STATE CONSERVATION DISTRICT ADVISORY COUNCIL
Manure Management Subcommittee

FINAL REPORT
December 4, 1997

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EXECUTIVE SUMMARY
of the
FINAL REPORT
December 9, 1997

In the fall of 1996, the State Conservation District Advisory Council (Advisory Council) established a manure management subcommittee to explore a variety of issues related to the production and utilization of manure on Maine farms and to develop recommendations for addressing those issues. The 17 member subcommittee was made up of farmers and representatives of agricultural agencies and organizations. Some of the concerns leading to the formation of the subcommittee included:

- the need to revise the 1972 Manure Management Guidelines
- the rapid expansion of dairy herds with a fixed land base
- the continued practice of spreading manure during the winter
- issues associated with Decoster manure on other farms
- the increasing number of nuisance complaints related to manure

It was apparent to the Advisory Council that there was a trend towards more manure related problems and consequently more pressure to regulate the management of manure. The creation of this subcommittee provided an opportunity for agricultural leaders and agencies to explore the issues that were unfolding and to develop solutions that would help solve the problems identified.

As the work of the subcommittee progressed, a number of other issues arose that increased both the scope and urgency of the task being undertaken. These included:

- proposals to build large hog production facilities in Aroostook County that met with considerable citizen resistance, in part because there was no mechanism for regulating such facilities in the state,
- the introduction of Maine legislation to regulate livestock operations and
- several initiatives by the US EPA to focus on and expand the permitting of Concentrated Animal Feeding Operations (CAFO's) through the National Pollution Discharge Elimination System (NPDES).

The subcommittee sought throughout the process to incorporate voluntary mechanisms and current programs into the solutions recommended, but the advent of these new activities made it clear that any recommended solutions to the problems being experienced must necessarily include at least some regulatory elements to be effective and acceptable to the non agricultural

community. Those proposed by the subcommittee were felt to be ones that would be the least intrusive while still addressing the issues.

It was anticipated that the subcommittee report would be used as guidance by the Commissioner of Agriculture and the other agencies named in the report in establishing and coordinating actions relating to manure management.

ISSUES AND RECOMMENDATIONS

The Manure Management Subcommittee identified and explored a long list of manure related issues, including the overuse or misuse of nutrients on farmland; spreading manure on frozen or snow covered ground; lack of enforcement provisions in the 'Right to Farm Law'; management and handling issues related to odors, insects and spills; transportation of manure on Maine roads; regulation of manure in the shore land zone; increased interest in regulating Concentrated Animal Feeding Operations (CAFOs) by Maine citizens and the US EPA; animals in water and others. It became clear that many of the issues were interrelated and that a broad, comprehensive approach would be needed to encompass and address them all. The approach for doing this included three key components. These are:

- Make having and implementing Nutrient Management Plans (NMP) mandatory for livestock farms or farms bringing manure onto the farm.
- Establish a Nutrient Management Advisory Board (NMAB) within the Maine Department of Agriculture to implement a comprehensive nutrient management program for the state.
- Revise the 1972 Manure Management Guidelines

After identifying the overall approach, the subcommittee turned its attention to addressing the issues associated with its implementation. Legislation was proposed that would make Nutrient Management Plans mandatory and set up a Nutrient Management Advisory Board with staff and resources to implement the program. Other recommendations requiring legislation were:

- Changes to strengthen the 'Right to Farm Law'
- Prohibition of Winter Spreading of Manure
- Permitting of specific types of Livestock Operations

The major recommendations meant to be implemented by a Nutrient Management Advisory Board included:

- Revise the 1972 Manure Management Guidelines
- Develop BMPs to address a variety of manure related nuisance issues
- Address the 'animals in water' issue
- Address the issue of hauling manure over posted roads
- Establish a permitting program for new and expanding large animal feeding operations and those meeting the EPA definition of a CAFO or AFO
- Establish a certification program for writers of NMPs

- Establish standards for Nutrient Management Plans

Recommendations to other agencies included:

- Cooperative Extension should develop fact sheets for BMP's and some issues.
- Natural Resources Conservation Service should provide technical assistance to farmers on planning and implementing manure and nutrient management.
- Cooperative Extension should develop an educational outreach program for farmers to introduce them to the requirements of this program.
- Cooperative Extension and NRCS should assist farmers in finding funding to implement changes needed as a result of this new program.

The subcommittee evaluated penalties for farms that would not adopt BMPs after a problem is identified or that failed to prepare or implement nutrient management plans. Their recommendations were:

- Loss of protection under the 'Right to Farm Law'
- Imposition of fines by the Commissioner as a last resort, when an operator refuses to cooperate and the voluntary approach has failed.

One concern about the imposition of mandatory nutrient management plans was the time necessary to prepare the large number of plans that would be needed. In addition, some of the plans would necessitate construction of new storage facilities or other capital investments be made. There would need to be time to arrange financing and time for the actual construction before these plans could be fully implemented. The following phase in schedule was recommended:

- Plans must be developed by January 1, 2001.
- Plans must be fully implemented by October 1, 2005.
- NMAB should seek to have farms voluntarily achieve full implementation by October 1, 2003.

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INTRODUCTION

In the fall of 1996, the State Conservation District Advisory Council (Advisory Council) established a manure management subcommittee to explore a variety of issues related to the production and utilization of manure on Maine farms and to develop recommendations for addressing those issues. Some of the issues that the Advisory Council was concerned about at that time included:

- the need to revise the 1972 Manure Management Guidelines
- the rapid expansion of dairy herds with a fixed land base
- the continued practice of spreading manure during the winter
- issues associated with Decoster manure on other farms
- the increasing number of nuisance complaints related to manure

It was apparent to the Advisory Council that there was a trend towards more manure related problems and consequently more pressure to regulate the management of manure. With the continued expansion of dairy operations that is necessary in order to stay in business in today's agricultural economy, this trend is likely to continue into the foreseeable future. It was their belief that the agricultural community should be proactive in solving issues involving agriculture rather than wait until forced to do so. The creation of this subcommittee provided an opportunity for agricultural leaders and agencies to explore the issues that were unfolding and to develop solutions that would help solve the problems identified in ways that would be the most beneficial or least harmful to the industry.

The members of the subcommittee included eight farmers, four representatives of the Maine Department of Agriculture, two soil and water district representatives and one representative each for Farm Bureau, Cooperative Extension and the USDA Natural Resources Conservation Service (See the Appendix for a list of the subcommittee members). A representative of the Maine Department of Environmental Protection also attended some of the subcommittee meetings. The farmers on the subcommittee were, for the most part, dairy farmers since the initial set of issues seemed to be associated primarily with dairy farms.

As the work of the subcommittee progressed, a number of other issues arose that increased both the scope and urgency of the task being undertaken. These included:

- proposals to build large hog production facilities in Aroostook County that met with considerable citizen resistance, in part because there was no mechanism for regulating such facilities in the state,

- the introduction of Maine legislation to regulate livestock operations and
- several initiatives by the US EPA to focus on and expand the permitting of Concentrated Animal Feeding Operations (CAFO's) through the National Pollution Discharge Elimination System (NPDES).

The subcommittee sought throughout the process to incorporate voluntary mechanisms and current programs into the solutions recommended, but the advent of these new activities made it clear that any recommended solutions to the problems being experienced must necessarily include at least some regulatory elements to be effective and acceptable to the non agricultural community. Those proposed by the subcommittee were felt to be ones that would be the least intrusive while still addressing the issues.

This report of the subcommittee which is directed to the State Conservation District Advisory Council and the Commissioner of Agriculture, Food and Rural Resources is intended to be a summary of the recommended actions based on the subcommittee's work with very brief explanations of the rationale behind the recommendations . It is anticipated that this report would be used as guidance by the Commissioner and the other agencies named in the report in establishing and coordinating actions relating to manure management.

The report resulted from a tremendous amount of time and effort being made by the Manure Management Subcommittee. The subcommittee held 14 five hour meetings beginning on November 12, 1996 and concluding on December 1, 1997. Attendance at the meetings ranged from 10 to 15 subcommittee members.

Purpose of the Subcommittee

The purpose of the Manure Management Subcommittee was:
1. to identify the issues involving manure production and use in agriculture
2. to develop possible solutions which would address these issues.
3. to recommend actions that should be taken to implement the preferred solutions.

Procedure Used by the Subcommittee

The subcommittee started its work by brainstorming to identify all the issues involving manure on Maine farms. The result of this process was a list of approximately 65 different issues. These included such widely different issues as expanding farms without sufficient land base to utilize the manure and posted roads.

Secondly the subcommittee grouped the issues into broad categories such as those related to management and handling issues. This allowed the subcommittee to narrow the discussion and to propose common solutions for issues within each category.

Thirdly the subcommittee discussed each of the issues and the strengths and weaknesses of alternative solutions. As would be expected with such a large and diverse group, there were many different views of the solutions discussed and not every subcommittee member agreed with every action proposed. But with give and take in the discussions, approaches were found that could be supported by the group as a whole.

Finally the subcommittee developed a set of recommendations that taken together constitute a program for the management of manure and other nutrients on Maine farms.

MANURE ISSUES AND RECOMMENDATIONS

The Manure Management Subcommittee identified and explored a long list of manure related issues, including the overuse or misuse of nutrients on farmland; spreading manure on frozen or snow covered ground; lack of enforcement provisions in the 'Right to Farm Law'; management and handling issues related to odors, insects and spills; transportation of manure on Maine roads; regulation of manure in the shore land zone; increased interest in regulating Concentrated Animal Feeding Operations (CAFOs) by Maine citizens and the US EPA; animals in water and others. The following sections summarize the subcommittee findings on these issues and the recommendations made by the subcommittee for actions to address them.

It became clear during the subcommittee discussions, that many of the issues addressed individually, were in fact interrelated and that a broad, comprehensive approach would be needed to encompass and address them all. The approach for doing this included three key components. These are:

1. Revise the 1972 Manure Management Guidelines
2. Focus on farm Nutrient Management Plans (NMP) as the tool for addressing farm specific manure issues.
3. Establish a Nutrient Management Advisory Board (NMAB) within the Maine Department of Agriculture to implement a comprehensive nutrient management program for the state.

After identifying the overall approach, the subcommittee turned its attention to addressing the issues associated with Nutrient Management Plans and the establishment of a Nutrient Management Advisory Board. The later sections of this report outline the major points of those discussions. Out of these discussions, legislation was proposed that would set up a Nutrient Management Advisory Board and make Nutrient Management Plans mandatory. They also resulted in a long list of recommended actions that should be undertaken by the Nutrient Management Advisory Board after its establishment.

Manure Overuse or Misuse

One of the primary concerns of the subcommittee revolved around the overuse of manure on certain fields as a result of the need to dispose of excess manure . This problem is sometimes exacerbated by bringing additional nutrient sources from off the farm onto some fields thus

displacing manure use to fields that do not need the nutrients. In addition, many farms still adhere to practices that were acceptable under the 1972 Manure Management Guidelines, but that may not be acceptable given today's technical knowledge and environmental concerns.

Recommendations:

1. The NMAB should revise and publish the 1972 Manure Management Guidelines
2. All agricultural agencies should promote whole farm nutrient management planning
3. DAFRR should coordinate discussions with UMCE , NRCS, FSA, DEP and SPO to be sure all agencies recognize the emphasis being placed on this initiative.

