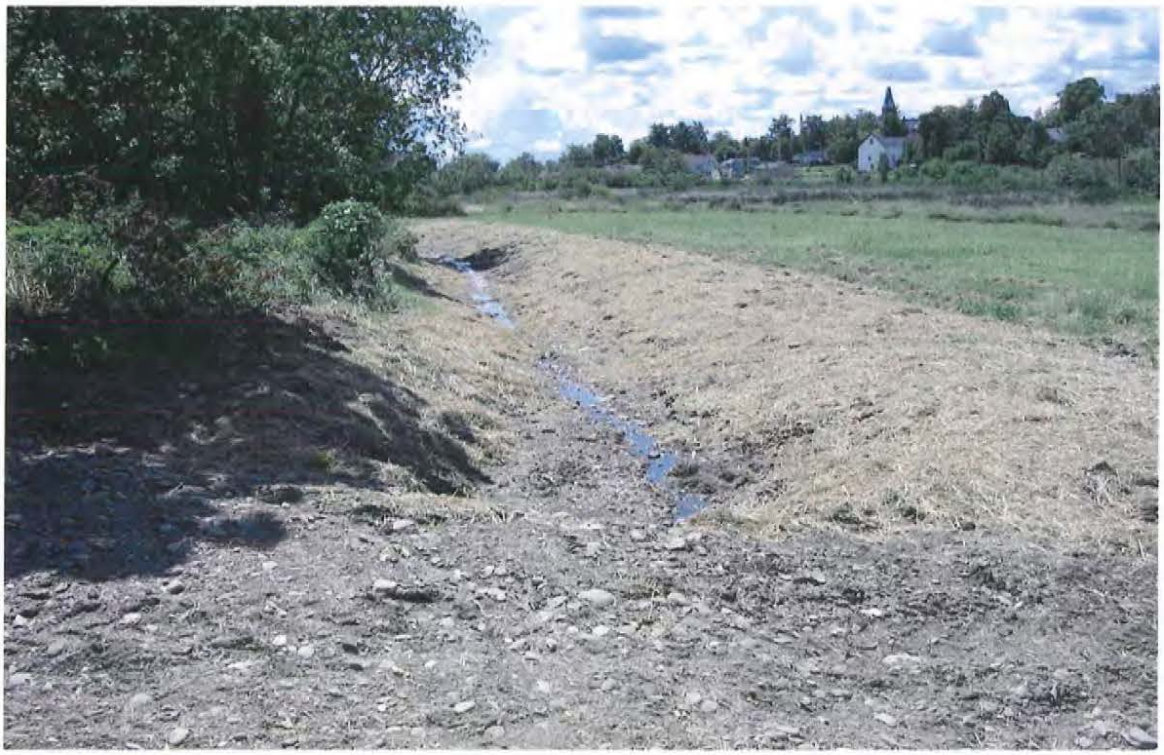
Manual of Best Management Practices



For Maine Agriculture

Maine Department of Agriculture, Food & Rural Resources
Division of Animal Health & Industry
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STATE OF MAINE
DEPARTMENT OF AGRICULTURE
Division of Animal Health & Industry
28 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0028

John Elias Baldacci
Governor

Seth H. Bradstreet, III
Commissioner

January 2007

Dear Friends,

The ***Manual of Best Management Practices for Maine Agriculture*** has been published after years of preparation by many cooperating agencies and individuals. It is a reference document for staff of the Maine Department of Agriculture, Soil & Water Conservation Districts, the USDA Natural Resources Conservation Service, University of Maine Cooperative Extension Educators, agricultural industry experts and others.

The Manual is a tool for assisting planners charged with developing and/or evaluating best management practices (BMPs) on farms for resolving agriculture-related environmental concerns, and may be used as a guide for determining whether a farm is conforming to or has adopted BMPs. Certain Maine statutes require conformance to, and adoption of, BMPs by agricultural operations, and this Manual provides guidance here as well. Farming activities/site conditions are diverse and BMPs must be adapted to conditions on a site-specific basis.

The 144 best management practices listed in the Manual, along with their associated 400 references from the scientific literature or technical manuals, constitute a menu from which appropriately trained/experienced planners can select BMPs for problem solving. It must be recognized, however, that this Manual is a collection of "standard" or "conventional" BMPs, that it is not possible for any one Manual to cover every situation that might arise, and that other valid procedures or practices not listed here may be utilized successfully to achieve desired performance expectations.

The Manual is not a static document. As research continues, farm management practices change, and new ideas evolve, additional or modified BMPs with innovative approaches to problem resolution will be added to future updates of this document.

Copies of the Manual, as well as review copies of most of the 400 references mentioned above, are available in the Nutrient Management Office. The Manual will be posted on the Department's website for easy access. Many of these references have an active link that can be accessed directly from the on-line manual.

Enjoy the Manual!!

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Acknowledgements

This *Manual of Best Management Practices for Maine Agriculture*, published in January 2007, is the first comprehensive compilation of agriculture-related best management practices ever published in the State of Maine. It is a work that has been in progress for many years, and has reached completion through the efforts of many individuals. These individuals either have written text for the *Manual* and/or contributed lists of potential best management practices for the *Manual*, or have reviewed its contents for clarity and technical accuracy. We acknowledge their contributions below:

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I. *Introduction*

1. Purpose of the Manual

The ***Manual of Best Management Practices for Maine Agriculture*** has been developed as a resource for the Agriculture Compliance Program of the Maine Department of Agriculture, Food & Rural Resources (hereinafter "Department of Agriculture"). Maine statutes, 17 MRSA §2805, commonly known as Maine's "Right-To-Farm" Law, 17 MRSA §2701-B, known as the "Manure Handling Law", and Title 7 Chapter 747, the Nutrient Management Law, establish and give authority to the Agriculture Compliance Program, and require a farm or farm operation to conform to and adopt "best management practices". These statutes give the commissioner of the Department of Agriculture the authority to determine whether a farm or farm operation is in conformance with best management practices, and require the Department of Agriculture to promulgate rules to interpret and implement these laws. Although investigations under these laws are initiated by complaints from the public, another statute, 7 MRSA §17, gives the Commissioner of Agriculture authority to investigate water quality concerns related to manure involving any farm operation, without having received a complaint. Such investigations, and any subsequent development of best management practices, are conducted under the Agriculture Compliance Program Rules referred to above using the same procedures.

This manual provides a guide for making a determination whether a farm or farm operation is conforming to or has adopted best management practices. It may be used by the department, in conjunction with other sources of information, for making such a determination. It also is available to farms or farm operations, or anyone consulting or advising a farm or farm operation, as a guide for getting a farm to conform to and/or adopt best management practices. Likewise it may serve as a guide to anyone else involved in addressing complaints that arise under the statutes listed above.

Best Management Practices for Maine Agriculture

Section III of the manual is a collection of practices that have been determined to meet environmental goals and commodity production goals that apply to a wide variety of agricultural issues in the State of Maine; these are termed "best management practices" (BMPs). The BMPs listed in the manual provide guidance and a basis for the development of "site-specific best management practices" for farms in Maine. Since each farm has a unique combination of site conditions and farming practices, and since several BMPs often could be effective for addressing a specific agricultural issue, the BMPs listed in the manual should be used as a menu from which appropriate site-specific BMPs are selected. The user of this Manual must clearly understand, however, that, although the BMPs listed in this Manual are a partial collection of "standard" or "conventional" BMPs, there are other valid procedures, also BMPs that may be utilized in some situations, but are not listed here. These omissions do not necessarily negate the potential effectiveness of such practices (BMPs) that may be employed in a specific situation. A person developing BMPs must have the appropriate training and experience to investigate agriculture-related problems, evaluate site conditions, and consider alternatives for addressing the agricultural issue(s) present. Development of actual site-specific BMPs often requires that people with the appropriate training and experience exercise their best professional judgment when selecting BMPs, or combinations of BMPs, after the investigation and evaluation of an agriculture-related problem. The BMPs contained in this manual may augment and guide that professional judgment but are not substitutes for it.

