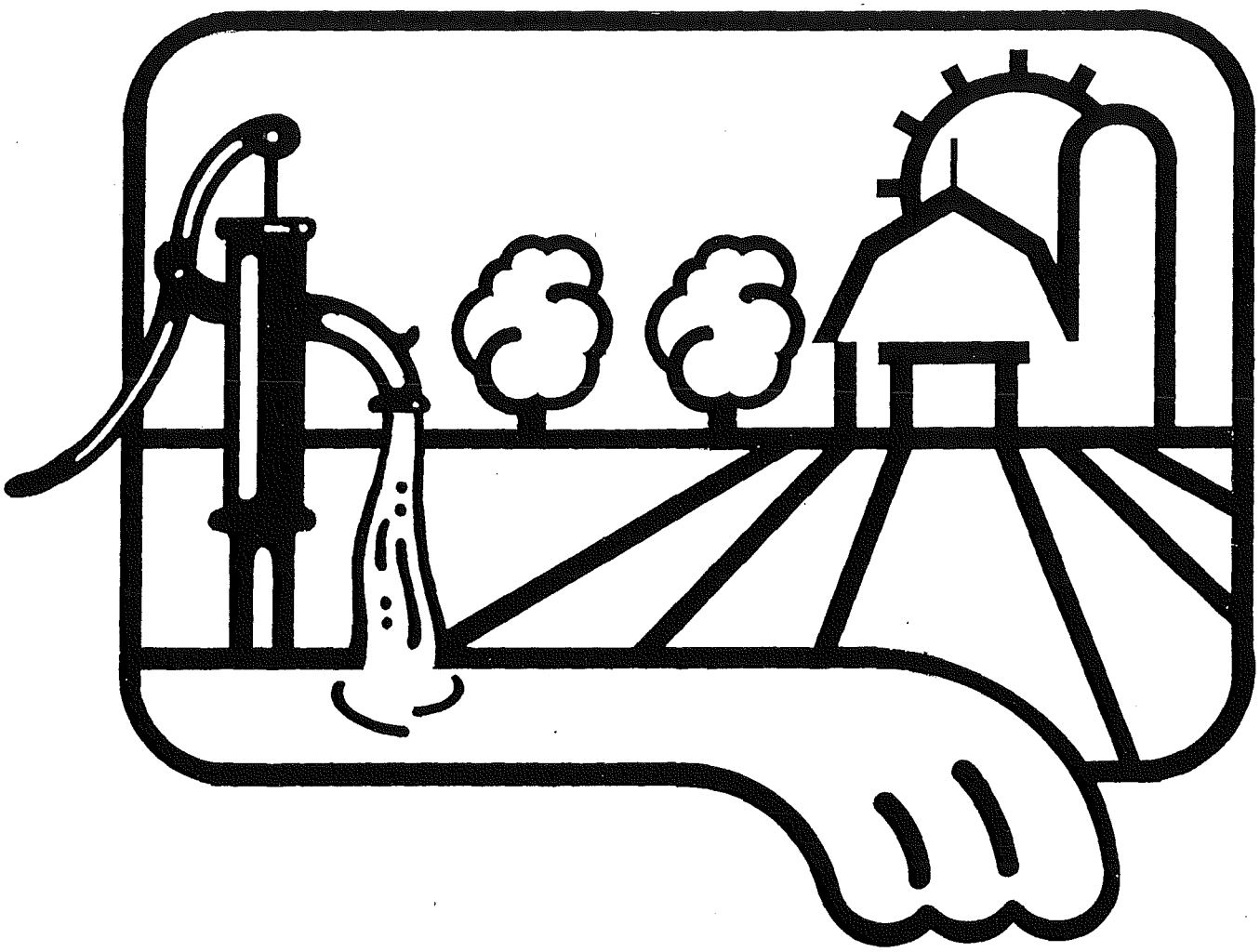


STATE OF MAINE

GENERIC STATE MANAGEMENT PLAN FOR PESTICIDES AND GROUND WATER

JUNE 1994

STATE OF MAINE

GENERIC STATE MANAGEMENT PLAN FOR PESTICIDES AND GROUND WATER

June 1994

prepared by
Tammy L. Gould, Pesticides Planner
Maine Board of Pesticides Control

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

ACKNOWLEDGEMENTS

The Maine Board of Pesticides Control and its staff thank the following individuals for offering their assistance, expertise, and patience in completing this plan.

Ground Water Planning Committee

David Braley, Maine Department of Human Services, Drinking Water Control Program
Charles Collins, Maine Dry Bean Growers Association
James Corliss, Maine Christmas Tree Association
Neil Crane, Maine Association of Conservation Districts and Maine Farm Bureau
Wes Davis, Central Maine Power Co.
Jeff Dearborn, New England Council for Plant Protection
James Dill, University of Maine Cooperative Extension
Ron Dyer, Maine Department of Environmental Protection
Rick Eastman, Maine Landscape and Nursery Association
John Fogler, Dairy Farmer
Steve Goodwin, Maine Vegetable-Small Fruit Growers Association
Carl Haag, S.D. Warren Co.
William Johnson, Maine Pomological Society
Chris Jones, Soil Conservation Service
David Lavway, Maine Potato Board
Dr. Jeff McBurnie, University of Maine, College of Applied Science and Agriculture
Ed McLaughlin, Maine Blueberry Commission
Peter Mosher, Maine Department of Agriculture, Food, and Rural Resources
Craig Neil, Maine Geological Survey
Charles Ravis, Augusta Country Club, MGCSA
Nancy Ross, Maine Organic Farmers and Growers Association
Tim Zorach, Maine Audubon Society

Others who have contributed to this or previous drafts

Michael Corey, Maine Potato Board
Paul Dutram, Maine Department of Environmental Protection
Bill Ferdinand, Maine State Planning Office
John Harker, Maine Department of Agriculture, Food, and Rural Resources
Thom Harnett, Office of the Attorney General
Jeff Jenks, Maine Department of Human Services, Drinking Water Control Program
Rick Kersbergen, University of Maine Cooperative Extension
Rob Koethe, U.S. EPA, Region I

Others who have contributed to this or previous drafts (cont.)

Esther Lacognata, Maine Department of Agriculture, Food, and Rural Resources
Russell Libby, Maine Department of Agriculture, Food, and Rural Resources
Terry Mingo, Maine Department of Human Services, Drinking Water Control Program
Michele Notarianni, U.S. EPA, Region I
Steve Pinette, Maine Department of Environmental Protection
Tony Pisanelli, U.S. EPA, Region I
David Poe, Soil Conservation Service
David Rocque, Soil and Water Conservation Commission
Andrew Triolo, U.S. EPA, Region I
Debra Vanderbeek, New England Council for Plant Protection
Tom Weddle, Maine Geological Survey

CONCURRENCE SIGNATURES

The following agency representatives have read the *Maine Generic State Management Plan for Pesticides and Ground Water* and concur with their agency's responsibilities as stated in the plan.

Maine Dept. of Agriculture
Bureau of Agricultural Production

Maine Dept. of Environmental Protection
Bureau of Land and Water Quality

Maine Dept. of Human Services
Drinking Water Control Program

Maine Dept. of Environmental Protection
Bur. of Hazardous Material and Solid Waste Control

Maine Dept. of Conservation
Geologic Survey

Maine Soil & Water Conservation Commission

University of Maine
Cooperative Extension

US Dept. of Agriculture
Soil Conservation Service

STATE LIAISON

The purpose of a state liaison is to have a single contact point responsible for the transmittal and receipt of official correspondence and information. The single contact point for all formal communications concerning the State Management Plan process between the U.S. Environmental Protection Agency and the State of Maine shall be:

Robert I. Batteese, Jr., Director
Maine Board of Pesticides Control
State House Station #28
333 Deering Building, AMHI Complex
Augusta, Maine 04333-0028
Tel: (207)287-2731

EXECUTIVE SUMMARY

Ground water is an essential resource to Maine's citzens. Over half of the U. S. population relies on ground water for drinking water, and in rural Maine, ground water is the dominant source of drinking water. Because pesticides and other agricultural chemicals have been found in wells in many states, including Maine, the U.S. Environmental Protection Agency (EPA) has developed a *Pesticides And Ground-Water Strategy* to prevent unacceptable contamination of ground water resources from the normal, registered use of pesticides. Part of this strategy includes having states develop state management plans (SMPs). *Maine's Generic State Management Plan (SMP) for Pesticides and Ground Water* is designed to set the framework for developing future pesticide-specific state management plans (Pesticide SMPs).

Background

After EPA proposed its initial *Agricultural Chemicals in Ground-Water Strategy* in 1987 the Maine Board of Pesticies Control (BPC) began collaborating with other state agencies to develop a strategy for preventing ground water contamination by pesticides. Two draft plans were completed by April 1991, the second of which received comment from a diverse public. The BPC, reacting to those comments, formed the Ground Water Planning Committee to amend the draft plan. This final plan is the product of the dedicated efforts of that committee.

Plan in Brief

The *Generic State Management Plan for Pesticides and Ground Water* outlines the government agencies involved with ground water resource protection, describes their roles within the planning process, and describes how overlapping authorities will be coordinated. To ensure compliance with Pesticide SMPs, agency enforcement roles are set forth.

The basis for ground water assessment and protection planning is formed through the characterization of Maine's ground water resources and the description of pesticide use patterns. Emphasis is placed on contamination prevention measures, such as best management practices, user education and technical assistance. If these measures are not sucessful, the BPC may consider other means to control pesticide use. To help determine what controls are needed and to allow for public participation, the BPC will create a unique Pesticide SMP Advisory Committee for each Pesticide SMP it chooses to write. This committee will respond to EPA or BPC mandates by developing pesticide-specific management plans. The response and regulatory framework shows how the BPC will define and respond to contamination situations.

A two-phase groundwater monitoring program is described; the program goal being detection of potential contamination problems and once detected, to assess the extent of the

problems and the success of pesticide management practices implemented in response to identified contamination trends.

Recommendations

Actions required to implement the Generic SMP are also outlined. These actions include development of memoranda of understanding with other cooperating state and federal agencies, adoption of a policy for development of the Pesticide SMP Advisory Committee, and continuation of support staff for plan coordination and implementation.

SECTION I
INTRODUCTION

Ground water is an important national resource which provides about one-fourth of all water used in the United States. Nearly half of the U.S. population relies on ground water for drinking water, and in rural areas, ground water may be the only, or at least the dominant, source of drinking water.[1] Until a few years ago, most people believed that ground water was protected from contamination by soil and rock formations.[2] This belief began to change in the 1970s when agricultural chemicals were found in wells in several states. Monitoring surveys flourished throughout the 1980s as the impact of pesticides on ground water became evident. For more than a decade now, regulators have been attempting to devise a comprehensive and rational strategy which both serves the needs of pesticide users while addressing environmental concerns. In December 1987, the U.S. Environmental Protection Agency (EPA) proposed such a strategy in *"Agricultural Chemicals in Ground-Water: Proposed Pesticide Strategy."*

Agricultural Chemicals in Ground-Water: Proposed Pesticide Strategy

The strategy proposed by EPA consists primarily of an environmental goal, a contamination prevention policy and program, and a response policy and program. While EPA asserts that it would continue to take uniform action nationwide on pesticide use and disposal practices, the Agency also encourages the development of strong state roles in the local management of pesticide use to protect ground water. State Management Plans (SMPs) are the preferred vehicle of EPA because states, which are close to local conditions, could better evaluate and respond to local variations in use and vulnerability. The EPA believes that SMPs would be an effective way to provide adequate protection of ground water resources without restricting pesticide use unnecessarily.

The incentive for states to prepare these plans comes from the federal pesticide registration process. The future use of registered pesticides, identified by EPA as a threat to ground water, would depend on the presence and adequacy of the state's management plan. In some situations, EPA may require a state-specific label or supplemental labeling with SMP-prescribed, pesticide management measures. In other cases, EPA may have to take steps, including statewide cancellations, to control the use of a pesticide that poses a significant ground water threat if there is no adequate SMP that could reasonably be expected to prevent or reduce the threat of

---

[1]U.S. Environmental Protection Agency, "Agricultural Chemicals in Ground Water: Proposed Pesticide Strategy", December 1987, pp. 13.

[2]Ibid., pp. 21.

unacceptable contamination.[3] The possibility of special state management measures in lieu of EPA cancellation has been the driving force behind this plan's development.

Pesticides And Ground-Water Strategy

After nearly four years, EPA published the final *Pesticides And Ground-Water Strategy* in October 1991. The final strategy reflects many of the comments which were received from the industry, environmental groups, and the states and incorporates EPA's new statement of principles for programs dealing with ground water. Increased emphasis on prevention of ground water contamination is at the heart of these new principles. That commitment is demonstrated in the stated goal of the *Pesticides And Ground-Water Strategy*, which is "to prevent contamination of ground water resources that presents an unreasonable risk of adverse effects to human health and the environment resulting from the normal, registered use of pesticides."[4]

As in the proposed strategy, the centerpiece of the final strategy is the development and implementation of SMPs for specific pesticides of concern. EPA will now be applying Pesticide SMPs as a label requirement so that a product can be legally used only in states with an approved plan. But, unlike the proposed strategy, the final *Pesticides And Ground-Water Strategy* encompasses not only agricultural pesticides, but products which may pose a threat to ground water from all outdoor pesticide uses.

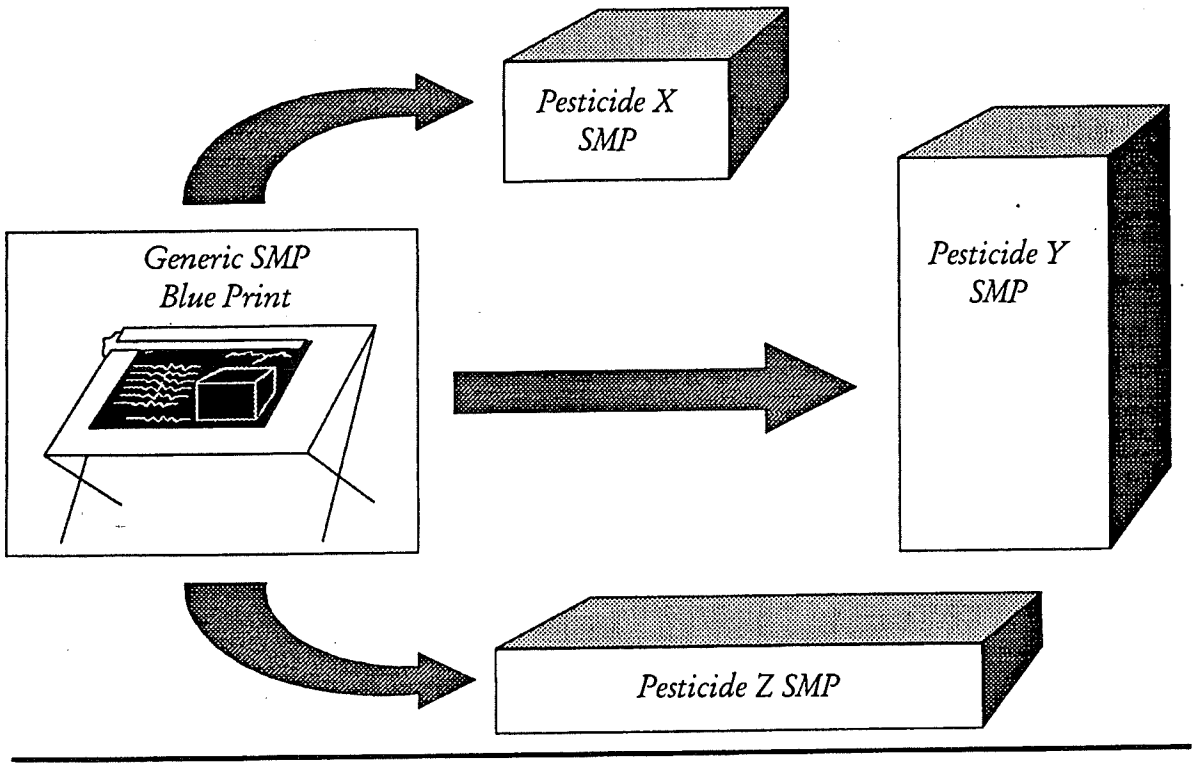
EPA has also gone on to define two types of state management plans: Generic SMPs and Pesticide SMPs. Generic SMPs are to provide basic information in twelve identified areas regardless of a specific pesticide. Pesticide SMPs contain all the information appropriate to a Generic SMP plus all the information specific to an identified pesticide. A Generic SMP is used to put in place the resources and coordinating mechanisms that will be required to develop and implement a Pesticide SMP. Figure I-A explains the interaction of Generic and Pesticide SMPs. This plan has been designed to meet the requirements of a Generic SMP. Pesticide SMPs will be added as addenda, as needed.

Subsequent national and regional guidance documents have looked to these state management plans to complement and enhance other state ground water protection programs, such as the comprehensive state ground water protection program, nonpoint source pollution strategy, coastal zone pollution management program, and wellhead protection program. In all, keys to the success of any state management plan will be 1) the authority and ability to implement ground water contamination prevention measures, 2) the authority to implement some type of

---

[3]Ibid., pp. 108.

[4]U.S. Environmental Protection Agency, *Pesticides And Ground-Water Strategy,* October 1991, pp. 11.



By designing a voluntary Generic SMP, the State can facilitate the timely and cost-effective development of Pesticide SMPs as the need arises.

Figure I-A: SMP Blue Print

remediation in the event of contamination, and 3) the authority and resources to conduct a monitoring program to evaluate the effectiveness of both prevention and restoration measures.

The Maine Generic State Management Plan for Pesticides and Ground Water

Maine has taken the initiative and addressed the problems of pesticide use and ground water contamination before they threaten the livelihood and lifestyle of Maine, its citizens, and its environment. Since 1988, the Board of Pesticides Control (BPC) has collaborated with representatives of the Department of Agriculture, Maine Geological Survey, Department of Environmental Protection, and Department of Human Services to develop the state's strategy for preventing ground water contamination by pesticides. In 1990, the BPC hired a full-time planner to coordinate the elements of the strategy and to write the plan.

Two draft plans were completed by the spring of 1991. The second draft plan (April 1991) received wide public comment. Several public meetings were held in agricultural areas in the state to gather input. The BPC, reacting to the comments received, authorized the formation of a planning committee that would better represent the diverse interests of the agricultural community. With the publication of the final strategy, that group was expanded to include non-agricultural pesticide users as well. Building upon the existing drafts, a proposed plan was released in August of 1993 and sujected to another round of hearings and comments. The plan today is the product of the dedicated efforts of that committee.

SECTION II
STATE PHILOSOPHY AND APPROACH TO PESTICIDE MANAGEMENT FOR GROUND WATER PROTECTION

Plan Philosophy

Maine's approach to pesticide management for ground water protection will be one which emphasizes contamination prevention of all ground water according to 1) health-based reference points or 2) other EPA established water quality standards, particularly where ground water is closely connected to surface water ecological systems. The Maine Ground Water Management Strategy recognizes that clean-up of contaminated ground water may be impractical for both technical and financial reasons, so prevention is the only practical course available.

All ground water in Maine is currently classified as a present or future source of public drinking water. Until such time that Maine's ground water resources are evaluated and classified based on use, value, and/or vulnerability, all of Maine's ground water must be afforded equal protection. However, the BPC, lead agency for the development and implementation of this plan, wishes to remain flexible in its allocation of prevention, monitoring, and response resources so as to achieve the greatest benefit to public health and to the environment.

The BPC remains committed to maintaining registration of vital pesticide products. Pesticides which are identified by EPA as requiring a Pesticide SMP will be considered on a case-by-case basis in Maine. Value to their user communities and evident or potential environmental and public health impacts will be considered when prevention and response mechanisms are tailored to the identified pesticide products. Beyond what is required by EPA, the state may choose to address pesticides of local concern in a manner similar to that established in this plan. Conversely, the BPC also retains the option of not developing a Pesticide SMP where few cost, pest control, or environmental benefits may be realized, thereby, prohibiting future sale and use of that pesticide in Maine.