Spreading on Frozen Ground

The subcommittee identified spreading manure on frozen or snow covered ground as one of the most environmentally unacceptable as well as highly visible practices occurring on Maine farms. Manure spread on snow or on frozen ground in most situations will not be a crop nutrient source. The nutrients are lost as spring rains and snow melt move over the surface , carrying the manure with it. These nutrients often end up as pollutants in lakes and streams. Because of the high visibility of this practice, it contributes to a negative public image of agriculture as a whole. (Note: Currently, the Great Ponds Act prohibits spreading on frozen and snow covered ground in great pond watersheds. This law has no enforcement provisions and so relies on voluntary compliance.)

Recommendations :

1. Legislation should be enacted, prohibiting manure spreading between Dec. 1 and March 15 of each year.
2. The legislation should:
   a. take affect within 1 year after law passed
   b. allow variances from Commissioner under special circumstances
3. The Commissioner should use a Memorandum of Agreement (MoA) with farmers in the transition period
4. The NMAB, Cooperative Extension and NRCS should work with farmers to identify funding sources and technical assistance in changing from winter spreading (EQIP program priority).
5. The Commissioner should impose penalties for failure to comply with the law. Some options are:
   a. Refer to DEP for enforcement
   b. Designate as CAFO requiring NPDES permit
   c. Loss of protection from Right to Farm Law
   d. Impose a Fine
6. The fine structure should be established by legislation. The fine should be an amount per day of violation similar to that imposed in the cull potato law.

7. The NMAB should review the part of the Great Ponds Watershed law dealing with spreading on frozen ground and determine if the legislature should repeal it as the new law would be much broader.

Right to Farm Law

The 'Right to Farm Law' currently works well to encourage farmers to adopt Best Management Practices. In those cases where the farmer is uncooperative, however, the law lacks any enforcement provisions to force the adoption of BMP's regardless of the severity of the problems caused. The only recourse for the Department in these cases is to refer the cases to the Attorney General and /or the Department of Environmental Protection for possible enforcement of water quality laws. This avenue has not had much success in past cases.

The 'Right to Farm Law' is currently administered by the Department under a set of rules that do not adequately address the processes involved in BMP development, handling complaints and reviewing municipal ordinances. This has not resulted in major problems with the program in the past, but as activity increases in these areas and especially if staff changes over time, having more formalized procedures may avoid problems and challenges.

Recommendations:

1. The Department of Agriculture should submit legislation to strengthen the 'Right to Farm Law' in areas regarding manure by giving the Commissioner the authority to impose fines or other penalties.
   a. Penalties should be for failure to adopt site specific BMPs that have been developed for an operation as a result of a verified manure related problem.
   b. Farms should be allowed a reasonable amount of time to adopt BMPs that have been developed for an operation as a result of a verified manure related problem before the penalty is imposed.
2. The legislation should add Mandatory Nutrient Management Plan requirements to the 'Right to Farm Law '.
3. The Department should formalize the process for developing and designating BMPs dealing with manure and decide if BMPs should be in the rules
4. The Department should adopt Rules governing the implementation of the 'Right to Farm Law' .
5. The Department should develop a formal process for reviewing town ordinances dealing with manure .

Manure Management and Handling Issues (odors, insects, manure spills, visual impacts)

One of the major problems associated with manure is the growing number of nuisance complaints about odors, flies, spills on roads and unsightly piles. Often, these complaints are also associated with fears about contaminated wells and other human health issues. These nuisances and health concerns have already led to a number of communities passing or proposing ordinances to limit or control manure management practices. Farmers need to be very sensitive

to such issues and need to know what are the best management practices to follow to minimize the impact of their manure management on neighbors.

Recommendations:

1. The NMAB should develop Best Management Practices (BMPs) to minimize odor problems.
2. The NMAB should develop BMPs to minimize insect problems.
3. The NMAB should develop BMPs to minimize manure on roads.
4. The NMAB should develop BMPs to minimize visual impacts of manure piles.
5. The NMAB should explore the need for BMPs for pathogens such as E. coli and Salmonella and parasites such as Cryptosporidium and Giardia.
6. The NMAB should research/keep current on latest technology to reduce odor and insect problems.
7. Cooperative Extension should develop fact sheets on each of the BMP's developed.
8. The BMP's developed should become part of the revised Manure Management Guidelines.
9. General BMP's should be placed in rules where appropriate with site specific BMP's used where appropriate .

Animals in Water

Another issue is the highly visible problem of animals in streams and ponds. The primary environmental problem associated with allowing animals in water bodies is the sedimentation caused by the breakdown of the banks and stream bottoms. This issue is included here because of the additional problem that animals defecate directly into the water body. Not only is this environmentally unacceptable, but due to its high visibility, it is another activity negatively impacting the public image of agriculture.

Recommendations:

1. The NMAB should develop BMPs for providing livestock access to drinking water while minimizing water quality impacts
2. The Cooperative Extension should develop a fact sheet regarding the impact on water quality of animals in water.

Shore land Zoning Ordinances

Shore land zoning ordinances regulate manure use and storage in the shore land zone. They reference the 1972 Manure Management Guidelines as the standard for manure application. These guidelines are 25 years old and in many cases do not reflect what would be considered to be best management practices today. The requirements in the shore land zone should be consistent with those in the rest of the state.

Recommendations:

1. The Nutrient Management Advisory Board should finish revising the Manure management guidelines to be sure that they reflect the need for mandatory nutrient management plans and include the latest technical information available.

2. The Nutrient Management Advisory Board should work with the State Planning Office, Maine Municipal Association and DEP to be sure that guidance given to towns regarding shore land zoning ordinances reflects the need for mandatory nutrient management plans and other requirements of this program.

Transporting Manure on Maine Roads

Many Maine farms are located on roads that are posted each spring prohibiting heavy truck traffic on those roads. Not being able to move trucks over these roads for two to three months is a severe handicap for many farm operators since they need to spread the manure in their storages at precisely the time when the roads are posted. This means that they are forced to spread on only those fields they can reach without transporting over the road contributing to the problem already noted about the overuse of manure on the nearby fields

Currently, state law establishes the authority to post roads, but the towns are left to determine which roads to post and for what time frame. Some agricultural products such as milk and feeds, are exempt from the posting limits. If manure and bedding were also exempted, some of these problems would be reduced.

Recommendations:

1. The NMAB should seek (submit legislation) to get an exemption to road restrictions (posted roads) for manure and bedding materials.

Interest in Regulating Concentrated Animal Feeding Operations (CAFOs)

The US EPA has required National Pollution Discharge Elimination System (NPDES) permits for Concentrated Animal Feeding Operations for a number of years, but this requirement has not been rigorously enforced to date. In Maine, there have been no NPDES permits issued to CAFO's. The US EPA has recently placed a higher priority on regulating CAFO's and is developing a new comprehensive strategy to identify and regulate them. A recent bill in the Maine legislature proposed to have LURC regulate Animal production facilities in the unorganized territories due to concerns about the potential impact of manure handling and utilization on lake water quality and on air quality (odors). These actions have livestock producers concerned that they may end up being regulated by several different agencies under different sets of rules requiring several different permits.

Recommendations:

1. The state should have one permit for CAFO's that addresses all aspects of the operation.
2. The state needs to make the permitting of CAFO's a part of the overall strategy for addressing manure issues in the state.
3. Regulation of manure issues should be done through the Maine Department of Agriculture.

New and Expanding Large Livestock Operations

Related to the CAFO issue is the problem of new large livestock operations intending to set up facilities in the state or of existing livestock operations desiring to expand significantly. At present, there is no review or permitting process for these types of operations to insure that manure handling is adequately dealt with in the construction or expansion plans. This has led to discomfort among the general public in the immediate area of these operations because there is no process for hearing their concerns and to insure that basic standards are met. Operators wishing to construct facilities or to expand existing ones would also like to know that there is a clearly defined process that they must follow to get approval for their planned activity. Lack of such a process has already contributed to conflicts between local citizens and a company proposing to develop large livestock facilities in northern Maine.

The interest in regulations expressed by citizen groups has been based on the desire to insure that new livestock operations (particularly hogs) must go through a review and approval process before they can build in Maine. The subcommittee felt that in terms of potential environmental impact, existing large operations that are rapidly expanding are of equal concern and should also go through a similar review and approval process before they can expand.

Recommendations:

1. Legislation should be submitted that would authorize The Maine Department of Agriculture or the Nutrient Management Advisory Board to establish a permit process for large new livestock enterprises that addresses all aspects of the operation.

2. Legislation should be submitted that would authorize The Maine Department of Agriculture or the Nutrient Management Advisory Board to establish a permit process for large expanding livestock enterprises that addresses all aspects of the operation .

Soil Tests

Many farmers use soil tests to determine the amount of supplemental soil nutrients needed to raise a crop. Soil test results are intended to show the farmer whether their soil needs additional nutrients, if there are sufficient nutrients available or if there are more than enough for a specific crop. When used in this way, the soil tests are a useful tool to the farmer. A problem arises, however, when the soil tests are used by local code enforcement officers or others as an environmental indicator. In particular, when soil tests report phosphorus levels in the soil, any

amount above 40 lb. per acre is reported as 'excessive' and is indicated as a graph that extends off the paper. The indication of this level of nutrient as 'excessive' acts as an environmental 'red flag' and may lead to pressure to discontinue the use of manure on the crop land, even if no environmental threat exists.

A second problem can arise if the soil test recommendations are based on unrealistic (too high or too low) crop yield estimates. In other words, application rates may be either excessive or insufficient if the crop yield used as a basis for the recommendation is not close to the actual yield observed in the field.

Recommendations:

1. The Department of Agriculture should approach the University of Maine Plant and Soil Testing Lab to explore changing the soil test report to have it indicate the pounds of nutrients available and remove the 'excessive' notation.
2. The yields upon which the soil test recommendations are based, need to reflect reality on farms (e.g.. 20 tons/acre for silage corn). The soil test recommendations need to reflect the variety of yields obtained on Maine farms.

Decoster Consent Decree

Manure management for Maine's largest egg producer, Decoster Egg Farms, is regulated under a consent decree (an administrative agreement) with the Department of Environmental Protection. That decree requires, among other things, that nutrient management plans be developed for every farm operation receiving manure from the Decoster operation. Many farms in the central Maine area receive manure from Decoster and so are affected by the consent decree. It is important for these farms that any requirements for nutrient management planning imposed on all farms by the Department of Agriculture and the requirements of the consent decree be consistent with one another. It is also important that farms using Decoster manure have only one state agency regulating their manure management activity in order to avoid duplicating efforts and conflicting requirements.

Recommendations:

1. DAFRR should work with DEP to apply recommendations regarding nutrient management plans to Decoster consent decree.
2. DAFRR should have all responsibility for matters relating to manure utilization and storage on farms.

ISSUES ASSOCIATED WITH IMPLEMENTING RECOMMENDATIONS

In the process of reviewing the various manure issues and trying to find workable solutions, it became apparent that a comprehensive approach would be needed to address the tremendous

variety of manure related issues on a long term basis. This required that some entity be established and charged with considering and addressing all these issues. The strategy also would have to include a method to insure that nutrient management plans were developed and implemented on Maine farms where manure was being generated or used. It would also have to make sure that the nutrient management plans that were developed were consistent and based on appropriate Best Management Practices. These findings of the subcommittee led to discussions of the options for an administrative and policy setting entity that would oversee the manure management program, how and for whom nutrient management plans would be made mandatory, the definition of a nutrient management plan and the elements of a certification program for individuals who would prepare nutrient management plans. The following sections cover the main points of the discussions related to these topics and the recommendations made.

Oversight of Nutrient Management Program

The consensus of the subcommittee was that there should be one entity in the state whose sole purpose was to deal with manure related issues. This one entity should have the responsibility for implementing a strategy that encompassed the permitting, review and enforcement requirements of all federal and state laws governing manure. This would avoid the confusion and difficulties caused when multiple agencies implement a variety of laws with different and sometimes conflicting requirements.