This manual has been compiled as a resource for people with professional training and expertise in agriculture, such as staff of the Maine Department of Agriculture, Food & Rural Resources, the University of Maine Cooperative Extension, the USDA Natural Resources Conservation Service (NRCS) and consultants working with or advising farms on farm management issues. This manual is not intended to be an educational document or a "how-to" manual for farming in Maine; it is a reference manual that may help in locating educational material such as "how to" descriptions and similar information. It contains general descriptions of BMPs sufficient to identify its utility in addressing

particular agriculture-related problems, and essentially is an annotated list of known BMPs that may pertain to agriculture-related problems that occur on Maine farms.

The descriptions of BMPs contained in this manual are a starting point. Details of how to implement a given BMP, the scientific basis for the BMP, or any limitations or cautions in the use of the BMP, may be found in the material referenced with each BMP.

2. History of Development of BMPs for Agriculture in Maine

Following the 1981 passage of the Right-To-Farm Law, the Department promulgated Rule 01-001, Chapter 10: *Definition of Generally Accepted Agricultural Practices.* This rule stated that an agricultural practice is deemed a "generally accepted agricultural practice" if it meets two general tests. The first is that it must be consistent with current published rules, regulations and guidelines of state agencies, federal agencies, recognized agricultural organizations, or agricultural extension services. The second is that it must be "essential" to one or more aspects of the operation of the farm such as its "economic viability," "the successful production ...of commodities," "disposition of ...waste," etc.

This rule has proven over time to be too broad and general to serve as an effective guide for administering the agriculture compliance program. In practice, department personnel and others involved in the investigation and resolution of complaints have come to rely on a wide range of published and unpublished BMPs derived from many sources, and often pulled together on an as-needed basis. Furthermore, the term "generally accepted agricultural practices" has become obsolete. The focus, when selecting an agricultural practice to address agriculture-related problems, must not be whether that practice has been generally accepted, but rather whether that practice is the best practice for the circumstances of the particular situation. The more specific and more relevant term "best management practices" is used instead because "BMP" more accurately reflects the criteria for selecting a practice or set of practices. A BMP, or a set of BMPs, will be selected not only because it is the best available technology, but also because it makes both economic and environmental sense by providing the most benefit for the least cost.

While Rule 01-001, Chapter 10 seems to permit and even require that the Department of Agriculture reference a multitude of published sources when making a determination about a farm operation's conformance to BMPs, the law implies that BMPs should be adopted by rule. The department has adopted several specific rules that may be considered BMPs for certain agriculture issues such as Disposal of Animal Carcasses (Rule 01-001, Chapter 211), Disposal of Cull Potato Piles (Rule 01-001, Chapter 600), and Nutrient Management (Rule 01-001, Chapter 565). However, there are no rules in place that are comprehensive enough to serve as an effective guide to best management practices for the myriad of agriculture-related problems that arise under these pertinent statutes.

Probably the most complete agricultural best management practices document produced in the State of Maine to date is the October 1991 report of the Non-Point Source Agricultural Task Force entitled *Strategy for Managing Nonpoint Source Pollution from Agricultural Sources and Best Management System Guidelines* (hereinafter "NPS Report"). That report is one of several documents containing BMPs that the department may refer to when administering the agriculture compliance program. The NPS Report has not been adopted as a rule and therefore does not have the force of law. It does, however, serve as a guide when the department makes a determination as to whether a farm or farm operation has conformed to or adopted BMPs. It also is used as a resource or a guide when developing site specific BMPs. Some of the information in this manual is derived from this NPS Report.

In June 1999, the department compiled a list of about 130 BMPs organized by category of agricultural issue. The goal in developing this list was to formally adopt, by rulemaking process, the BMPs contained in the list. Although that list was not developed into a rule, it does serve as a source of much of the information contained in this manual. That list has been supplemented and revised for this manual and the descriptions of the BMPs have been expanded.

3. Continued Development of BMPs

The ***Manual of Best Management Practices for Maine Agriculture*** is not a static document. The process of developing best management practices has evolved over time as new research proceeds and agricultural knowledge is expanded. This on-going process will continue as new technologies and new management techniques are constantly being developed, tested and disseminated. Numerous BMPs in this manual were not included in the 1991 NPS Report because they were not known techniques or were not recognized as effective techniques. Likewise the BMPs included in this manual may be replaced, updated or refined over time. Therefore, even if a BMP may not appear in this manual it does not necessarily mean that it does not have some application in certain circumstances. Therefore, consultation with a qualified expert is required when developing BMPs.

II. *Explanation of General BMPs and Site Specific BMPs*

A. Definition of BMPs

The following definition of "BMP" was adopted for the 1991 NPS Report and still is applicable for Maine agriculture. It is based on practicality, economics, efficiency, and a cost/benefit comparison:

> *A Best Management Practice is a method or practice which, when installed or used, is consistent with efficient, practical, technically and environmentally sound animal or crop production practices. BMPs are those practices best suited to preventing, reducing, or correcting agriculture-related problems.*

(NPS report, October 1991)

It also is important to understand the meaning of the word "best" in "best management practices" as used in the above definition. "Best" in this case does not infer the absolute maximum water quality protection method, measure, or practice that has been developed. In this context, the term "best" refers to any method, measure, or practice that, when installed, will provide reasonably improved prevention, reduction, or correction of water pollution.

In actuality, some BMPs offer greater protection than others. Not surprisingly, the BMPs offering the greatest degree of protection may also cost the most in terms of dollars, effort, and/or time to implement and maintain. If the cost of implementing a management practice or technique is substantially greater than the benefit that may accrue from that practice then it is not the best choice for the situation.

Finally, BMPs for water quality are not necessarily BMPs for other purposes. In fact the BMPs for water quality might directly conflict with an equally, if not more important,

BMP to the farmer that could impact animal health, soil productivity or overall financial viability of the farm operation.

B. Use of General BMPs

The BMPs listed in section III of this manual are best described as "general" BMPs. Together they form a menu from which one or more techniques or practices may be selected to address an agriculture-related problem in the most appropriate manner for the site and the issue. Rarely will the use of a single BMP for any land use activity be sufficient to adequately address agricultural-related problems. More often, several BMPs, individually selected to fit the unique characteristics of each site and farming operation, will be required.

The BMPs developed to address the specific situation and the unique characteristics of the land are referred to as site-specific BMPs. When used in combination to address an agriculture-related problem within the context of the entire farm operation these groups of BMPs are often referred to as best management systems. The EPA defines management systems as:

> *Economically- achievable measures for the control of the addition of pollutants from existing and new categories and classes of non-point sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available non-point source control practices, technologies, processes, siting criteria, operating methods, or other alternatives.*

While farming operations have been considered potential "non-point sources" of pollution, recent changes in federal legislation define certain livestock operations, "concentrated animal feeding operations" (CAFOs), as potential "point sources" of pollution attributable to agriculture. This necessitates recognition of these entities as candidates for BMP adoption utilizing the approaches outlined in this manual, and may include adoption of nutrient management plans and/or specifically defined effluent

limitations guidelines, as appropriate. Such changes further illustrate the on-going need for constructive thought during planning processes and for flexibility when evaluating specific agricultural situations.

Farming activities are quite diverse, as are the site conditions upon which farming activities are practiced. It would be impractical to develop the list of specifications that fit each unique set of site conditions and farming practices. Additionally, there occasionally are several equally suitable approaches to the same problem and, therefore, management systems are designed so there is considerable flexibility to determine *how* to best achieve the performance expectations.

C. Development of Site Specific BMPs

Implementation of agricultural BMPs, for the most part, affects existing activities, whereas most BMPs for other land use activities impact proposed uses. Most farmers are farming on a limited land base and may not be able to expand into new areas. BMPs that would unnecessarily reduce this land base or hinder farmers' existing operation may force those farmers out of business. Therefore the BMPs must be carefully developed and implemented on a site-specific basis to address each unique situation.

Best management practices that have the greatest cost/ benefit ratio should be adopted and implemented. In some instances it may be necessary to require best management practices that are relatively expensive. In situations where the required best management practice is very costly and the primary benefit may be for society, rather than for the farmer, which usually is the case, it is appropriate that some financial assistance be provided. In other instances, creative application of best management practices may actually resolve a problem and save a farm operation some money.