Approach to Planning

Contamination prevention measures will emphasize best management practices, user education, and technical assistance. Where these may be inadequate, the BPC will consider the adoption of pesticide control measures. To assist and advise them in technical decisions, the BPC will create a Pesticide SMP Advisory Committee. The primary duty of a Pesticide SMP Advisory Committee is to respond to a mandate from either EPA or the BPC to develop a pesticide-specific state management plan. A variety of prevention options exist so that the most practical prevention measures can be derived for each pesticide.

Should contamination occur, a pesticide-specific response strategy will be developed which coordinates actions with other ground water protection programs, most notably the Nonpoint Source Pollution Program. Progressive contaminant action levels based upon established health-based reference points allow for an appropriate response depending on the contaminant and the concentration at which it is detected. Follow-up in the field will aid in determining the source of the contaminants. Once this information is gathered, the BPC will determine an appropriate response. Response by the BPC may include referral to the Agricultural Nonpoint Source Program, temporary pesticide control measures, changes in existing State Limited Use permits or actions to mitigate a site-specific problem. If a Pesticide SMP currently exists, the Pesticide SMP Advisory Committee may recommend long-term management measures for consideration by the BPC.

As a measure of both prevention and response strategies, a ground water monitoring program will assess the quality of ground water in pesticide use areas, measure the success of prevention strategies in maintaining water quality, and measure the results taken in response to contamination. Ground water monitoring is considered both a proactive and reactive tool within the context of state management plans.

SECTION III
COOPERATING AGENCIES

States, not the federal or local governments, have the central role in developing and implementing state management plans. Yet, states alone cannot assure effective implementation. Requisite legal authorities and existing programs must be coordinated, and cooperation must be developed among a variety of federal, state, county, and local agencies. Overlapping responsibilities and duties must be clearly defined to provide effective implementation.

Below are the government agencies involved with pesticides, ground water, and implementation of Generic and Pesticide SMPs. A review of their statutory authorities is included as well as a description of any of their existing ground water protection or pesticide control programs. Finally, for those agencies with the direct responsibilities, we have detailed their role as it relates to this process.

U.S. Environmental Protection Agency (EPA)

The EPA is responsible for regulating pesticide use, for protecting the quality of the nation's ground and surface water, and for regulating the storage, disposal, and response to releases of pesticides. It used the legal authorities and mandates of several federal acts in creating 1991's *"Pesticides And Ground-Water Strategy."*

A. Legal Authorities Necessary to Implement this Plan

7 U.S.C. §136 et seq.
The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
FIFRA regulates the registration and use of pesticides. FIFRA allows EPA to address ground water concerns about pesticides on a national level, and, through cooperative agreements with the states, to pass on that authority to a more local level.

33 U.S.C. §466 et seq.
Clean Water Act (CWA)
The CWA was established to protect the integrity of this nation's surface and ground waters. Grants to protect ground water are awarded to states for development and implementation of state wellhead protection programs, for development of statewide ground water protection strategies, and for nonpoint source pollution programs.

42 U.S.C. §300f et seq.
The Safe Drinking Water Act (SDWA)
The SDWA is designed to ensure the safety of public drinking water supplies. The Act requires

EPA to establish both national drinking water quality standards (MCLs) and monitoring requirements for suppliers of public water. Amendments to the SDWA authorize states to establish Wellhead Protection Programs for the protection of public drinking water wells and to authorize the designation of sole source aquifers by EPA. This plan has incorporated drinking water standards in its policy for responding to contamination (See Section VIII, "Regulatory and Response Framework".)

42 U.S.C. §6901 et seq.
The Resource Conservation and Recovery Act (RCRA)
RCRA regulates the disposal of hazardous wastes which include pesticides or pesticide-contaminated material deemed no longer useful.

42 U.S.C. §9601 et seq.
The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
CERCLA established a trust fund to finance responses to non-routine releases of hazardous substances. CERCLA also allows for assessment and recovery of damages from liable parties. For pesticide spills or illegal applications which may cause ground water contamination, this statute is important. CERCLA is also the only law which provides for the "temporary provision of an alternate water supply" under such circumstances.

B. Existing Programs

There are several offices in EPA Headquarters which oversee the above programs. The Office of Pesticide Programs (OPP) administers FIFRA, while the Office of Water (OW) administers the SDWA. Other divisions of EPA are also responsible for administration of other ground water protection strategies and pollution prevention programs. Figure III-A depicts the interaction of EPA's ground water-related offices and statutes. The *Pesticides in Ground-Water Strategy* (October 1991) draws from these regulatory authorities and lays the foundation for this management plan.

C. Role in this Plan

1. EPA should continue to develop its strategy at the national level and to provide technical support and guidance documents to the states on implementation of the state management plans.

2. EPA should continue to provide assistance to states to establish Comprehensive State Ground Water Protection Programs consistent with the State Management Plan approach and implement multi-year program plans which build upon and further integrate state ground water protection strategies, wellhead protection programs, nonpoint source programs, and other ground water related programs.

EPA OFFICES WORKING TO PROTECT GROUND WATER[5]

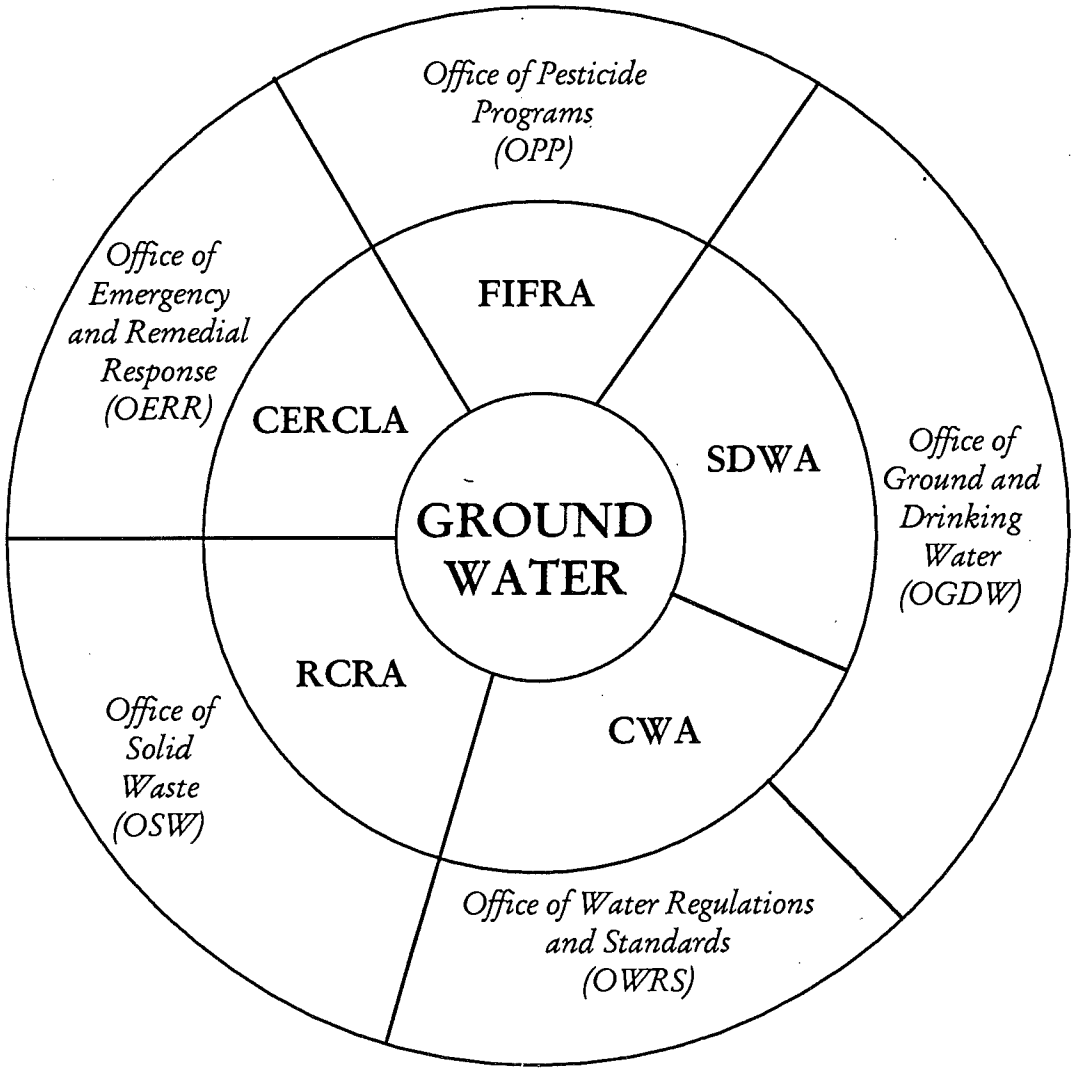


Figure III-A: EPA Offices Working to Protect Ground Water

[5]U.S. Environmental Protection Agency, op. cit., pp.43.

3. EPA should continue to evaluate the environmental fate of pesticides and to regulate products, via the registration process, which pose a ground water threat, on a national basis.

4. EPA should continue to provide financial assistance to develop state management plans.

5. EPA will review this Generic SMP and approve Pesticide SMPs, when submitted.

U.S. Department of Agriculture (USDA)

The USDA, through its various divisions, provides both technical assistance to individual landowners and a range of incentives that can affect the way landowners choose to manage their land and water resources. USDA divisions in Maine include the University of Maine Cooperative Extension (UMCE), Soil Conservation Service (SCS), Agricultural Stabilization and Conservation Service (ASCS), and Agricultural Research Service (ARS).

A. Legal Authorities Necessary to Implement this Plan

None.

B. Existing Programs

The SCS and UMCE offer education and technical assistance to private landowners to solve natural resource management problems. SCS provides free services, including assistance with planning, preserving, and improving water quality. ASCS provides cost-share programs for landowners to implement soil and water conservation plans. USDA has also funded a nonpoint source, hydrologic unit program in Maine. Other programs are also under consideration. For a further discussion of programs at the state level, see "University of Maine Cooperative Extension" later in this section.

C. Role in this Plan

1. USDA-SCS will continue to provide technical assistance to land owners and incorporate, where appropriate, reference to this document or Pesticide SMPs.

U.S. Department of the Interior (DOI)

The U.S. Geological Survey (USGS), a division of the DOI, has the principal role for gathering hydrogeologic information on, and assessing the quality of, the nation's aquifers.

A. Legal Authorities Necessary to Implement this Plan

None.

B. Existing Programs

The USGS, through cooperative programs with states, compiles information for planning, developing, and managing the nation's water resources. USGS topographic maps are used in the design of Maine's ground water monitoring program (See Section VII, "Ground Water Monitoring Program).

C. Role in this Plan

No specific role in implementing this plan.

Maine Department of Agriculture, Food, and Rural Resources

Board of Pesticides Control

The Board of Pesticides Control (BPC) was established to protect the public health and safety of Maine's citizens and to protect the public interest in the soils, water, forests, wildlife, agriculture, and other resources of the state by assuring scientific and proper use of pesticides. The Board and its staff are charged with registration of pesticide products, licensing of applicators, and enforcement to ensure that pesticides are properly used.

A. Legal Authorities Necessary to Implement this Plan

7 M.R.S.A. §606(2)(F)
Prohibited Acts; Unlawful alteration, misuse, divulging of formulae, transportation, disposal and noncompliance
Section (F) is the basis for enforcement by the Board in that it prohibits any person from applying pesticides in a manner inconsistent with pesticide rules and regulations.

7 M.R.S.A. §607-A(2)(C)&(3)
Review or reregistration; Review process and Effect of review on reregistration
Section (2)(C) states that the BPC, in conjunction with the Department of Environmental Protection, Department of Inland Fisheries and Wildlife, Department of Human Services, and the Department of Conservation, shall review registration of pesticides by conducting a water residue survey, inclusive of wells and surface water, to determine the kinds and amount of pesticides present. If the review indicates a negative environmental impact, then the BPC shall "require implementation of...safeguards prior to reregistration."

7 M.R.S.A. §609
Refusal to register, cancellation, suspension, legal recourse
This section gives the Board the power to change or cancel the registration of a pesticide via the rulemaking process when the Board determines that a pesticide or its labeling does not comply with the rules or regulations of this chapter.

7 M.R.S.A. §610(2)
Determination; rules and regulations; restricted use pesticides; uniformity
Section (2) gives the BPC broad authority to promulgate rules in conformance with their statutory authority.

7 M.R.S.A. §611(3)
Enforcement; Repeated violations
Section (3) allows the Board to identify persons who repeatedly violate pesticide use laws and recommend them to the Maine Attorney General for action. This section also discusses enforcement procedures.

7 M.R.S.A. §616-A
Penalties
This section provides for penalties for civil violations of not more than $1,500 for the first violation and $4,000 for each subsequent violation within a four-year period. For private applicators, penalties may not exceed $500 for a first violation or $1,000 for any subsequent violation within a four-year period for violations of recordkeeping or the return and disposal of pesticide containers.

7 M.R.S.A. §620
Cooperation
This section is Maine's planning authority for this state management plan. It allows for grants, cooperative agreements, and the preparation and submittal of plans to EPA under state statute and FIFRA.

22 M.R.S.A. §1471-D(8)(A)-(I)
Certification and licenses; revocation
This section provides the conditions under which a pesticide applicator may be found in violation

or license may be revoked. They include having used a pesticide "in a careless, negligent or faulty manner or in a manner which is potentially harmful to the public health, safety or welfare of the environment."

22 M.R.S.A. §1471-H
Inspection
This section is the basis for this strategy's ground water monitoring program. It provides for inspection of "any public or private premises" for the purpose of inspecting equipment, storage areas, and "sampling pesticide residues on crops, foliage, soil, water or elsewhere in the environment."

22 M.R.S.A. §1471-M(4)
Designation of critical areas
Section (4) allows the Board to designate critical areas "where pesticide use ... present[s] an unreasonable threat to [the] quality of the water supply."

B. Existing Programs

The Board of Pesticides Control has a number of existing programs which protect the integrity of Maine's ground water resources. Among the programs are pesticide registration, applicator certification and licensing, returnable container regulations, and obsolete pesticide pick-up.

Registration of Pesticides

In the protection of ground water, the BPC has formal authority in regulating pesticide use through the state registration process. All pesticides sold or used in the state of Maine must be registered by both the EPA and the BPC and carry one of three use classifications: general use, restricted use, or state limited use. General use pesticides are commonly found in hardware, department, and farm stores. They may be bought and used by the general public on their own property without training or certification. Restricted use pesticides may be sold only by licensed pesticide dealers and may be purchased and used only by licensed pesticide applicators. State limited use pesticides may be used only under a special permit granted by the BPC. Tied to permission to use such limited use pesticides may be reasonable terms and conditions, otherwise known as "management practices," which are designed to protect the health, safety, and general welfare of the environment and public health above and beyond the label guidelines. This management plan addresses the importance of restricted use and limited use classifications as part of the overall prevention strategy in subsequent chapters.

Applicator Certification and Licensing

To ensure that pesticides are used properly, the BPC has adopted rules related to the certification and licensing of pesticide applicators. Persons must be licensed to (1) use or supervise the use of any restricted or limited use pesticide or (2) make custom applications of general use pesticides, or (3) apply a pesticide in connection with their duties as an official or employee of federal, state, or local government. To become licensed in Maine, individuals must first earn *certification*, a credential which shows proficiency in pest management, pesticide use, and safety. Information concerning ground water vulnerability and pesticide leaching potential were added in 1990 to the core exams for certification. Once certified, an applicator applies for a license appropriate to his/her intentions. For more on certification, see Section VI, "Prevention Strategies."

Returnable Pesticide Container Regulations

In response to environmental concerns about the proliferation of empty pesticide container dumps on the edges of fields and to prevent the possibility of point source pollution of ground and surface waters from the improper disposal of these containers, the BPC has been charged with regulating the return and disposal of limited and restricted use pesticide containers. In 1984, the BPC adopted regulations which (1) established a deposit collected pending the return of all glass, metal, or plastic restricted and limited use pesticide containers over one-half pint in size, (2) required stickers to be affixed on all such containers at the time of sale, (3) required triple rinsing or the equivalent of containers prior to their return, and (4) specified places where rinsed containers may be returned for refund of deposit in addition to the dealer location. These regulations cover both in-state and out-of-state purchases to ensure that waste rinsate concentrations are minimized and that containers are disposed of in an environmentally sound manner.

Obsolete Pesticide Pick-Up Program

Disposal of banned and unusable pesticides has been a problem in Maine and throughout the country since EPA began to take certain pesticides off the market in the early 1970s. The BPC has endeavored to assist conscientious citizens in disposing of unusable pesticides at no charge to them. This activity began in 1972 when a convoy of DOT trucks was organized to haul the remains of a pesticide manufacturing plant to Massachusetts for safe storage in a naval center. This option subsequently disappeared when the base disposal area closed, although calls for assistance continued to pour into the BPC's office.

In 1973, the BPC sought out and established a temporary storage facility at Camp Keyes in Augusta where pesticides were stockpiled until the facility became full in 1980. In 1981, the DEP informed the Board of Pesticides Control that such a storage practice

was illegal. The BPC used $26,000 in surplus registration fees to send six tons of material to out-of-state hazardous waste facilities.

Since that time, the BPC has used special general fund appropriations to conduct three separate programs to collect and properly dispose of obsolete pesticides. A total of 38 tons of chemicals have been delivered to a local hazardous waste contractor through these efforts. In addition, two special projects have been conducted to transport 2,4,5-T and dinoseb to out-of-state facilities under federal disposal programs required by EPA suspension orders. There is currently no steady source of funding for this program; the last obsolete pesticide pick-up program was conducted in 1989. However, the BPC does maintain a list of individuals who are holding obsolete or cancelled materials and will contact them when funding for such a project is available.

C. Role in this Plan

1. The BPC will continue to regulate pesticides to minimize the potential for ground water contamination.

2. The BPC will continue to provide ground water education for pesticide applicators through its certification programs and to work cooperatively with other state agencies in educating licensed and non-licensed applicators.

3. The BPC will be the lead agency for developing, enforcing, and implementing state management plans, acting as the liaison between EPA and state agencies for this program.

4. The BPC will oversee the development and implementation of a ground water monitoring program for pesticides, as specified in this plan.

5. The BPC will seek Memoranda of Understanding/Letters of Agreement with agencies involved with implementation of this plan.

6. The BPC will assist pesticide users, to the best of its ability, to properly dispose of contaminated material resulting from pesticide spills.

7. The BPC will respond to contamination problems and will assist in identifying and enforcing means to mitigate the problem.

Bureau of Agricultural Production

The Bureau of Agricultural Production is responsible for responding to complaints or problems involving agriculture, including those of surface and ground water pollution.

A. Legal Authorities Necessary to Implement this Plan

17 M.R.S.A. §2805

Farms or farm operations not a nuisance

An updated version of the "Right-to-Farm" Law, this statute authorizes the commissioner of Department of Agriculture, Food and Rural Resources to investigate all complaints involving a farm or farm operations, including complaints involving ground and surface water pollution. If the commissioner believes the subsequent problem to be a nuisance, there are a number of steps, including finally referral of the matter to the Office of the Attorney General, to assure that the farm or farm operation adopts best management practices. This section also establishes an Agricultural Complaint Response Fund to investigate complaints and to abate conditions potentially resulting from farms or farm operations.

B. Existing Programs

When a ground water problem from agriculture arises, the Bureau of Agricultural Production, working with other appropriate state and federal agencies, makes site-specific recommendations that should be adopted by the farmer to solve the problem. If formal enforcement is necessary to alleviate a problem, the Bureau of Agricultural Production refers the matter to the appropriate agency, including the Maine Department of Environmental Protection or the Office of the Attorney General.