Options for the entity to oversee the Nutrient Management Program considered by the subcommittee included:

1. The US EPA or other federal agency
2. A farm organization such as Farm Bureau or Maine Association of Conservation Districts (MACD)
3. The Maine Department of Environmental Protection
4. The Maine Department of Agriculture
5.. A newly created Nutrient Management Advisory Board within the Department of Agriculture.

Each of these options was evaluated in detail by the subcommittee. The following is a summary of those evaluations:

The US EPA or other federal agency option had the merit that there is already a program, the National Pollution Discharge Elimination System (NPDES), in place for permitting and regulating some types of facilities. The problems with this option included the lack of manpower or funds to actually implement the program in many states. No NPDES permit for any livestock feeding operation has ever been issued in Maine. In addition, the subcommittee felt very strongly that the regulating entity should be very familiar with the conditions in Maine, so that the program would 'fit'. A federal agency, just by the nature of the federal bureaucracy would not be able to adjust its regulatory approach to fit conditions in each of the 50 states.

The option of having a farm organization such as Farm Bureau or MACD had the merit that these organizations are made up of farmers who would know farm conditions intimately and would be able to design a program that would address those conditions. One of the important parts of the strategy, however, would be the need to enforce the mandatory nature of the program, conduct investigations and inspections, seek corrective actions and impose penalties when necessary. In order to do these parts of the program, the entity would need to be a public agency with the authority to adopt and implement rules.

The Maine Department of Environmental Protection was considered because it is now enforcing environmental laws and has indicated an interest in seeking delegation from the US EPA to issue NPDES permits for all sources (not just agriculture) in Maine. The subcommittee felt that this would not be a logical choice since DEP has not been involved in manure regulation other than the consent decree for Decoster Egg Farms and as a result, does not have the working knowledge of the Maine farm community that the Department of Agriculture has.

The Maine Department of Agriculture has been regulating manure through the 'Right to Farm Law' for a number of years and so has both the experience and mandate to deal with manure issues. Because of this history, the Department has the working knowledge necessary to structure and implement an overall nutrient management program. The two items that the Department would need to undertake such a task, are (1) sufficient staff and resources and (2) a mechanism for industry and public participation in setting policies, establishing procedures, developing rules and hearing requests, complaints and appeals.

A Nutrient Management Advisory Board established within the Department of Agriculture with resources allocated to it to implement a program would draw on the strengths of the Department and at the same time allow for the decision making to be guided by a board that reflects all interests. Such a board would only deal with manure related issues and so its focus and energy would not be dissipated by having to consider a number of other environmental or agricultural topics. It was suggested that having decisions made by such a representative board would result in greater public acceptance and credibility than if they were made by Department administrators or staff. The Animal Welfare Board was suggested as a model for structuring this board.

Recommendations:

1. Submit legislation to Establish a Nutrient Management Advisory Board
   a. Membership
      (1) Commercial Farmers (5)
      (2) NRCS (1)
      (3) State Conservation District Advisory Council representation(1)
      (4) DEP Commissioner or designee(1)
      (5) University of Maine(1)
      (6) Others(1)/General Public
      (7) Land Use Regulation Commission
      (8) Maine Department of Agriculture

b. Responsibilities relating to manure

(1) Establish criteria for NMPs
(2) Assist in developing regulations for NMPs
(3) Work with state and federal agencies to develop one permitting system (security for agriculture)
(4) Hear Appeals if a plan is not approved
(5) Certify and maintain list of approved writers of NMPs
(6) Maintain list of farmers with NMPs
(7) Hold hearings regarding violations and Right to Farm Law complaints related to manure
(8) Deal with issues/details such as 'which nutrient should be used to limit manure applications.'
(9) Public outreach
(10) Involvement in issuing permits.

c. Staffing and resources required by the Nutrient Management Advisory Board-
(1) Minimum of two (2) staff needed:
- one to act as staff to the Board, setting up and managing certification and permitting programs and field work as necessary
- one agricultural compliance officer, spending most of the time in the field.
(2) Sufficient resources to implement the program.

Mandatory Nutrient Management Plans (NMPs)

A critical aspect to the overall manure management strategy as outlined by the subcommittee was mandatory Nutrient Management Plans. Nutrient Management Plans are already required for farms receiving manure under the Decoster Consent Decree and in the future they will be required of Concentrated Animal Feeding Operations (CAFO's) and farms receiving sludge or residuals. (Residuals are any nonagricultural byproducts regulated by the Maine Department of Environmental Protection, that may be used as a nutrient source or soil amendment.) The subcommittee considered the option of having nutrient management plans be adopted entirely on a voluntary basis. In fact, most of the more progressive dairy farms in the state already have a nutrient management plan of some type, but the subcommittee felt that additional voluntary adoption would result in only a limited increase and would not address the 'bad actors' at all. They also considered requiring NMP's for only certain types of facilities such as those in great pond watersheds or those meeting the definition of a CAFO. In the end, the subcommittee felt that because problems are not limited to one type of operation or to certain locations, that NMP's should be mandatory for all operations generating or utilizing manure. They recognized, however, the impracticality of developing plans for hundreds of very small livestock producers and of trying to enforce the law on them. They felt that farms generating or

utilizing less than one hundred tons of manure per year should not be required to have a NMP unless they had a record of causing manure related problems. In later discussions of proposed legislation, size of livestock operation that would be exempted was changed to farms having less than 50 animal units in order to reduce the number of plans to be prepared. It was felt that these smaller operations would still need to have a nutrient management plan to be protected under the 'Right to Farm Law' and so would need to have a plan if they caused a verified manure related complaint.

The subcommittee noted other benefits of mandatory Nutrient Management Plans. The first of these was that farms would benefit from better management of the resources on their farm once they had gone through the process of developing and implementing their plan. That is, it would help them be better managers. A second benefit would be the improvement of the public perception of Maine agriculture as the general public sees agriculture take a strong step in addressing manure related environmental and nuisance issues.

Recommendations:

1. The State Conservation District Advisory Council and/or the Department of Agriculture should develop legislation for making nutrient management plans mandatory.
2. Nutrient Management Plans (NMPs) should be mandatory for all farms that produce, own, keep or house 50 animal units or more of livestock or that receive more than a total of 100 tons of manure and other residuals per year. (Residual refers to any byproduct material that has value for improving the soil for plant growth. These are often byproducts from another industry such as wood ash or fish scales.)
3. The legislation should include time frames such as:
   a. New and expanding large livestock operations and CAFO's must develop NMPs before a permit is issued and must implement the plan immediately
   b. Other livestock operations must develop NMPs within 3 years of the passage of the law and implement them within 7 years of passage.

4. NMPs should be mandatory and permits required for:

   a. New operations - The State Conservation District Advisory Council and/or the Department of Agriculture should submit legislation to implement a review and permitting process for construction of new agricultural animal operations proposing to have 300 animal units or more.

   b. Concentrated Animal Feeding Operations (CAFOs) as defined by the US EPA. (Guide Manual On NPDES Regulations for Concentrated Animal Feeding Operations. USEPA Office of Water. December 1995. # EPA

833-B-95-001.) Department of Agriculture should seek delegation of NPDES Permitting of CAFOs from EPA.

c. Expanding operations - Defined as an existing operation which is increasing the number of animals beyond the capacity of its manure storage or of its land base for spreading or will have over 300 animal units on the farm after the expansion. The State Conservation District Advisory Council and/or the Department of Agriculture should submit legislation to implement a review and permitting process for the expansion of these large agricultural animal operations .

5. Farms using off farm nutrients including manures, sludges and other residuals The Nutrient Management Advisory Board should take steps to be sure that nutrient management plan requirements are consistent with DEP sludge and residual permit requirements and Decoster consent agreement requirements for farms bringing these nutrient sources onto the farm.
6. The Nutrient Management Advisory Board should assure that standards established in any state programs, laws or rules impacting manure utilization and management are consistent.
7. The Nutrient Management Advisory Board should conduct inspections of permitted facilities on a regular basis and respond to complaints. Inspections should include:
   a. amount of manure produced and brought onto the farm
   b. storage and spreading sites
   c. stacking site location(s)
   d. compliance with the plan

8. Other provisions that should be in the law are:

   a. NMPs should be kept on the farm
   b. the writer of the plan should be required to notify NMAB of the plan's existence.
   c. The farm operation should be required to make a copy of the NMP available to the NMAB upon request.

Definitions of a Nutrient Management Plan (NMP)

Many farms now have what they would consider to be a nutrient management plan. These plans,however, have been prepared for many different purposes. This means that there is a wide range of depth and quality of the plans. Some consider only one nutrient source, others apply to only certain fields while others apply to the whole farm. Some may also include soil erosion

control practices while others do not. In order to prevent the overuse or misuse of nutrients, a plan would need to be a whole farm plan that accounted for all the farm produced nutrients before importing off farm nutrients onto farm.

Because of the wide range of documents that could be labeled as a 'Nutrient Management Plan' there is likely to be confusion about what will be needed to satisfy the requirements of the law . Written standards and sample plans will therefore be needed in order to develop NMPs that are based upon crop needs and that protect the environment and public health.

Recommendations:

1. The legislation making nutrient management plans mandatory should include a definition for NMPs that makes it clear that they will be for the whole farm and include all nutrients produced or used on the farm.
2. NMAB should establish standards for NMPs and adopt in rules.
3. The law should be clear that manure must be applied to land according to a Nutrient Management Plan(NMP) which meets MDAFRR standards and/or USDA-NRCS Code #590 (See Appendix)
4. The NMP standards should include provisions for soil erosion control.
5. The standards should require that the NMP reflect the current situation on the farm.
6. The standards should require that the NMP Identify and establish setbacks for spreading, stacking or storing manure.
7 The rules adopted should require that the Nutrient Management Plan include soil testing every 3-5 years or when crops are rotated for land spread or irrigated with manure.
8. The rules adopted should require that the Nutrient Management Plan include manure testing every 5 years or when a significant management change affects manure nutrient values.
9. The standards should require that yield goals used in nutrient management plans will be the yields achieved in 2 years of 5 or if records do not exist, they should not be over 200% of state average.
10. The standards should require that the limiting nutrient for determining application rates will be determined from an environmental standpoint using the decision matrix included in the Appendix.(N and P Manure Priority Matrix.)
11. The standards should require that time of spreading and how quickly manure is incorporated will be based upon the need to conserve or volatilize nitrogen to the atmosphere .
12. The standards should address storage facilities/ stacking sites:

    a. NMP must address when to store, where to stack and what type of storage is needed based on criteria established by NRCS or the Department of Agriculture.
    b. NMP must address storage in an environmentally sound structure/area when manure is not spread daily

c. NMP must include that structures/manure stacking sites will be approved, built and maintained according to NMAB standards or according to USDA-NRCS standards and specifications Code 312, Waste Management System; Code #313, Waste Storage Facility and Code #393 Filter Strip.

13. NMP must address record keeping:

    a. Amount of manure applied to field
    b. Amount of other nutrient sources applied to field.
    c. yield of crop.