It is because of the myriad of potential agricultural-related problems, the uniqueness of site conditions, and the interconnectivity and complexity of farming operations that development of site-specific best management practices is approached systematically –

that is, through the use of best management systems – and is both an art involving considerable professional judgment and a science based on sound research and site analysis.

The great diversity of site conditions, farming operations, crop selections, and farming practices must be considered when developing BMPs. To adequately address each unique set of conditions, not only for each farm, but also for each field or portion of the field, site-specific BMPs are required. Therefore the agricultural BMPs in section III refer to a partial listing of technical publications and organizations that can be consulted for further guidance. Some of these references are continually being updated thus updating the BMPs.

Lists of the general best management practices associated with various best management systems follow. These are to be used as a menu from which the appropriate best management practice can be chosen for application on a site-specific basis.

III. *General BMPs for Maine Agriculture*

Following, is a list of BMPs arranged by categories based on the subject matter of the BMP. Each BMP is listed by title and contains a description of the BMP or a summary of the practice(s) it calls for, and references additional materials that can provide more detail about the use of the BMP and the science that supports the BMP. The list of references appears in section IV and each reference is numbered. The numbers listed in the "references" line for each BMP corresponds to the references that can be found in section IV. References are coded A, B or C, or in combinations thereof, and have the following meanings:

"A" references explain how a particular BMP is to be applied site specifically, or suggest ways of implementing the practice from an engineering or practical standpoint.

"B" references describe the basic science, research results or other activities, which support the practice.

"C" references offer a general description of a practice or situation which relates to a BMP for problem solving, but do not necessarily offer specifics about how to achieve a desired result.

Print versions of most reference materials are on file at the Maine Department of Agriculture and are available for copying and inspection. Most references are available on the Internet and have the web page link as part of the reference if the reference was available on line at the time this listing was assembled in 2005 - 2006.

A. Erosion and Sedimentation Control

1. Contour Plowing

Plant crops across the predominant slope of the land, along the contour, to reduce the erosive force of runoff water. This BMP becomes more appropriate as the slope increases or the distance to a water-body decreases.

References: 25 AC; 99 AC; 255 ABC; 306 AC; 329 AC; 335 AC.

2. Interseed Row Crops

Plant a ground cover crop between the rows of the primary crop to protect the bare soil between rows.

References: 25 C; 45 AC; 49 C; 50 BC; 217 C; 223 B; 246 ABC; 277 AC; 317 AC.

3. Rotated Crops

Rotate crops that provide limited soil cover (row crops) with crops that provide high amounts of cover (hay or clover).

References: 45 AC; 99C; 213 AC; 218 BC; 219 C; 220 AC; 221 ABC; 238 ABC.

4. Buffer Strips

Install buffer strips next to surface waters that are in a position to receive runoff from crop fields.

References: 25 AC; 239 ABC; 240 ABC; 241 ABC; 258 C; 358 ABC; 361 AC; 375 ABC; 376 ABC.

5. Strip Crop

Plant row crops in strips along the contour on sloping fields, alternating with strips of plants that provide a high amount of cover and the potential to filter sediment out of runoff from the row crops.

References: 25 BC; 99AC; 242 ABC; 243 ABC; 376 BC.

6. Crop Residue

Leave as much residue from previous crop on the ground as possible to act as mulch.

References: 25 ABC; 58 ABC; 136 ABC; 207 ABC; 208 ABC; 243 ABC; 281 ABC; 336 ABC; 361 ABC.

7. Vegetate Highly Erodible Areas

Areas that are particularly prone to excessive erosion should be vegetated to permanently protect the soil.

References: 25 ABC; 34 ABC; 240 ABC; 244 ABC; 245 ABC; 248 ABC; 304 AC; 361 ABC; 358 ABC.

8. Cover Crops

Plant cover crops to reduce erosion, protect water quality, improve soil, impede weed growth, and enhance nutrient moisture availability to subsequent crops.

References: 45 AC; 58 ABC; 215 BC; 216 ABC; 240 ABC; 244 ABC; 245 ABC; 260 ABC; 292 ABC; 304 AC; 337 B; 373 ABC.

9. Divert Surface Waters

Construct diversions for controlling surface runoff water. Divert flows away from farmsteads, eroding areas, or other sites, as necessary.

References: 247 ABC; 248 ABC; 250 ABC; 356 ABC; 358 ABC.

10. Stabilize Surface Water Diversion

Stabilize surface water diversion channels so that they will not erode and become a source of sediment.

Reference: 247 AC; 248 AC; 250 AC; 358 ABC

11. Sediment Basins

Construct sediment basins to trap and store waterborne sediment and debris that could enter and fill waterways, reservoirs or ditches, etc.

References: 99 AC; 250 ABC; 251 ABC; 351 C; 358 ABC.

12. Limit Livestock Access To Sediment Producing Areas

Limiting livestock access and allowing those areas to become re-vegetated can stabilize areas that have bare soil due to extensive livestock traffic and are therefore prone to erosion.

References: 241 ABC; 249 ABC; 252 ABC; 253 ABC; 294 AC; 295 AC; 315 AC; 362 AC.

13. Limit And Stabilize Livestock Crossings of Streams

Direct livestock to one or more stable stream crossing areas to reduce soil disturbance in and adjacent to streams.

References: 2 ABC; 23 AC; 40 C; 99 C; 252 ABC; 253 ABC; 254 ABC; 315 AC; 362 AC.

14. Locate or Develop a Stable Stream Crossing For Farm Equipment

Farm equipment can cause erosion and sedimentation if stream crossings have not been stabilized with appropriate materials and methods.

References: 2 ABC; 209 ABC; 254 ABC.

B. Manure Management

1. Determine Manure Application Rates

Base manure application rates on realistic yield goals to avoid over fertilizing. Keep accurate fertilizer and manure applications rates and yield records on a worksheet.

References: 1 ABC; 5 ABC; 6 A; 25 ABC; 55 ABC; 309 AC; 312 ABC; 317 AC; 323 ABC; 375 ABC; 376 BC; 382 BC; 383 AC; 384 ABC; 387 ABC.

2. Buffers or Setbacks

Establish site-specific manure spreading setbacks or buffers where and when appropriate.

References: 5 AC; 18 AC; 22 AC; 25 ABC; 40 AC; 55 ABC; 62 AC; 63 AC; 64 C; 258 C; 326 AC; 362 AC; 363 B; 375 ABC; 380 C; 387 ABC.

3. Manure Nutrient Value

Have manure analyzed to determine nutrient content.

References: 1 ABC; 5 ABC; 25 ABC; 29 AC; 30 C; 147 ABC; 330 C; 323 ABC; 376 C.; 383 AC; 384 ABC; 386 ABC; 387 ABC.

4. Apply Manure at Appropriate Rates

Calibrate manure application equipment to assure proper application rates.

References: 5 AC; 6 AC; 22 AC; 25 AC; 29 AC; 64 AC; 111 AC; 115 AC; 312 ABC; 324 C; 327 AC; 375 ABC; 376 ABC; 383AC; 386 ABC; 387 ABC.

5. Uniform Application

Apply manure uniformly over the entire area to be spread to avoid under and/or over fertilization.

References: 5 AC; 22 ABC; 25 ABC; 29 C; 157 ABC; 309 AC; 327 AC; 387 ABC.

6. Reduced or Non-Application Areas

In areas where organic matter additions are not desired or where bacteria may be a significant concern, other nutrient sources may be preferable to the spreading of manure or reduced manure application rates should be used.

References: 25 ABC; 60 AC; 156 AC; 258 C; 309 AC; 324 BC; 330 C; 362 AC; 363 C; 387 ABC.

7. Timing Manure Applications

Manure spreading activities should be timed to coincide with crop uptake needs, particularly in areas where soils are highly permeable or where there is a highly sensitive resource concern located nearby.

References: 5 AC; 25 ABC; 55 AC; 60 AC; 64 AC; 324 C; 375 ABC; 376 C; 382 ABC; 384 ABC.

8. Incorporate Manure Applications

Where and when appropriate, manure applications should be incorporated (odor concerns, loss of N through volatilization).