The Bureau of Agricultural Production is currently working with other state and federal agencies in implementing the Agricultural Nonpoint Source Strategy, the Department of Agriculture's contribution to the state's overall NPS strategy. Included are Best Management Practices (BMPs) to control sediment, nutrient, manure, and pesticide nonpoint source pollution. The strategy has both regulatory and non-regulatory components, with emphasis on voluntary programs such as research, targeted educational programs, technical assistance, and financial incentives.

C. Role in this Plan

1. The Bureau of Agricultural Production will provide education to growers and farmers about Best Management Practices and provisions to reduce or alleviate ground water contamination.

2. The Bureau of Agricultural Production will notify the BPC of all complaints involving pesticides and ground water.

3. The Bureau of Agricultural Production and the BPC will coordinate on-site investigation of pesticide complaints.

4. The Bureau of Agricultural Production and the BPC will coordinate enforcement for adoption of BMPs according to the scenarios outlined in Section VIII of this strategy.

5. The Bureau of Agricultural Production and the BPC will coordinate resource grants and educational programs to maximize outreach efforts.

Maine Department of Environmental Protection (DEP)

The Maine Department of Environmental Protection is responsible for protecting the state's natural resources. In particular, two of the Department's five bureaus, the Bureau of Land and Water Quality Control (BLWQC) and the Bureau of Hazardous Materials and Solid Waste Control (BHMSWC), have responsibilities related to this plan. The BLWQC has the responsibility of maintaining standards for the protection of Maine's surface and ground waters. The BHMSWC oversees hazardous material and waste regulations in the state.

A. Legal Authorities Necessary to Implement this Plan

38 M.R.S.A. §410-H thru §410-K
Nonpoint Source Pollution Program
These sections establish the state's nonpoint source pollution program by defining what nonpoint source pollution is, by defining best management practice guidelines, and by designating lead agencies for implementation of components of the state program. The Department of Agriculture, Food and Rural Resources is designated the lead agency to implement the *Strategy For Managing Nonpoint Source Pollution from Agricultural Sources and Best Management Systems Guidelines,* (October 1991), a plan to reduce and prevent nonpoint source pollution from agricultural activities.

38 M.R.S.A. §413
Waste discharge licenses
This section prohibits the direct or indirect discharge of any pollutant to water without first obtaining a discharge license. Two types of aquatic pesticide permits are exempted, including application of aquatic pesticides by the Department of Inland Fisheries and Wildlife and the treatment of public water supplies with copper sulfate or its compounds where swimming and fishing are not allowed.

38 M.R.S.A. §465-C
Standards of classification of ground water
Maine has adopted two standards for classification of ground water. The first, Class GW-A, is of the quality that it can be used for public drinking water supplies. The second, Class GW-B, is for all other supplies not suitable for public drinking water.

38 M.R.S.A. §470
Classification of ground water
This section classifies all ground water in Maine as Class GW-A. Also, this section gives the Maine Legislature the final authority on ground water classification.

38 M.R.S.A. §571
Corrupting Waters Forbidden
This section makes it a Class A, Criminal offense to intentionally corrupt a private or public water supply. (Note: The word ground water is not used; "well" and "spring" are used.)

38 M.R.S.A., Chapter 13
Hazardous Matter, Substance, and Waste Statutes
This chapter contains all the state statutes related to the proper transportation, storage, and disposal of material deemed hazardous matter, hazardous substances, and hazardous wastes. The section also discusses emergency response to spills, the identification of responsible parties, and remedial actions. Chapter 13, in essence, is the state's companion statute to CERCLA and RCRA and will guide response actions to pesticide disposal and spill clean-up.

B. Existing Programs

Critical to the process of controlling ground water contamination by pesticides is the development of nonpoint source (NPS) pollution control measures. In November 1989, Maine DEP finalized the state's "Nonpoint Source Pollution Management Plan." The NPS Plan recognizes that land users can control nonpoint source pollution by the development and implementation of Best Management Practices (BMPs). Several task forces have developed BMPs, including an agricultural task force (see "Department of Agriculture, Food, and Rural Resources -- Bureau of Agricultural Production" below). The NPS Plan is currently being updated.

C. Role in this Plan

1. Maine DEP will continue to provide expertise in the development and implementation of state management plans to ensure that they remain consistent with current ground water regulations.

2. Maine DEP will be the lead agency in pesticide spill response and ground water remediation as a result of such spills.

3. Maine DEP will evaluate ground water resources for classification purposes and ensure that pesticide use does not violate the existing ground water classification and protections for that water body.

Maine Department of Human Services
Bureau of Health

The Bureau of Health is responsible for maintaining the integrity of public water systems and protecting them from contaminants which may adversely affect human health. The Maine Health and Environmental Testing Laboratory, one of the laboratories selected for ground water sample analyses, is a division of the Bureau of Health.

A. Legal Authorities Necessary to Implement this Plan

22 M.R.S.A. §2608
Information on private water supply contamination; interagency cooperation
The Department of Human Services will provide information and consultation to private citizens who report contaminated wells or request information on potential contamination of a site. They are to work with the Maine Department of Environmental Protection to determine an appropriate response to the contamination, including investigation of the site and ground water remediation.

22 M.R.S.A. §2611, et seq.
Safe Drinking Water Act
This act is the state companion to the Federal Safe Drinking Water Act. It protects all types of public water supplies in the state as well as authorizes the Department of Human Services to promulgate and enforce primary and secondary drinking water standards. Selected sections are listed below.

22 M.R.S.A. §2611
Drinking water regulations
This section gives the Department of Human Services authority to promulgate and enforce primary and secondary drinking water standards. Their scope of authority includes identification of contaminants and establishment of maximum contaminant levels.

22 M.R.S.A. §2612
Approval of construction or alteration, training, inspection, regulations and records; Operation and maintenance of public water systems
This section gives the Department of Human Services the authority to review and approve all new sources of public drinking water as well as require public drinking water systems to submit samples for water quality monitoring. Frequency of sampling has been subsequently established by rule.

22 M.R.S.A. §2614

Imminent hazards to public health

When an imminent hazard exists, the Commissioner of Human Services may issue an emergency order to the supplier of public drinking water to take action in one or more areas: 1) prohibit distribution and supply, 2) repair/install purification equipment, 3) notify users of the imminent hazard, or 4) analyze the water further to discover the extent of the hazard. This section provides the only well closing authority available to this plan and only applies to public drinking water supplies.

B. Existing Programs

The Bureau of Health is mandated to promulgate and enforce primary and secondary drinking water standards for public water supplies. These standards may be no less stringent than the most recent National Primary Drinking Water Regulations. The Bureau of Health has also established non-enforceable guidelines, known as Maximum Exposure Guidelines (MEGs), for a variety of drinking water contaminants (See Section VIII, "Regulatory and Response Framework").

Since 1977, the Bureau of Health has been required to review and approve all new sources of public drinking water. The Bureau of Health will be the lead agency for the Wellhead Protection Program and will continue to work with municipalities in the identification and protection of wellhead protection zones and public drinking water supplies.

Wellhead Protection Program

Public water supplies have been identified as an important municipal and state resource. Approximately 92% of Maine's public water systems rely in part or totally on ground water to service their customers.[6] The 1986 amendments to the Safe Drinking Water Act recognize the need to provide extra protection to these important resources and mandate the establishment of a Maine Wellhead Protection Program (WHPP) to provide guidance to municipalities, water utilities, and districts to prevent contamination of public drinking water wells and their ground water recharge areas. The WHPP will require, in part, an inventory of potential sources of ground water contaminants, and delineation of Wellhead Protection Areas, for some public water systems. Municipalities are empowered to enact land use controls to prevent contamination of current and future sources of public water.

---

[6]Rossoll, Charles, et al., "Maine Wellhead Protection Program," Maine Department of Human Services and Maine State Planning Office, February 1990, pp.7.

C. Role in this Plan

1. The Bureau of Health will notify the BPC of pesticide residues detected in public water supplies and the location of the affected wells.

2. The Bureau of Health will notify the BPC of pesticide residue detections in private wells and the location of the affected wells.

3. The Bureau of Health will work with the BPC Toxicologist in the development of MEGs and health advisory levels for those pesticides for which no MCL or MEG has been established.

4. The Bureau of Health will provide information to the BPC on the location of Wellhead Protection Areas and any pesticide restrictions the Bureau adds which may affect those areas.

Maine Department of Conservation
Maine Geological Survey (MGS)

Maine Geological Survey is tasked with the collection and analysis of information relating to the nature, extent, and quality of aquifers and aquifer recharge areas.

A. Legal Authorities Necessary to Implement this Plan

None.

B. Existing Programs

MGS serves as a primary source of information and expertise on ground water resources and monitoring. Data concerning water resources are mapped and made available to requesting agencies. MGS undertook the three-year program, *"Pilot Study: Pesticides in Ground Water,"* and will be doing additional ground water studies provided funding is available. For the present, MGS's involvement with pesticides in ground water will continue as they provide guidance in the development and implementation of the ground water monitoring program for this plan and Pesticide SMPs.

C. Role in this Plan

1. MGS will continue to provide expertise in the development and implementation of the ground water monitoring program, pursuant to this management plan.

2. MGS will also continue to provide technical assistance in matters involving aquifers, recharge areas, flow directions, and contamination plumes, as called on in the course of state management plan implementation.

Executive Department
Maine State Planning Office

In 1985, the Maine Ground Water Standing Committee was created to coordinate the state's diverse ground water interests. The Committee was charged with assessing priorities and ensuring the implementation of the state's ground water management and protection programs. The Committee, comprised of various department commissioners and bureau directors, until recently drew upon the resources of the State Planning Office for its staff and services. Subsequently, the staff position was moved to the Maine DEP in 1990 and was discontinued in 1991. The Ground Water Standing Committee was dissolved in 1991 and the responsibilities of the committee were transferred to the Land and Water Resource Council, Water Resources Committee, which now oversees ground water policy development and provides a common contact point for the various agencies involved with ground water matters.

In 1992, the State Planning Office once again became involved with ground water protection when it was designated as the lead coordinating agency for preparing the Maine Coastal Nonpoint Source Program, a component of the state's overall nonpoint source management program which is administered by the Department of Environmental Protection. Although the State Planning Office will oversee development of this program, much of the planning and implementation will include the participation of state agencies (many previously mentioned in this plan), nongovernmental organizations, and the public.

A. Legal Authorities Necessary to Implement this Plan

None.

B. Existing Programs

Maine Ground Water Management Strategy (1989)

In June of 1989, the Maine Ground Water Standing Committee published the "Maine Ground Water Management Strategy," a comprehensive look at the threats to Maine ground water with a multi-point policy statement on how ground water can best be protected. The Strategy states as its Primary Goal:

> "....to protect, conserve, and manage Maine's ground water resources to protect the public health, safety, and general welfare; to meet future water supply needs; and to sustain economic growth."[7]

To achieve this goal, seven broad-based policies were established to guide state, regional, and local planners in the protection of ground water. Figure III-B lists the seven policies. These policies have served and will continue to serve as the foundation upon which many of the premises and guidelines used in this plan are based as coordinated and integrated under the larger umbrella of the state's CSGWPP.

The Strategy recognized the potential impact on ground water by pesticides and the role of the BPC within the Department of Agriculture, Food, and Rural Resources (DAFRR) in the registration and management of pesticides use. Completion and adoption of this plan fulfills one of the action items outlined for DAFRR in the Ground Water Management Strategy.

Coastal Zone Management Program

The Coastal Zone Amendments and Reauthorization Act of 1990[8] requires all coastal states to prepare a Coastal Nonpoint Pollution Control Program which must then be submitted to both EPA and the National Oceanic and Atmospheric Administration (NOAA). This program will be integrated with both the statewide Nonpoint Source Management Plan and the various reports prepared under the Clean Water Act, at least as far as they relate to coastal waters.

Each state Coastal Nonpoint Pollution Control Program must, as a minimum, provide for the implementation of enforceable management measures to control identified sources of nonpoint pollution in conformity with guidance issued by EPA and NOAA.

---

[7]Dutram, Paul W., et al., "Maine Groundwater Management Strategy," Maine Groundwater Standing Committee, June 1989, pp. 6.

[8]16 USC 1455(b).

MAINE GROUND WATER POLICIES

Policy 1 *There shall be no discharges of pollutants to ground water unless land use activities which have the potential to discharge pollutants to the soil conform to state and local regulations which address the attenuative capacity of local geological deposits to provide protection for ground water quality.*

Policy 2 *When ground water is polluted, sources of pollution shall be removed or contained so that the restoration of ground water quality to drinking water standards or better may proceed by natural processes, or by the application of technology when physically and economically feasible.*

Policy 3 *No development or use of land shall unreasonably cause or exacerbate salt water intrusion, or changes in historic ground water flow patterns and water table height.*

Policy 4 *The State Ground Water Classification System, with assessments of current and future ground water use, should be used by State agencies, municipalities, and water districts in protecting ground water systems.*

Policy 5 *It is the responsibility of municipalities to require the appropriate siting of new facilities and activities and performance standards for all facilities and activities not regulated by the State that may pose a threat to local ground waters in order to minimize damage.*

Policy 6 *Ground Water and surface water are components of a single hydrologic system. Neither one should degrade the quality classification of the other.*

Policy 7 *Public Water supplies, because they serve many people and businesses from single sources, are important municipal and State resources. Municipalities and water utilities should cooperate in the identification and protection of existing and future well head and recharge areas.*

Figure III-B: Maine Ground Water Policies[9]

[9]Dutram, Paul W., et al., op. cit., pp. 6-7.

This law does not necessarily require the adoption of new laws or regulations because states may rely on existing regulatory programs to fulfill these requirements. States which fail to prepare these programs are subject to losing an increasing percentage of the federal funds for both their Coastal Zone Management Programs and their statewide Nonpoint Source Pollution Control Programs.

In January 1993, EPA and NOAA issued final guidelines for preparing these coastal nonpoint source programs. The plan must be submitted to EPA and NOAA by July 1995.

C. Role in this Plan

No specific role in implementing this plan, although a commitment to program coordination should be maintained.

Maine Department of Economic and Community Development Office of Comprehensive Planning (OCP)

The Office of Comprehensive Planning assists individual communities in Maine with the development of comprehensive management plans that address, among other things, the protection of existing and future drinking water resources. These water resources may include ground water and/or recharge areas. Working jointly with the Department of Human Services, the Office of Comprehensive Planning assists municipalities which have public drinking water systems with the implementation of the Wellhead Protection Programs.

A. Legal Authorities Necessary to Implement this Plan

None.

B. Existing Programs

The Comprehensive Planning Program (CPP) describes the requirements of a community comprehensive management plan. Among those requirements are needs to inventory and analyze significant water resources and to "protect, maintain, and, when warranted, improve the water quality of each water body."[10] Under the guidelines developed to implement the CPP, communities may designate ground water resources *significant* to the community. Significant ground water resources may be those under a densely developed section of the community

[10]Title 30-A, M.R.S.A., §4326.

utilizing private wells or ground water selected for a future public water supply. The comprehensive management plan should then identify whether the significant ground water resource will be protected by exclusionary methods or through strict control of potential sources of contamination. This information, once submitted to the Department of Economic and Community Development, will be used by the DEP to designate ground water classifications. The CPP requires communities with public ground water supplies to complete a Wellhead Protection Plan.

However, in 1991, the Maine Legislature repealed many provisions of the Comprehensive Planning Program in a effort to relieve municipalities of the financial burden associated with some of its mandates. Two hundred twenty municipalities had received some level of funding to write plans. As of October 1992, approximately thirty municipal comprehensive plans have been completed, the remainder may never be completed.

C. Role in this Plan

No specific role in implementing this plan.

University of Maine Cooperative Extension (UMCE)

The University of Maine Cooperative Extension, a division of the U.S. Department of Agriculture, has sixteen regional offices in Maine organized roughly along county lines.

A. Legal Authorities Necessary to Implement this Plan

None.

B. Existing Programs

UMCE offers a variety of educational and training programs designed to safeguard surface and ground water quality from pesticides and nutrients. Working in conjunction with other state and federal agencies, the UMCE published *"Best Management Practices for Agricultural Producers: Protecting Ground Water From Nutrients and Pesticides"* in 1989. New pesticide applicator training materials, as well as drift management materials, have been developed and distributed in cooperation with the BPC. UMCE also provides education and training as part of the Pesticide Applicator Training Program. This program includes modules on ground water protection, nonpoint source pollution, and water quality.

C. Role in this Plan

1. UMCE will utilize its existing educational and outreach programs to inform growers and applicators about the requirements of state management plans.

2. UMCE will continue outreach programs which inform growers about BMPs and other ground water protection measures.

3. As new materials are developed by UMCE, the intent and requirements of state management plans will be incorporated.

University of Maine
Maine Agricultural Experiment Station (MAES)

The Maine Agricultural Experiment Station is charged with serving the land grant research mission of the University of Maine.[11] Through basic and applied research programs, MAES scientists work to provide solutions to problems being encountered by the State's agriculture, forestry and aquaculture enterprises, as well as rural communities in general. MAES' research mission is clearly stated in its motto: RESEARCH FOR MAINE AND ITS PEOPLE.

A. Legal Authorities Necessary to Implement This Plan

None.

B. Existing Programs

MAES has several ongoing research projects which study fate and transport of pollutants such as agricultural chemicals and waste materials through soil and water systems, investigate means of reducing the need for chemical applications, and refine methods of analyzing contaminant concentrations in water, soil, and food. MAES researchers also serve the public interest through involvement as technical consultants.

C. Role in this Plan

Although MAES has no direct role in the implementation of this plan, it will continue to conduct research which may facilitate implementation and management of this plan. Furthermore, MAES will continue to provide technical expertise and assistance if available.

---

[11]MAES Faculty Handbook, 1988.

Maine Soil and Water Conservation Commission and Districts

The Maine Soil and Water Conservation Commission (SWCC), an agency of state government, has responsibility for fulfilling programs and policies for the conservation, development, and utilization of the Maine's soil and water resources. These policies and programs are administered at the state level by the Commission and at the local level by Soil and Water Conservation Districts (SWCDs) organized by the Commission and operated by land occupiers within the districts.

A. Legal Authorities Necessary to Implement this Plan

None.

B. Existing Programs

The SWCC provides technical assistance along with educational programs through Maine's sixteen SWCDs to land occupiers, focusing on such topics as soil erosion prevention, flood control, water quality, and water conservation. The Districts provide further technical assistance under the guidance of SCS to individual land occupiers in planning and installing conservation practices. The Districts also initiate and conduct demonstration projects which encourage the adoption of conservation plans. The SWCDs maintain a variety of databases, including soil surveys, hydrologic data, and commodity information, all of which are important in evaluating the pesticide leaching potential within a given geographic area.

C. Role in this Plan

1. SWCC will utilize its existing educational and outreach programs to inform growers and applicators about the requirements of this management plan.

Regional Planning Councils

Maine's eleven Regional Planning Councils provide technical assistance to municipalities in implementing state and federal comprehensive planning requirements and in preparing municipal plans.

A. Legal Authorities Necessary to Implement this Plan

None.

B. Existing Programs

Recent planning efforts of the councils have included programs on ground water management, with assistance projects ranging from ground water hazard identification maps to draft ordinances for the control of nonpoint source pollution. The councils will continue to be an important source of information to municipalities as ground water management and wellhead protection become integrated into comprehensive planning efforts.

C. Role in this Plan

No specific role in implementing this plan.

Municipalities

Under the constitution of the state of Maine, municipalities have broad "home-rule" powers to enact ordinances, including police power and land use ordinances. Under FIFRA, the authority to regulate pesticides is specifically delegated to the states, but not to local governments. The right of municipalities to regulate pesticides and application practices has been a controversial issue, being settled finally by both state and federal supreme court decisions.