14. NMP must address calibration of manure spreaders to insure that spreading rates are accurate.
15. NMP must incorporate any local, state and federal laws that affect nutrient management. (examples - Clean Water Act ; Coastal Zone Management Act)
16. NMP must address label requirements for use of manure containing pesticides (example - larvadex)
17. Professional judgment has to be taken into account and should be provided for in the NMP rules

Elements of a Certification Program

Because the cornerstone of the strategy for addressing manure related issues is the development and implementation of consistent, technically sound manure management plans, the subcommittee felt that it will be essential to establish a certification program for individuals interested in writing NMP's. Obviously, many farmers would seek assistance from NRCS , the Soil and Water Conservation Districts and Cooperative Extension, while others would hire private consultants. An approach would be needed to insure that the standards used to prepare the plans would be the same, no matter which entity did the work and that the person preparing the plan had adequate qualifications. They also felt strongly that farmers should be allowed to write their own plans if they wanted and that there should be a mechanism to certify that those plans met the minimum criteria set out by the Nutrient Management Advisory Board. This meant that a system for certifying people to write plans is needed and a system is also needed for certifying that farmer written plans meet the basic standards.

Recommendations:

1. The NMAB in cooperation with UMCE should set up training sessions for farmers/private consultants/state and federal personnel regarding certification requirements.
2. The NMAB should develop a standardized format for NMPs that would help guide those preparing plans.

3. Individuals who can be certified to write plans for others would include federal and state staff and private consultants who meet qualifications established by the NMAB
4. Farmers can write their own plans as long as the plan is certified to have met the standards established for NMPs by a certified management consultant (public or private)
5. Private and public sector management consultants (i.e. those preparing NMP's) should be certified by :

    a. National Certifying agencies - (This would be the least costly method of certifying)

        (1) National Alliance of Independent Crop Consultants
        (2) American Society of Agronomy
        (3) American Registry of Certified Professionals in Agronomy, Crops and Soils

    b. Certifying agencies in State

        (a) Nutrient Management Advisory Board administers tests and determines qualifications for certified management consultants OR
        (b) MDAFRR administers tests and determines qualifications for certified management consultants

Education and Training Program

Along with the certification program, there will need to be a significant effort made to teach farmers and farm agency personnel about the requirements of the new law and to train those who want to be certified to prepare Nutrient Management Plans. This will need to be a statewide effort involving all the farm agencies and organizations.

1. The Cooperative Extension in cooperation with the NMAB should initiate a statewide educational process to educate farmers of the new requirements. This process should include NRCS, the Soil and Water Districts, Farm Bureau, MACD, the State Conservation District Advisory Council and farm commodity groups.

2. The Cooperative Extension in cooperation with the NMAB should initiate a training program for farmers and agency personnel who wish to become certified to write Nutrient Management Plans.

3. Cooperative Extension should establish a team to develop the educational materials needed for the certification training program .

Regulatory Modifications Needed to be Consistent with NMP Requirement

The implementation of the strategy as outlined by the subcommittee will significantly change how manure is regulated in the state of Maine. A number of federal, state and local laws and regulations are already in place that impact manure management in a piecemeal fashion. Some examples are shore land zoning ordinances that still refer to the 1972 Manure Management Guidelines, the Great Ponds Watershed Act that prohibits spreading on snow covered or frozen ground in Great Pond Watersheds and the EPA's NPDES permitting program for CAFO's. The result of implementing this new strategy (including new laws and regulations) will be that some parts of existing laws will no longer be needed (Great Ponds) or need to be updated in order to be consistent. In some cases, there could be the potential for double permitting by a federal and a state agency (CAFO's under NPDES definition). These inconsistencies need to be worked out to avoid confusion and complications for farmers trying to meet the requirements.

Recommendations:

1. MDAFRR should coordinate with DEP to seek delegation of NPDES permitting from EPA as a part of the strategy to regulate CAFOs .
2. Shore land zoning
   a. The NMAB should Revise the Manure Management Guidelines
   b. The NMAB should investigate the possibility of modifying the zero discharge provision of the Shore Land Zoning Law
   c. The MDAFRR should work with the Shore Land Zoning Unit of DEP to address other issues with manure regulation in the shore land zone.
3. The NMAB should determine if legislation is needed to make the ban on spreading on snow covered and frozen ground in the Great Pond Watershed Act consistent with the winter spreading ban for the whole state.
4. The NMAB should investigate the Wellhead Protection Program to determine if there are inconsistencies that need to be addressed.
5. The NMAB should investigate the Non point Source Program to determine if there are inconsistencies that need to be addressed.
6. The NMAB should investigate Other laws such as the Natural Resources Protection Act to determine if there are inconsistencies that need to be addressed.

Monitoring Program

One of the key elements of the manure management strategy is the development and adoption of Best Management Practices for all aspects of manure management. In order to know if these BMPs are being adopted and are making an impact, someone needs to periodically contact and in at least some cases visit a representative cross-section of farms . These visits will also provide feedback that will allow the BMPs to be improved or refined over time.

Recommendations:

1. The NMAB should coordinate a monitoring program involving SPO, DEP, the Soil and Water Districts, NRCS and UMCE to determine the effectiveness of BMPs and to improve BMPs in sensitive areas.

Penalties/ Fines

The subcommittee spent a considerable amount of time discussing the 'mandatory' aspect of nutrient management planning and what the penalty ought to be for farms that do not comply. It was suggested that loss of protection under the 'Right to Farm Law' would be adequate incentive for farmers to comply. It was pointed out, however, that occasionally an operator absolutely refuses to cooperate despite complaints filed by neighbors and loss of protection under the 'Right to Farm Law'. In the past when the Department of Agriculture has had to deal with such cases, they have turned them over to DEP or the Attorney General's office for enforcement. The track record for a timely response in these cases has been very poor, leaving the impression that there is no need to comply since nothing will happen to those who don't. The subcommittee concluded that for these cases, the Commissioner should be able to impose fines similar to those for illegal cull potato piles but that this option should be taken as a last resort, when a voluntary approach has failed.

Recommendations:

1. MDAFRR or State Conservation District Advisory Council should submit details about fines in the legislation that establishes mandatory nutrient management plans.
2. The fines could be imposed as a result of either routine inspections or a complaint response that showed failure to develop and/or implement a nutrient management plan.
3. When implementing the program, MDAFRR should allow time to develop a nutrient management plan and adopt BMPs as a result of inspection or follow through on complaints before a fine is imposed as long as it is evident that the operator is making a good faith effort to comply.

Phase in Requirements

One concern that the subcommittee had about the imposition of mandatory nutrient management plans was the need for the industry to adjust to this new requirement and the time necessary to prepare the large number of plans that would be needed at the start. In addition, some of the plans would necessitate that some construction of new storage facilities or other capital investments be made. There would need to be time to arrange financing and time for the actual construction before these plans could be fully implemented. It would be impractical to have this all accomplished immediately, so some phase in period would need to be allowed.

Recommendations:

1. Legislation should require that plans be developed by January 1, 2001.
2. Legislation should require that plans be fully implemented by October 1, 2005.
3. NMAB should seek to have farms voluntarily achieve full implementation by October 1, 2003.

SUMMARY

This report details the discussions and recommendations of the Manure Management Subcommittee of the State Conservation District Advisory Council. The discussions cover a wide range of manure related issues, including manure utilization issues, nuisances, winter spreading and others. For each issue, one or more recommended actions are listed. The recommendations can be grouped into three categories, those requiring legislation, those meant for action by a Nutrient Management Advisory Board and those made to other organizations such as Cooperative Extension or the USDA Natural Resources Conservation Service. The major recommendations requiring legislation are:

Establishing A Manure Management Program based on Mandatory Nutrient Management Plans
Creation of the Nutrient Management Advisory Board with funding for staff and implementation costs.
Changes to strengthen the 'Right to Farm Law'
Prohibition of Winter Spreading of Manure
Permitting of specific types of Livestock Operations

The major recommendations meant to be implemented by a Nutrient Management Advisory Board included:

Revise the 1972 Manure Management Guidelines
Develop BMPs to address a variety of manure related nuisance issues
Address the 'animals in water' issue
Address the issue of hauling manure over posted roads
Establish a permitting program for new and expanding large animal feeding operations and those meeting the EPA definition of a CAFO or AFO
Establish a certification program for writers of NMPs
Establish standards for Nutrient Management Plans

Recommendations to other agencies included:

Cooperative Extension develop fact sheets for BMP's and some issues.
Natural Resources Conservation Service should provide technical assistance to farmers on planning and implementing manure and nutrient management.
Cooperative Extension develop an educational outreach program for farmers to introduce them to the requirements of this program.

Cooperative Extension and NRCS assist farmers in finding funding to implement changes needed as a result of this new program.

GLOSSARY OF ACRONYMS

Acronym	Meaning
AFO	Animal Feeding Operation (as defined by US EPA)
AU	Animal Unit - Defined as 1000 pounds of animal body weight
BMP	Best Management Practice
CAFO	Concentrated Animal Feeding Operation (as defined by US EPA)
DAFRR	Maine Department of Agriculture, Food and Rural Resources
DEP	Maine Department of Environmental Protection
EPA	Environmental Protection Agency (United States)
EQIP	Environmental Quality Improvement Program
FSA	Farm Service Agency (USDA)
LURC	Maine Land Use Regulation Commission
MACD	Maine Association of Conservation Districts
MDAFRR	Maine Department of Agriculture, Food and Rural Resources
MoA	Memorandum of Agreement
NMAB	Nutrient Management Advisory Board
NMP	Nutrient Management Plan
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
SPO	Maine State Planning Office
UMCE	University of Maine Cooperative Extension
US EPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture

APPENDIX

This Appendix contains the following items:

1. Members of the State Conservation District Advisory Council Manure Management Subcommittee
2. USDA NRCS Code 590 Nutrient Management
3. USDA NRCS Code 312 Waste Management System
4. USDA NRCS Code 313 Waste Storage Facility
5. USDA NRCS Code 393 Filter Strip
6. N and P Manure Priority Matrix
7. The Maine 'Right to Farm' Law (17 MRSA § 2805)

MEMBERS OF THE
STATE CONSERVATION DISTRICT ADVISORY COUNCIL
MANURE MANAGEMENT SUBCOMMITTEE

The members of the subcommittee were:

Adrian Wadsworth	Dairy Farmer	Turner
Ralph Caldwell	Dairy Farmer	Turner
John Hemond	Dairy Farmer & Andr.Valley SWCD	Minot
Bussie York	Dairy Farmer & Franklin Co. SWCD	Farmington
Sid Record	Farmer & Oxford Co. SWCD	So. Paris
Perry Lilley	Dairy Farmer & So Aroostook SWCD	Houlton
Bob Fogler	Dairy Farmer & Penobscot SWCD	Corinna
Karen Piper	Dairy Farmer & Somerset SWCD	North Anson
Reinald Nielsen	Washington Co.SWCD	East Machias
Stephanie Gilbert	Andr.Valley SWCD	Lewiston
Jon Olson	Maine Farm Bureau	
Peter Mosher	MDAFRR	
Craig Leonard	MDAFRR	
David Rocque	MDAFRR	
Bill Seekins	MDAFRR	
Chris Jones	USDA, NRCS	
Rick Kersbergen	UMCE	

NUTRIENT MANAGEMENT (ACRE)

DEFINITION

Managing the amount, form, placement and timing of applications of plant nutrients.

SCOPE

This standard applies to management of plant nutrients associated with organic waste, commercial fertilizer, legume crops, and crop residues.

PURPOSE

To supply plant nutrients for optimum forage and crop yields, minimize entry of nutrients to surface and groundwater, and maintain or improve the chemical and biological condition of the soil.

CONDITIONS WHERE PRACTICE APPLIES

On all lands where plant nutrients are applied. Sources of nutrients shall be considered using appropriate soil, water, and plant resource management features to protect water quality.

PLANNING CONSIDERATIONS

1. Evaluate water quality standards and designated use limitations that exist locally or statewide in management nutrients to protect the quality of water resources.