References: 5 AC; 22 ABC; 55 AC; 64 AC; 68 C; 111 AC; 309 AC; 325 ABC.

9. Do Not Incorporate Manure

Manure should not be incorporated in inappropriate areas such as a stabilized hay field that is strongly sloping and is a highly erodible soil.

References: 64 AC; 118 BC.

10. Do not Apply Manure on Saturated Soils, Frozen or Snow-covered Fields or Drainage Swales

Base manure application rates on realistic yield goals to avoid over fertilizing. Keep accurate fertilizer and manure applications rates and yield records on a worksheet. Unless exempted by the Commissioner of the Maine Department of Agriculture, Food and Rural Resources, manure may not be spread between the dates of December 1 and March 15.

References: 5 AC; 6 AC; 22 ABC; 40 AC; 55 AC; 117 C; 156 AC; 157 ABC; 298 C; 320 C.

11. Store Manure Properly

Manure should be stored properly (on suitable field stacking sites or in properly designed storage facilities) when land application is not possible.

References: 3 BC; 5 ABC; 22 ABC; 29 AC; 40 C; 41 AC; 61 C; 67 C; 105 AC; 269 AC; 298 C; 309 AC; 312 ABC; 320 C; 362 AC; 376 ABC.

12. Stackable Manure

Manure should be a minimum of 18% by weight, dry matter for field stacking.

References: 5 AC; 22 AC; 29 AC; 314 C.

13. Adequate Storage

Storage capacity should be available to store manure for the time that manure cannot or should not be field applied or otherwise utilized.

References: 3 BC; 22 ABC; 61 C; 69 AC; 226 AC; 309 AC; 312 AC; 314 C; 320 C; 330 C; 387 ABC.

14. Compost Manure

Composting manure is a method of storing manure and is a way to tie up nutrients so that they are not so readily lost through leaching and/or volatilization.

References: 17 AC; 18 AC; 19 C; 231 ABC; 309 AC; 314 AC; 320 C; 365 AC.

15. Crop Rotations

Plan crop rotations so that crops are included that can utilize residual nitrogen, where and when appropriate.

References: 45 ABC; 54 ABC; 212 C; 213 AC; 214 ABC; 216 AC; 220 AC; 222 ABC; 246 ABC; 267 AC; 317 AC.

16. Minimize Soil Erosion

If soil is eroding from a field where manure is applied, manure will be transported off-site.

References: 25 AC; 35 AC; 55 AC; 67 C; 238 ABC; 239 ABC; 242 ABC; 245 ABC; 246 ABC; 255 ABC; 279 AC; 324 C; 362 AC; 375 ABC; 387 ABC.

17. Pest Control

Proper pest control should be employed so that crop yields and nutrient uptake are maximized and neighborhood nuisances are limited.

References: 9 ABC; 14 ABC; 15 ABC; 52 AC; 317 AC.

18. Bedrock Outcrops

Avoid spreading over bedrock outcrops that may have fractures leading to groundwater aquifers.

References: 59 AC; 157 ABC; 158 AC; 338 ABC.

19. Shallow To Bedrock Soils

Reduce application rates on shallow to bedrock soils, particularly if the spreading will be after crop harvest (row crops).

References: 41 AC; 59 AC; 63 C; 64 AC; 157 ABC; 324 C.

20. Barnyard and Feedlot Runoff

Divert clean water away from of barnyards and feedlots, including roof runoff from barns and feedlot facilities. Treat runoff from barnyards and feedlots by use of settling basins, manure pits or filter strips with level spreaders. Encourage sheet flow.

References: 64 AC; 67 C; 68 C; 71 C; 74 AC; 233 ABC; 240 ABC; 251 ABC; 258 C; 279 AC; 312 AC; 314 AC; 339 ABC; 362 AC; 375 ABC; 380 C; 387 ABC.

21. Water Body Access

Livestock access to water bodies should be controlled and limited.

References: 38 AC; 67 AC; 99 AC; 297 AC; 362 ABC.

22. Manure Concentrations

Manage barnyards, feedlots and pastures to control concentrations of manure.

References: 67 AC; 71 C; 240 ABC; 257 AC; 298 C; 313 AC; 330 C; 340 ABC; 362 AC; 387 ABC.

23. Cover Crop

Plant crop fields to a cover crop after harvest to tie up nutrients not utilized by the primary crop.

References: 48 ABC; 54 AC; 58 BC; 60 ABC; 260 ABC; 267 AC; 292 ABC; 317 AC; 373 ABC.

24. Soil Infiltrative Capacity

On fine textured soils, maintain good soil structure and do not compact so that manure related nutrients can infiltrate the soil rather than be lost in run off.

References: 66 ABC; 67 C; 68 C; 72 AC; 73 C; 118 C; 126 AC; 217 AC; 306 ABC; 309 AC; 321 C.

C. Pest Management

The following BMPs are part of, or should be used in conjunction with, an Integrated Pest Management Plan (IPM).

1. Biological Controls

Utilize and encourage biological controls when and where appropriate.

References: 9 ABC; 20 ABC; 26 AC; 36 C; 43 AC; 249 ABC; 305 ABC; 317 AC; 332 C; 366 ABC.

2. Field location Selection

Where and when possible, select fields which are not conducive to the development of pathogens for a particular crop.

References: 89 C; 90 AC; 91 AC; 92 AC; 93 ABC; 94 C: 95 AC; 369 ABC; 370 ABC; 372 C

3. Disease Free Seed and Propagation Material

Select disease free seed and propagation material.

References: 17 ABC; 45 AC; 53 AC; 57 ABC; 317 ABC.

4. Crop Disease Resistance

When possible, plant disease resistant crops or select varieties that are more resistant to specific diseases than are other varieties.

References: 45 AC; 50 BC; 57 ABC; 82 ABC; 306 C; 317 AC; 343 AC.

5. Natural Pest Controls

Protect and encourage the growth of natural pest predators.

References: 17 ABC; 36 C; 43 AC; 51 AC; 56 AC; 58 AC; 249 ABC; 305 ABC 317 AC; 332 C; 366 ABC.

6. Cultural Controls

Utilize management practices that discourage crop pests, such as crop rotation, cover crops, varying planting and harvest dates, mechanical controls, etc.

References: 18 C; 19 C; 34 ABC; 49 ABC; 50 ABC; 54 ABC; 55 C; 57 ABC; 99 C; 267 AC; 306 AC; 317 AC; 318 AC; 366 ABC.

7. Pest Scouting

Determine when and where pest levels are high enough to warrant management actions by conducting field evaluations instead of applying treatments according to a calendar date.

References: 21 AC; 34 ABC; 49 ABC; 50 C; 51 AC; 82 ABC; 99 AC; 305 AC; 307 C; 366 ABC.

8. Manage Crops To Compete With Weeds

Proper crop management can be an effective tool in controlling competition by weeds. Healthy, vigorous crops can more effectively compete with weeds.

References: 33 AC; 34 AC; 37 AC; 49 AC; 56 AC; 99 C; 276 ABC; 307 AC; 317 AC; 318 AC; 341 ABC; 342 ABC.

9. Develop Pesticide Application Plan

Pesticide applications should be based upon a number of site-specific factors, including: crop needs; pest levels; well locations; soil type; soil depth; land slope; organic matter content of soils; water table depth; and soil texture.

References: 10 AC; 22 ABC; 25 BC; 27 ABC; 311 C; 359 AC.

10. Calibrate Pesticide Application Equipment

Under application can result in a lack of control of a pest while over application can be a threat to ground and/or surface water resources. State and federal regulations require proper application rates for specific crops and circumstances.

References: 8 AC; 10 A; 75 AC; 80 C; 82 AC; 86 AC; 99 C; 367 AC.

11. Read and Follow all Pesticide Label Directions & Material Safety Data Sheets

Federal and State laws require applicators to know how and when to apply a pesticide. All Material Safety Data Sheets (MSDS) should be read, understood and readily available. Pesticide labels are legal documents that must be followed.

References: 8 AC; 10 A; 27 ABC; 82 AC; 306 AC; 311 ABC.