In 1983, the town of Lebanon, Maine passed an ordinance prohibiting any commercial, non-agricultural use of herbicides in its town unless approved by a town meeting vote. In 1986, Lebanon denied Central Maine Power's request to spray its electrical rights-of-way and the case was brought to court. In 1990, the Maine Supreme Court finally upheld the town ordinance and firmly established the right of municipalities in Maine to regulate pesticides.[12] It was not until June 1991, that the U.S. Supreme Court also upheld a municipality's right to regulate pesticides beyond FIFRA.[13]

Meanwhile, in 1988, the Maine Legislature had passed a law requiring municipalities in Maine with pesticide ordinances to file them with the BPC in order for them to be deemed valid. Thirteen municipalities have filed copies of their ordinances with the BPC. The ordinances vary

[12]Central Maine Power v. The Town of Lebanon, 571 A.2d 1199 (Me. 1990).

[13]Wisconsin Public Intervenor v. Ralph Mortier, 115L Ed. 2d. 253, 111 S Ct. 2476.

from bans on herbicide use on road sides to comprehensive pesticide prohibitions, including one which protects aquifers within two municipal-designated districts. The latter also requires an applicator to notify the code enforcement officer 60 days in advance of any plan to apply a restricted use pesticide within one of the districts. Although municipalities have no direct responsibilities under this plan, municipal comprehensive planning efforts, combined with ordinance powers, will play an important role in future land use patterns and pesticide regulation in Maine.

SECTION IV
NATURAL RESOURCE CHARACTERIZATION

This section of the plan describes, in brief, Maine's ground water resources and soil characteristics. Because of Maine's diversity in soil type and depth to bedrock, this section can provide only a general description. Site-specific characteristics will be researched and considered as the need arises.

Ground Water Resources

General Geology of Maine's Ground Water Sources

Maine obtains useful supplies of ground water from two sources of very different geologic origin: unconsolidated surface sediments deposited by glaciers over the last 25,000 years and underlying consolidated bedrock formations that began forming hundreds of millions of years ago.

The bedrock that forms the foundation of Maine was created by the same geologic processes active in the world today, including sedimentation, volcanic activity, intrusion of molten rock, metamorphism, and weathering and erosion. Regardless of their diverse origins, these bedrock formations have very similar ground water-bearing characteristics because crustal deformation has left them brittle and fractured.

Unconsolidated sediments that overlie the bedrock formations are largely products of continental glaciers that once spread across Maine and New England as far south as Long Island, New York. Much of what is seen today was deposited during the last 25,000 years by the most recent period of glaciation that ended in Maine around 10,000 years ago. Advance of the mile thick ice across the land left widespread deposits of mixed clay, silt, sand, cobbles, and boulders called till. The ice sheet's melting left more restricted deposits of sand and gravel, found primarily in valleys and low-lying areas, which are important sources of ground water today.

As the climate warmed and the ice sheet melted away, the weight of the ice had so depressed the Earth's crust in Maine's coastal region that the ocean flooded the area. Eventually, the land surface rebounded faster than the ocean flooding, and the sea level began to retreat back towards its present day shoreline. Throughout this area of temporary marine transgression, glacio-marine silt and clay deposits now cover the glacial till as well as sand and gravel deposits. Although clay and silt are not a source of abundant ground water in Maine, they are important because their low permeability has a strong influence on the occurrence and quality of ground water in the underlying sand and gravel and bedrock aquifers.

Geologic Maps

USGS topographic maps, at 7.5-minute and 15-minute scales, are available through the Maine Geological Survey(MGS). The maps show elevation, culture, and drainage. These maps are used as the base maps for various studies. MGS also has available reconnaissance and detailed surficial and bedrock geologic maps. These maps show sand, gravel, and other unconsolidated materials which overlie the bedrock in Maine and the nature of the underlying bedrock, respectively. They can be used for detailed geologic studies and planning for siting studies. These maps will be used in developing the comprehensive monitoring program.

Ground Water Maps

Significant sand and gravel aquifer maps and reports are currently available from the Maine Geological Survey. These maps show the locations of sand and gravel aquifers which provide a yield of greater than 10-gallons per minute to a properly installed well. They can be used as a basis for detailed hydrogeological siting studies and planning and for providing information on aquifer favorability.

Ground Water Classification in Maine

Ground water in Maine is currently divided into two classification categories: GW-A, ground water of a quality that can be used for public water supplies, and GW-B, all other supplies not suitable for public drinking water. In one sweeping move, Maine's state legislature, which has the role of formally classifying ground water, classified all ground water in the state of Maine as GW-A. This classification system does not recognize that all ground water is not of equal value and that it is not desirable to restrict land use activities equally throughout the state. Several new ground water classification systems have been proposed in recent years which consider value and future use, however, none have been adopted.

Soil Characterization

Formation of Maine Soils

As mentioned previously, Maine soils began to form when the last glacier moved across the state in a generally southeasterly direction, carrying rock and soil materials with it. These materials were deposited either as glacial till or as water-sorted sediments along glacial streams, rivers, lakes, or the ocean and are the parent materials from which the present soils developed.

During the period of temporary marine transgression, higher ridges protruded above the ocean surface as islands, while the areas covered by sea water received a blanket of fine water-

deposited sediments. The result of this inundation is a complex pattern of soils along the Maine coast and inland to the elevation of the limit of the marine transgression, derived from glacial till, fine sediments, sands and gravels.

Soils currently recognized in Maine formed as a result of various weathering processes which are an interaction of climate, time, topography, and vegetation on parent material. Therefore, the diversity of Maine soils not only includes the various parent materials but also the way the parent material weathered.

Relevance of Soils to Pesticide Application

The ability of the soil to treat or attenuate potential contaminants associated with pesticides or any other chemical depends on many factors, including its texture, structure, consistency, drainage class, organic matter content, and depth to bedrock or hardpan. In general, those soils best suited to protect ground water from contamination are those which have these features:

- fine texture,
- good soil structure,
- friable,
- well drained,
- relatively high organic matter contents, and
- deep to bedrock or hardpans.

It is important to understand soil characteristics and their limitations. It may be possible to modify some characteristics so that the soils offer a better buffer for ground water, such as altering the drainage by diverting surface water away from a field or altering organic content by adding organic matter to coarse textured soils.

Soil Maps

The best way to learn about the soil characteristics of a given site is to refer to soil maps prepared by the Soil Conservation Service. These maps are published in books which include a detailed description of the soil and soil characteristics. These books, called Soil Surveys, are completed for many counties in Maine and include most of the organized areas. If a soil survey is not published for a county, contact should be made with the local Soil and Water Conservation District office. The SCS, housed in District offices, may be in the process of preparing soil maps for that area.

Basis for Assessment and Planning

Because all ground water in Maine is classified as suitable for public drinking water, theoretically, all ground water should receive equal protection emphasis. However, in practice, this is neither practical nor economically feasible. Therefore, efforts need to be made to identify those resources which are more threatened by pesticide contamination and planning efforts should be concentrated in those areas.

Previous attempts at identifying vulnerable sites have been focused in two areas. Ground water monitoring projects by the BPC has provided a wealth of information about ground water quality and site characteristics which may lead to contamination. The BPC has been able to identify locations in the state where ground water quality has been impaired through use of a specific pesticide, namely aldicarb(Temik). However, ground water monitoring is expensive and ongoing projects are difficult to maintain. Realistically, this is not a viable option although monitoring does serve several important purposes in this plan. See Section VII, "Ground Water Monitoring Program," for a further discussion of the role of monitoring.

Computer models have also been tried in Maine with varying success. In 1989, the MGS, U.S. EPA, Region I, and the BPC initiated the *Maine Agricultural Chemical - Ground Water Mapping Pilot Project.* The primary objective of this project was to test vulnerability systems, in this case Agricultural DRASTIC, for predicting ground water contamination in an intensely farmed region in northeastern Aroostook County. A secondary objective was to assess the usefulness of geographic information systems (GIS) in pesticides-in-ground-water studies.

In conclusion, the study provided no support for using the Agricultural DRASTIC methodology in developing a county-wide or regional pesticide/ground water quality management plan on the computed relative vulnerability of ground water. GIS proved to be an extremely useful tool for the organization and integration of mapped and tabular data. However, the effectiveness of GIS was limited due to the long time period necessary to gather and enter map data into the system. Once more map data are available, using GIS for sensitivity and vulnerability assessments will be more cost- and time-effective.[14]

The most useful computer model available for assessing vulnerability is the National Pesticide/Soil Database and User Decision Support System for Risk Assessment of Ground and Surface Water Contamination, better known as NPURG. NPURG gives the user the opportunity to quickly evaluate the relative leaching and surface loss potentials for multiple pesticides on one or more specific soil types.

---

[14]Williams, John S., Nancy A. Beardsley, et al., "Assessment of Ground Water Contamination Vulnerability from Agricultural Chemical Use in Northern Maine: The Maine Agricultural Chemical - Ground Water Mapping Pilot Project" (Final Draft Report), January 1992, pp. 1-2, 6.

NPURG has been made available free of charge to landowners through county Cooperative Extension and Soil and Water Conservation District offices in Maine. The DHS, Drinking Water Control Program is currently using NPURG to identify those pesticides with a low leaching potential in order to provide waivers to public water systems for Phase II and Phase V monitoring requirements. Until better models or more cost effective means are identified, the BPC will continue using NPURG as a planning tool in vulnerability assessments. For a further description of NPURG, selected sections of the users manual and sample data sheets can be found in Appendix B.

SECTION V
PESTICIDE USE IN MAINE

Maine Agriculture and Land Use

The story of Maine agriculture in the past, the present, and the future is one of adaptation to the changing world around us. Maine has changed from a state where more than half the households were farm-based, to one where about 6300 farms in Maine produce more food than the state consumes in total. Unlike the isolated conditions of a hundred years ago, Maine products now compete in markets around the world.

Since 1840, the U.S. Department of Commerce, Bureau of the Census, has been conducting a national agricultural census. The census now is conducted on a 5-year cycle, collecting data for years ending in 2 and 7. The agricultural census is the leading source of consistent, comparable, statistical information about the nation's agricultural production at the county, state, and national levels.[15]

According to the last available census (1987), there are approximately 1.3 million farm acres in Maine, although more than half of the farms in Maine have less than 200 acres. Almost 90% of the farms in Maine are owned by individuals or families, but only slightly more than half of the operators describe their principal occupation as farming. Clearly, the Maine farm today represents a unique scenario, blending the tradition of the family farm with contemporary rural economic conditions.

Farm acres in Maine are divided primarily among woodland (45.9%) and cropland (44.1%), with the remaining acres divided between pastureland, rangeland, and other land. Although not the leading money crop, hay, including alfalfa and grass silage, dominates Maine cropland with over 220,000 acres. Potatoes follow second with over 80,000 acres concentrated primarily in Maine's northern Aroostook County. Wild blueberries continue to be eastern Maine's primary commodity with approximately 83% of Maine's bearing acres in Washington and Hancock counties. Figure V-A lists some of those crops in Maine grown on over 1,000 acres and the counties with significant acreage.

Agricultural Chemical Use In Maine

There are a number of reporting and survey mechanisms in existence which contribute to understanding the sales and use of Maine's approximately 1000 registered agricultural products.

---

[15]U.S. Department of Commerce, Bureau of the Census, "1987 Census of Agriculture," Vol. 1, Part 19, pp. vii.

CROPLAND AND COMMODITY ACREAGE[16]

Item		1987 acres
Land in farms		1,342,588
Total woodland		615,780
Total cropland		592,309
Hay-alfalfa, other tame, small grain, wild, grass, silage, green chop, etc.	(Maine)	221,675
	(Kennebec County)	30,702
	(Somerset County)	28,131
	(Penobscot County)	27,582
Irish potatoes	(Maine)	83,261
	(Aroostook County)	75,473
	(Penobscot County)	4,090
Corn for silage or green chop	(Maine)	28,711
	(Penobscot County)	5,710
	(Kennebec County)	4,556
	(Somerset County)	4,142
Wild blueberries[17]	(Maine)	21,186
	(Washington County)	13,695
	(Hancock County)	3,870
Apples	(Maine)	7,293
	(Androscoggin County)	1,842
	(York County)	1,427
	(Oxford County)	1,133
Green Peas	(Maine)	3,615
	(Aroostook County)	3,456
Broccoli	(Maine)	2,367
	(Aroostook County)	2,339
Sweet corn	(Maine)	2,107
	(York County)	459
	(Cumberland County)	336

Figure V-A: Cropland and Commodity Acreage

[16]Ibid., pp. 206-213.

[17]Number of acres indicate harvested acres of wild blueberries.

Sales data from agricultural products combined with spray and crop recommendations begin to create general geographic patterns. This section of the management plan describes the reporting and survey methods currently being utilized in Maine, summarizing the most recently available data.

U.S. Department of Commerce, Census of Agriculture

Although the Census of Agriculture primarily deals with livestock and crop production data, it also yields statistics related to agricultural chemical use. Figure V-B summarizes the data gathered on agricultural chemical use from the 1987 Census of Agriculture. Specific county breakdowns are given in the census, but not by pesticide.

Pesticide Sales Database

Since 1977, annual restricted and limited use sales reports have been required as part of the licensing procedure in Maine for restricted use pesticide dealers. Unfortunately, resources have not always been available to provide proper maintenance and management of the data, and early efforts at compiling the sales data were sporadic at best.

In 1990, this data compilation process was further complicated by the addition of general use pesticide sales data. Responding to concerns about lawn care and structural pesticides and their use, the Maine legislature instituted general use pesticide dealer licenses in 1989. Annually, these dealers must report on the sales of general use pesticides sold in packages of one quart or greater or five pounds or greater. There are over 400 licensed general use pesticide dealers in Maine, and the data which they generate are voluminous.

Summaries are available for various years and products, and recent years have seen a more concerted effort at compiling the pesticide sales data. In 1990, the BPC hired an additional staff person whose many tasks include maintaining the pesticide sales database so that information would be available in a more timely manner.

The most recently available compilation effort was undertaken with the 1991 sales data. The list of products reported was screened and narrowed for those products used in agriculture. A preliminary tabulation of active ingredients and their percentages within the formulations were researched and added to the database. The results for those active ingredients sold in amounts over 1,000 pounds are in Appendix C, "1991 Agricultural Pesticide Sales Data." Work is proceeding now on a complete compilation of all 1993 sales data and is expected to be completed by summer 1994.

AGRICULTURAL CHEMICALS USED, INCLUDING
FERTILIZER AND LIME IN 1987[18]

Item		1987
Total farms in Maine (number)		6,269
Land in farms (acres)		1,342,588
Any chemicals, fertilizer, or lime used (farms)		3,896
Commercial fertilizer	(farms)	3,252
	(acres on which used)	246,899
Lime	(farms)	1,220
	(acres on which used)	59,021
Sprays, dusts, granules, fumigants, etc., to control		
Insects on hay and other crops	(farms)	1,728
	(acres on which used)	129,050
Nematodes in crops	(farms)	144
	(acres on which used)	8,314
Diseases in crops and orchards	(farms)	1,079
	(acres on which used)	72,535
Weeds, grass, or brush in crops and pasture	(farms)	1,833
	(acres on which used)	138,262
Chemicals used for defoliation or for growth control of		
crops or thinning of fruit	(farms)	552
	(acres on which used)	53,000

Figure V-B: Agricultural Chemicals Used, Including Fertilizer and Lime

[18]Ibid., pp. 19.

Applicator Recordkeeping and the 1990 Farm Bill

In Maine, nearly all certified applicators are required to keep and to maintain application records, although only commercial applicators are required to report on pesticide use to the BPC (See below – commercial Applicator Quarterly/Annual Summary Reports). Certified private applicators are required to keep records only for outdoor applications with powered equipment. These records are not submitted to the BPC, although they are available for inspection by the BPC staff.

The 1990 Farm Bill included a provision requiring that all agricultural users of restricted use pesticides maintain records of their use. A Federal Register notice, published May 12, 1992, listed the proposed elements for each record. They include:

- The brand name or product name, formulation, and the EPA registration number of the product applied;
- The total amount and rate of application;
- The address or location, the size of area treated, the target pest, and the crop, commodity, or stored product to which the restricted use pesticide was applied;
- The month, day, and year on which the application occurred; and
- The name, address, and certification number of the certified applicator who applied or who supervised the application.

The recordkeeping provision includes a requirement that USDA and EPA survey restricted use pesticide records annually to develop a comprehensive report on pesticide use to Congress. While this will allow the Federal government a better opportunity to estimate pesticide use regionally and nationally, the 1990 Farm Bill, as with Maine law, does not provide for the gathering of statewide, site-specific data, a key piece of information in ground water vulnerability assessments.

Non-agricultural Pesticide Use

Agriculture, although the largest sector of pesticide use in the state, is by no means the only contributor to outdoor pesticide use. Outdoor applications of pesticides occur to:

- Forest lands,
- Lawns and golf courses,
- Ornamental trees and shrubs,
- Utility and railroad rights-of-way,
- Roadsides, and
- Homes and industrial buildings.

The following sections characterize several nonagricultural sites of primary importance in Maine.

Forestry

Maine has approximately seventeen million acres of commercial forest lands. Approximately half of these lands are owned by the state's seventeen industrial timber/paper companies. Herbicides are used in management practices designed to control competition and increase yields of desired species. Such practices include initial site preparation, softwood release, and precommercial thinning, with a majority of the herbicide use for softwood release. In 1992, approximately 37,000 acres of forest land were treated with herbicides, less than one percent of total commercial forest land.[19]

Roadsides and Rights-of-way

Roadside vegetation management is conducted primarily by the Maine Department of Transportation (MDOT) and the Maine Turnpike Authority, although some cities and towns also undertake limited projects. In 1991, MDOT used herbicide applications on slightly over 9,700 miles of roadside to control vegetation under guardrails and larger species which could interfere with highway safety.

Vegetation control is also conducted along utility, railroad, and timberland access rights-of way. Most utility companies combine handcutting and backpack herbicide applications on a three- to four-year rotation to control tree growth.[20] Larger trees, over eight to ten feet tall, are mechanically cut. The stumps of those species capable of resprouting are treated with a herbicide. Central Maine Power, Maine's largest electric utility uses these practices to control vegetation along it's 2,200 miles of transmission lines.[21] Herbicides are also used along Maine's railroads. In 1991, over 3,000 acres adjacent to railroad tracks were sprayed to control vegetation.

Lawns and Golf Courses

According to 1988 EPA estimates, products used to control turf pests in lawns, parks, gardens, and golf courses, constitute a large and growing market. Generally known as lawn care pesticides, their sales nationally have increased to over $700 million annually and result in sixty-

[19]Compilation of 1992 Commercial Applicator Spray Reports, Board of Pesticides Control.

[20]Cline, Michael L., et. al., "Pesticide Reduction: A Blueprint for Action," Maine Audubon Society, June 1990, pp. 23-25.

[21]Commission to Study the Use of Herbicides, op. cit., pp. 31.

seven million pounds of active ingredient being applied. EPA estimates that professional lawn care companies, treating mostly residential lawns, do a $1.5 billion annual business.[22]

In Maine, there are over 330 individuals licensed to control turf pests, including commercial lawn care applicators and golf course superintendents. In 1989, licensed pesticide dealers sold 450,190 pounds and 26,400 gallons of lawn care formulation for use on by commercial applicators and homeowners on residential and commercial sites in Maine. Commercial applicators reported over 50,000 acres of turf treated in 1990, although this number is inflated due to multiple pesticide applications on some turf sites.

Commercial Applicator Quarterly/Annual Summary Reports

The best means available to estimate nonagricultural pesticide use is by commercial applicator summary reports. Quarterly, companies must file a report summarizing their outdoor applications (annually, for government applicators). The report, shown in Figure V-C, includes information on the target pest and site, brand and amount of pesticide used, total area treated, and application method. The University of Maine Cooperative Extension has assumed management responsibilities for these data which they use in preparing pesticide recommendations.

