche, as demonstrated by the continued popularity of farm implements, farm art and traditional farming crafts. This cultural identity is a valued aspect of American life.

Quality of Life Aspects

Many farmers and farm employees comment on long hours, unpredictability of the weather, and never-ending responsibilities of caring for animals and facility upkeep. At the same time, few will deny the passion with which many farmers cling to this difficult but rewarding way of life. The farming profession keeps owners and employees "close to nature", a valued experience in a high-tech and fast-paced society. For many residents and visitors who grew up on or near farms, the rewards of the farming "way of life" are recognized as something worth preserving. While this cannot be readily quantified, it reflects a diversity of life that is desirable throughout America.

Air Quality and Green Space

Farming and animal husbandry operations are often challenged with odor management issues. However, most farm odors are largely natural and for some people, comfortable and pleasant. Farming operations in Connecticut also provide green space and open space buffers to residential, commercial and industrial development. By providing this green space, visual buffers are afforded and sustained naturally. On a larger scale, carbon absorption from the atmosphere is increased by maintaining land in a productive state. As urban centers continue to grow and put pressure on surrounding lands, the need for green space becomes more important. Although there is no way to "value" green space in purely economic terms, land use planners and resource managers recognize this as an integral part of good planning and development.

Water Resource Protection and Soil Preservation

Maintenance of land in farming provides many environmental benefits. From the water and soil resource perspectives, these benefits include:

- *Mitigation of flood peaks in surface waters.* Farmlands typically are much more pervious than residential, commercial and industrial land uses. This reduces both the quantity and the rate of runoff reaching streams. Therefore, the streambanks are protected, flow rates are reduced, and water quality is also protected.
- *Aquifer recharge.* As impervious areas are increased through residential, commercial and industrial development, the rate of recharge is reduced. This in turn reduces the replenishment rate of the aquifer, and can also reduce the sustainable yield of an aquifer that is used for water supply. Therefore, farmland helps to sustain water supplies.
- *Soil preservation.* Provided farming is conducted properly and that manure is applied to the land at agronomic rates, soil quality is protected and, in the long run, enhanced through these activities. Healthy soils ensure continued carbon dioxide uptake, better plant health and reduced needs for pest control.

Local Food and Homeland Security

Roadside stands, local produce at neighborhood markets, and produce in grocery stores throughout the state provide visible evidence of local food production for local residents. The success of these sales venues is a testament, in part to the Connecticut Grown Program (discussed above).

Locally produced food provides a number of environmental and human health benefits. Environmentally, local purchasing of local products reduces the transportation requirements for food imports. While transportation of imports is a viable means of providing food to consumers, it requires logistics, warehousing, and transportation fuel, and creates significant air quality impacts. From a health and nutritional standpoint, local food purchasing typically has the advantage of a shorter time between harvest and purchase, typically resulting in increased nutritional value. As well, local purchasing increases awareness of a variety of food types on a seasonal basis. This can help improve the diet of residents.

From a security point of view, the growth and purchase of local food provides a buffer against any potential transportation disruptions. The distributed nature of local food production also diminishes risk of tampering with a central supply system. These factors enhance homeland security.

7.4 SUMMARY OF BENEFITS AND RATIONALE FOR SUPPORT

As discussed, existing CAFOs in Connecticut provide a wide range of benefits to the state and its residents, including but not limited to economic, social and environmental returns. At the same time, the costs to municipalities of servicing farmland are typically lower than the tax revenues that the municipalities receive from those farms. Therefore, the conversion of farmland to residential land is not necessarily desirable from a municipal perspective.

Support for CAFOs to help them deal successfully with pollution control regulations is justified when the many benefits of these facilities are taken into consideration. The implementation of the proposed CAFO General Permit will create both capital and operating costs to farmers. Provided, however, that farmers have the ability and resources to implement the control measures that are required, the General Permit implementation will also enhance the long-term sustainability of farm operations.

SECTION 8

RECOMMENDATIONS

This report discusses the existing Animal Feeding Operations in Connecticut, the need for a General Permit, the cost impacts of that permit, the benefits of compliance, the financial assistance mechanisms that are available to help farmers with pollution control investments, and the benefits of Animal Feeding Operations to the state economy and to the social and cultural environment. This section presents the recommendations arising from the study.

8.1 SHORT-TERM RECOMMENDATIONS

Education and Awareness

- Use this report to educate farmers, local, state, and federal officials and elected representatives about the nutrient surplus in Connecticut and its potential for being exacerbated.
- Use this report to educate local, state and federal officials and elected representatives of the requirements of the General Permit, including the requirements for Comprehensive Nutrient Management Planning, the operational and financial implications to Connecticut farmers, the current crisis in dairy operations and the need for additional funding sources.
- Develop a coalition of farmers, state farm agencies, federal farm agencies, and non-governmental organizations to support the implementation of the CAFO General Permit as a means to help make agriculture sustainable in Connecticut.