12. Comply With All Federal and State Laws Regarding Pesticide Use

Federal and State laws have been established to protect human health and the environment.

References: 7 AC; 8 AC; 10 AC; 27 ABC; 44 AC; 49 AC; 80 AC; 82 AC; 151 C; 290 AC; 308 AC; 351 ABC.

13. Become a Certified and Licensed Pesticide Applicator

Becoming a certified and licensed applicator or attending educational sessions for certification is a good way to become educated about pesticide use, and is a legal requirement for applications of restricted use pesticides.

References: 8 AC; 10 A; 13 AC; 79 AC; 282 AC; 291 AC.

14. Mix, Load and Apply Pesticides Properly

Using proper techniques and procedures will help protect surface and ground water resources, and is a legal requirement.

References: 8 C; 10 AC; 75 AC; 78 AC; 81 C; 99 C; 308 ABC; 311 AC.

15. Pesticide Storage

Pesticides should be stored in a safe location to minimize environmental risk and to protect the pesticides from degradation.

References: 7 AC; 10 AC; 12 AC; 76 C; 82 AC; 155 ABC; 283 AC; 308 AC.

16. Pesticide Container Disposal

Observe pesticide container label and MSDS instructions for safe pesticide container disposal. Follow Maine's returnable pesticide container law. Rinse liquid pesticide containers a minimum of three times.

References: 10 AC; 76 AC; 77 AC; 99 ABC; 155 ABC; 285 C; 311 AC.

17. Spray Drift

Follow label guidelines and Maine's drift law regarding wind speeds and equipment requirements to avoid over-spraying or drift problems.

References: 10 ABC; 11 C; 21 AC; 32 AC; 80 AC; 82 AC; 150 AC; 359 AC.

18. Use Crop Rotation To Reduce Pesticide Application

Crop rotation can be used as a means of controlling pest numbers and types, and may reduce the need to apply the same pesticide on a field year after year.

References: 11 BC; 45 C; 85 AC; 155 AC; 216 AC; 359 BC.

19. Select Crops That Can Compete With Weeds

By selecting crops that can effectively compete with weeds, less pesticide will be needed to control weeds, reducing possible environmental impacts of the pesticides.

References: 99 C: 317 ABC; 292 C.

20. Use Cover Crops To Control Weeds

Planting cover crops on fields where crops have been harvested can minimize the need for pesticide applications and reduce weed infestations.

References: 11 C; 45 C; 49 ABC; 54 ABC; 99 C; 267 ABC; 292 ABC; 304 ABC; 317 AC 318 ABC; 373 ABC.

21. Utilize Mechanical Weed Control

Use mechanical weed control such as row cultivation and rotary hoeing whenever possible to minimize the need for chemical weed control.

References: 45 AC; 83 AC; 84 AC; 87 AC; 99C; 267 AC; 317 ABC; 318 ABC; 359 AC.

22. Consider Field Characteristics To Determine Application Levels

Pesticide application levels should take into consideration individual field characteristics such as slope, soil texture, soil permeability, soil depth to bedrock, soil drainage, buffer type and width and setback features. Always consult the pesticide label for guidance.

References: 11 C; 27 AC; 41 ABC; 119 C; 122 ABC; 141 AC.

23. Chemigate Properly

Follow state and federal regulations when using chemigation to minimize drift, over spray, well contamination and impacts upon surface and ground waters.

References: 11 C; 27 AC; 96 AC; 97 AC; 98 C; 141 AC; 311 C.

24. Pesticide Application Techniques

When determining the pesticide application technique to use on a field, consider the specific characteristics of each field and the characteristics of the pesticide. For example, aerial spraying of a field with areas of exposed bedrock may not be appropriate for a pesticide that is highly leachable and persistent whereas aerial spraying may be appropriate where the site-specific conditions are different.

References: 10 ABC; 11 ABC; 22 ABC; 32 AC; 141 AC.

25. Weather Conditions

Avoid pesticide applications prior to a heavy rainfall during which leaching or runoff of the pesticide may occur. This potentially will result in contamination of surface and/or groundwater, and also may remove the pesticide from the crop field, negating its intended purpose. In contrast, some pesticides require light rainfall for activation.

References: 11 C; 120 AC; 122 AC; 123 AC.

D. Nutrient Management

1. Nutrient Application Levels

Nutrients should be applied at a level needed to grow the intended crop, taking into consideration typical losses (leaching, volatilization, competition from microbes and weeds, and sequestration by soil particles).

References: 1 ABC; 69 AC; 70 C; 99 AC; 306 AC; 307 AC; 312 ABC; 314 AC; 317 ABC; 318 AC; 326 AC; 288 ABC; 375 ABC; 377 ABC; 383 BC; 385 ABC; 387 ABC.

2. Uniformity of Nutrient Application

Nutrients should be applied uniformly on a field unless a site-specific evaluation (or varied cropping practice) has determined that sections of a field need higher (or lower) rates of application than others.

References: 5 AC; 99 ABC; 127 ABC; 257 AC; 289 AC; 306 AC; 317 ABC; 318 AC.

3. Background Nutrient Levels

Utilize soil tests to determine background levels of P, K, Ca, Mg, other pertinent nutrients and pH so that appropriate application rates can be determined.

References: 1 ABC; 22 ABC; 45 AC; 115 AC; 116 AC; 129 AC; 157 AC; 266 ABC; 288 C; 306 AC; 307 AC; 317 AC; 324 C; 326 C; 375 ABC; 385 ABC.

4. Background Organic Matter Content Levels

Determine the nitrogen application rate needed for a crop by evaluating soil organic matter levels obtained from current soil tests.

References: 1 ABC; 22 ABC; 45 AC; 111 AC; 157 AC; 267 AC; 306 AC; 317 AC; 377 BC.

5. Soil Amendment Nutrient Levels

Test manure or other soil amendments to determine nutrient content and the level of supplemental nutrient applications needed.

References: 1 ABC; 22 ABC; 69 ABC; 115 AC; 157 AC; 256 C; 307 C; 312 AC; 314 AC; 326 C; 307 C; 327 AC; 375 ABC; 377 C; 382 BCV

6. Determine Yield

Decide crop yield goals in order to accurately determine nutrient application levels.

References: 1 ABC; 22 ABC; 128 C; 129 ABC; 130 AC; 131 AC; 314 AC; 317 C; 326 C; 377 C; 382 BC.

7. Split Fertilizer Applications

Depending on the site, fertilizer type and crop, using split fertilizer applications can result in greater uptake by a crop and reduced nutrient loss to the environment.

References: 1 ABC; 25 ABC; 39 AC; 99 C; 256 AC; 257 C; 377 BC.

8. Fertilizer Release Rate

Adverse environmental impacts may be reduced by selecting a fertilizer with a specific release rate (depending upon crop, site characteristics and how often a fertilizer is to be applied).

References: 1 ABC; 5 ABC; 19 B; 153 C; 154 AC; 317 C; 387 ABC.

9. Soil Characteristics

Do not apply nutrients over exposed bedrock. Use several, smaller applications on shallow to bedrock or highly permeable soils and do not apply leachable nutrients when crops are absent or dormant on these soil types. Do not apply nutrients to poorly drained soils or when the water table is close to the soil surface.

References: 16 AC; 41 AC; 64 AC; 157 AC.

10. Calibrate Nutrient Application Equipment

Proper calibration of nutrient application equipment is necessary to guard against over or under application.

References: 16 AC; 150 AC.

11. Accurate Records

Keep accurate crop yield, soil amendment and nutrient application levels to assist in proper nutrient management planning.

References: 5 AC; 146 AC; 147 C; 150 AC; 152 AC; 309 AC; 326 AC; 327AC; 387 ABC.

12. Irrigation

Balance irrigation applications with crop needs to reduce potential leaching or surface runoff losses of nutrients.

References: 16 C; 45 AC; 132 AC; 133 AC; 268 AC; 310 AC; 312 ABC; 314 AC; 318 AC 343 AC.

13. Crop Rotations

Residual and/or excess nutrients can be effectively utilized by diversifying crop rotations.

References: 16 AC; 99 C; 213 AC; 214 AC; 267 ABC; 317 AC.