UMCE Pesticide Use Survey for Maine

The University of Maine Cooperative Extension in 1989 began a voluntary survey of private and commercial applicators to gauge crop, pest, and formulation uses in Maine. This information is useful because it established the only mechanism currently available to measure actual use and application practices. Even though UMCE entices applicants into completing the survey by offering one (1) recertification credit towards license renewal, participation is generally low.

Household Pesticide Use

Very little is known about homeowner pesticide use in Maine or nationwide. Maine's pesticides sales database is limited because only products in packages greater than one quart or five pounds need be reported. This leaves may household pesticides unreported.

In March 1988, EPA contracted Research Triangle Institute to design and conduct the National Home and Garden Pesticide Use Survey (NHGPUS). The NHGPUS was a one-time,

---

[22]U.S. General Accounting Office. "Lawn Care Pesticides: Risks Remain Uncertain While Prohibited Safety Claims Continue" (GAO/RCED-90-134), March 1990, pp. 8.

Applicator Company_____ **COMMERCIAL APPLICATOR QUARTERLY/ANNUAL SUMMARY REPORT**

Address_____ Period Covered_____

County_____ Tel.#_____

Target Pest	Target Site	Pesticide Brand Name	EPA Reg#	Total Pounds	Total Gallons	Total Area Treated	Method of Application

Figure V-C: Commercial Applicator Quarterly/Annual Summary Report

cross-sectional survey of the use of pesticides in and around homes in the United States. Data were collected on a list of items, including which pesticides were used and what they were used for. The NHGPUS found an average of 3.84 (+/- 0.5) pesticide products per household, estimating the total number of pesticide products in storage at residences nationwide at nearly 325,000,000.[23]

The potential impact of homeowner pesticide use on ground water quality cannot be overlooked. Pesticide use and disposal practices by homeowners remains relatively unchecked by regulatory officials until a complaint is received or a problem investigated. Quantitatively determining their impact on ground water quality is nearly impossible. Section VI, "Prevention Strategies", talks about avenues available to educate homeowners about proper pesticide use and ground water protection.

[23]U.S. EPA, "National Home and Garden Pesticide Use Survey", April 1992, pp. 1-2, 6.

SECTION VI
PREVENTION STRATEGIES

As stated in Section II, Maine's management plan for pesticides in ground water emphasizes prevention over post-contamination mitigation. This section of the plan describes the education and pesticide control strategies that will be used to prevent contamination.

Best Management Practices

Regardless of how a pesticide is regulated or managed, the user will continue to be in the unique position of directly controlling the use of pesticides in the field. Thus, the user has the responsibility to seek better understanding of ground water concerns. At a minimum, as required by federal and state law, a user must follow the instructions found on the label of each pesticide product and, when required, be trained and certified in the proper use of the pesticide.[24] In addition to what is required by law, there may be certain methods, measures or practices that the user can perform to help prevent, reduce, or correct ground water contamination. These methods or measures are known as Best Management Practices (BMPs).

However, rarely will the use of a single pesticide BMP be sufficient to adequately address a particular ground water concern. More frequently, a number of BMPs, individually selected to fit the unique characteristics of each site and operation, will be required. These groups of BMPs are referred to as a Best Management System (BMS).[25]

The *Maine Nonpoint Source Pollution Management Plan* (November 1989) identified several major source categories in which strategies could be developed to control nonpoint source (NPS) pollution. These included agriculture, silviculture, and transportation facilities and support. Several task forces were formed to develop and, subsequently, implement the BMPs identified for each practice. The BPC will work with these task forces and their member organizations in educating users about pesticide BMPs and encouraging their adoption.

Education of Users

Pesticides user education remains at the forefront of any ground water protection strategy. There are numerous avenues available to educate the wide variety of pesticide users in the State --

---

[24]U.S. Environmental Protection Agency, op. cit., pp. 109.

[25]Maine Agriculture NPS Task Force, "Strategy for Managing Nonpoint Source Pollution from Agricultural Sources," October 1991, pp. 9.

from utilization of radio, television, and newspapers to educate the public about its role in groundwater protection to site-specific technical assistance programs for farmers that directly address pesticide use patterns in relation to soil and cropping practices. The first part of this section addresses some of the education means currently available and some which, hopefully, will be available in the future. Any of these education means can be tailored to a specific pesticide. Their unique role in Pesticide SMPs will be detailed when these plans are developed.

Certification and Training

The cornerstone of educational efforts in ground water protection is applicator recognition of the contributing factors of contamination. The primary avenue in achieving this is through certification of applicators (see Section III, "Cooperating Agencies" for a description of certification and licensing). Since the Fall of 1989, a section called, "Pesticides and the Environment," has been included in the core *Pesticide Education Manual*, developed by Pennsylvania State University and adapted for use in Maine by the University of Maine Cooperative Extension and the Maine Board of Pesticides Control. "Pesticides and the Environment" covers such topics as drift, pesticide fate in the environment, and factors leading to ground water contamination. Ground water-related questions are included in the core exam as well.

Ground water protection has become a focal point of recertification efforts in Maine. There have been numerous presentations on ground water, the largest being a three-hour seminar on pesticide leachability and soil characteristics in 1990. As Pesticide SMPs are implemented, additional training classes on the requirements of such state management plans will be offered to assist applicators in meeting the mandates. The BPC will work with affected commodity groups and trade associations to ensure that Pesticide SMP training is offered to their memberships. For Pesticide SMPs which may be lengthy or contain numerous protection measures, the BPC will consider the development of a home-study course.

Outreach Efforts

However, not every pesticide user in Maine uses restricted or limited use pesticides. Hundreds of thousands of pounds of general use pesticides are used each year in Maine, therefore efforts to reach general use consumers and applicators become an important intervention step. Listed below are some of the avenues available to inform applicators and users about this plan and other ground water protection measures.

Newsletters and Mailings

The Board of Pesticides Control produces a quarterly publication, *The BPC Communicator*, for consumption by the regulated pesticide community, media, environmental groups, and other interested parties. As of July 1993, distribution was in excess of 4,300. *The BPC Communicator* can service outreach efforts on a regular, per-issue

basis, apprising its readership, primarily applicators, with the general goals of this plan during its development, as well as with specific announcements of federal regulations and product reregistrations. The publication is especially useful for explaining the rationale behind pesticide regulations.

Commodity-specific newsletters are also published and distributed by UMCE. Monthly, bimonthly, and seasonal newsletters are available free to subscribers. Newsletters with larger circulations include *Farming and Beyond* (circulation 900), the alternative farming newsletter; *Spudlines* (circulation 700-800), the potato newsletter; and *Cows and Crops* (circulation 700-800), the livestock and forage crop newsletter. During the winter of 1989-1990, *Spudlines* ran a series on ground water protection, and *Cows and Crops* has addressed BMPs, atrazine use, and ground water protection on several occasions. Cooperative Extension regional offices also publish monthly newsletters that address specific regional concerns and keep their readers informed about changes in state and federal regulations. Beyond newsletters, UMCE continually reaches users by providing updates to their brochures and conducts specific mailings on items of urgency and importance to applicators and users in Maine.

In addition to newsletters published by the BPC, DAFRR, and UMCE, many of the agricultural and pesticide user associations in Maine publish newsletters for their constituents. The Pomological Society, Maine Potato Board, Northeast Weed Science Society, and Forest Products Council are just some in Maine and New England that have their own newsletters. *Mainely Green* is published six times a year by the Maine Golf Course Superintendents Association to inform its members about issues related to golf course and turf management. The BPC has the capability to use these additional trade-specific publications to inform their readers about regulatory changes in their field, although direct mailings have proven to be more effective in reaching individual members. As Pesticide SMPs are implemented, the BPC will be able to address specific commodity concerns through these association's newsletters and direct mail pieces.

Talks to Civic and Growers Groups

Other avenues of public education are talks to civic and growers groups. To date, the BPC has shown modest success with its speakers bureau. The BPC Director addresses regulators, environmental groups, and growers on a host of topics. The staff Public Information Officer primarily addresses members of the non-regulated community and has done a number of presentations to high school students during the past year. BPC's Pesticide Toxicologist gives presentations before growers groups, agriculture educators and university-level students. Any of these avenues may afford an entree to the discussion of the state management plans.

UMCE Specialists are also available to speak to interested groups on a variety of either crop-specific or pest-specific problems. During 1990, more than fifteen talks to

commodity groups were given by UMCE staff on BMPs and ground water protection. Pesticide dealers in Maine often host growers' meetings, inviting a member of the BPC or UMCE staff to address the group about a particular topic.

Four Cooperative Extension regional offices in Maine offer eight-hour Master Gardening Programs for homeowners and small commercial growers. Even though these classes are not part of the certification program, pesticide use is discussed with participants and applicable state and federal laws are explained. In return for the training, graduates of the Master Gardening Program are asked to donate thirty hours to community service and education programs.

Media Exposure

Initial media exposure will occur when the generic state management plan goes out for comment during the public comment period (See Section XI, "Public Participation"). Releases to the mass media and grower publications will announce its completion and will invite comment from the regulated community. Public hearings on the plan will be heavily publicized in local communities through newspapers, electronic media, and the relevant commodity publications.

Once this plan has been accepted by EPA, the BPC's Public Information Officer will coordinate a press conference featuring lead agency representatives. This conference will be supported with the usual tools of public relations; i.e., press kit/release, interviews, and photo opportunities. Subsequently, specific media may be directed to interview individuals implementing or affected by this strategy. Any regulatory changes, whether statutory or rulemaking, may be directed to the regulated community through both commodity-specific publications and the media at large. Media exposure for Pesticide SMPs will be similar.

Public Service Announcements (PSAs)

Public service announcements (PSAs) can be used to educate the general public about proper pesticide use and ground water protection. In 1992, UMCE sponsored a series of drinking water protection PSAs on television stations in Maine. These focused primarily on identification of sources of contamination. The BPC has developed a pesticide label comprehension PSA with the Maine Broadcasting System which will be run as part of their "Color Me Green" campaign. This PSA ran in the Portland and Bangor markets during the summer of 1993.

Classroom Educational Component

Another component of the public outreach program will be the development of classroom education programs geared to high school students which will address pesticide use and ground water protection in Maine. The BPC staff will work with existing curriculum development divisions in both the Maine Department of Environmental Protection and Maine Department of Agriculture, Food, and Rural Resources on this project. The foundation of such a program would include the basic concepts of ground water, aquifers, and pesticides and their utility in food production. More complicated concepts, such as ground water movement, agronomics, nonpoint source pollution, and wellhead protection could be added. Teacher materials would include, among other things, aquifer maps within the school district. No date is set for the completion of this component and it will be worked on as time permits.

Informational Brochures

The BPC and UMCE currently publish a variety of brochures that address crop, pest, ground water, and safety-related topics. Aside from being available through the mail from any of their offices, UMCE field representatives and BPC pesticide inspectors carry this literature with them for distribution and discuss this with applicators, dealers, and growers during visitations and inspections. This one-to-one contact is important; the opportunity to explain recommendations and to leave instructions in the hands of the farmer, applicator, or dealer is often more effective than other training or education methods.

Cooperative Extension Weed and Pest Control Guides

UMCE, in cooperation with extension offices in other New England states, has published a variety of commodity-specific weed and pest control guides. These guides serve as an invaluable source of information to farmers and applicators on their choice of an appropriate pesticide. The characteristics of specific pesticides are discussed and recommendations for their use to control certain commodity problems are given. Recently these guides began to address ground water protection and the factors which contribute to leaching: soil, pesticide, and water table characteristics. Guides currently available include those for potatoes, corn and forage crops, commercial vegetable production, small fruit, nursery crops, turf, problem weeds and brush, and Christmas trees. The BPC anticipates working with UMCE to develop editions which highlight the requirements of Pesticide SMPs and remind users of any special use restrictions in Maine.

"Best Management Practices for Maine Agricultural Producers"

An early and substantial effort in ground water protection publications came in 1989 with UMCE's *"Best Management Practices for Maine Agricultural Producers: Protecting Ground Water from Nutrients and Pesticides"* (not to be confused with BMPs as described earlier in this section). Its readable text, timely recommendations and easy-to-understand

worksheets have been valuable in the initial training of farmers and applicators about the factors involved in pesticide contamination of ground water. It has been distributed widely and over 400 individuals are on UMCE's mailing list for updates to the manual.

In addition to the above publications, a Drift Management Resource Notebook and Pesticide Applicator Log Book have also been developed and distributed by UMCE. Numerous state training programs have been held for producers to assist them in complying with drift management and recordkeeping regulations. In 1993, UMCE put out their first set of pesticide-specific recommendations on atrazine.

"Before You Use Pesticides"

Homeowners have historically been the most difficult group to reach with educational materials about pesticides and ground water. In 1991, the BPC published *"Before You Use Pesticides,"* which features a signature character who sets a lighter tone for discussing concerns about homeowner use of pesticides. Topics include subjects viewed by EPA and BPC surveys as least understood by the home users of pesticides. Label comprehension, the difference between a pest and pest infestation, risks and benefits to pesticide use, storage and disposal, spill control, and proper disposal of obsolete pesticides are just some of the topics discussed.

Farm*A*Syst

The Farmstead Assessment System, better known as Farm*A*Syst, is a series of twelve worksheets that help farm owners assess how effectively farmstead practices protect their drinking water. The worksheets provide farm owners with a numerical score on different farmstead practices which might be affecting their well water. The numerical score then allows farm owners to look at each potential source of contamination in light of particular site conditions, to compare potential sources to see where improvements are needed most, and to determine where to spend time and money most effectively to protect the ground water that supplies drinking water wells. With each worksheet is a fact sheet that contains suggestions about things which can be done to modify farmstead practices and places to go for additional information and help. While field practices also have the potential to contaminate ground water, the Farm*A*Syst series is not designed to address this concern. The specific focus of Farm*A*Syst is the potential impact of farmstead practices and structures on drinking water supplies.

Farm*A*Syst was developed by the University of Wisconsin, Cooperative Extension; Minnesota Extension Service; and the U.S. Environmental Protection Agency, Region V. Because of differences in Maine geology and farming practices, the University of Maine Cooperative Extension has assembled a work group, consisting of representatives from DAFRR, BPC, SCS, MGS, and DEP, to review the worksheets and fact sheets and

to make them applicable to Maine conditions and regulations. Work is expected to be completed on this project by early 1994.

Future Publications

Numerous other topic-specific brochures could be used to address unique sections of the pesticide/ground water contamination issue. The BPC, in conjunction with the other cooperating state agencies of this plan, is hoping to develop in the near future guidelines and recommendations on the following topics:

Pesticides, Rinsates, and Container Disposal,
Storage and Disposal of Pesticides,
Spill Mitigation, and
Well Siting and Construction.

Plans are also being made to produce informational brochures about the requirements of Pesticide SMPs which the BPC inspectors and UMCE field representatives will distribute during the implementation phase.

Technical Assistance and Research

Technical Assistance

A variety of technical assistance programs and specialists are available to pesticide applicators and landowners who wish to minimize pesticide use and protect their ground water resources. Long before this plan was conceived, many efforts were being made in instructing farmers and applicators in their role in preserving natural resources for future agricultural and non-agricultural uses.

University of Maine Cooperative Extension

The UMCE provides technical assistance and educational programs to growers in the areas of crop production, pest control, and water quality. Extension specialists are available for a variety of commodities, including potatoes, tree and small fruit, horticulture, forestry, and agricultural engineering. The UMCE Pest Management Office is staffed by an Insect Diagnostician, a Plant Disease Diagnostician, and a Pest Management Specialist; all of whom help growers with identifying and treating pest problems. In 1991, the UMCE added a Water Quality Specialist to their staff to educate landowners and the general public on surface and ground water protection. A substantial number of educators have also been trained in NPURG, the New England Pesticide/Soil Database and User Decision Support System for Risk Assessment of Ground and Surface Water Contamination. NPURG is one of the few vulnerability assessment programs

available and assists land users in choosing the pesticide, based on their soil type, which will be least likely to leach. (For more information about NPURG, see Appendix B.)

USDA Soil Conservation Service (SCS)

The Soil Conservation Service provides technical assistance to land users in the areas of erosion control, water quality, crop management, soil management, environmental assessments, and other special programs. In Maine, SCS is staffed with an Agronomist, a Biologist, an Economist, a Water Resources Specialist, a Forester, a Plant Materials Specialist, a Geologist, and other soil and engineering specialists. Additional technical specialists at the regional and national SCS offices are also available to Maine upon request. SCS assists land users in developing site-specific plans and carries out soil surveys, national resource inventories, and river basin and watershed programs. Its Resource Conservation and Development program is focused on solving community or group problems. SCS maintains a detailed set of standards and specifications in each of the sixteen field offices called, *"Field Office Technical Guide."* These guides describe how agricultural, erosion, and water quality practices should be installed and how these practices should fit together into systems for solving total-farm problems.

Soil and Water Conservation Districts

Maine's sixteen Soil and Water Conservation Districts (SWCDs) are subdivisions of state government, created to provide for the conservation of our state's soil and water resources. Governed by a five-member board of supervisors, elected or appointed from constituents living within each district's boundary, SWCDs utilize a unique combination of federal, state, and local resources to carry out their mission.

It is through district offices that SCS technical staff assist land occupiers, a cooperative effort that effectively solves local soil and water conservation problems. SWCDs can also employ their own technical and/or administrative staff to work in concert with SCS staff, when necessary, to meet local needs. Federal and state research funds are often funnelled to SWCDs because of their strategic locations, technical capability, and close working relationships with cooperating agencies and land occupiers within district boundaries. Examples include Washington County's Integrated Crop Management (ICM) Program, designed to minimize the use of pesticides on blueberries. Another county office, Hancock County, is conducting a study of Velpar transport in blueberry field soils.

Soil and Water Conservation Commission

The Maine Soil and Water Conservation Commission does not have sufficient staff to provide a great deal of direct technical assistance to land owners. However, there are many indirect ways that the Commission serves in that capacity. The Commission serves

as liaison between state and federal agencies and the local Soil and Water Conservation District (SWCD) offices and assists with the transfer of information and programs, both ways. This facilitates the dissemination of information to the land owner. The Commission cooperates with other technical assistance organizations in sponsoring training and information workshops and seminars in producing technical guides, such as the *"Environmental Quality Handbook."*

Creation of educational materials about the requirements of this plan is a priority. The BPC will work with cooperating state and federal agencies in fulfilling the goals of this plan by disseminating information through the aforementioned technical assistance specialists.

UMCE Research and Assistance Projects

Numerous research projects currently are being conducted in Maine by the UMCE. A Hydrologic Unit Project at the Fish River Lakes in Aroostook County, Maine, is providing detailed technical assistance to farmers in pest and soil management. Other projects include a hydrologic unit project in the Meduxnekeag River/Houlton, Maine, area and a demonstration project for the use of organic wastes in Androscoggin County, Maine.

The UMCE is also conducting a number of integrated pest management (IPM) programs for Maine crops such as potatoes, broccoli, sweet corn, blueberries, apples, and, in the future, strawberries. Integrated crop management (ICM) projects are also being conducted on approximately 70 farms in Maine. ICM is a cost-share program through ASCS with the goal of obtaining a 20% reduction in pesticide and nutrient application over three years.

Pesticide Control Measures

Many of the prevention measures mentioned in the previous sections are on-going programs. In some instances, current measures and programs may not be sufficient to prevent ground water contamination and more stringent measures may be needed as part of a Pesticide SMP. The regulatory alternative to best management practices, education, and technical assistance is a multi-tier approach to pesticide control measures. Which measures are chosen as part of a Pesticide SMP will depend, in large part, on the decisions made by the Pesticide SMP Advisory Committee.