2. Evaluate sources and forms of nutrients available for plant growth and production and how they affect the nutrient budget for the proposed crop and target yield.

3. Consider effects of the season water budget on nutrient balance and on potential loss from the plant environment to surface or ground water. These effects will be the basis for developing the nutrient management plan for the practice application

4. Legume cover crops or green manure crops should be considered, where feasible, to provide a nitrogen source for the next crop. Consider these effects in the nutrient budget.

5. Effects of soil erosion control practices used to reduce soil loss, runoff, and transport and leaching of dissolved and attached nutrients should be considered.

6. Consider adjustments to rate, timing, placement, method of application, and nutrient form to conform to seasonal variation in plant uptake needs, reduce soil fixation, and avoid excessive soil-water solution nutrient concentrations that could leach out of the root zone when capacity is exceeded.

7. Consider induced deficiencies of nutrients due to excessive levels of other nutrients, and the affect of soil pH on the availability of both soil and applied sources of plant nutrients and the optimum pH range of the crop to be grown.

8. The importance of soil tilth and organic content onplant nutrient absorption and root development should be considered.

9. Consider cover crops following crop harvest, where appropriate, to take up residual nutrients.

10. Use of practices such as crop rotations, selection of crop varieties, waste utilization, etc., that enhance efficiency of nutrient uptake and improve soil and soil water conditions should be evaluated.

11. Consider waste storage and treatment needs to meet application timing as well as land area requirements for proper waste utilization.

12. Effects of water table management or controlled drainage on availability and movement of nutrients should be evaluated

OPERATION, SAFETY, AND MAINTENANCE

1. Calibrate manure and fertilizer application equipment to ensure recommended rates are applied.

2. Minimize exposure to animal and organic wastes, manure gases, and chemical fertilizers. Wear protective clothing when appropriate.

3. Protect commerical fertilizer and agricultural waste storage facilities from weather and accidental leakage or spillage that will result in undesirable effects on soil, water, and plants.

4. When cleaning equipment after nutrient application, remove and save fertilizers or wastes in an appropriate manner. If system is flushed, use rinse water in the following batch of nutrient mixture, where possible, or dispose of according to state and local regulations, always avoiding high runoff areas, ponds, lakes, streams, and other water bodies. Extreme care must be exercised to avoid contaminating wells.

DESIGN CRITERIA

1. Sources of Nutrients

Sources of plant nutrients may include residual amounts in the soil, legume residues, organic wastes, and chemical fertilizers. Chemical fertilizers are those soil amendments with a guaranteed analysis displayed in accordance with Maine Department of Agriculture Food and Rural Resources regulations.

Non-farm organic waste shall be analyzed for content and applied and managed as prescribed by Maine Department of Environmental Protection (Rules for Land Application of Sludge and Residues, Chapter 567 April 1985 and revisions).

Manure and on-farm generated waste shall be analyzed for nutrient content by the University of Maine Analytical Laboratory or other laboratories that employ the same testing methods. The sampling method shall be as prescribed in the "Manure Sample Information Form" UM-Department of Plant, Soil and Environmental Sciences. Analyze manure nutrient levels every two years and whenever farm management changes occur that may significantly alter manure nutrient content. (i.e., changes in feed program, bedding type or quality, amount of water added or lost, and length of method of storage).

2. Application Rates

Nutrient application rates and lime application rates on agricultural land shall be based on plant needs as shown on a current University of Maine Soil Test Report or other laboratories that employ Maine nutrient testing methods and recommendations. Realistic yield goals shall be used in establishing needs. A nutrient worksheet as shown in Figure 1 or similar sheet shall be prepared by field for each crop to be grown. The worksheet shall consider all sources of nutrients that will be available to the crop.

a. Setting Realistic Yield Goals

Base nutrient applications on a realistic yield goalfor the crop to be produced.

Consider as a realistic yield goal the crop yield that you can expect for the best two years out of five.

b. Frequency of Soil Tests

For immobile nutrients such as phosphorous and potassium, soil samples shall be taken and analyzed once every three years as a minimum, or when the crop is rotated.

For nitrogen on corn, the Maine Nitrogen Soil Test shall be taken annually when the crop is 8"-12" tall

3. Timing and Methods of Application - Manure and Organic Nutrients

Animal manure and organic nutrients shall be injected or incorporated within 2 days on annual crops or reseeded perennial crops. Manure may be applied without incorporating within 2 days if surface runoff control measures such as a grass or legume crop, heavy crop residue cover, stripcropping, or diversions have been applied. However, losses of N by NH_3 volatilization is likely, thereby reducing available N from manure.

Non-manure organic wastes such as municipal sludge and septage shall be spread in accordance with the separation distances from surface waters, ditches, wetlands, tile inlets, waterways and potable water supplies listed in Maine Department of Environmental Protection regulations. (Rules for Land Application of Sludge and Residues, Chapter 567 April, 1985 and revisions.)

Manure will be spread in accordance with the Waste Utilization Standard (Code 633) which lists application rates, separation distances from water bodies, and periods when spreading is prohibited.

4. Timing and Methods of Application - Commercial Fertilizer

Commercial fertilizer may be applied as broadcast, banding with the planter, or surface banded. Any one method may have advantages under a given set of circumstances.

Fertilizers shall not be applied in fall or winter when soils are frozen or are covered with ice or snow.

a. Nitrogen

Apply nitrogen fertilizer close to the time of greatest crop demand

On corn, either a split application of preplant and sidedress nitrogen or sidedress only shall be used. In most Maine situations adequate early season N is supplied to the plant by a combination of manure, soil organic matter, and/or starter fertilizer, and no pre-plant N fertilizer is needed. Exceptions are sandy, low organic matter soils that have not received manure, where a pre-plant N application may be needed. In both situations, the Maine Nitrogen Soil Test should be used to determine the need for additional fertilizer N as a sidedress (or late topdress) application.

On grass hay or pasture which does not receive adequate nitrogen from manure a topdress commercial fertilizer application shall be applied in the spring (but not on frozen ground) or between cuttings or grazings.

b. Phosphorous, Potash and Micro Nutrients

Incorporating these nutrients into the soil on row cropped fields reduces the chance of runoff and loss. Lower rates of phosphorous and potash can be applied with an incorporated band application than with broadcast applications.

Liming should be done on soils with improper pH before phosphorous is applied. This is especially critical when seeding perennial crops such as legumes.

Apply P and K at rates recommended based on soil tests. For corn, when soil test P is excessive none or only a low rate of P2O5 in the starter fertilizer (15-40 lb/acre) is needed.

Topdress applications of phosphorous and potassium on hayland and pasture shall be done during early spring regrowth (after the ground thaws) or between cuttings or grazings.

SUPPORTING DATA FOR DOCUMENTATION

The following items shall be recorded as minimum documentation requirements for this practice.

1. Location
2. Extent in acres
3. Nutrient worksheet or equivalent
4. Nutrient timing and placement

REFERENCES

- Soil Testing Handbook for Professional Agriculturalists, Cooperative Extension Service - University of Maine 1989

- Best Management Practices for Maine Agricultural Producers Protecting Groundwater from Nutrients and Pesticides, University of Maine Cooperative Extension

- Instructions on How to Take a Soil Sample, University of Maine Cooperation Extension

- Water Quality Workshop - Integrating Water Quality and Quantity into Conservation Planning Handbook, USDA-SCS, October and November 1988

- USDA-SCS, Field Office Technical Guide, Section II-D, Soil Rating for Nitrate and Soluble Nutrients

- Rules for Land Application or Sludge and Residues, Chapter 567, Maine Department of Environmental Protection April 1985.

Figure 1

Nutrient Worksheet

Field Number _____ Date _____

Soil Series _____ Tillage Practices _____

Crop Rotation _____ Acres _____

Previous Crop _____ Yield _____

Planned Crop _____ Yield Goal _____

Water Resource Concern:

_____ Groundwater

- Leaching Index ____
- Soil < 20" fractured bedrock _____

(See USDA-SCS Field Office Technical Guide, Section II-III-L)

_____ Surface water - Nutrient surface runoff

Soil Test Levels:

P _____lbs/acre K _____lbs/acre pH_____

	N	P2O5	K2O
A. Soil Test Recommendation * (#/Ac)	____	____	____
B. Legume N Credit **	____	N/A	N/A
C. Total A minus B	____	____	____
D. Agricultural Waste ***	____	____	____
E. Chemical Fertilizer	____	____	____

Management Techniques (i.e. additional tests, timing, agricultural waste spreading rates) -

_____

_____

_____

For Wild Low Bush Blueberries use soil test for pH and leaf tissue tests for nutrients.

** Already factored in for potato recommendations. For corn see Table #1. The Residual Nitrogen Contributions from Legumes for Corn Production.

*** From Code 633 Waste Utilization. Insert available Nitrogen, Phosphorous and Potassium here.

****

Table 1 - The Residual Nitrogen Contributions from Legumes for Corn Production **

Alfalfa	
First year after alfalfa	
50% to 75% stand	110 lbs/ac
25% to 49% stand	80 lbs/ac
<25% stand	40 lbs/ac
Second year after alfalfa	
50% to 75% stand	50 lbs/ac
Red Clover and Trefoil	
First year after clover or trefoil	
>50% stand	100 lbs/ac
25% to 49% stand	70 lbs/ac
<25% stand	40 lbs/ac

** The Pennsylvania State University Agronomy Guide, 1987-88.

F

Waste Management System (No.)

DEFINITION

A planned system in which all necessary components are installed for managing liquid and solid waste, including runoff from concentrated waste areas, in a manner that does not degrade air, soil, or water resources.

SCOPE

This standard establishes the minimum acceptable requirements for planning and operating waste management systems. It does not apply to the design and installation of the system components.

PURPOSE

To manage waste in rural areas in a manner that prevents or minimizes degradation of air, soil, and water resources and protects public health and safety. Such systems are planned to preclude discharge of pollutants to surface or ground water and to recycle waste through soil and plants to the fullest extent practicable.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where: (1) waste is generated by agricultural production or processing; (2) waste from municipal and industrial treatment plants is used in agricultural production; (3) all practice components necessary to make a complete system are specified; and (4) soil, water, and plant resources are adequate to properly manage the waste.

WATER QUANTITY AND QUALITY

This practice is a system composed of one or more practices. The effects of this practice on the quantity and quality of surface and ground water must be determined by evaluating the effects of the component practices.

PLANNING CONSIDERATIONS FOR WATER QUANTITY AND QUALITY

Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, on farm uses and ground water recharge.

2. Variability of effects often seasonal and weather variations.

3. Effects of vegetation on soil moisture.

4. Effects on snow catch and melt on water budget components.

5. Effects of increasing organic matter on water holding capacity of the soil.

6. Potential for a change in plant growth and transpiration because of changes in the volume of soil water.

Quality

1. Effects of both growing and decaying vegetation or nutrient balance in the root zone.

2. Effects on erosion and the movement of sediment, pathogens, organic material, and soluble and sediment-attached substances carried by runoff.

3. Effects of use and management of nutrients and pesticides on surface and ground water quality.

4. Effects on the visual quality onsite and of downstream water.

5. Sediment-attached and construction-related effects on the quality of onsite downstream water courses and impoundments.

6. Effects on the movement of dissolved substances below the root zone and toward ground water, especially for on-farm water supply for human and livestock consumption.

7. Effects on wetlands and water-related wildlife habitats.

PLANNING

General

Waste, as used in this standard, includes both liquid and solid waste, waste water used in processing, and polluted runoff such as that from a feedlot.