14. Cover Crops

Cover crops can effectively tie up available nutrients and provide organic matter to the soil for the next cropping season.

References: 54 AC; 99 C; 159 C; 214 AC; 215 ABC; 216 AC; 260 ABC; 292 AC; 317 AC; 343 ABC.

15. Fertigation

Incorporate fertilizers into irrigation systems only when there is need for the nutrients by the crop and then supply only the necessary amounts of nutrients to the crop.

References: 5 AC; 45 C; 96 AC; 97 C; 170 C; 318 AC; 343 AC; 382 C.

16. Plant Tissue Testing

Plant tissue testing is an effective method of determining soil macronutrient levels and availability. Stunted crops do not use nutrients at the same rate as healthy crops and therefore may leave excessive levels of nutrients in the soil that may be transported to surface or groundwater.

References: 34 AC; 129 C; 130 ABC; 284 AC; 343 AC; 345 ABC; 377 C; 385 ABC.

17. Leachable Nutrients

Applying nutrients, such as nitrogen, in a form that is readily leachable should be based upon site conditions and crop needs. Where leaching potential is high and off site impact is a major concern, leachable nutrients should be applied when crop uptake is expected to be high. Fall applications should be avoided or a less leachable form of the nutrient should be used.

References: 16 AC; 17 AC; 39 AC; 258 AC; 310 AC; 377 BC; 382 BC; 387 ABC.

18. Avoid Applications On Frozen, Saturated or Snow Covered Soil

If the soil is frozen, saturated or snow-covered, the likelihood that nutrients will be transported off-site in surface runoff is high, unless the site is nearly level and/or has been modified to contain and treat runoff. Unless specifically exempted, manure applications are illegal during the period of December 1 to March 15.

References: 6 AC; 60 C; 117 C; 156 AC; 157 ABC; 298 C; 320 C; 346 AC.

19. Soil Erosion

Minimize soil erosion to reduce the loss of nutrients with runoff water. This is particularly true for nutrients such as phosphorous, which are readily attached to soil particles.

References: 99 AC; 156 AC; 318 AC; 320 C; 361 AC; 362 AC; 387 ABC.

20. Buffer Strips

Buffer strips act as filters to collect and treat runoff waters, removing both sediments and nutrients.

References: 25 ABC; 99 AC; 239 AC; 240 ABC; 391 AC.

21. Organic Matter Content of Soils

By increasing or maintaining the organic matter content of soils to 5%-10%, the cation exchange capacity (CEC) of soils will improve. Increasing the CEC allows the soil to retain, and enables plants to utilize, more nutrients. Organic matter promotes good soil structure, which improves soil permeability thereby decreasing runoff of nutrients. High organic matter content also helps the soil to retain moisture, decreasing the need for irrigation, and promoting a more vigorous crop in dry years, even without irrigation.

References: 1 ABC; 41 BC; 64 C; 124 AC; 159 C.

22. Compost Excess or Spoiled Crops

Compost, re-cycle or utilize organic materials in an environmentally sound manner to minimize odors, vermin attraction, disease transmission or run-off.

References: 17 ABC; 18 ABC; 45 C; 365 AC

E. Irrigation Management

1. Irrigating from Streams and Rivers

When irrigating from a small stream or river, water should not be drawn down below a level that could harm aquatic organisms.

References: 45 C; 132 AC; 268 AC.

F. Livestock Management

1. Housing Facilities

Utilize appropriate housing for optimal productivity and health of various species.

References: 108 AC; 235 ABC; 237 ABC; 279 ABC; 301 ABC; 302 ABC; 316 ABC; 319 ABC; 320 ABC; 380 C.

2. Waste Management Structures

Utilize appropriate containment structures in terms of capacity, siting and construction method for personnel safety and environmental protection.

References: 22 ABC; 226 AC; 279 ABC; 298 C; 309 ABC; 312 ABC; 320 ABC; 363 C; 374 C.

3. Environmental Factors

Provide appropriate facilities and environment for optimal livestock productivity and health.

References: 235 ABC; 236 ABC; 274 ABC; 275 ABC; 297 AC; 299 ABC; 301 ABC; 319 ABC; 320 ABC; 333 ABC; 334 ABC; 374 C; 379 C; 380 C; 381 AC.

4. Livestock Fencing

Construct species-specific fencing for livestock and predator control, and for environmental protection.

References: 294 ABC; 295 ABC; 296 ABC; 315 ABC.

5. Pasture/Forage Crop Management

Manage crops for optimal productivity, nutritional value and environmental protection.

References: 37 ABC; 183 ABC; 184 ABC; 185 ABC; 187 ABC; 188 ABC; 189 ABC; 190 AC; 191 AC; 192 AC; 193 AC; 194 AC; 195 ABC; 196 ABC; 197 ABC; 198 AC; 205 AC 306 ABC; 307 ABC; 360 AC.

G. Odor Control

1. Manure Storage Structures

Locate new manure storage structures as far as practical from neighboring residences.

References: 5 AC; 22 ABC; 63 AC; 100 C; 279 AC; 287 ABC; 298 AC; 387 ABC; 389ABC.

2. Coordinate Manure Applications With Neighbors

When and where appropriate, notify neighbors of intent to spread manure and adjust schedule to avoid conflict with neighbors' outdoor activities.

References: 5 AC; 100 AC; 110 AC; 113 C; 287 ABC; 309 C; 313 AC; 387 ABC.

3. Cover Field Stacked Manure

When manure is to be stacked in close proximity to houses or other occupied buildings, when and where odor may be offensive, cover manure pile with lime, sawdust, plastic or some other odor barrier.

References: 5 AC; 67 C; 105 C; 112 AC; 287 ABC; 314 AC; 322 C.

4. Incorporate Manure

Incorporate manure applications on row crop ground as soon as possible after application.

References: 5 C; 68 C; 70 C; 110 C; 117 C; 136 AC; 287 ABC; 298 C; 322 ABC; 330 ABC.

5. Sod Crop Applications

When possible, apply manure to sod crops just before a light or moderate rain is predicted.

References: 5 C; 117 ABC; 287 ABC.

6. Weather Conditions

When possible, spread manure on cool moist days.

References: 110 AC; 111 AC; 113 C; 287 ABC; 298 AC; 322 ABC; 389 ABC.

7. Injection

When and where possible, and when appropriate, apply liquid manure by sub-surface injection.

References: 99 BC; 110 AC; 111 AC; 113 BC; 117 ABC; 136 AC; 287 ABC; 313 C; 322 ABC.

8. Spreading Activity

Concentrate manure spreading activities so that it will be completed shortly after being started rather than spreading small amounts each day over a long period of time.

References: 5 AC; 110 AC; 134 C; 136 AC; 137 AC; 298 C.

9. Spreading Rates

Do not exceed spreading above the recommended rate.

References: 1 ABC; 5 AC; 6 AC; 25 ABC; 64 AC; 136 ABC; 389 ABC.

10. Minimize Spillage

Do not overload trucks or spreaders. Secure equipment so that spillage is minimized, particularly in areas that are not to be spread upon.

References: 29 AC; 100 C; 116 AC; 157 ABC; 287 ABC; 309C.

11. Even Application

Apply manure as evenly as possible.

References: 61 C; 111 AC; 166 AC; 287 ABC; 309 C; 320 C.

12. Solid Manure

Keep solid manure as dry as possible.

References: 67 C; 104 C; 105 C; 108 C; 287 ABC.

13. Composting

Compost manure when and where appropriate.

References: 17 ABC; 18 ABC; 53 AC; 115 C; 298 ABC; 309 C; 313 C; 314 AC; 320 C; 322 C; 365 AC.

H. Insect Management

1. Proper Sanitation

Keep all animal and barnyard areas as clean and dry as possible to minimize insect breeding sites.

References: 20 ABC; 28 AC; 42 ABC; 43 AC; 50 C; 108 C; 298 C; 362 AC.

2. Spilled Feed and Spoil Piles

Clean up spilled feed and spoil piles as soon as possible.

References: 20 ABC; 28 AC; 100 C; 101 C; 136 C.