Permit Finalization

- Finalize the draft CAFO General Permit using input from the public and stakeholders. Develop a timetable for issuance, finalization and implementation. Prepare a DEP "white paper" to be distributed statewide in advance of issuance.
- Develop a brief and concise Guidance Document that supports the CAFO General Permit, building on information presented in this report. Make the Guidance Document available at the time the General Permit is issued.
- Develop a preamble to the regulations that provides necessary background to basis, intent.

Funding Programs

- Support legislation being proposed by the CT Department of Agriculture to increase funding under the Environmental Assistance Program to the level of 90% of the project cost.
- Urge the representatives of the state legislature to develop and implement appropriate revenue enhancement mechanisms that would be used to fund CAFO improvements and provide support for ongoing operations and maintenance. This program could be managed by the DOA.

- Request that EPA designate a portion of the Section 319 Clean Water Act funds to be directed to agricultural pollution control and waste management projects resulting from CNMP for the CAFO General Permit.

8.2 LONGER-TERM RECOMMENDATIONS

In addition to the Short-term Recommendations presented above, the following longer-term recommendations are put forward:

Education and Awareness

- Support the development of ideology within local, state and federal agencies that agricultural is a preferred land use from the perspective of controlling the municipal costs of community services while providing economic, environmental and social benefits.
- Continue to work with the coalition of farmers, state farm agencies, federal farm agencies, and non-governmental organizations to support the implementation of the CAFO General Permit as a means to help make agriculture sustainable in Connecticut.

Permit Implementation

- Develop a program and conduct reviews of all potential Type 2 CAFOs in Connecticut. Identify which operations will be designated as CAFOs to be permitted under the General Permit.
- Develop the "Land Application Risk Management" training program to be sponsored by DEP with NRCS and the University of Connecticut Soil Test Lab. The purpose of the training is to assist operators and certified Conservation Planners in the decision-making processes associated with managing nutrients and nutrient surplus as the CNMP is implemented.
- Develop a fact sheet for a de minimus quantity of materials that would constitute a reportable spill in order to minimize unnecessary reporting.
- DEP, in cooperation with NRCS and University of Connecticut Extension, should develop a fact sheet to be given to third-party recipients of manure that will be used on lands that are not under control of the Permitted CAFO Operator.
- Develop a compliance form letter to be submitted by the permittee on an annual basis certifying implementation of CNMP.
- Support the work of the Cooperation Extension Service in assisting the farmers to implement the requirements of the CAFO General Permit.
- Develop a General Permit for composting agricultural waste to encourage composting which in turn would redistribute nutrients to help reduce the surplus.
- Monitor the implementation success of the CAFO General Permit. Make corrections and refinements to the General Permit as experience is gained. Develop a record-keeping information database for maintenance and retrieval of all data arising from the General Permit reporting.

Funding Programs

- Support the Connecticut Agricultural Business Cluster's ongoing project to develop a statewide approach for the effective, cost efficient and environmentally sound use of agricultural wastes.
- Urge the federal legislators to modify the tax statutes that require EQIP funds and other federal and state program funds to be reported as taxable income to farmers.
- Urge the state legislators to modify the tax statutes that require Environmental Assistance Program funds and other federal and state program funds to be reported as taxable income to farmers.
- Identify and develop additional funding sources within watersheds, such as through Trout Unlimited, watershed associations, lake associations, water utilities, and river groups. Work with watershed coordinators at CT DEP.
- Explore the use of EQIP Funds for regional manure handling facilities.
- Support the DOA Farmland Preservation Program as a means of encouraging the sustainability of farming in Connecticut.
- Support funding for Farm Research Groups, where farmers help identify and solve problems.
- Identify and provide proponents with access to funding for demonstration projects for management of the manure nutrient surplus that arises as farms implement CNMPs and waste management programs. Give priority to projects that are developed as a result of the work completed by CERC in cooperation with the Connecticut Academy of Science and Engineering and the CT Department of Agriculture.

Alternative Funding Opportunities

- Evaluate the scope and viability of a statewide bond issue that could be used for raising funds to help CAFOs remain sustainable, with a goal of supporting potential regional facilities and demonstration projects. (Examples of potential projects are described in Appendix B.)
- Evaluate the opportunity to modify the Clean Water Fund mechanisms that would allow such funds to be directed to single-farm and/or regional waste management projects for multiple farms.
- Evaluate the opportunity for state agencies to establish preferential purchasing of Connecticut-based products. This could include premium payments as well as specifications requiring the use of Connecticut-generated manure byproducts.
- Should these or other opportunities appear viable, lobby the agencies and legislators to implement programs.