Pesticide SMP Advisory Committee

The Pesticide SMP Advisory Committee will assist and advise the BPC on technical decisions related to the development of Pesticide SMPs. The committee will be composed of permanent members (known as "Core" members) and individuals with knowledge specific to the Pesticide SMP under development. A policy statement describing the membership and duties of the Pesticide SMP Advisory Committee can be found in Appendix D.

When considering appropriate prevention measures, a Pesticide SMP Advisory Committee will consider the following information:

- the scope of crop and non-crop uses in Maine,
- current application practices in Maine,
- chemical characteristics of the pesticide,
- economic impact on user community(ies),
- available sales and use data in Maine,
- availability of efficacious chemical and non-chemical alternatives,
- environmental impact on Maine's ecosystem,
- practicality of changes in application practices,
- potential health impacts and the product's toxicity,
- geographic specificity of use which may yield identifiable geologic characteristics, and
- past ground water monitoring data or the practicality of monitoring when no data exists.

Pesticide Control Measures

Figure VI-A depicts the pesticide control measures available to the BPC in order of increasing regulation. Below is a description of each. All pesticide control options require rulemaking under the Maine Administrative Procedures Act; therefore, there will be an opportunity for public input at all of these levels.

Restricted Use Classification

The first regulatory avenue the BPC can utilize in the control of pesticides of state concern is reclassification onto Maine's Restricted Use List. When a pesticide is registered as restricted use in Maine, it can be sold only by appropriately licensed dealers and be bought only by applicators licensed to apply restricted use products. In this way, the BPC can be assured users of such pesticides have been trained in proper application techniques and that applicators have an understanding of the factors that contribute to ground water contamination. Recently, ground water protection issues were added into the certification and training curriculum (see "Certification and Training" in this section). Pesticides which are identified by EPA as requiring a Pesticide SMP will have been previously classified as Federally Restricted Use, therefore these products will have been automatically added to the Maine's State Restricted Use list.

Special Restriction of Pesticide Use

As the second step in the regulatory process, the BPC may promulgate rules to impose special restrictions on pesticide use. These "special restrictions" would prescribe

Prevention Strategies: Pesticide Control Measures

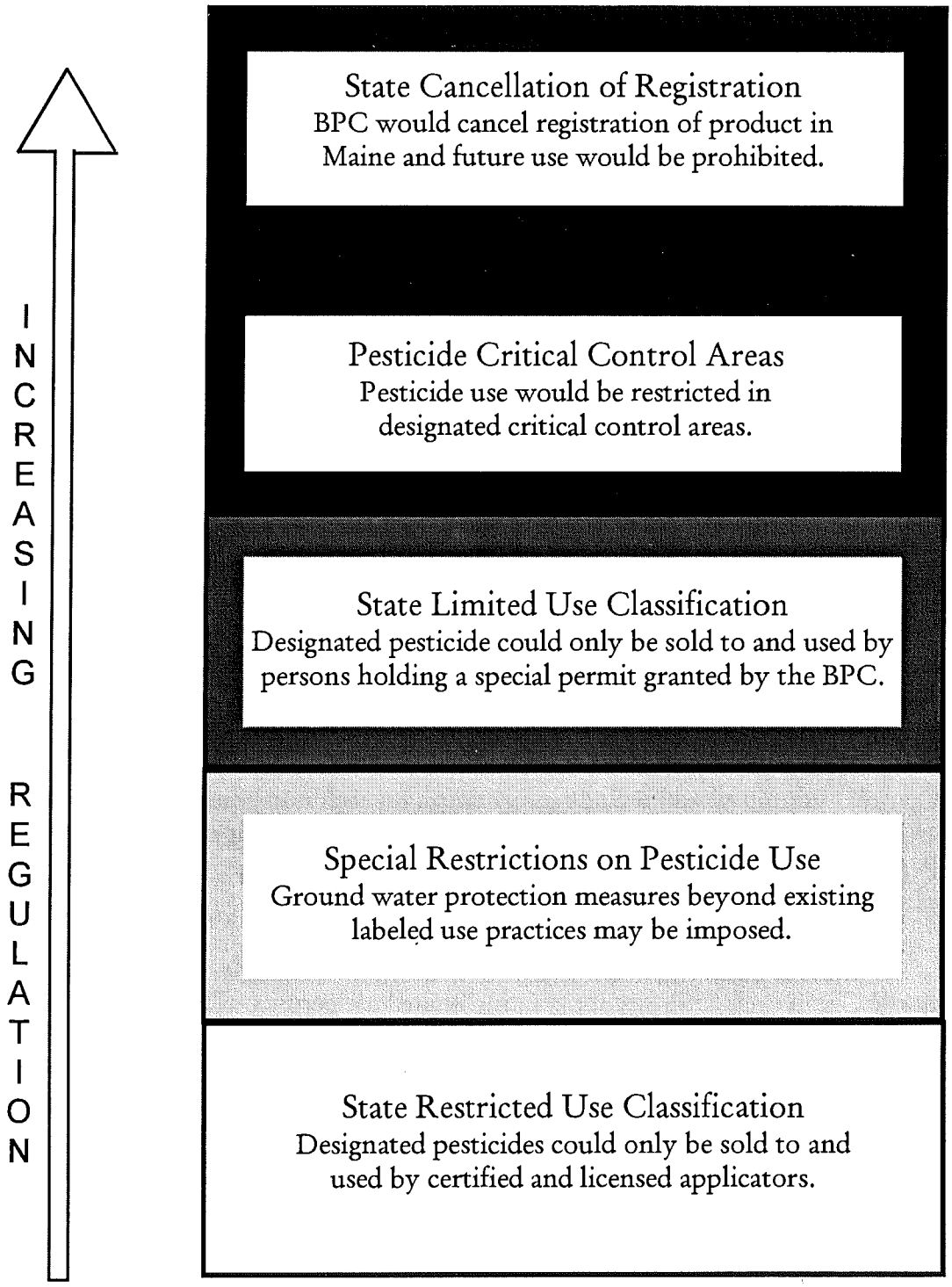


Figure VI-A: Pesticide Control Measures

management practices, such as mandatory setback areas from wells or surface waters, without site-specific considerations. In 1981, the BPC set a precedent for such actions by adopting 10-026 CMR Chapter 41, "Special Restrictions on Pesticide Use - Captan," which required prior notification of application. In 1984, another Special Restriction was promulgated requiring setbacks from potable water sources for aldicarb (Temik). The benefits of this action were two-fold: 1) it went beyond the label requirements in providing protection of wellheads and sources of drinking water, yet 2) it allowed continued use by applicators with minimal regulation or change in application practices.

State Limited Use Classification

A more site-specific means available to the BPC is the control of highly leachable pesticides through their classification as Maine Limited Use pesticides. Once reclassified as a limited use pesticide, the product may then be sold to and used by only licensed persons holding a use permit granted by the Board of Pesticides Control.

Permit forms and maps will be provided by the BPC and elements of the permit may include, at minimum, the following items:

- Name of applicator and name of landowner (if different),
- Soil description of use area,
- Physical description and 7.5-minute topographic map of the use area, noting the location of surface water bodies, wells, springs, and bedrock or ledge outcrops,
- Proposed rate, timing, and method of application of the pesticide, and
- Any proposed wellhead setbacks or other current ground water protection measures.

The final elements of the permit will be decided by the Board of Pesticides Control. Permits would include information on each non-contiguous, non-adjacent use area and on each designated limited use pesticide that the applicant would like to use. Permits would be granted to applicators for a period of one year and must be renewed each year.

To expedite the permit process, the Board of Pesticides Control may delegate to the BPC staff their authority for granting limited use permits. The staff of the BPC, with the assistance of other state agencies or a pre-existing Pesticide SMP Advisory Committee, when necessary, would review all permits and assess their potential impact upon ground water in the use area. Where there is an indication that the combination of site, soil, use pattern, and pesticide characteristics may have a high potential for pesticide leaching, certain management practices may be attached to the permit before issuance or the permit may be denied. Figure VI-B briefly describes some of the possible management practices. For an applicator to purchase and use the pesticide, the measures detailed in the permit

GROUND WATER PROTECTION
PESTICIDE MANAGEMENT PRACTICES

Management Practice	Description
Setback Areas (Buffer Zones)	Buffer zones may be required near surface water, wellheads, springs, and bedrock protrusions to limit application in these sensitive areas.
Restriction to Soil Type	Application of the pesticide may be limited to soil types that have high adsorption and dissipation capabilities.
Change in Rate of Application	A lower rate of application of the pesticide may be required where the soil has low attenuative abilities.
Change in Method of Application	Application methods that decrease leachability potential may be required; i.e., foliar vs. soil-incorporated application, banding.
Change in Timing of Application	Seasonal changes or yearly limitations in applications may be required.
Site-specific Pesticide Management Plan	Because of the complex nature of the pesticide application or the presence of sensitive areas, the permit may be contingent upon the presence of a written, site-specific pesticide management plan which has been accepted by the Board of Pesticides Control.
Other Restrictions	Additional restrictions may become evident in the course of permit investigation and imposed with site-specific conditions, such as the construction of a mixing/loading pad.
Moratorium	Permit is denied, thus creating a localized use moratorium.

Figure VI-B: Ground Water Protection Pesticide Management Practices

would have to be followed. Failure to follow them could result in revocation of the permit and possible enforcement action.

Should a pesticide present a clear and present threat to the ground water supply, the staff of the BPC may refer those applications to the Board for additional review. If the Board decides that any use of the pesticide in that given area is a significant threat to the ground water, then the Board may reject the permit application, thus creating a localized moratorium. The petitioner may ask the Board to reconsider its decision at the next regular meeting. Further appeals must be made in accordance with Title 22, M.R.S.A. §1471-K, "Appeals."

Critical Areas

In 1975, the BPC was empowered by statutory authority to designate critical areas. These critical areas are to include, but not be limited to:

> "....areas where pesticide use would jeopardize endangered species or critical wildlife habitat, present an unreasonable threat to [the] quality of the water supply, be contrary to a master plan for the area where such area is held or managed by an agency of the State or Federal Government, or would otherwise result in unreasonable adverse effects on the public health, welfare or the environment of the area."[26]

In April of 1989, rules were adopted which established the criteria and procedures for designating critical areas. Section 3(D) allows for the designation of critical areas where, "without additional restrictions, [pesticide use] is likely to significantly risk the quality of surface and ground water supplies used for human consumption."[27] These additional restrictions may include prohibition of pesticide use. To date, two locations in Maine, the Deblois Fish Hatchery Critical Pesticide Control Area and the Dennys River Critical Pesticide Control Area, have been designated; neither case was designated because of an imminent threat to the ground water.

State Cancellation of Registration

The most restrictive action the BPC can take with respect to a pesticide is the cancellation or suspension of registration in Maine. This action has the equivalent result as the state refusing to develop a Pesticide SMP. For products which contribute to

[26]Title 22, M.R.S.A., §1471-M (4).

[27]01-026 CMR Chapter 60, Section 3 (D).

widespread contamination and with only few, if any, important uses in Maine, this may be considered a viable option. Certainly, it is to be considered in only a very few and very extreme cases.

Title 7, M.R.S.A., §609(2) generally describes the situations in which the state may refuse, cancel, or suspend registration. It says:

> "If the board determined that any federally registered pesticide...might cause unreasonable adverse effects on the environment, it may refuse to register the pesticide as required in section 607, or if the pesticide is registered under section 607, the registration may be canceled or suspended as provided in Section 1."[28]

Any cancellation or suspension is considered rulemaking and must be done in accordance with the Maine Administrative Procedures Act.

[28]Title 7, M.R.S.A., §609, §§2.

SECTION VII
GROUND WATER MONITORING PROGRAM

Ground water monitoring is defined as "the set of activities that provide chemical, physical, geological, biological, and other environmental data needed by environmental managers/decision-makers to assist in developing and implementing ground water protection policies and programs."[29] Maine's ground water monitoring program, subject to the limitations of the BPC's finite resources, will consist of a baseline assessment component for determining the existence of contamination and a pesticide-specific component to define the extent of contamination and to measure the success or failure of prevention and response programs. In addition to data gathered by the BPC, this program attempts to incorporate data currently being gathered by other state agencies.

BPC Monitoring Program

The BPC on-going monitoring program will consist of two phases. Phase One consists of a general pesticide monitoring program designed to detect potential contamination problems in pesticide use areas. Phase Two of the program consists of a targeted sampling initiative designed a) to assess whether contaminants detected in Phase One show widespread trends for concern and b) to evaluate the effectiveness of pesticide management changes implemented in response to contamination trends already identified. Phase Two is described further in Section VIII, "Regulatory and Response Framework."

General Monitoring Program

The stratified random sampling program will be conducted by the BPC in pesticide use areas throughout the state. The number of samples in any given year depends largely on the funding available, although efforts will be made to provide an acceptable confidence interval for finding contamination in Maine's ground water.

Sample units will be the area within one USGS 7.5-minute topographic map. Six hundred eighty-four (684) individual 7.5-minute quadrangles have been identified and the BPC field staff has been gathering data on the presence of pesticide use areas within those quadrangles. In addition to commodity information, the field staff has been locating such non-agricultural use areas as golf courses, turf farms, and utility and railroad rights-of-way. The information has been entered into a database which will provide the basis for a stratified random sampling.

---

[29]U.S. EPA, "Pesticide State Management Plan Guidance for Ground Water Protection," (Review Draft), July 1992, pp. 3-10 - 3-11.

The sampling effort will be divided among the primary commodity and pesticide use locations based upon statewide prevalence. Once samples have been allocated among these areas, 7.5-minute quadrangles containing these areas will be selected at random. Once the quadrangles have been selected, the BPC's field staff will visit the area to search for an existing, drinking water well with the following characteristics:

1) It must be within 1/4 mile of an active field for the commodity selected, and
2) It must be down gradient of the field.

Samples will be collected, stored, and shipped by the BPC's field staff according to a protocol prescribed by the Maine Department of Human Services' Health and Environmental Testing Laboratory. The protocol selected will depend upon the pesticide for which the sample is being screened.

EPA has encouraged states to adopt their Minimum Set of Data Elements for Ground Water Quality (MSDE). The BPC does not utilize monitoring wells and currently has no means of gathering much of the information required by the MSDE, most notably latitude, longitude, and well construction information about homeowner wells. Efforts will be made to comply with MSDE and provide available data in an acceptable format, when required. The BPC is exploring the use of global positioning system (GPS) equipment and USGS topographic maps to aid in locating sampled wells. The current sample information sheets utilized by the BPC are described in Appendix E.

Incorporation of Other State Monitoring Efforts

Department of Human Services, Health and Environmental Testing Laboratory

Public Water Systems

Public water systems are required to regularly monitor their water for contaminants, including organic chemicals. Efforts will be made to ensure that pesticides detected in such routine monitoring activities will be reported to the BPC for follow-up investigation and determination of the source.

Private Wells

Water samples from private wells are occasionally sent to the Health and Environmental Testing Laboratory for analysis when the owner believes there is a possibility of pesticide contamination. Efforts also will be made to see that the location of samples showing contamination are reported to the BPC for further investigation and inclusion into the monitoring database. (See Section III, "Cooperating Agencies," Department of Human Services, Bureau of Health.)

Department of Conservation, Maine Geological Survey

The three-year pilot pesticide study by MGS considerably advanced our knowledge and understanding of ground water contamination by pesticides in Maine. Unfortunately, the money for such an undertaking was limited, so the results of that study were neither comprehensive nor complete. Future monitoring efforts from MGS will occur only when funding can be found.

Sample Analyses and QA/QC

The Maine Department of Human Services, Health and Environmental Testing Laboratory, will be the primary lab for sample analyses. As part of the Cooperative Agreement with EPA, the BPC maintains and regularly updates a quality assurance/quality control program for the collection of samples related to pesticide enforcement activities. The current QA/QC program will be followed for the collection of all samples related to both Generic and Pesticide SMPs.

Where technologically possible, monitoring will be conducted using *immunoassay tests* to detect initial contamination. Until recently, full-scale monitoring programs would have been cost prohibitive, but the recent introduction of immunoassay tests for pesticides allows broad screening at 10-20 times less cost than conventional chromatography techniques, and they can be processed in as little as 90 minutes. Currently, immunoassay tests are available for such known contaminants as aldicarb, the triazines, carbofuran, and alachlor. Chromatographic analysis will be conducted as a screen for other chemicals and as a confirmation of the reliability and accuracy of the immunoassay method.

SECTION VIII
REGULATORY AND RESPONSE FRAMEWORK

This section of the Generic SMP describes the regulatory framework through which pesticide-specific response actions will occur. The need to prescribe response actions, implement prevention measures, and coordinate monitoring data requires a policy which simultaneously addresses many different fronts in the state's ground water protection strategy. This section outlines such policy and it provides guidance for BPC decisions and recommendations in the development of Pesticide SMPs.

Reference Points

The U.S. EPA has adopted the use of Maximum Contaminant Levels (MCLs) as defined under the Safe Drinking Water Act as standards for determining unacceptable contamination of potable ground water. Where no MCL exists, EPA will use interim drinking water protection criteria as its reference point.[30]

In Maine, the Department of Human Services, Bureau of Health (BOH), has developed a series of Maximum Exposure Guidelines (MEG) which complement EPA's effort. For non-carcinogenic products, the MEG is based on the No Observable Effects Level (NOEL) for adverse effects in laboratory animals divided by appropriate safety factors. For carcinogens, the MEG is equivalent to the dose at which one would predict one additional cancer death per 100,000 individuals. Where no MCL exists or has yet to be adopted, the MEG will be used as the reference point for determining an appropriate response. If neither the MCL nor the MEG has been established, the BPC and BOH will work together to prepare an appropriate response to the contamination problem. Appendix F, "Pesticide Drinking Water Guidelines," lists those pesticides for which MCLs and/or MEGs have been established. Appendix G contains a discussion of risk assessments procedures.

Contaminant Action Level Guidelines

Contaminant action level guidelines are based upon a percentage of the MCL or MEG. When the average of four (4) samples taken over one month from a single site shows contamination at or above a contaminant action level, the BPC will initiate a series of response actions based upon the average detected concentration. Figure VIII-A outlines the contaminant action levels and recommended response actions which may be initiated when each level is reached.

---

[30]U.S. Environmental Protection Agency, loc. cit.

CONTAMINANT ACTION LEVEL GUIDELINES[31]

Action	Contaminant Concentration	Recommended Response
LEVEL A	At or above the detection limit yet below 50% of the MCL or MEG	Follow-up by BPC inspector, review of use and application practices
LEVEL B	Between 50% and 100% of the MCL or MEG	1) Site investigation by NPS-Pesticide Response Team 2) Additional monitoring within local area 3) Mitigation of site-specific problem -or - modification in pesticide use practices through referral to Ag NPS Program, temporary pesticide control measures or changes in existing limited use permits, as appropriate 4) Formal notification of DEP, DHS, and DAFRR
LEVEL C	At or above 100% of the MCL or MEG	1) Site investigation by expanded Response Team 2) Expanded monitoring effort within area 3) Mitigation of site-specific problem -or- further modification in pesticide use practices (as described above) 4) Formal notification of DEP, DHS, and DAFRR

Figure VIII-A: Contaminant Action Level Guidelines

[31]Response actions based upon a confirmed contaminant concentration over an average of four (4) samples.

Pesticides which have an MCL or MEG below 10 ppb present a unique problem when considering appropriate responses. The statistically sound detection limit of laboratory analysis for many of these pesticides is often near or above the established MCL or MEG. Because a small change in the concentration, as small as 1 ppb, could mean the difference between confirmed detection and detection above the MCL, it may be prudent to take preventative action sooner than in other cases. For pesticides with an MCL or MEG below 10 ppb, response actions may be accelerated to compensate for the potential threat to human health.