A waste management system for a given enterprise shall include the components necessary to properly manage waste and prevent degradation of air, water, soil, and plant resources. A system may consist of a single component, such as a diversion, or may consist of several components. Components shall not be installed until an overall waste management system has been planned.

Components

Components of complete waste management systems may include, but are not limited to, the following:

Debris basins
Dikes
Diversions
Fencing
Grassed waterways or outlets
Irrigation systems
Irrigation water conveyance
Pond sealings or linings
Subsurface drains
Surface drains
Waste storage ponds
Waste storage structures
Waste treatment lagoons
Waste utilization

Design criteria for individual components shall be according to standards in the National Handbook of Conservation Practices. The criteria for the design of components not included in this handbook shall be consistent with sound engineering principles.

PLANNING CONSIDERATIONS

1. Waste should be used to the fullest extent possible by recycling it through soil and plants. If very little land is available, such practices as lagoons and oxidation ditches may be needed.

2. Clean water should be excluded from concentrated waste areas to the fullest extent practical.

3. Manure shall be collected and safely spread on land, treated, or stored until it can be safely spread. Adequate storage must be provided to allow spreading during favorable weather and at times compatible with crop management and available labor.

4. Polluted runoff and seepage from concentrated waste areas shall be intercepted and directed to storage or treatment facilities for future disposal or be directly applied to land in an acceptable manner.

5. Waste water from processing shall be collected and directly applied, stored, or treated before using it.

6. Adequate drainage, erosion control, and other soil and water management practices shall be incorporated to prevent system-related problems.

7. The overall system shall include sufficient land for proper use of disposal of waste at locations, times, rates and volumes that maintain desirable water, soil, plant, and other environmental conditions. Appropriate waste-handling equipment shall be available for effective operation of the system.

8. The system should be outside major viewsheds to conserve visual resources. Vegetative screens and other methods should be provided, as appropriate, to improve visual conditions.

Sequence of installation

System components shall be planned and installed in a sequence that insures that each will function as intended without being hazardous to others or to the overall system.

Safety

Safety features and devices shall be included in waste management systems, as appropriate, to protect animals and humans from drowning, dangerous gases, and other hazards. Fencings shall be provided, as necessary, to prevent livestock and others from using the facilities for other purposes. Fencing must meet the practice code 382, Specialty Fence For Controlling Access By People to Manure Storage Facilities.

SYSTEM OPERATION

The owner or operator shall be responsible for operating and maintaining the system. An operation plan shall be prepared for this use. It should provide specific details concerning the operation of each component and should include:

1. Timing, rates, volumes, and locations for application of waste and, if appropriate. approximate number of trips for hauling equipment and an estimate of the time required.

2. Minimum and maximum operation levels for storage and treatment practices and other operations specific to the practice, such as estimated frequency of solid removal.

3. Safety warnings, particularly where there is danger of drowning or exposure to poisonous or explosive gases.

4. Maintenance requirements for each of the practices.

PLANS AND SPECIFICATIONS

Plans and specifications for waste management systems shall be in keeping with this standard and standards for individual system components.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
WASTE STORAGE FACILITY
(NO.)
CODE313

DEFINITION

A waste impoundment made by constructing an embankment and/or excavating a pit or dugout, or by fabricating a structure.

PURPOSE

To temporarily store wastes such as manure, wastewater, and contaminated runoff as a function of an agricultural waste management system.

CONDITIONS WHERE PRACTICE APPLIES

The storage facility is a component of a planned agricultural waste management system.

Temporary storage is needed for organic wastes generated by agricultural production or processing.

The storage facility can be constructed, operated and maintained to minimize pollution to air or water resources.

Soils, geology, and topography are suitable for construction of the facility.

The practice applies to facilities utilizing embankments with an effective height of 35 feet or less where damage resulting from failure would be limited to damage of farm buildings, agricultural land, or township and country roads. Fabricated structure facilities applies to tanks, stacking facilities, and pond appurtenances.

CRITERIA

General Criteria

Definitions. A non-discharge storage facility is a facility that captures and contains all contaminated runoff and leachate associated with the facility.

A discharge storage facility is a facility that allows runoff and leachate to leave the facility. These facilities include gated precast concrete structures and open sided stacking facilities.

Stacking facilities consist of stacking pads and field piling areas. Stacking pads are storage structures that have a paved

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

floor and one or more earth berm sides. Field piling areas are storage facilities located on the natural ground.

Storage period. The storage period is the maximum length of time anticipated between emptying events. The minimum storage period shall be based on the timing required for environmentally safe waste utilization considering the climate, crops, soil, equipment, and local, state, and Federal regulations.

Design storage volume. The design storage volume for nondischarge facilities shall consist of the total of the following as appropriate:

a. Manure, wastewater, and other wastes accumulated during the storage period.

b. Normal precipitation less evaporation on the surface area of the facility during the storage period.

c. Normal runoff from the facility's drainage area during the storage period.

d. 25-year, 24-hour precipitation on the surface of ponds.

e. 25-year, 24-hour runoff from the facility's drainage area.

f. Residual solids after liquids have been removed. A minimum of 6 inches shall be provided for tanks.

g. Additional storage as may be required to meet management goals or regulatory requirements.

Inlet. Inlets shall be of any permanent type designed to resist corrosion, plugging, and freeze damage incorporating erosion protection as necessary. Inlets from enclosed buildings shall be provided with a water-sealed trap and vent or similar devices to control gas entry into the buildings or other confined spaces.

Safety. Design shall include appropriate safety features to minimize the hazards of the facility.

Protection. Embankments and disturbed areas surrounding the facility shall be treated to control erosion.

Filter Strips. Use filter strips as a component practice to treat polluted runoff or expected leachate from discharge storage facilities and from stacking facilities. Filter Strips shall conform to Practice Standard 393. Filter strips are not needed when runoff and leachate are eliminated by roofing the facility.

Flexible membranes. Flexible membranes shall meet or exceed the requirements of flexible membrane linings specified in NRCS Practice Standard Pond Sealing.

Location. Waste storage facilities, if located within floodplains, shall be protected from inundation or damage from a 25-year flood event.

Pond Criteria

Soil and foundation. The pond shall be located in soils with acceptable permeabilities, or the pond shall be lined. Information and guidance on controlling seepage from waste storage ponds can be found in the Agricultural Waste Management Field Handbook (AWMFH), Chapter 7. The high water table shall be maintained a minimum of 2 feet below the bottom elevation of the pond.

Outlet. No outlet shall automatically release storage from the required storage volume. Manually operated outlets shall be of permanent type designed to resist corrosion and plugging.

Embankments. The minimum elevation of the top of the settled embankment shall be 1 foot above the required storage volume. This height shall be increased by the amount needed to ensure that the top elevation will be maintained after settlement. This increase shall be not less than 5 percent. The minimum top width shall be 8 feet. The combined side slopes of the settled embankment shall be not less than 5 horizontal to 1 vertical, and neither slope shall be steeper than 2 horizontal to 1 vertical.

Emptying facilities. Some type of facility shall be provided for emptying the pond. It may be a dock, a pumping platform, a retaining wall, or a ramp. Ramps used to empty liquids shall have a slope of 4 horizontal to 1 vertical or flatter. Those used to empty slurry, semi-solid, or solid waste shall have a slope of 7 horizontal to 1 vertical or flatter.

Provision shall be made for periodic removal of accumulated solids to preserve storage capacity. The anticipated method for doing this must be considered in planning, particularly in determining the size and shape of the pond and type of seal, if any.

Safety. The pond shall be fenced and warning signs posted to prevent children and others from using it for other than its intended purpose.

Fabricated Structure Criteria

Foundation. The foundations of waste storage structures shall be proportioned to safely support all superimposed loads without excessive movement or settlement.

Where a non-uniform foundation cannot be avoided or applied loads may create highly variable foundation loads, settlement should be calculated from site specific soil test data. Index tests of site soil may allow correlation with similar soils for which test

data is available. If no test data is available, presumptive bearing strength values for assessing actual bearing pressures may be obtained from Table 1 or another nationally recognized building code. In using presumptive bearing values, adequate detailing and articulation shall be provided to avoid distressing movements in the structure.

Table 1 - Presumptive Allowable Bearing Stress Values 1

Foundation Description	Allowable Stress
Crystalline Bedrock	12000 psf
Sedimentary Rock	6000 psf
Sandy Gravel or Gravel	5000 psf
Sand, Silty Sand, Clayey Sand, Silty Gravel, Clayey Gravel	3000 psf
Clay, Sandy Clay, Silty Clay, Clayey Silt	2000 psf

1Basic Building Code, 12th Edition, 1993, Building Officials and Code Administrators, Inc. (BOCA)

Structural loadings. Waste storage structures shall be designed to withstand all anticipated loads including internal and external loads, hydrostatic uplift pressure, concentrated surface and impact loads, water pressure due to seasonal high water table, and frost or ice pressure and load combinations in compliance with this standard and applicable local building codes.

The lateral earth pressures should be calculated from soil strength values determined from the results of appropriate soil tests. Lateral earth pressures can be calculated using the procedures in TR-74. If soil strength tests are not available, the presumptive lateral earth pressure values indicated in Table 2 shall be used.

Lateral earth pressures based upon equivalent fluid assumptions shall be assigned according to the structural stiffness or wall yielding as follows:

- Rigid frame or restrained wall. Use the values shown in Table 2 under the column "Frame Tanks", which gives pressures comparable to the at-rest condition.

- Flexible or yielding wall. Use the values shown in Table 2 under the column "Freestanding Wall," which gives pressures comparable to the active condition. Walls in this category are designed on the basis of gravity for stability or are designed as a cantilever having a base wall thickness to height of backfill ratio not more than 0.085.

Internal lateral pressure used for design shall be 65 lbs/ft2 where the stored waste is not protected from precipitation. A value of 60 lbs/ft2 may be used where the stored waste is protected from precipitation and will not become saturated. Lesser values may be used if supported by measurement of actual pressures of the waste to be stored. If heavy equipment will be operated near the wall, an additional two feet of soil surcharge shall be considered in the wall analysis.

Tank covers shall be designed to withstand both dead and live loads. The live load values for covers contained in ASAE EP378.3, Floor and Suspended Loads on Agricultural Structure Due to Use, and in ASAE EP393.2, Manure Storages, shall be the minimum used. The actual axle load for tank wagons having more than a 2,000 gallon capacity shall be used.

If the facility is to have a roof, snow and wind loads shall be as specified in ASAE EP288.5, Agricultural Building Snow and Wind Loads. If the facility is to serve as part of a foundation or support for a building, the total load shall be considered in the structural design.

Structural design. The structural design shall consider all items that will influence the performance of the structure, including loading assumptions, material properties and construction quality. Design assumptions and construction requirement shall be indicated on the plans.

Tanks may be designed with or without covers. Covers, beams, or braces that are integral to structural performance must be indicated on the construction drawings. The openings in covered tanks shall be designed to accommodate equipment for loading, agitating, and emptying. These openings shall be equipped with grills or secure covers for safety, and for odor and vector control.

All structures shall be underlain by free draining material or shall have footing located below the anticipated frost depth.

Minimum requirements for fabricated structures area as follows:

- Steel. "Manual of Steel Construction", American Institute of Steel Construction.

- Timber. "National Design Specifications for Wood Construction", American Forest and Paper Association.

- Concrete. "Building Code Requirements for Reinforced Concrete, ACI 318", American Concrete Institute.

- Masonry. "Building Code Requirements for Masonry Structures, ACI 530", American Concrete Institute.