SECTION 9

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APPENDIX A

**GENERAL PERMIT FOR
CONCENTRATED ANIMAL FEEDING OPERATIONS**

General Permit for CONCENTRATED ANIMAL FEEDING OPERATIONS

note: the larger print denotes information specific to regulating discharges from CAFOs; the smaller print indicates that the information is contained in the DEP format for general permits

Section 1. Authority

This general permit is issued under the authority of Section 22a-430b of the General Statutes.

Section 2. Definitions

The definitions of terms used in this general permit shall be the same as the definitions contained in Section 22a-423 of the General Statutes and Section 22a-430-3(a) of the Regulations of Connecticut State Agencies. In addition, the following definitions shall apply:

“25-year, 24-hour rainfall event” means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years, as defined by the National Weather Service in Technical Paper Number 40, “Rainfall Frequency Atlas of the United States,” May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

“Agricultural wastes” means manure, bedding materials, poultry litter, spilled feed or feed waste, and crop residues.

“Animal Feeding Operation (AFO)” means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

Authorized discharge” means a discharge authorized under this general permit.

“Best Management Practices (BMPs)” means recommended practices or procedures designed to prevent, minimize or control environmental impacts. BMPs may include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

“Catastrophic rainfall event” is equivalent to a 25-year, 24-hour storm event. Catastrophic events include tornadoes, hurricanes, or other conditions that would cause an overflow from the waste retention structure that is designed, constructed, operated, and maintained to meet all the requirements of this permit.

“Certified Conservation Planner” means a third party vendor or Natural Resources Conservation Service (“NRCS”) employee as defined in the Connecticut NRCS General Manual 180 Part 409, Conservation Planning Policy and who has successfully completed a “Land Application Risk Management” training program sponsored by the Department of Environmental Protection (“DEP”) with the Connecticut NRCS and the University of Connecticut Soil Test Lab.

“CFR” means the Code of Federal Regulations.

“Chronic rainfall” means a series of wet weather events that prevent the dewatering of properly maintained waste retention structures.

“Commissioner” means the commissioner of environmental protection or his agent.

“Comprehensive Nutrient Management Plan (CNMP)” means a site-specific plan to properly manage agricultural wastes and process-generated wastewaters, including runoff and seepage from land application areas, in order to minimize the impacts of animal feeding operations on water quality.

“Concentrated animal feeding operation (CAFO)” means an animal feeding operation that meets any of the three following criteria:

- a. Operations that stable or confine a number equal to or greater than the numbers of animals specified in any of the following categories:
 1. 1,000 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs,
 2. 1,000 veal calves,
 3. 700 mature dairy cattle whether milked or dry,
 4. 2,500 swine each weighing 55 pounds or more,
 5. 10,000 swine each weighing less than 55 pounds
 6. 500 horses,
 7. 10,000 sheep or lambs,
 8. 55,000 turkeys,
 9. 82,000 laying hens,
 10. 125,000 chickens other than laying hens,
 11. 5,000 ducks (outdoor operations),
 12. 75,000 ducks (indoor operations).

b. Proposed new operations at a new location which will generate more than 1000 gallons per day of process-generated wastewater or which stable or confine greater than or equal to the numbers of animals specified in the following categories:

1. 300 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs,
2. 300 veal calves,
3. 200 mature dairy cattle whether milked or dry cows,
4. 750 swine each weighing over 55 pounds,
5. 3,000 swine each weighing less than 55 pounds,
6. 150 horses,
7. 3,000 sheep or lambs
8. 16,500 turkeys,
9. 37,500 chickens other than laying hens
10. 25,000 laying hens,
11. 1,500 ducks.

c. Any other animal feeding operation that the Commissioner designates as a CAFO.

"Department" means the department of environmental protection.

"Designation of a facility as a CAFO" means that the Commissioner has determined that an AFO is a significant contributor of pollutants pursuant to 40 CFR 122.23, and therefore, should be designated as a CAFO.

"Discharge associated with a CAFO" means a discharge under catastrophic or chronic rainfall conditions from a facility designed, constructed and operated to hold all agricultural wastes, process-generated wastewater, and the runoff from at least a 25-year, 24-hour rainfall event; and all other discharges in accordance with the CNMP.

"Individual permit" means a permit issued to a named person under Section 22a-430 of the General Statutes.

"Land application" means the application of agricultural wastes and process-generated wastewater onto, or incorporation into, the soil.

"Land application area" means any land owned, leased or otherwise controlled by the CAFO owner/operator for the purpose of land applying agricultural wastes and process-generated wastewater generated at the CAFO.

"NRCS" means the Natural Resources Conservation Service of the United States

Department of Agriculture.

"Permittee" means a person who initiates, creates, originates, or maintains an authorized discharge.

"Person" means person as defined by Section 22a-423 of the General Statutes.