Because all ground water in Maine is currently designated as a present or future source of public drinking water, these contaminant action levels apply to all ground water in Maine. In assessing a situation involving ground water contamination by pesticides, the potential, as well as the need for restoration of the ground water resource to classification GW-A will have a high priority.

Response to Contamination

Once pesticides are detected in ground water at a concentration corresponding to or exceeding the action levels shown in Figure VIII-A, an appropriate response should be made to prevent further degradation of the ground water. Response may include one or all of the following five elements: 1) follow-up by the BPC, 2) site investigation by the NPS-Pesticides Response Team (or similar non-agricultural group), 3) increased ground water monitoring within and/or surrounding the use area, 4) mitigation of a site-specific problem, and 5) modification in current use practices or prevention strategies. Figure VIII-B depicts the dynamic and interactive nature of these five elements within the prevention-monitoring-response framework. Each of these elements will be expanded upon and tailored to the products identified for Pesticide SMPs. This response strategy is designed to protect ground water while allowing continued use of the product with minimal use restrictions.

Notification of Well Owners/Users

All private domestic well owners/users who submit to water sampling during the course of an investigation or routine monitoring program will receive notification of results in writing from the BPC. For wells with detectable concentrations of pesticides, this notification will include summary of the health effects associated with the contaminant prepared by the BPC Toxicologist. The BPC Toxicologist will also be available to answer questions from the public regarding the health effects of pesticides in drinking water. Notification of public well users is handled by the Department of Human Services, Drinking Water Control Program by the protocol described in the Safe Drinking Water Act .

Follow-up by the BPC

When contamination is detected corresponding to Action Level A, an appropriate response will be initiated which may include a visit to the land user by a BPC inspector for

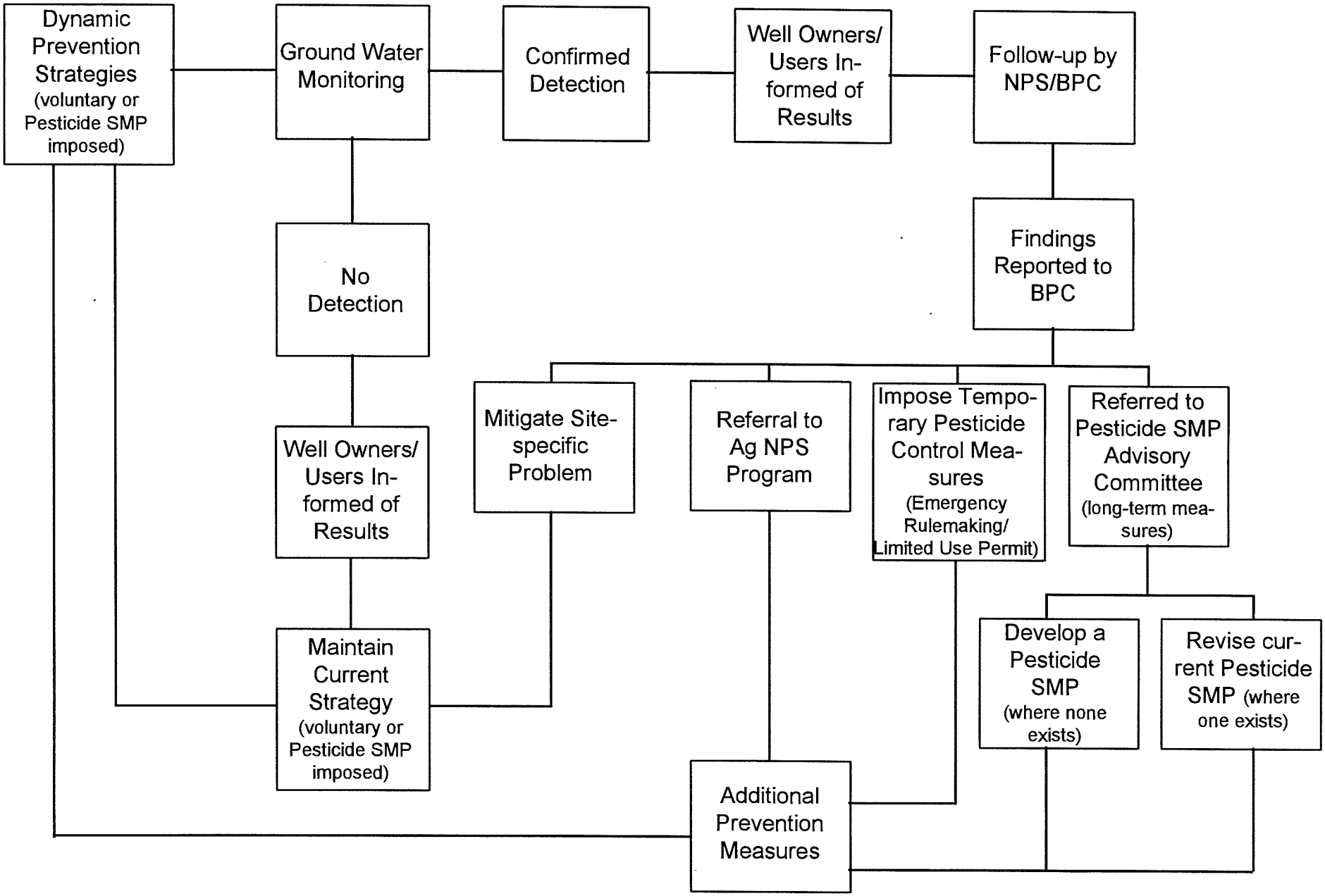


Figure VIII-B: Interaction of Prevention, Monitoring, and Response Strategies

an evaluation of the pesticide application and storage practices. The BPC inspector may be able to identify a point-source pollution problem or identify some particular use practice, which combined with site and soil characteristics, may be the contributing factor. Appropriate educational materials may be sent to the land user or distributed at the time of the inspection to encourage further protection and to prevent further degradation. Additional ground water samples in or near the use area may also be taken.

Site Investigation

When contamination by an agricultural product is detected at Action Level B or C, a formal complaint may be initiated by the BPC, its staff, or an injured party under the state's Agricultural Nonpoint Source Pollution (Ag NPS) Strategy. Investigation of the complaint will involve an on-site visit by the NPS Response Team, incorporating, at minimum, persons with knowledge of pesticides and expertise in ground water. Agencies involved with the NPS Response Team include, among others, Cooperative Extension, Soil Conservation Service, the Department of Agriculture, the Department of Environmental Protection, and the Board of Pesticides Control. Site-specific situations determine the appropriate persons to be included on the Response Team.

The NPS-Pesticides Response Team will review application practices and attempt to further isolate the source of contamination. If the land user has a Best Management System, the team will attempt to determine if the individual BMPs are being utilized. The team will report their findings and site recommendations to the Board of Pesticides Control at their soonest regular meeting.

Presently, there is no corresponding non-agricultural response unit. In cases where contamination is detected at non-agricultural sites, the BPC and staff will work closely with the landowner and trade association to find a resolution to the situation.

Increased Ground Water Monitoring

Where pesticide contamination of ground water is detected, a targeted sampling effort will be initiated in order to evaluate the probable cause and scope of the problem and to determine whether any discernable trend can be identified. This effort will incorporate a triple-data point sampling principle, whereby positives of concern will be evaluated by sampling two other sites in the same watershed with similar geological and pesticide use characteristics of the first site. If either of these additional sample points confirms the original concern, then the sampling effort will be expanded in the original water shed and samples will be taken in two other similar watersheds. This process continues until the scope of the problem is adequately evaluated. Additional sampling will also be necessary to evaluate the effectiveness of any use modifications imposed to mitigate the contamination problem.

Mitigation of Site-specific Problem

Site investigation may reveal that the pollutants are coming from a point source, such as a pesticide spill in a storage area. The BPC will work with the land user to eliminate and/or reduce the flow of pollutants from the point source and ensure that the proper authorities are notified. The site will be referred to the Maine DEP for remediation and clean-up, if necessary.

Modification of Current Prevention Strategy

The BPC will meet to review available monitoring data and the findings and recommendations of the BPC inspector and/or the NPS-Pesticides Response Team (or similar group). When a trend in contamination is indicated, the BPC may seek some type of pesticide use modification. The BPC has several avenues available to affect use modification.

Referral to the Ag NPS Pollution Management Program

It has been recognized that the BPC has little site-specific control over general and restricted use pesticides. The adoption of BMPs by the land user is essentially the only means available for protecting ground water in areas where restricted and general use pesticides are used.

To affect use modification of an agricultural general or restricted use pesticide, the BPC will rely on the Ag NPS Pollution Management Program. Voluntary adoption of site-specific BMPs is sought, but an avenue of legal enforcement is available should BMPs not be adopted. Land users and applicators will receive regular inspections by the BPC and/or NPS inspection staff to provide assistance and to ensure compliance. Continued ground water monitoring until resolution of the problem will evaluate the effectiveness of the BMPs.

This program does not expressly cover non-agricultural uses of pesticides. Where non-agricultural uses are involved, the BPC will work with affected landowners in the state to adopt management practices which may mitigate ground water contamination. Most likely, though, some type of special restriction on pesticide use may have to be adopted for particular non-agricultural use(s).

Temporary Pesticide Control Measures

Should voluntary cooperation be ineffective or the degree of contamination be such that immediate action is needed in cases of contamination through legal use, then the BPC initiate emergency rulemaking to reclassify the pesticide as State Limited Use or to impose special restrictions for a maximum of ninety (90) days. At the end of ninety (90) days, pending no further rulemaking, the pesticide reverts back to its original classification without special restrictions.

Revision of Existing Limited Use Permits

If the pesticide is currently managed in a Pesticide SMP as a State Limited Use Pesticide and the land user holds a permit for its use, then the BPC, with the assistance of the Pesticide SMP Advisory Committee, revise the prescribed management practices stipulated on the permit. For contamination above Level C, action may include revocation of the permit. Once imposed by the BPC, the land user may appeal the additional requirements at the next regular meeting of the BPC. Further appeals may be made in accordance with Title 22, MRSA, §1471-K, "Appeals."

Long-term Changes in Pesticide Management Strategy

A Pesticide SMP must be considered a failure if it does not prevent or mitigate contamination. A Pesticide SMP Advisory Committee may recommend permanent changes to the existing Pesticide SMP when it has been shown to be inadequate to protect ground water. In the absence of a Pesticide SMP, the BPC may for a Committee and charge them with considering the development of one so as to put into place a statewide prevention strategy to prevent further contamination.

Alternative Drinking Water for Private Domestic Well Users

The BPC has been relatively successful at working with registrants to provide alternative water and/or filters when contamination above health-based standards has been detected. The BPC hopes to continue to work with registrants in this stewardship capacity, however, the BPC recognizes that this may not always be possible.

The BPC has discussed in detail options which would provide affected homeowners with safe drinking water. One such option includes the establishment of an alternative drinking water fund. Under it, owners of private domestic wells which have been contaminated due to proximity to a pesticide use area would petition the BPC for funding to supply alternative drinking water or to remedy wells with filtration systems. Because of the necessity to provide potable water in an expeditious manner, the Director of the BPC would be able to authorize allocations in a set limited amount. Long-term remediation would be taken up by the BPC. Unfortunately, this program may require a substantial amount of funding, the source of which cannot be decided.

Impact on Land Users

It may be determined that ground water contamination can only be prevented by an outright moratorium on pesticide use within a specific area. Alternatives to using a given pesticide, although some may be more costly or less effective, will have to be developed. In some cases, no alternatives may be found, and the land user may be restricted to non-chemical pest control means.

The Agricultural Nonpoint Source Pollution Management Plan recognizes the financial impact the BMP implementation could have on farmers. In the strategy, two types of financial assistance are recommended: 1) cost sharing, to lessen the financial burdens of some mechanical or labor intensive BMPs, and 2) direct compensation for lost production and decreased land values when farm land is removed from production. However, the Board has already determined that the availability of compensation programs will not be a pre-condition for declaring a use moratorium, and a lack of money for such programs will not impede the implementation of this plan.

SECTION IX
PESTICIDE SMP INFORMATION DISSEMINATION

Because the user is ultimately responsible for management of pesticides, measures prescribed in a Pesticide SMP must be communicated to pesticides users as well as appropriate industry groups and regulatory officials. This section describes the means available to make targeted groups aware of their responsibilities.

Workshops

Prior to the development of any Pesticide SMP, one or more workshops will be held (1) to make growers and users aware of the change in regulatory status of the product and (2) to gather grower and user input on issues affecting plan development. These workshops will be held in areas of the State where the pesticide in question is used and will be heavily publicized.

Recertification Meetings

As mentioned in Section VI, "Prevention Strategies," recertification meetings will be used to convey ground water protection information to licensed applicators. Recertification meetings will be the primary means used to inform users about the requirements of Pesticide SMPs.

Mailings to Commodity Groups

Copies of Pesticide SMPs may be mailed to affected commodity organizations and user groups. Commodity publications will be used as an additional means of making users aware of their obligations under pesticide-specific management plans. The Board of Pesticides Control currently maintains a database of commodity and user organizations and will update it on a regular basis.

Direct Mailing to Applicators

When the number of applicators affected by a Pesticide SMP is limited or the requirements of a Pesticide SMP are highly technical, the Board of Pesticides Control will consider direct mailing of information to applicators in the affected user groups. In addition, *The BPC Communicator*, which is mailed to each applicator four times a year, will be used to inform them about the existence and requirements of state management plans.

Role of Other Groups in Informing Users

The educational roles of the University of Maine Cooperative Extension, Soil Conservation Service, Soil and Water Conservation Districts, and Soil and Water Conservation Commission have previously been outlined in Sections III and VI. In addition to those groups, the Board of Pesticides Control will work closely with commodity organizations and pesticide dealers.

Commodity Groups

The Board of Pesticides Control encourages commodity and trade organizations to take the initiative in educating their members about the requirements of Pesticide SMPs. The Board's staff will work with these organizations and tailor recertification meetings to specific crop/use concerns. As mentioned previously throughout this plan, commodity and trade organizations will play a major role in Pesticide SMP development.

Pesticide Dealers

Pesticide dealers are in a unique position to provide one-on-one assistance to growers and users. In Maine, all persons who sell restricted or limited use pesticides must be licensed, therefore the BPC will educate dealers about the requirements of Pesticide SMPs and encourage them to then educate their patrons.

SECTION X
ENFORCEMENT

Agency Roles in Enforcement

To ensure that requirements of Pesticide SMPs are followed, enforcement action may be necessary to achieve compliance. The Board of Pesticides Control anticipates being designated lead agency for this plan, therefore primary enforcement action will occur through the BPC.

The Board of Pesticides Control will monitor compliance with and enforce ground water protection labeling as part of its use, marketplace, and dealer inspections. The BPC will focus use inspections on those commodities and growers who use pesticides which require a state management plan. Marketplace and dealer inspections will focus on products which require a Pesticide SMP as part of the labeling. Applicators who violate the label or other State or Federal statutes related to this plan will be subject to enforcement action as outlined in the BPC's enforcement protocol (attached in Appendix H).

The BPC has considered enforcement authorities available under other State and Federal statutes and will attempt to coordinate enforcement activities with EPA and other State agencies, as appropriate, to make full use of those statutes through the use of letters of agreement or memoranda of understanding. The Department of Environmental Protection, the state's lead agency for ground water protection, will be notified of all action taken by the BPC. Enforcement for nonpoint source pollution violations may be referred to either the Department of Agriculture, Food, and Rural Resources or the Department of Environmental Protection. Legal authorities necessary for proper enforcement have been outlined in Section III, "Cooperating Agencies."

Penalties

In 1990, the legislature increased penalties for violating BPC regulations. For any person who commits a civil violation, the maximum fine is $1,500 for the first violation and $4,000 for each subsequent violation within a four-year period. For private applicators, the penalty may not exceed $500 for a first violation or $1,000 for any subsequent violation within a four-year period related only to violations of recordkeeping or the return and disposal of pesticide containers. For the first time in 1990, a criminal violation section was added to the BPC penalty regulations. It provides for a "fine not to exceed $7,500 and...imprisonment not to exceed 30 days, or both, for each violation" for an applicator who "intentionally or knowingly violates" pesticide laws.[32]

[32]Title 7, M.R.S.A. §616-A.

SECTION XI
PUBLIC PARTICIPATION

One of the EPA requirements for this plan is that the public be given ample opportunity to provide input and comment on the methods chosen to prevent contamination and the proposed regulatory framework. This section describes the provisions being made to involve the public in Generic and Pesticide SMP development.

Generic SMP Development

Comment Period

Following the completion of the proposed Generic SMP, the BPC held a 90-day comment period during which concerned individuals from both the regulated and non-regulated community may offer input to the plan. The opening of the comment period was heavily publicized (as described in Section VI, "Prevention Measures," Media Exposure) to ensure that all interested parties were aware of the plan's existence. Copies of the plan were made available free of charge to the public via written requests during the comment period.

Public Informational Gathering Meetings

During the 90-day comment period, the BPC conducted three (3) public informational gathering meetings at which citizens were able to offer their comments in person. Copies of the plan were available prior to and at the meetings.

A summary of the comment process and a response to comments received on the Generic SMP is located in Appendix I.

Pesticide SMP Development

The route for public participation following Pesticide SMP development depends primarily on the proposed requirements. If proposals in the plan require the BPC to seek additional legal authorities, then the BPC will provide for public comment through rulemaking, following the guidelines in the Maine Administrative Procedures Act (MAPA).[33] The MAPA provides for ample public comment, including input from both public hearings and written comments.

---

[33]5 M.R.S.A., Chapter 375, Subchapter II.

If the Pesticide SMP proposals do not require the BPC to seek additional authorities, then a public participation program, similar to that conducted for Generic SMPs, will be followed.

SECTION XII
RECORDKEEPING, REVIEW, AND REPORTING

The best test of a plan is its day-to-day use. Documenting the plan's progress not only provides a source of data to share with EPA and other cooperating agencies, but also provides a basis with which to assess implementation and effectiveness. Incorporating what is learned back into the plan makes it a living document, not an inanimate object carved in stone. This section of the plan outlines the BPC's commitment to keep records, report results to the EPA or appropriate agencies, and to use that information in the review of Generic and Pesticide SMPs.

Records and Reporting

The BPC will maintain all records relating to the development and implementation of either a Generic or a Pesticide SMP for a period of four years. The information maintained will include:

- results from ground water sampling and monitoring;
- the number of persons reached by outreach and education efforts;
- the number of, and a summary of, inspections performed to determine compliance with ground water labeling or Pesticide SMP provisions, including a determination of whether provisions were being followed;
- the number of, and a narrative summary of, completed enforcement actions related to non-compliance with ground water labeling or Pesticide SMP provisions;
- a summary of significant findings;
- an assessment of whether use of specific pesticide(s) has substantially changed over a given period;
- accomplishments and progress on the Implementation Items listed in Section XIII;
- identification of any special issues within the state regarding either the Generic or any Pesticide SMPs;
- identification of needed modifications to either the Generic or Pesticide SMPs;
- a description of available projected resources for the next year;
- a description of any response actions taken for detections of specific pesticides.

The BPC will make available to EPA, upon request and appropriate allowance of time, any and all records related to the development and implementation of state management plans.

Plan Review and Update

Biannually, the BPC will give thorough reconsideration to the strategies and implementation items listed in the Generic SMP. In its review of the Generic SMP, the BPC will consider, in addition to many of the items listed above, the following items:

- Does the plan still reflect the current state philosophy on ground water management?
- Has definitive action been taken on Implementation Items?
- Are the roles of the Cooperating Agencies still the same?
- Are there new or modified Prevention Strategies that need to be incorporated?

The BPC will also consider comments from the public on the future direction of the Generic SMP and incorporate comments on its performance into a biannual republication.

Each Pesticide SMP Advisory Committee will biannually (or sooner) review its respective plan. This will include an assessment of the adequacy of the plan and a discussion as to whether the plan is actually serving to protect the ground water resources. Considering many of the points listed above, each committee may then recommend changes for the BPC to consider. Biannual updates will also be published for inclusion.