3. Dead Animals

Properly dispose of animal carcasses immediately upon discovery.

References: 18 ABC; 100 C; 107 C; 114 AC; 178 AC; 179 AC; 287 ABC; 314 AC; 330 C; 388 ABC.

4. Feed Bunks

Maintain clean feed bunks.

References: 20 ABC; 28 AC; 71 C; 136 C.

5. Waterers

Inspect for and repair leaks frequently. In poultry houses, spread compost, dry shavings or lime to absorb spilled water.

References: 20 ABC; 28 AC; 101 C; 103 C; 105 C; 108 C.

6. Animal Diet

Use proper animal feed to keep manure as dry as possible.

References: 137 ABC; 330 ABC.

7. Ventilation

Use proper ventilation in poultry houses to keep manure as dry as possible.

References: 101 C; 106 ABC; 108 AC; 143 C.

8. Poultry House Manure Removal

Clean deep pit poultry houses as often as practical to minimize build up of flies, preferably during cold weather to minimize dispersal of flies.

References: 43 C; 103 C; 108 AC; 314 C.

9. Empty Poultry Houses

Remove manure from poultry houses within six (6) months after poultry have been taken away.

References: 43 AC; 101 C; 103 C; 170 C.

10. Droppings Boards

Clean droppings boards in poultry houses at least twice a day.

References: 109 C.

11. Natural Insect Enemies

Encourage natural insect predators by using partial cleanout of manure, or by releasing natural enemies into the manure.

References: 26 AC; 43 AC; 101 AC; 138 AC.

12. Utilize Physical Fly Removal Methods

Use traps or other devices to reduce fly populations in and around animal buildings.

References: 20 ABC; 28 C; 43 AC; 101 AC.

13. Use Pesticides Sparingly

Use pesticides to reduce insect populations as a last resort.

References: 20 ABC; 42 ABC; 49 ABC; 99 AC.

14. Use Pesticides Properly

Follow label and Cooperative Extension recommendations when applying pesticides to control insect populations.

References: 8 AC; 42 AC; 49 ABC; 141 ABC; 144 AC.

15. Use Proper Pesticide Application Techniques

Use proper protective equipment and calibrate all application equipment.

References: 10 AC; 99 AC; 121 C; 135 AC; 150 C; 351 ABC; 359 AC.

16. Pesticide Feed Additives

Use insecticidal feed additives only when necessary and in accordance with label and Cooperative Extension recommendations.

References: 138 AC; 139 AC; 140 AC; 141 ABC.

17. Cover Manure Piles

Use plastic or other appropriate materials to cover manure piles and prevent insect ingress or egress.

References: 105 C; 112 C; 157 ABC; 313 C; 320 C.

18. Compost

Composting can be used as a means of controlling insect populations in manure.

References: 18 C; 61 AC; 145 C; 159 C; 365 AC.

19. Transporting Manure

Control insect infestations in manure before transporting it to a stacking or spreading site.

References: 28 C; 29 AC; 42 ABC; 43 ABC; 139 AC.

20. Controlling Barnyard Exercise Lots

Keep clean by periodically sweeping and cleaning to control insects.

References: 20 ABC; 28 C; 42 AC; 340 ABC; 362 AC.

I. Noise Control

1. Irrigation Pumps

Operate pumps when they will not create offensive noise levels to neighbors. Install noise buffers where and when necessary.

References: 161 AC; 211 C; 213 C; 310 AC.

2. Farm Equipment

As much as practical, operate farm machinery when it will least likely result in noise levels that may be offensive to neighbors. Use appropriate mufflers and other noise-reducing features when operating equipment within hearing distance from neighbors.

References: 107 C; 167 AC; 212 C; 213 C; 214 C.

J. Farm Management

1. Animal Carcass Disposal

Follow Chapter 211: Rules for the Disposal of Domestic Animals and Poultry.

References: 18 AC; 107 C; 114 AC; 178 AC; 179 AC; 328 AC; 330 AC; 388 ABC.

2. Cull Potato Disposal

Follow Chapter 600: Rules Regarding Disposal of Cull Potato Piles.

References: 17 ABC; 18 ABC; 19 BC; 31 ABC; 293 AC.

3. Equipment Exiting Farm Fields

When leaving farm fields with machinery, make the exit as clean as practical by preparing a gravel way or driving equipment over clean areas of the field to clean the tires of mud/manure before exiting.

References: 163 C; 165 AC; 209 AC; 309 C.

4. Watering Livestock

Limit livestock access to natural waterbodies or waterways for watering purposes so as to minimize sedimentation and/or deposition of animal wastes into the waterbody or waterway.

References: 4 AC; 23 AC; 38 AC; 99 AC; 171 AC; 294 AC; 295 AC; 315 AC; 381 AC.

5. Livestock Waterway Crossings

Funnel livestock to a single, stable crossing and complete the crossings as quickly as possible.

References: 2 C; 23 AC; 99 C; 252 ABC.

6. Insect and Disease Infestations

Properly dispose of any crop residue that may result in an insect or disease infestation. This includes infestations that may impact neighbors, but not affect the farmer who has the residue.

References: 18 AC; 19 BC; 45 AC; 53 AC; 258 C.

7. Aesthetics

Maintain as neat and orderly an operation as possible when visible from a public way, particularly a heavily used public way, or when adjacent to a public place.

References: 61 AC; 162 C; 163 AC; 164 AC; 165 AC; 167 C; 169 AC; 272 ABC.

8. Vermin Control

Control vermin by maintaining as neat and clean an operation as possible. If additional vermin control is needed, consult Cooperative Extension or a licensed pest management professional for the control of particular vermin.

References: 18 AC; 20 ABC; 61 AC; 200 ABC.

9. Wild Animal Damage

Consult the local Animal Control Officer, Maine Department of Inland fisheries and Wildlife, or the U.S.D.A. – APHIS Wildlife Services.

References: 18 C; 45 AC; 172 BC; 173 C; 174 AC; 175 AC; 176 AC; 177 AC; 201 ABC; 269 AC; 294 AC; 295 AC; 315 AC.

10. Residual Usage

If a residual is to be used as a nutrient source or soil amendment, follow Maine Department of Environmental Protection, Agronomic Utilization of Residual Rules and Maine Department of Agriculture, Nutrient Management Rules.

References: 5 AC; 157 ABC; 207 ABC; 208 ABC; 210 AC.

11. Feed Storage

Produce and store forage crops in a manner that preserves optimal nutritional value for livestock and which minimizes run-off and vermin attraction.

References: 180 ABC; 181 AC; 182 AC; 183 AC; 184 AC; 185 ABC; 186 ABC; 187 ABC; 188 ABC; 189 ABC; 190 AC; 191 ABC; 192 ABC; 195 ABC; 196 ABC; 197 ABC; 198 AC; 199 C.

12. Milkroom Waste

Construct and maintain appropriate systems to minimize milkhouse effluent off-site deposition of nutrients and other potential contaminants.

References: 22 AC; 65 AC; 203 AC; 204 AC; 211 AC; 312 C; 313 AC.

13. Silage Management

Produce and store forage crops in a manner that preserves optimal nutritional value for livestock, and which minimizes odors, leachate, and potential ground and surface water contamination.

References: 185 AC; 192 AC; 195 ABC; 196 ABD; 205 ABC; 278 ABC; 313 C.

14. Management of Spoiled or Excess Crops

Compost, re-cycle or utilize organic materials in an environmentally sound manner to minimize odors, vermin attraction, disease transmission or run-off.

References: 17 ABC; 18 ABC; 19 C; 31 AC; 157 ABC; 206 C.

15. Dust Control

Reduce dust and mold emissions from farmyard and livestock operations to enhance human health and reduce odor transmission to neighbors. Utilize respiratory protection with appropriate masks and filters when conditions warrant.

References: 17 AC; 46 AC; 49 C; 107 C; 202 ABC; 208 ABC;245 ABC; 271 AC; 272 ABC; 287 C; 320 AC; 322 ABC; 330 C; 348 ABC; 349 ABC; 350 BC; 351 ABC; 352 C; 387 AC.

16. Financial Record Keeping

Keep appropriate business records to help insure viability of the farm business.