"Process-generated wastewater" means any water directly or indirectly used in, or resulting from, the operation of an AFO, including any of the following:

- Spillage or overflow from animal or poultry watering systems
- Washing, cleaning or flushing of pens, barns, manure pits or other feedlot facilities
- Washing or spray cooling of animals
- Dust control
- Leachate from silage and feed storage areas
- Wastewater generated in the production of intermediate or final products such as eggs and milk
- Stormwater that comes into contact with any production area, raw materials, or products or byproducts of the operation.

"Production Area" means the animal confinement area(s), the waste storage area(s), the raw materials storage area(s), the waste containment area(s), and any egg washing or egg processing facility. The animal confinement area(s) includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, exercise yards, animal walkways, and stables. The waste storage area(s) includes but is not limited to lagoons, sheds, under-house or pit storage, liquid impoundments, static piles, and composting piles. The waste containment area(s) includes but is not limited to all collection ditches, conduits and swales used for the collection of runoff and process wastewater. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials storage.

"Registrant" means a person who files a registration.

"Registration" means a registration filed with the commissioner pursuant to Section 4 of this general permit.

"Retention facility or retention structures" means all ditches, conduits, swales, basins, ponds, and lagoons used to collect and store agricultural wastes, process-generated wastewater and runoff.

"Runoff" means collected or uncollected gravity flow overland of water from rain, melted snow, or agricultural or landscape irrigation.

"Stormwater" means waters consisting of precipitation (rain or snow) runoff.

"USDA" means United States Department of Agriculture.

Section 3. Authorization Under This General Permit

(a) Eligible Discharges

Provided the requirements of subsection (b) of this section are satisfied, this general permit authorizes:

Discharges associated with a CAFO, as defined in Section 2 of this general permit.

Any other discharge of water, substance or material into the waters of the state is not authorized by this general permit, and no person or municipality may initiate, create, originate, or maintain such a discharge without first obtaining authorization therefor under Section 22a-430 of the General Statutes.

(b) Requirements for Authorization

This general permit authorizes the discharges listed in subsection (a) of this section provided:

(1) Registration

A completed registration with respect to such discharges has been filed with the commissioner.

(2) Coastal Area Management

Such discharge is consistent with all-applicable goals and policies in Section 22a-92 of the General Statutes, and will not cause adverse impacts to coastal resources as that term is defined in Section 22a-93 of the General Statutes.

(3) Endangered and Threatened Species

Such discharge does not threaten the continued existence of any species listed pursuant to Section 26-306 of the General Statutes as endangered or threatened and will not result in the destruction or adverse modification of habitat designated as essential to such species.

(c) Geographic Area

This general permit applies throughout the State of Connecticut.

(d) Effective Date and Expiration Date of this General Permit

This general permit is effective on the date it is issued by the commissioner and expires 5 years from such date.

(e) Effective Date of Authorization

To be determined

(f) Revocation of an Individual Permit

If a discharge which is eligible for authorization under this general permit is presently authorized by an individual permit, such individual permit may be revoked by the commissioner upon a written request by the permittee. If the commissioner revokes such individual permit in writing, such revocation shall take effect on the effective date of authorization of such discharge under this general permit.

(g) Issuance of an Individual Permit

If the commissioner issues an individual permit authorizing a discharge which has already been authorized by this general permit, this general permit shall cease to authorize such discharge beginning on the date such individual permit is issued.

Section 4. Registration Requirements

(a) Who Must File a Registration

(1) For a facility meeting the definition of a CAFO, on or before 60 days after issuance of this general permit, any person who wishes under the authority of this general permit to initiate, create, or maintain a discharge associated with a CAFO shall file with the commissioner (1) a registration form which meets the requirements of Section 4 of this general permit and (2) the fee specified by subsection (c) of this section.

(2) For a facility designated as a CAFO, on or before 60 days after being notified by the commissioner that the facility has been so designated, any person who wishes under the authority of this general permit to initiate, create, or maintain a discharge associated with a CAFO shall file with the commissioner (1) a registration form which meets the requirements of Section 4 of this general permit and (2) the fee specified by subsection (c) of this section.

(b) Contents of Registration

(1) Fees

(A) The registration fee of \$250.00 established by Section 22a-6f of the General Statutes shall be submitted with a registration form. A registration shall not be deemed complete and no discharge shall be authorized by this general permit unless the fee specified in this paragraph has been paid in full.

(B) Such fee shall be paid by check or money order payable to the **Department of Environmental Protection**.

(C) Such fee is non-refundable.

(2) Registration Form

A registration shall be filed on forms prescribed and provided by the commissioner and shall include the following:

(A) Legal name, address, and telephone number of the registrant. If the registrant is a corporation or a limited partnership transacting business in Connecticut, provide the

exact name as registered with the Connecticut Secretary of the State.