. Slabs on grade. Slab design shall consider the required performance and the critical applied loads along with both the subgrade material and material resistance of the concrete slab. Where applied point loads are minimal and liquid-tightness is not required, such as barnyard and feedlot slabs subject only to precipitation, and the subgrade is uniform and dense, the minimum slab thickness shall be 4 inches with a minimum joint spacing of 10 feet. Joint spacing can be increased if steel reinforcing is added based on subgrade drag theory.

Table 2 - Lateral earth pressure values 1

Soil		Equivalent fluid pressure (lb/ft2/ft of depth)			
		Above seasonal high water table2		Below seasonal high water table3	
Description4	Unified Classification4	Free-standing wall	Frame tanks	Free-standing walls	Frame tanks
Clean gravel, sand or sand-gravel mixtures (max 5% fines)5	GP,GW,SP,SW	30	50	80	90
Gravel, sand, silt and clay mixtures (less than 50% fines) Coarse sands with silt and/or clay (less than 50% fines)	All gravel/sand dual symbol classifications and GM,GC,SC, SM,SC-SM	35	60	80	100
Low-plasticity silts and clays with some sand and/or gravel (50% or more fines) Fine sands with silt and/or clay (less than 50% fines)	CL,ML,CL-ML SC,SM,SC-SM	45	75	90	105
Low to medium plasticity silts and clays with little sand and/or gravel (50% or more fines)	CL,ML,CL-ML	65	85	95	110
High plasticity silts and clays (liquid limit more than 50)6	CH,MH				

1 For lightly compacted soils (85% to 90% maximum standard density.) Includes compaction by use of typical farm equipment.

2 Also below seasonal high water table if adequate drainage is provided.
3 Includes hydrostatic pressure.
4 All definitions and procedures in accordance with ASTM D2488 and D 653.
5 Generally, only washed materials are in this category.
6 Not recommended. Requires special design if used.

. For applications where liquid-tightness is required such a floor slabs of storage tanks, the minimum thickness for uniform foundations shall be 5 inches and shall contain distributed reinforcing steel. The required area of such reinforcing steel shall be based on subgrade dag theory as discussed in industry guidelines such as American Concrete Institute, ACI 360, "Design of Slabs-on-Grade".

. When heavy equipment loads are to be resisted and/or where a non-uniform foundation cannot be avoided, an appropriate design procedure incorporating a subgrade resistance parameter(s) such as ACI 360 shall be used.

Safety provisions. Entrance ramps shall be no steeper than 7 horizontal to 1 vertical. Warning signs, ladders, ropes, bars, rails, and other devices shall be provided, as appropriate, to ensure the safety of humans and livestock. Ventilation and warning signs must be provided for covered waste holding structures, as necessary, to prevent explosion, poisoning, or asphyxiation. Pipelines from enclosed buildings shall be provided with a water-sealed trap and vent or similar devices to control gas entry into the buildings.

Stacking Facilities Criteria

Definition. Stacking facilities consist of stacking pads and field piling areas. Stacking pads are storage structures that have a paved floor and earth berms sides. Field piling areas are storage facilities located on the natural ground.

Design Criteria. Locate stacking facilities to minimize the risk of surface and ground water contamination. Design considerations shall include the following:

a. Exclude unpolluted surface and ground water from facilities and loading areas.

b. Site facilities on soils that meets the criteria for treatment of waste water by the overland flow process as shown in Table 3.

Table 3
Site Criteria for Stacking Facilities

Property	Limitation

Maximum Slope for Stacking Facilities	3.0 Percent
Maximum Permeability of C Horizon	2.0 Inches/Hour
Minimum Depth to Bedrock	40 Inches
Minimum Depth to High Water Table	24 Inches

c. Modify sites that do not meet the criteria in Table 3 in consultation with a soil specialist and an engineer. However, never place stacking facilities on soils that are less than 30 inches to bedrock nor soils less than 6 inches to the seasonal high water table (hydric soils) or hydraulically restrictive layer.

d. Locate stacking facilities a minimum of 100 feet away from wells and surface water bodies.

e. Use filter strips as a component practice to treat polluted runoff or expected leachate from stacking facilities. Filter Strips shall conform to Practice Standard 393.

Considerations

Waste storage facilities should be located as close to the source of waste and polluted runoff as practicable. In addition, they should be located considering prevailing winds and landscape elements such as building arrangement, landform, and vegetation to minimize odors and visual resource problems.

An auxiliary (emergency) spillway and/or additional embankment height should be considered to protect the embankment. Factors such as drainage area, pond size, precipitation amounts, downstream hazards, and receiving waters should be evaluated in this consideration.

Nonpolluted runoff should be excluded to the fullest extent possible except where its storage is advantageous to the operation of the agricultural waste management system.

Freeboard for waste storage structures should be considered. Use 0.5 feet for structures and 1.0 feet for ponds.

Solid/liquid separation of runoff or wastewater entering pond facilities should be considered to minimize the frequency of accumulated solid removal and to facilitate pumping and application of the stored waste.

Due consideration should be given to economics, the overall waste management system plan, and safety and health factors.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for its design. The plan shall contain the operational requirements for emptying the storage facility. This shall include the requirement that waste shall be removed from storage and utilized at locations, times, rates, and volume in accordance with the overall waste management system plan. In addition, for ponds, the plan shall include the requirement that following storms, waste shall be removed at the earliest environmentally safe period to ensure that sufficient capacity is available to accommodate subsequent storms.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
FILTER STRIP
(ACRE)
CODE 393

DEFINITION

A strip of area or vegetation for removing sediment, organic matter, and other pollutants from runoff and waste water.

PURPOSES

To remove sediment and other pollutants from runoff or waste water by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization, thereby reducing pollution and protecting the environment.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies: (1) on cropland at the lower edge of fields or above conservation practices such as terraces or diversions, or on fields adjacent to streams, ponds, and lakes; (2) in areas requiring filter strips as part of a waste management system to treat polluted runoff or waste water; and (3) on forest land where filter strips are needed as part of a forestry operation to reduce delivery of sediment into waterways.

CRITERIA

Filter Strips For Sediment and Related Pollutants

These criteria apply to filter strips on cropland at the lower edge of fields, on fields, on pastures, or in manure spreading areas adjacent to streams, ponds, and lakes, and above conservation practices such as terraces or diversions.

The length of flow through vigorous vegetation shall be at least 10 ft for slopes of less than one percent and proportionately up to at least 25 ft for 30 percent slopes.

Filter Strips For Runoff From Concentrated Livestock Areas

These criteria apply to filter strips for feedlot and barnyard runoff.

A settling basin, vegetated barrier, or low velocity channel shall be provided between the waste source and filter strip when more than 100 1,000 -pound animal units are confined. Such facilities should be considered for use with all filter strips.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

A constructed settling basin, if needed, shall have sufficient capacity, as a minimum, to store the runoff computed for 15 minutes duration at the peak inflow rate resulting from a 2-year, 24-hour rainfall. Any basin outflow shall be disregarded in computing minimum storage. Additional storage capacity, based on frequency of cleaning, shall be provided for manure and other solids settled within the basin. When the basin is cleaned after every significant runoff event, additional storage equivalent to at least 0.5 in. from the concentrated waste area shall be provided. If only annual cleaning of the basin is planned, additional storage equivalent to at least 6 in. from the concentrated waste shall be provided.

A low velocity channel shall be a minimum of 75 ft. long. It shall be designed for a flow depth of 0.5 ft or less to pass the peak flow resulting from a 2-year, 24-hour rainfall at a velocity of 0.5 ft per second or less. Provisions shall be provided for removing settled solids from the channel as necessary to maintain proper functioning.

A filter strip may be a relatively uniform grass area or grass waterway. Minimum dimensions shall be based on the peak outflow from the concentrated waste area or settling facility based on a 2-year 24 hour rainfall.

Grass area filter strips shall be generally on the contour and sufficiently wide to pass the peak flow at a depth of 0.5 in. or less. Flow length shall be sufficient to provide at least 15 minutes of flow-through time.

Grass channel filter strips shall be designed to carry the peak flow at a depth of 0.5 ft. or less. Flow length shall be sufficient to provide at least 30 minutes of flow-through time. Grass species and shape of channel shall be such that grass stems will remain upright during design flow.

Design Criteria for Leachate Filter Areas

The following items are necessary design considerations for filter areas which are built as a component of animal waste stacking facilities or storage structures.

1. All unpolluted surface runoff will be excluded from the planned filter area.

2. Filter area will be sited on soils which meet the following criteria;

Property	Limitation
Maximum Slope for Filter Strip	8.0 Percent

Maximum Permeability of C Horizon	2.0 Inches/Hour
Minimum Depth to Bedrock	40 Inches
Minimum Depth to High Water Table	24 Inches

3. Modify sites that do not meet the above criteria in consultation with a soil specialist and an engineer. However, never place filter strips on soils that have less than 30 inches of depth to bedrock or that have less than 6 inches of depth to the seasonal high water table or hydraulically restrictive layer.

4. Filter areas will be sited a minimum of 100 away feet from a domestic water supply.

5. Filter areas will be sited so that the minimum flow length from the filter outlet to a public water body or adjoining property line is a minimum of 300 feet.

6. Sloping filter areas may require some means to uniformly disperse the leachate over the filter area (such as gravel berms, perforated header pipe, level lip spreader, etc.)

7. Filter area will be sized based on 40 square feet of perennial vegetation per animal unit or 80 square feet of annual vegetation (at tolerable soil loss) per animal unit, below manure storage areas.

8. Filter areas will be fenced where necessary to protect its continued functioning.

9. The following types of vegetative cover are acceptable in a filter area: woods, hayland and annual or perennial vegetation. Wetland types of vegetation may be used when determined to be adequate by the SRC.

Filter Strips on Forest Land

These criteria apply to filter strips for runoff as part of a forestry operation to reduce delivery of sediment into waterways.

As a guide, the length of flow through undisturbed forest floor should be at least 25 ft for slopes of less than one percent and proportionately up to at least 65 ft for 30 percent slopes and at least 150 ft for 70 percent slopes. Longer flow lengths should be used as contributing drainage areas increase.

CONSIDERATIONS

Evaluate type and quantity of pollutant, slopes and soils, adapted vegetative species, time of year, for proper establishment of vegetation, necessity for irrigation, visual aspects, fire hazards, and other special needs. Prevent erosion where filters outlet into stream or channels. If filter strips

are to be used in treating waste water or polluted runoff from concentrated livestock areas, the following must be considered:

1. Adequate soil drainage to ensure satisfactory performance.

2. Provisions for preventing continuous or daily discharge of liquid waste unless the area is adequate for infiltrating all daily applied effluent. Temporary storage should be considered to prevent discharge to the filter strip more frequently than once every 3 days.

3. Enough rest periods to maintain an aerobic soil profile. Storage or alternating filter strips may be desirable.

4. Reduced effectiveness of filter strips under snow or frozen conditions.

5. An adequate filter area and length of flow to provide the desired reduction of pollutants. A serpentine of switchback channel can be used to provide greater length of flow.

6. Provisions for excluding roof water and unpolluted surface runoff.

7. Slopes less than 5 percent are more effective; steeper slopes require a greater area and length of flow.

8. Provisions for mowing and removing vegetation to maintain the effectiveness of the filter area. While not generally recommended, controlled grazing may be satisfactory when the filter area is dry and firm.

9. The need for a level lip weir, gated pipe, sprinklers, or other facilities to distribute flow uniformly across the top of the filter strip and maintain sheet flow through the strip.

Filter strips by themselves will not meet the "no-discharge" requirement applicable to livestock operations requiring permits under the National Pollutant Discharge Elimination System. More stringent pollution abatement measures may also be necessary where receiving waters must be highly protected.