References: 148 AC; 149 AC.

17. Soil Health Management

Employ appropriate measures conducive to long-term soil productivity.

References: 1 ABC; 45 ABC; 47 ABC; 48 ABC; 66 ABC; 124 ABC; 157 ABC; 220 ABC; 221 ABC; 267 ABC; 304 ABC; 307 ABC; 373 ABC; 374 C; 378 BC.

18. Crop Production Guides

A compilation of excellent vegetable, fruit and greenhouse crop production guides outlining culture and management of various crops.

References: 14 ABC; 15 ABC; 34 ABC; 45 ABC; 57 ABC; 82 ABC; 317 ABC; 318 ABC; 343 ABC; 347 ABC; 353 ABC; 354 ABC; 355 ABC.

IV. *List of References*

Print versions of most of the following reference materials are on file at the Maine Department of Agriculture and are available for copying and inspection. Most references are also available on the internet and have the web page link as part of the reference if the reference was available on line at the time this listing was assembled in 2005 - 2006.

The complete references are listed by reference number in ascending order in part A. The reference document titles are listed in alphabetical order followed by the reference number in part B. Part C lists the reference document titles alphabetically by BMP category along with the reference numbers.

A. References by Reference Number

1. **Soil Testing Handbook for Professionals in Agriculture, Nutrient and Residuals Management. 3rd. Ed.**

2. **Stream Bank Fencing**. Penn. State Extension Circular 397.

3. **Barn and Manure Storage Safety**. University of Maine Cooperative Extension Bulletin 2304.

4. **Watering Pumps for Livestock – Pasture Pump and Hydro Ram**. NRCS Field Office Technical Guide **http://efotg.nrcs.usda.gov**.

5. **Maine Nutrient Management Certification Training Manual, 1999.**

6. **Dairy Farm Nutrient Balancer Spreadsheet**. NRCS Field Office Technical Guide **http://efotg.nrcs.usda.gov/treemenuFS.aspx?Fips=23013&MenuName=menuME.zip**.

7. **Maine Pesticide Control Act. Title 7, http://janus.state.me.us/legis/statutes/7/title7sec601.html.**

8. **Maine Board of Pesticides Control Website – Certification and Training.** www.maine.gov/agriculture/pesticides.

9. **Biological Control: A Guide to Natural Enemies in North America.** NRAES, Cornell University, www.nraes.cornell.edu/emt/biocontrol/.

10. **Pesticide Education Manual, "Core Manual".** University of Maine Cooperative Extension, www.umext.maine.edu.

11. **National Management Measures for the Control of Non-Point Pollution from Agriculture.** EPA Manual 841-B-03-004.

12. **Recommended Storage Practices for Pesticide Applications.** Maine Board of Pesticides Control, ftp://ftp.state.me.us/pub/sos/cec/rcn/apa/01/026/026c020.doc.

13. **Licensing Requirements for Pesticide Applicators in the State of Maine.** Maine Board of Pesticides Control, www.maine.gov/agriculture/pesticides

14. **New England Small Fruit Pest Management Guide.** University of Maine Cooperative Extension, www.umext.maine.edu.

15. **New England Greenhouse Floricultural Recommendations Management Guide for Insects, Diseases, Weeds and Growth Regulators.** University of Maine Cooperative Extension, www.umext.maine.edu.

16. **Nutrient Management: Crop Production and Water Quality.** NRAES 101, Cornell University, http://www.umassextension.org/Merchant2/merchant.mv?Screen=PROD&Product_Code=NS-101P&Category_Code=AEM&Product_Count=16.

17. **On Farm Composting Handbook.** NRAES 54, Cornell University, http://www.nraes.org/.

18. **Field Guide to On-Farm Composting.** NRAES 114, Cornell University, www.nraes.org.

19. **Science and Engineering of Composting: Design, Environmental, Microbiological and Utilization Aspects**. Hoitink & Keener, Editors, Ohio State University, ISBN 0-936645-15-6.

20. **Integrated Fly Management Around Confined Livestock.** (video) NRAES, Cornell University, http://www.nysipm.cornell.edu/videos/flyvideo.html.

21. **Gempler's IPM Almanac, 1999-2000.** 1-800-382-8473, www.ipmalmanac.com.

22. **Agricultural Waste Management Field Handbook,** Part 651. NRCS, www.wcc.nrcs.usda.gov/awm/awmfh.html.

23. **Corridor Management for Pastureland Streams.** Pennsylvania Fish and Boat Commission, 814-359-5158, www.fish.state.pa.us.

24. **Fish Habitat Improvement for Trout Streams.** Pennsylvania Fish and Boat Commission, 814-359-5158, www.fish.state.pa.us.

25. **CORE4 Conservation Practices Reference Manual.** USDA, NRCS, (printed manual plus CD ROM available), **http://www.wsi.nrcs.usda.gov/products/buffers.html**.

26. **Biological Pest Controls from IPM Laboratories, Inc.** 315-497-2063, www.ipmlabs.com.

27. **WIN-PST (Windows Pesticide Screening Tool).** National Water and Climate Center, USDA, NRCS, www.wcc.nrcs.usda.gov/pestmgt/winpst.html.

28. **IPM for Fly Control in Maine Dairy Barns.** University of Maine Cooperative Extension Bulletin 5002, www.umext.Maine.edu.

29. **Manure Utilization Guidelines, February 1, 2001**. Maine Dept. of Agriculture, Food & Rural Resources, (Craig Leonard's BMP Manual).

30. **Manure: What is it Worth on your Farm?** University of Maine Cooperative Extension, Bulletin 2432, www.umext.maine.edu.

31. **Cull Potato Composting.** University of Maine Cooperative Extension Bulletin 2415, www.umext.maine.edu.

32. **Minimizing Off-Target Deposition of Pesticide Applications.** University of Maine Cooperative Extension Bulletin 2182, Fact Sheet 303, www.umext.maine.edu.

33. **Filling Bare Spots in Blueberry Fields.** University of Maine Cooperative Extension Bulletin 2057, Fact Sheet 221, www.umext.maine.edu.

34. **Wild Blueberry Grower's Guide.** University of Maine Cooperative Extension, www.umext.maine.edu.

35. **Mulching for Improved Plant Cover.** University of Maine Cooperative Extension, Bulletin 2239, Fact Sheet 228, www.umext.maine.edu.

36. **Approaches to the Biological Control of Insects.** University of Maine Cooperative Extension, Bulletin 7144, www.umext.maine.edu.

37. **Selecting Forage Crops for your Farm.** University of Maine Cooperative Extension, Bulletin 2272, www.umext.maine.edu.

38. **Watering Systems for Livestock** University of Maine Cooperative Extension, Bulletin 7129, www.umext.maine.edu.

39. **Nitrogen Fertilizer Choices.** University of Maine Cooperative Extension, Bulletin 7097, www.umext.maine.edu.

40. **Guidelines for Horsekeeping in Maine.** University of Maine Cooperative Extension, Bulletin 1011, www.umext.maine.edu.

41. **Soil Survey of "X" County, Maine.** USDA, NRCS, (See local soil & water conservation district).

42. **Integrated Management of Flies in and Around Dairy and Livestock Barns.** Cornell Cooperative Extension Fact sheet, www.nysipm.cornell.edu/factsheets/dairy/barnflies/banflies.html.

43. **Control of Flies in and Around Poultry Houses.** Ohio State University, Poultry Pest Management Bulletin 853, http://ohioline.osu.edu/b853_1.html.

44. **USDA Pesticide Recordkeeping Requirements for Certified Private Applicators of Federal Restricted Use Pesticides.** USDA Agricultural Marketing Service, Pesticide Records Branch 8700 Centerville Road, Suite 200, Manassas, VA. 22110.

45. **Sustainable Vegetable Production from Start-Up to Market. NRAES** 104, Grubinger, University of Vermont, www.nraes.cornell.edu.

46. **Agricultural Respiratory Protective Equipment: Air-Purifying Respirators.** Colorado State University Extension, National Ag Safety Database (NASD), www.cdc.gov/nasd/docs/d000801-d000900/d000894/d000894.html.

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