- (B) Legal name, address, and telephone number of the owner of the property on which the CAFO is located, if different from the registrant.
- (C) Legal name, address, and telephone number of the registrant's attorney or other representative, if applicable.
- (D) Legal name, address, and telephone number of any consultant(s) or engineer(s) retained by the registrant to prepare the registration or to design or construct the subject activity.
- (E) Location address of the CAFO for which the registration is submitted.
- (F) The number and type of animals maintained at the CAFO.
- (G) The signature of the registrant and of the individual or individuals responsible for preparing the registration, each of whom shall certify in writing as follows:
 - “I have personally examined and am familiar with the information submitted in this registration, including all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief.”
 - “I understand that a false statement in the submitted information may be punishable as a criminal offense, in accordance with section 22a-6 of the General Statutes, pursuant to 53a-157b of the General Statutes, and in accordance with any other applicable statute.”
 - “I certify that this general permit registration is on complete and accurate forms as prescribed by the commissioner without alteration of the text;
 - “I also certify under penalty of law that I have read the *General Permit for Concentrated Animal Feeding Operations* issued by the commissioner on DATE; that the discharges which are the subject of this registration are eligible for authorization under such permit; and that I will comply with all schedules and applicable requirements of such permit, including the development and implementation of a site-specific Comprehensive Nutrient Management Plan, reviewed and approved by a Certified Conservation Planner.”

(c) *Where to File a Registration*

A registration shall be filed with the commissioner at the following address:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

(d) Additional Information

The commissioner may require a registrant to submit additional information which the commissioner reasonably deems necessary to evaluate the consistency of the subject discharge with the requirements for authorization under this general permit.

(e) Action by Commissioner

- (1) The commissioner may reject without prejudice a registration if he determines that it does not satisfy the requirements of subsection 4 of this general permit or more than 30 days have elapsed since the commissioner requested that the registrant submit additional information or the required fee and the registrant has not submitted such information or fee. Any registration refiled after such a rejection shall be accompanied by the fee specified in subsection 4(c)(1) of this general permit.
- (2) The commissioner may disapprove a registration if he finds that the subject discharge is inconsistent with the requirements for authorization under section 3 of this general permit, or for any other reason provided by law.
- (3) Disapproval of a registration under this subsection shall constitute notice to the registrant that the subject discharge may not lawfully be conducted or maintained without the issuance of an individual permit under 22a-430 of the General Statutes.
- (4) The commissioner may approve a registration with reasonable conditions. If the commissioner approves a registration with conditions, the permittee shall be bound by such conditions as if they were a part of this general permit.
- (5) Rejection, disapproval, or approval of a registration shall be in writing.

Section 5. Conditions of this General Permit

The permittee shall assure that at all times each authorized discharge continues to meet the requirements for authorization set forth in section 3 of this general permit. In addition, a permittee shall assure that each authorized discharge is at all times conducted in accordance with all applicable requirements of this general permit, including the following conditions:

(a) Effluent Limitations

- (1) There shall be no discharges of agricultural wastes or process-generated wastewater except:
 - (A) when catastrophic or chronic rainfall events cause an overflow from a waste treatment or storage facility designed, constructed, maintained and operated to contain all agricultural wastes and process-generated wastewater plus the runoff from a 25 year, 24-hour rainfall event, **or**
 - (B) in accordance with an approved CNMP.

(b) Comprehensive Nutrient Management Plan

(1) Development of the CNMP

(A) A site-specific CNMP for the facility that is the subject of the registration for this general permit shall be reviewed and approved by a Certified Conservation Planner. The CNMP shall be prepared in accordance with the goals of the NRCS "Technical Guidance for Developing Comprehensive Nutrient Management Plans", except that Best Professional Engineering Judgement may be used in the design of waste collection, storage and treatment facilities. The CNMP may incorporate by reference any applicable existing document and shall describe the implementation of practices which are to be used to comply with the conditions of this permit.

(2) Deadlines for CNMP Preparation and Submittal

(A) For a facility meeting the definition of CAFO contained in Section 2 of this permit, the CNMP shall be prepared on or before 1 year after issuance of this permit or in accordance with any alternate time frame approved by the commissioner.

(B) For a facility designated as a CAFO as defined in Section 2 of this permit, the CNMP shall be prepared on or before 1 year after the facility is notified by the Commissioner that the AFO has been so designated or in accordance with any alternate time frame approved by the commissioner

(C) Within 30 days of the development of the CNMP, the permittee shall submit the CNMP for the commissioner's review and approval.