PLANS AND SPECIFICATIONS

Plans and specifications for filter strips shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Engineering Specifications

All trees, stumps, brush, rocks, and similar materials that can interfere with installing the filter strip shall be removed. The materials shall be disposed of in a manner that is consistent

with the standards for maintaining and improving the quality of the environment and with proper functioning of the filter strip.

The filter strip shall be shaped to the grade and dimensions shown on the plan or as staked in the field. If necessary, topsoil shall be stockpiled and spread to the required grade and thickness. Excess spoil shall be disposed of in areas where it does not interfere with the required flow characteristics of the filter strip.

Vegetative Specifications Guide

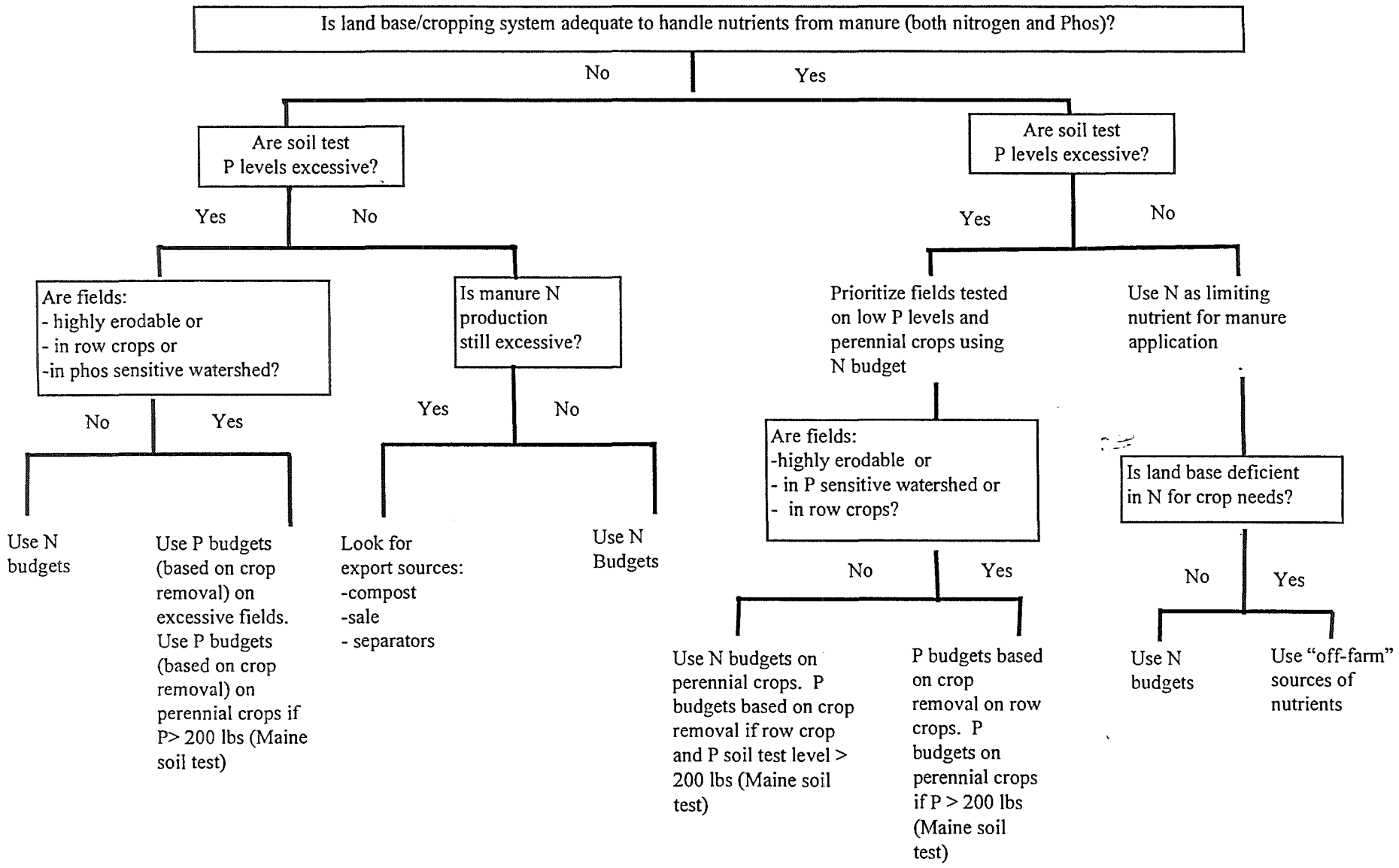
Specify methods of seedbed preparation; adapted plants; planting dates and rates of seeding or sprigging; need for mulching, use of stabilizing crop, or mechanical means of stabilizing; and fertilizer, soil amendment, and weed control requirements. Specify requirements for maintenance.

OPERATION AND MAINTENANCE

Development of rills and small channels within filter areas must be minimized. Needed repairs must be made immediately to reestablish sheet flow. A shallow furrow on the contour across the filter can be used to reestablish sheet flow. Vegetation must be maintained in a vigorous condition. If livestock have access to the filter area, it must be fenced to control grazing.

Excessive = Maine Soil Test > 40 lbs P per acre

N and P Manure Priority Matrix
Whole Farm Budget



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MAINE'S RIGHT TO FARM LAW
and Other Related Legislation
(With 1993 Changes)

17 MRSA §2805
Chapter 91

§2805. Farms or farm operations not a nuisance

1. **Definition.** As used in this section, unless the context otherwise indicates, the following terms have the following meanings.

   A. "Farm" means the land, buildings and machinery used in the commercial production of farm products.

   B. "Farm operation" means a condition or activity that occurs on a farm in connection with the commercial production of farm products and includes, but is not limited to, noise, odors, dust, fumes, operation of machinery and irrigation pumps, ground and aerial seeding, ground spraying, composting of material produced by the farm or to be used at least in part on the farm, disposal of manure, the application of chemical fertilizers, soil amendments, conditioners and pesticides and the employment and use of labor.

   C. "Farm product" means those plants and animals useful to man and includes, but is not limited to forages and sod crops, grains and food crops, dairy products, poultry and poultry products, bees, livestock and livestock products and fruits, berries, vegetables, flowers, seeds, grasses and other similar products.

2. **Best management practices.** A farm or farm operation may not be considered a public or private nuisance if the farm or farm operation alleged to be a nuisance conforms to best management practices, as determined by the Commissioner of Agriculture, Food and Rural Resources in accordance with the Maine Administrative Procedure Act, Title 5, chapter 375.[1]

3. **Change in land use.** A farm or farm operation shall not be considered a public or private nuisance if the farm or farm operation existed before a change in the land use or occupancy of land within one mile of the boundaries of the farm and, before the change in land use or occupancy of land, the farm or farm operation would not have been a nuisance.

3-A. **Violation of municipal ordinances.** A method of operation used by a farm or farm operation located in an area where agricultural activities are permitted may not be considered a violation of a municipal ordinance if the method of operation constitutes a best management practice as determined by the Department of Agriculture, Food and Rural Resources.

4. **Application; municipal ordinances.** This section does not affect the application of state and federal laws. After the effective date of this subsection, a municipality must provide the Commissioner of Agriculture, Food and Rural Resources with a copy of any proposed ordinance that impacts farm operations. The clerk of the municipality or a municipal official designated by the clerk shall submit a copy of the proposed ordinance to the commissioner at least 90 days

prior to the meeting of the legislative body or public hearing at which adoption of the ordinance will be considered. The commissioner shall review the proposed ordinance and advise the municipality if the proposed ordinance would restrict or prohibit the use of best management practices. This subsection does not affect municipal authority to enact ordinances.

5. **Complaint resolution.** The commissioner shall investigate all complaints involving a farm or farm operation, including, but not limited to, complaints involving the use of waste products, ground and surface water pollution and insect infestations. In cases of insect infestations not arising from agricultural activities, when the State Entomologist believes that the infestation is a public nuisance and is able to identify the source or sources of the infestation, the commissioner shall refer the matter to the Department of the Attorney General. If the commissioner finds upon investigation that the person responsible for the farm or farm operation is using best management practices, the commissioner shall notify that person and the complainant of this finding in writing. If the commissioner identifies the source or sources of the problem, has reason to believe that the source is a nuisance and finds that the nuisance is caused by the use of other than best management practices, the commissioner shall:

   A. Determine the changes needed in the farm or farm operation to comply with best management practices;

   B. Advise the person responsible for the farm or farm operation of the changes, as determined in paragraph A, that are necessary to conform with best management practices and determine subsequently if those changes are implemented; and

   C. Give the findings of the initial investigation and subsequent investigations and any determination of compliance to the complainant and person responsible.

6. **Failure to adopt best management practices.** If the person responsible for the farm or farm operation does not adopt best management practices, the commissioner shall send a written report to an appropriate agency if a federal or state law has been violated and to the Attorney General. The Attorney General may institute an action to abate a nuisance and the court may order the abatement with costs as provided under section 2702.

7. **Agricultural Complaint Response Fund.** There is established the nonlapsing Agricultural Complaint Response Fund. The commissioner may accept funds from any source designated to be placed in the fund. The commissioner may authorize expenses from the fund as necessary to investigate complaints involving a farm or farm operation and to abate conditions potentially resulting from farms or farm operations.

8. **Rules.** The commissioner shall adopt rules in accordance with the Maine Administrative Procedure Act[1] to interpret and implement this section.

1991, c. 395, §§ 1 to 3; 1993, c. 87, § 1; 1993, c. 124, §§ 3, 4, eff. May 18, 1993

[1]See 5. M.R.S.A. § 8001.

17 MRSA §2701-B

§2701-B. Action against improper manure handling

The Commissioner of Agriculture, Food and Rural Resources shall investigate complaints of improper manure handling, including, but not limited to, complaints of improper storage or spreading of manure. If the commissioner is able to identify the source or sources of the manure and has reason to believe that the manure is a nuisance and the nuisance is caused by the use of other than best management practices for manure handling, the commissioner shall:

1. **Findings.** Determine the changes needed in manure handling to comply with best management practices for manure handling;

2. **Conformance.** Require the person responsible to abide by the necessary changes determined in subsection 1 and determine if the changes have been made; and

3. **Report.** Give the written findings of the initial investigation and any determination of compliance to the complainant and the person responsible.

4. **Repealed.** Laws 1991, c. 548, § A-7, eff. July 10, 1991.

If the person responsible does not adopt best management practices for manure handling, the commissioner shall send a copy of the written report to the Department of Environmental Protection and refer the matter in writing to the Attorney General. The Attorney General may institute an action to abate a nuisance and the court may order the abatement with costs as provided under this chapter. If the commissioner, upon investigation, finds that the person responsible for the manure is following best management practices for manure handling, the commissioner shall advise the complainant and the person responsible in writing.

The commissioner shall adopt rules in accordance with the Maine Administrative Procedure Act[1] for the interpretation and implementation of this section, including a definition of "best management practices for manure handling."

If the commissioner finds that improper manure handling may have affected water quality and the person responsible does not adopt best management practices for manure handling, the commissioner shall advise the Commissioner of Environmental Protection that a potential water quality violation exists and the Commissioner of Environmental Protection may respond as appropriate.

1989, c. 836, § 2; 1991, c. 548; §§ A-6, A-7; 1993, c. 124, § 2, eff. May 18, 1993.

[1]See 5 M.R.S.A. § 8001.

38 MRSA §417-A

§417-A. Manure spreading

When the ground is frozen, a person may not spread manure on agricultural fields within a great pond watershed unless this activity is in accordance with a conservation plan for that land on file with a state soil and water conservation district.

1991, c. 838, § 20.