(D) The CNMP shall be submitted to the following address:

WATER MANAGEMENT BUREAU/PERD
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106

(3) The main elements of a CNMP include, **as applicable**:

(A) Animal outputs – manure and process wastewater collection, handling, storage, treatment, transfer and utilization

(B) Evaluation and treatment of sites proposed for land application and utilization

(C) Land application procedures based on the current NRCS Practice Standards 590 (Nutrient Management), 633 (Waste Utilization), the

Connecticut Nutrient Management Policy, Section 402.07(b), Progressive Planning and the “Land Application Risk Management” training program.

- (D) Records of CNMP implementation including as-builts of structural practices, operation and maintenance records, and records associated with land application procedures.
 - (E) Inputs to animals (feed management).
 - (F) Other waste utilization activities or options including but not limited to off-site transfers or composting operations.
 - (G) Management and control of stormwater to minimize contact with the production area.
- (4) The approved CNMP and associated records shall be maintained on site and shall be made available upon request to the commissioner or during any onsite inspection.
- (5) Interim management measures. The permittee shall implement any management measures deemed necessary by the commissioner prior to full implementation of the CNMP.
- (6) Implementation of the CNMP. The permittee shall implement the CNMP in accordance with the schedule contained in the plan approved by the commissioner, or any alternate schedule approved by the commissioner.
- (7) Keeping the CNMP current. The permittee shall be responsible for amending the CNMP whenever; (1) there is any change at the site which has an effect on the potential to cause pollution of the waters of the state; or (2) actions required by the CNMP fail to ensure or adequately protect against pollution of the waters of the state; or (3) the commissioner requests modification of the CNMP. The amended plan shall be completed within 60 days of the date the permittee becomes aware or should have become aware that any of the conditions listed above has occurred.
- (8) Failure to prepare or amend CNMP. In no event shall failure to complete or update a CNMP in accordance with this general permit relieve a permittee of responsibility to implement actions required to protect the waters of the state, complete any actions that would have been required by such plan , and to comply with all conditions of the permit.
- (9) Notification of noncompliance with CNMP. In the event that the permittee becomes aware that it did not or may not comply, or did not or may not comply on time, with any requirement of the CNMP, the permittee shall immediately notify the commissioner and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, minimized to the greatest extent possible. In so notifying the commissioner, the permittee shall state in writing the reasons for the noncompliance or

delay, and propose, for the review and written approval of the commissioner, dates by which compliance will be achieved, and the permittee shall comply with any dates which may be approved in writing by the commissioner. Notification by the permittee shall not excuse noncompliance or delay, and the commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically stated by the commissioner in writing.

(c) *Monitoring Requirements*

- (1) The permittee shall monitor and inspect each structural management practice per the operation and maintenance plan as indicated in the approved CNMP.
- (2) The permittee shall maintain records of land application activities in accordance with the approved CNMP.

(d) *Requirements for land application activities not under the control of the permitted CAFO operator*

- (1) The permittee shall do the following:
 - (A) Maintain records showing the amount of manure or manure products that leaves the permitted operation
 - (B) For quantities of greater than 50 cubic yards per calendar year, record the name and address of the recipient
 - (C) Inform the recipient of his/her responsibility to properly manage the land application of the manure to prevent discharge of pollutants to waters of the state.

(e) *Reporting and Record Keeping Requirements*

- (1) The permittee shall submit to the commissioner on an annual basis on or before JANUARY 31, a letter certifying that the permittee is implementing the requirements of the approved CNMP.
- (2) All records required by this general permit and the CNMP shall be maintained on-site for a period of at least five (5) years and shall be made available upon request to the commissioner or during any on-site inspection.

(f) *Recording and Reporting Violations*

The permittee shall, within 2 hours of becoming aware of the circumstances, and at the start of the next business day if he or she becomes aware of the circumstances outside normal business hours, notify the commissioner of any actual or anticipated noncompliance with the terms and conditions of this general permit and shall submit a written report to the commissioner within five days thereafter. Such report shall contain a description of the noncompliance

and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate and prevent recurrence of the noncompliance. Actual or anticipated noncompliance may include, but not be limited to, a leak, breach, overflow or other structural failure of a storage facility not caused by a catastrophic event but due to improper operation, maintenance or design; or a discharge due to manure releases related to the improper handling of liquid or solid manure.

(g) *Regulations of Connecticut State Agencies Incorporated into this General Permit*

The permittee shall comply with all laws applicable to the subject discharge, including but not limited to the following Regulations of Connecticut State Agencies which are hereby incorporated into this general permit, as if fully set forth herein:

(1) Section 22a-430-3:

Subsection (b) General - subparagraph (1)(D) and subdivisions (2),(3),(4) and (5)

Subsection (c) Inspection and Entry

Subsection (d) Effect of a Permit – subdivisions (1) and (4)

Subsection (e) Duty to Comply

Subsection (f) Proper Operation and Maintenance

Subsection (h) Duty to Mitigate

Subsection (i) Facility Modifications; Notification – subdivisions (1) and (4)

Subsection (j) Monitoring, Records and Reporting Requirements – subdivisions (1), (6), (7), (8), (9) and (11) (except subparagraphs (9)(A)(2) and (9)(C))

Subsection (k) Bypass

Subsection (m) Effluent Limitation Violations

Subsection (n) Enforcement

Subsection (o) Resource Conservation

Subsection (p) Spill Prevention and Control

(1) Section 22a-430-4:

Subsection (p) Permit revocation, denial or modification

(h) *Reliance on Registration*

In evaluating the permittee's registration, the commissioner has relied on information provided by the permittee. If such information proves to be false or incomplete, the permittee's authorization may be suspended or revoked in accordance with law, and the commissioner may take any other legal action provided by law.

(i) *Duty to Correct and Report Violations*

Upon learning of a violation of a condition of this general permit, a permittee shall immediately take all reasonable action to determine the cause of such violation, correct and mitigate the results of such violation, prevent further such violation, and comply with subsection 5(f) of this general permit. Such information shall be filed in accordance with the certification requirements prescribed in subsection 5(k) of this general permit.

(j) *Duty to Provide Information*

If the commissioner requests any information pertinent to the authorized discharge, or for compliance with this general permit, or with the approval of the permittee's registration, the permittee shall provide such information in writing within thirty (30) days of such request. Such information shall be certified in accordance with subsection 5(k) of this general permit.

(k) *Certification of Documents*

Any document, including but not limited to any notice, information or report, which is submitted to the commissioner under this general permit shall be signed by the permittee, or a duly authorized representative of the permittee, and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with Section 22a-6 of the General Statutes, pursuant to Section 53a-157b of the General Statutes, and in accordance with any other applicable statute."

(l) *Date of Filing*

For purposes of this general permit, the date of filing with the commissioner of any document is the date such document is received by the commissioner. The word "day" as used in this general permit means the calendar day; if any date specified in the general permit falls on a Saturday, Sunday, or legal holiday, such deadline shall be the next business day thereafter.

(m) *False Statements*

Any false statement in any information, including any registration, submitted pursuant to this general permit may be punishable as a criminal offense, in accordance with Section 22a-6, under Section 53a-157b of the General Statutes.

(n) *Correction of Inaccuracies*

Within fifteen days after the date a permittee becomes aware of a change in any information in any material submitted pursuant to this general permit, or becomes aware that any such information is inaccurate or misleading or that any relevant information has been omitted, such permittee shall correct the inaccurate or misleading information or supply the omitted information in writing to the commissioner. Such information shall be filed in accordance with the certification requirements prescribed in subsection 5(k) of this general permit. The provisions of this subsection shall apply both while a request for approval of registration is pending and after the commissioner has approved such request.

(o) *Transfer of Authorization*

Any authorization under this general permit shall be non-transferable.

(p) *Other Applicable Law*

Nothing in this general permit shall relieve the permittee of the obligation to comply with any other applicable federal, state and local law, including but not limited to the obligation to obtain any other authorizations required by such law.

(q) *Other Rights*

This general permit is subject to and does not derogate any present or future rights or powers of the State of Connecticut and conveys no rights in real or personal property nor any exclusive privileges, and is subject to all public and private rights and to any federal, state, and local laws pertinent to the property or activity affected by such general permit. In conducting any discharge authorized hereunder, the permittee may not cause pollution, impairment, or destruction of the air, water, or other natural resources of this state. The issuance of this general permit shall not create any presumption that this general permit should or will be renewed.

Section 6. Commissioner's Powers

(a) *Abatement of Violations*

The commissioner may take any action provided by law to abate a violation of this general permit, including the commencement of proceedings to collect penalties for such violation. The commissioner may, by summary proceedings or otherwise and for any reason provided by law, including violation of this general permit, revoke a permittee's authorization hereunder in accordance with Sections 22a-3a-2 through 22a-3a-6, inclusive, of the Regulations of Connecticut State Agencies. Nothing herein shall be construed to affect any remedy available to the commissioner by law.

(b) *General Permit Revocation, Suspension, or Modification*

The commissioner may, for any reason provided by law, by summary proceedings or otherwise, revoke or suspend this general permit or modify it to establish any appropriate conditions, schedules of compliance, or other provisions which may be necessary to protect human health or the environment.

(c) *Filing of an Individual Application*

If the commissioner notifies a permittee in writing that such permittee must obtain an individual permit if he wishes to continue lawfully conducting the authorized discharge, the permittee may continue conducting such activity only if he files an application for an individual permit within thirty (30) days of receiving the commissioner's notice. While such application is pending before the commissioner, the permittee shall comply with the terms and conditions of this general permit and any applicable approval of registration. Nothing herein shall affect the commissioner's power to revoke a permittee's authorization under this general permit at any time.

Issued: [DATE]

Arthur J. Rocque, Jr.
Commissioner

Note: the general permit will be followed with an Appendix containing the NRCS Comprehensive Nutrient Management Planning Technical Guidance, NRCS Connecticut Practice Standards No. 590 (Nutrient Management) and 633 (Waste Utilization), and a factsheet that the farmer can distribute to recipients of manure regarding the proper land application of the manure.

APPENDIX B

EXAMPLES OF PILOT OR DEMONSTRATION PROJECTS FOR OFF-FARM MANURE MANAGEMENT IN CONNECTICUT

Examples of Pilot or Demonstration Projects for Off-Farm Manure Management in Connecticut

While certain farms may own or control enough land to manage all of the manure they produce, in most cases the development of CNMP's will reveal that farms lack sufficient land for appropriate on-farm utilization of manure nutrients. In areas of the state where there are concentrations of farms, the solution to the surplus may lie in the development of a regional facility to receive and process manure solids.

Regional solutions for manure management have been employed elsewhere in the US (e.g. Texas, Oregon, Delaware, California) and in northern Europe. The keys to economic viability lie in: 1) reasonable transport distances from farms to a regional site; 2) a sufficiently large regional facility to offer significant economies of scale; 3) a well-planned processing plant that generates revenue from several sources, including such things as electricity, waste heat, compost, and specialty fertilizer products. The Europeans have been successful in combining manure with other high-energy waste materials such as food processing wastes, wood wastes or slaughterhouse residuals. By charging "tipping fees" to multiple feedstocks and gaining revenue from more than one output, regional facilities can provide a viable alternative to on-farm processing or the purchase of additional land for landspreading.

A regional facility requires the state (perhaps DEP and DOA) to bring together the parties needed to effect the solution. No one entity, and certainly not a single farmer, is in a position to carry out a regional facility on its own. The state could:

- Undertake the initial studies to define the scale and location of projects;
- Gain initial commitments from providers of feedstocks (farmers, etc.) and buyers of products (soil amendments, electricity, waste heat);
- Identify candidate sites;
- Expedite permitting;
- Facilitate the formation of a cooperative or special-purpose district to own and operate the facility;
- Seek funding; and
- Solicit private-sector proposals for building or for building and operating the facility.

One example of a regional facility might include the following components:

- Combustion of poultry manure and other waste organics (e.g. FOG);
- Generation of electricity and sale to the grid;
- Use of waste heat to dry dairy manure (after on-farm solids separation);
- Sale of dried dairy manure in bulk to local nurseries and mushroom farmers;
- Bagging and retail sale of dried dairy manure.

A second example might include:

- Anaerobic digestion of dairy and poultry manure;
- Combustion of methane to generate electricity for sale to the grid;
- Use of waste heat in a local industry or municipal facility (e.g. school);

- Solids separation (at the regional facility) with return of liquid to participating farmers for landspreading;
- Composting of digested solids; and
- Sale of compost to local nurseries or mushroom farmers.

The second example includes some of the features of the regional digester systems in use in Denmark. There the regional digester facility serves as a “manure bank”. The participating farmers pay a fee that is dependent on the volume of manure they send to the plant and the volume of digested manure they take back. Farmers with a deficit of land pay more than the average; farmers that are able to take back more digested manure than they contribute pay a lower fee. Farmers that do not raise any animals but have land available pay a fee based on the nutrient content of the digested manure. This program in Denmark was established to deal with new regulations that put many swine and dairy farmers in the “nutrient surplus” condition. It has been successful because the national government has coordinated its agriculture, environmental and energy policies to ensure the viability of small farms. In one Danish project, the nearby power plant has a financial incentive to use the methane produced at the regional digester, because it can charge more for the resulting power it produces. The waste heat from that power station is used for district heating in the nearby village.

State involvement in a regional facility can also facilitate the use of other waste organics to help with the economics. For example, the DEP is implementing a general permit program for fats, oils and grease (FOG) generated from Connecticut restaurants and food preparation facilities. This will result in a large controlled volume of FOG as grease traps are installed and both new and existing grease traps are pumped more frequently. The collected FOG will be taken to several wastewater treatment plants located across the state, where the FOG will be thickened through the removal of excess water. The thickened grease can be used as a fuel in an incinerator. If one or more of the receiving wastewater treatment plants were located near a cluster of dairy and/poultry farms, the thickened grease would be a useful feedstock to the hypothetical combustion system described in the first example above. In Europe, such wastes are also blended with manure before digestion to increase methane production.

The DEP might also be able to facilitate the use of locally-generated wood waste as a fuel in a combustion unit. This would add another revenue stream for the regional facility and reduce the need for purchased fuel.