SECTION XIII
PLAN IMPLEMENTATION

The following items have been identified as actions which must occur prior to full implementation of this ground water strategy. The actions listed are the expected courses of action for each of the items. As this plan is updated, progress on these items will be detailed for the reader.

Item #1

Obtain all Memoranda of Understanding (MOUs) and Letters of Agreement (LOAs) with cooperating state and federal agencies.

Action

As soon as the plan is completed, Memoranda of Understanding will be sought with the DEP, DHS, DAFRR, and UMCE, at a minimum, to ensure coordination and action on items listed in this plan. Letters of Agreement will be sought with MGS, SPO, SCS, SWCC, and other parties mentioned in this plan.

Item #2

Have the Board of Pesticides Control adopt the policy statement forming the Pesticide SMP Advisory Committee and appoint appropriate members.

Action

The policy statement forming the Pesticide SMP Advisory Committee will be presented to the Board for adoption at the same time they are considering adoption of this plan. Core members will be appointed in advance of an EPA decision requiring Pesticide SMPs.

Item #3

Continuation of support staff for the plan and ground water activities.

Action

The BPC staff person currently working on this project is funded from a FIFRA enforcement grant of approximately $53,000. EPA's continued funding is vital, as this remains the sole source of funding for ground water activities.

APPENDICES

APPENDIX A

ACRONYMS

Below is a list of acronyms found within this management strategy. Bureaus, divisions, and agencies include their respective departments in parentheses.

ARS	Agricultural Research Service (USDA)
ASCS	Agricultural Stabilization and Conservation Service (USDA)
BOH	Bureau of Health (DHS)
BHMSWC	Bureau of Hazardous Material and Solid Waste Control (DEP)
BMP	Best Management Practice
BMS	Best Management System
BPC	Board of Pesticides Control (DAFRR)
BWQC	Bureau of Water Quality Control (DEP)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Cooperative Extension Service (USDA)
CFR	Code of Federal Regulations
CMR	Code of Maine Regulations
CPP	Comprehensive Planning Program
CWA	Clean Water Act
DAFRR	Maine Department of Agriculture, Food, and Rural Resources
DECD	Maine Department of Economic and Community Development
DEP	Maine Department of Environmental Protection
DHE	Division of Health Engineering (DHS)
DHS	Maine Department of Human Services
DOC	Maine Department of Conservation
DOI	U.S. Department of the Interior
DOT	Maine Department of Transportation
DRASTIC	Depth of water, recharge, aquifer media, soil media, topography, impact of unsaturated zone, conductivity of the aquifer Computer Modeling Program
DWC	Drinking Water Control (DHS)
EPA	U.S. Environmental Protection Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
Generic SMP	Generic State Management Plan
GIS	Geographic Information System

H&ETL	Health & Environmental Testing Laboratory (DHS)
ICM	Integrated Crop Management
IPM	Integrated Pest Management
MAES	Maine Agricultural Experiment Station
MCL	EPA Established Maximum Contaminant Level
MEG	Maine Exposure Guideline
MGS	Maine Geological Survey (DOC)
MRSA	Maine Revised Statutes Annotated
MSDE	Minimum Set of Data Elements for Ground Water Quality
NOEL	No Observable Effects Level
NPS	Nonpoint Source
OCP	Office of Comprehensive Planning (DECD)
ODW	Office of Drinking Water (EPA)
OPP	Office of Pesticide Programs (EPA)
Pesticide SMP	Pesticide-specific State Management Plan
RCRA	Resource Conservation and Recovery Act
RPC	Regional Planning Council
SCS	Soil Conservation Service (USDA)
SDWA	Safe Drinking Water Act
SMP	State Management Plan
SPO	Maine State Planning Office
SWCC	Soil and Water Conservation Commission (DAFRR)
SWCD	Soil and Water Conservation District
UM	University of Maine
UMCE	University of Maine Cooperative Extension
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey (DOI)
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Program

National Pesticide/Soils Database and User Decision Support System for Risk Assessment of Ground and Surface Water Contamination.

A New England Initiative

9.50

SELECTED SECTIONS
USER'S MANUAL

This material is based upon work supported by USDA-ES under special project EWQI-90-1-9247 with MA, CT, ME, NH, RI, and VT cooperating.

CHAPTER 1

INTRODUCTION

NPURG is an automated version of the SCS Soil-Pesticide Interaction Screening Procedure developed by Don Goss (SCS Research Soil Scientist, Ft. Worth, Texas) for the SCS Water Quality Handbook in 1988. The rating procedure provides both a leaching potential and a surface loss potential for a given soil and pesticide. The soil/pesticide leaching potential and the soil/pesticide surface loss potential are a combination of the soil's rating and the pesticide's rating. A description of the procedure is available at the local United States Department of Agriculture, Soil Conservation Service office (attached as Appendix E to this manual). Help screens throughout the program also explain the rating procedures.

The University of Massachusetts Cooperative Extension and the Soil Conservation Service in Massachusetts created NPURG. They have been supported by USDA Extension Service, Cooperative Extension in each of the New England states, SCS National Headquarters, the SCS National Water Quality Technology Development Staff and SCS staffs in the other New England states.

NPURG gives a professional planner the opportunity to quickly provide landowners and landusers with an evaluation of the relative leaching and surface loss potentials for various pesticides on specific soils. The rating procedure utilizes two databases:

1) June 31, 1991 SCS/ARS/CES Pesticide Selected Properties Database, peer reviewed by a twenty-two member group including representatives from NACA, ARS, SCS, ES, EPA, FS, and the agrichemical industry.

2) Soil Conservation Service State Soil Survey Database.

NPURG allows the user to select a chemical and a soil, then display and print the relative potential for pesticide loss through leaching or surface runoff. The ratings include Potential 1, Potential 2, and Potential 3. "1" has the greatest potential for pesticide movement, followed by "2", with "3" having the lowest potential for pesticide movement. Two different ratings are determined for each soil/pesticide combination; one for the leaching potential and one for the surface loss potential.

NPURG also provides for the selection of multiple pesticides and soils, and will display and print a matrix of leaching and surface loss ratings for each soil/pesticide combination. The ability to display and print out all of the database parameters used in the rating procedure is also available.

In addition NPURG provides the user opportunities to customize the pesticide database and add data for new chemicals. Likewise the soils database can be customized by county or by farm. Individual soil records can be amended to specific site conditions. They can then be used in the screening procedure to provide a more accurate evaluation than the range of values provided by the default soil database.

NPURG RATING SUPPLEMENT

The National Pesticide/Soils Database and User Decision Support System for Risk Assessment of Ground and Surface Water Contamination (NPURG) is an automated version of the Soil Conservation Service Soil/Pesticide Interaction Screening Procedure.

This procedure provides both a leaching potential and a surface loss potential for the interaction of a given soil and a given pesticide. Soil/pesticide leaching potentials (SPLP) and soil/pesticide surface loss potentials (SPSLP) are contained in two separate NPURG worksheet print-outs titled: "Pesticide/Soil Interaction Ratings for Ground and Surface Water Protection", with "Soil/Pesticide Leaching Potential (SPLP) or Soil/Pesticide Surface Loss Potential (SSLP) in the center of the print-outs just above the rating matrix. The ratings are Potential 1, Potential 2, and Potential 3; with Potential 1 being greater than Potential 2 which is greater than Potential 3.

The individual soil ratings and pesticide ratings that the SPLP and SPSLP are based on, are available in "Tagged Soil Series Data" and "Tagged Pesticide Data" print-outs. Soils have Soil Leaching Potential (SLP) and Soil Surface Loss Potential (SSLP) ratings of High, Intermediate, and Nominal. Pesticides have Pesticide Leaching Potential (PLP) ratings of Large, Medium, Small and Nominal, and Pesticide Surface Loss Potential (PSLP) ratings of Large, Medium and Small.

The screening procedure utilizes two default databases:

1) the SCS/ARS/CES Pesticide Selected Properties Database (June 31, 1991 SCS version), which has been peer reviewed by a twenty-two member group including representatives from NACA, ARS, SCS, ES, EPA, FS, and the agrichemical industry.

2) the Soil Conservation Service State Soil Survey Database.

NPURG can also be used with "User" entered field specific information for both pesticides and soils. These entries will be identified with a "U_" preceding the pesticide or soil name in all worksheets. The "U_" designates "User" responsibility for the accuracy of the data.

NPURG evaluations help to indicate the relative need for more comprehensive water quality risk analysis. Many additional factors must be considered with the NPURG evaluation to provide a comprehensive analysis of water quality impacts of various management alternatives.

Soil/Pesticide Leaching Potential (SPLP)

Potential 1:

This pesticide applied on this soil has a high probability of leaching below the root zone, as compared to SPLP's of 2 or 3. Before deciding to use a pesticide which results in a SPLP of 1, the pesticide should be evaluated for its impact on human health and the environment. If a pesticide use on this soil is determined to pose an unreasonable risk to human health or the environment, an alternative pesticide or non-chemical pest management technique should be selected. See "General Considerations" for additional information.

Potential 2:

This pesticide applied on this soil has the possibility of leaching below the root zone, however the possibility of pesticide leaching is not as great as Potential 1. Because potential 2 is a gray area, overall risk assessment will be determined by further evaluation of site conditions and pesticide toxicity. See "General Considerations" for additional information.

In addition, potential 2 guidelines differ from potential 1 in that the pesticide leaching potential (PLP) may be reduced one rank, ie, high to intermediate, if the pesticide is foliar applied (significant interception by foliage resulting in less pesticide available for leaching). This will result in a SPLP rating of 3.

Potential 3:

This pesticide applied on this soil has a low probability of leaching below the root zone. Therefore, this pesticide could be used according to the label instructions with a low probability of an adverse impact on groundwater resources. See "General Considerations" for additional information.

*: Soil/Pesticide Leaching Potential (SPLP) for soils with a maximum slope of > 15 percent

The soil leaching potential (SLP) used to determine the Soil/Pesticide Leaching Potential (SPLP) applies to this soil for slope ranges of 0-3, 3-8, and 8-15 percent. For slopes greater than 15 percent, the soil leaching potential may be lower than displayed for the moderately fine and fine textures soils (CL, SCL, SICL, SC, SIC, C).

&: Soil/Pesticide Leaching Potential (SPLP) for soils with seasonal high water table (HWT) less than 6 feet

This soil has a seasonal high water table (HWT) within 6 feet of the surface for a significant period of the growing season. This requires careful evaluation of the soil/pesticide leaching potential. The closer the groundwater is to the surface the greater the probability of contamination.

Soils with a positive (+) depth to seasonal high water table (HWT) are poor[illegible]d for a portion of the growing season. Because the water table is [illegible]n the root zone, these soils have been assigned a high soil leaching potential (SLP) regardless of the calculated potential. Pesticide application is not recommended with a SPLP rating of +1.

General Considerations

The Soil/Pesticide Leaching Potential (SPLP) is a relative ranking of the potential for pesticide movement below the root zone. Risk assessment must also consider the potential for unreasonable adverse effects on human health and the environment. These include the sensitivity of the groundwater resource and toxicity of the pesticide. To evaluate the sensitivity of a groundwater resource ask such questions as: What is the water use? (Public well, private well, livestock, irrigation) What is the depth to the water table? (perched water table, shallow or deep aquifer) Where is the field located in relation to the nearest well withdrawal? What is the direction of groundwater flow?

To determine the risk posed by the pesticide ask such questions as: What are the short and long term human health effects? Short term effects are most often determined by the acute toxicity (LD50). Lo[illegible]erm effects include fertility impairment, birth defects, damage to [illegible] nervous or immune system, and cancer.

Consideration of alternative pest management practices should result from the risk assessment of impacts on the groundwater resource. These include alternative pesticide use practices (ie. reduced rates, reduced frequency, spot treatment, alternative formulations, modes and timing of application), alternative pesticides, non-chemical pest management techniques (ie. biological control, crop rotation, resistant varieties, mechanical control), and combinations thereof.

NPURG
Pesticide/Soil Interaction Ratings for
Ground and Surface Water Protection.

Chemical database name: TRAD2_03.DBF Date of issue: Wed Jul 17 12:50:56 1991

Soil database name: MASOILS.DBF Date of issue: Tue Jul 23 22:25:52 1991

Pesticide User:_____ Date: Sun Aug 04 11:27:37 1991

Address:_____ Crop:_____

Location:_____ Target Pest:_____

% of field for Soil Type #1: _____ % #2: _____ % #3: _____ %

Ave. Slope: _____ % pH: _____ Drained / Undrained.

Water Resource: Ground / Surface Type:_____ Distance:_____

Soil/Pesticide Leaching Potential (SPLP)

NPURG 9.350 Database 2.031 Pesticide: ========	Soil Series: Texture:	HADLEY SIL Hydro - B	LIMERICK SIL Hydro - C	WINDSOR LS Hydro - A
.TREX		1 &	2 &	1
BANVEL		1 &	F 3 &	1
F - Foliar application				
BLADEX		2 &	3 &	1
DUAL		1 &	2 &	1
LASSO		2 &	3 &	1
PRINCEP		1 &	2 &	1
PROWL		3 &	3 &	2
WEEDONE		F 3 & E	3 & E	1 E
F - Foliar application				

* max slope is > 15%, & depth to seasonal high water table < 6 ft., + ponded
G (guessed) / E (estimated) database values used in the computations.

These ratings are first tier relative rankings of pesticide/soil interactions. They are intended for use by SCS and CES personnel as one component of an environmental risk analysis. Please see attachment NPURG RATING SUPPLEMENT to help evaluate these ratings.

Planner:_____ Agency:_____ Phone: ( )

Understanding NPURG Columns

1/2 Life (days)

Half-life, given in days, is the time required for pesticides in soils to be degraded so that their concentration decreases by one-half. Pesticide degradation can be fairly accurately described by assuming that each successive elapsed half-life will decrease the pesticide concentration by half. For example, a period of two half-lives will reduce a soil concentration to one-fourth of the initial amount. "Persistence times" often reported in the literature are the times required for a pesticide to degrade to the point that is no longer active. We have arbitrarily assumed this equal to four half-lives when a persistence time was the only data available.

Half-lives vary by a factor of three or more depending on soil moisture, temperature, oxygen status, soil microbial population and other factors. The numbers given should only be used as relative indicators of persistence.

Solubility (PPM)

The solubility of the pesticides in water at room temperature is given in ppm (mg/l). This is the solubility of the pure active ingredient (ai), not the formulated product. Solubility is a fundamental physical property of a chemical and will strongly effect the ease of washoff and leaching through soil. In general, pesticides with solubilities of 1 ppm or less will tend to stay at the soil surface and be washed off the field in the sediment phase of runoff. Thus practices designed to reduce erosion will also stop pesticide runoff.

K_{oc}

The index for soil sorption is measured by the K_{oc} value. The K_{oc} measures the tendency of the pesticide to be strongly attached, by chemical or physical bonds, to soil particle surfaces. The higher K_{oc} values (1000) have a stronger attachment to soil and a lesser tendency for the pesticide to more except with sediment movement. Conversely, the lower K_{oc} values will tend to move with water and have a potential for deep percolation below the root zone or being carried in runoff water.

PLP (Pesticide Leaching Potential)

The leaching potential indicates the tendency of a pesticide to move in solution with water and leach below the root zone into deep percolation. The ratings of large, medium, small, and nominal describes the potential for leaching. A rating of large means the chemical has a high potential for leaching.

PSLP (Pesticide Surface Loss Potential)

The surface loss potential indicates the tendency of the pesticide to move with sediment in runoff. A large rating means the pesticide has a high tendency to move with sediment while a small rating means the pesticide has a low potential to move with sediment.

(FROM: Introduction to USDA-ARS, Interim Pesticide Properties Data Base, Version 1.0, by R.D. Wauchope, pp. I-5-4 and I-5-5.)

Corn Herbicide Example

NPURG

Tagged Pesticide Data

Pesticide	1/2 Life (days)	Solubility (PPM)	KOC	PLP	PSI
AATREX [ATRAZINE]	60	33.000	100	LAR	ME
BANVEL [DICAMBA SALT]	14	400000	2	LAR	SM
BLADEX [CYANAZINE]	14	170	190	MED	MI
DUAL [METOLACHLOR]	90	530	200	LAR	MI
LASSO [ALACHLOR]	15	240	170	MED	MI
PRINCEP [SIMAZINE]	60	6.200	130	LAR	MI
PROWL [PENDIMETHALIN]	90	0.275	5000	SMA	LA
WEEDONE [2,4-D ESTERS OR OIL-SOL. AMINES]	10	100.000 E	100 E	MED	MI

NOMINAL, SMALL, MEDIUM, LARGE ratings, or MISSING Data.
G (guessed) / E (estimated) database values.

APPENDIX C
1991 AGRICULTURAL PESTICIDE SALES DATA
(those with sales over 1,000 pounds active ingredient)

Common Name	Total Sales (pounds, active ingredient)
EBDC Fungicides	691,522
Aliphatic Petroleum	140,820
Captan	98,989
Atrazine	55,624
Phosmet	54,718
Disulfoton	54,687
Maleic Hydrazide	53,892
Endosulfan	53,787
Methamidophos	50,760
Glyphosate	50,318
Hexazinone	47,822
Diquat	41,472
Azinphos-Methyl	41,345
Metolachlor	39,840
Carbaryl	35,837
Chlorothalonil	33,655
Cryolite	29,280
Metribuzin	29,255
EPTC	23,876
Ethoprop	23,109
Pendimethalin	22,788
Napropamide	19,906
Oxamyl	18,173
Linuron	17,778

APPENDIX C
1991 AGRICULTURAL PESTICIDE SALES DATA
(those with sales over 1,000 pounds active ingredient)

Common Name	Total Sales (pounds, active ingredient)
2,4-D	14,573
Simazine	14,536
Metalaxyl	13,828
Copper Sulfate	12,514
Cyanazine	11,685
Dodine	10,533
Chlorpyrifos	10,082
Benomyl	9,756
Propargite	9,086
Fonofos	8,625
Copper Oxychloride	8,030
MCPA	7,524
PBO	7,432
Metam-Sodium	6,948
Thiram	6,253
Formentanate Hydrochloride	5,808
Fenvalerate	5,276
Diazinon	5,206
Paraquat	4,666
Thiophanate-Methyl	4,303
DCPA	3,972
1,3-Dichloropropene	3,791
Dicofol	3,482
Permethrin	3,480

APPENDIX C
1991 AGRICULTURAL PESTICIDE SALES DATA
(those with sales over 1,000 pounds active ingredient)

Common Name	Total Sales (pounds, active ingredient)
Endothall	3,401
Methoxychlor	3,248
Methomyl	2,980
Malathion	2,722
Phorate	2,510
Butylate	2,447
Copper Hydroxide	2,267
Sethoxydim	1,958
Dicamba	1,900
Methyl Isothiocyanate	1,896
Carbofuran	1,893
Triphenyltin	1,888
Trifluralin	1,668
Oryzalin	1,560
Alachlor	1,458
Terbacil	1,208
Bentazon	1,003
Thiocarb	1,000

Approved _____

APPENDIX D
PESTICIDE STATE MANAGEMENT PLAN (PESTICIDE SMP) ADVISORY COMMITTEE

Background

The *Pesticides and Ground-Water Strategy* (October 1991) states the EPA may choose to require pesticide-specific state management plans (Pesticide SMPs) for pesticides of national ground water concern. Furthermore, the Board of Pesticides Control may choose to plan for pesticides not recognized by EPA which present unique groundwater concerns for the State of Maine. For these reasons, the Board recognizes its need for experts who can assist and advise them on technical decisions related to the development of Pesticide SMPs, and therefore, establishes a volunteer Pesticide SMP Advisory Committee.

Membership

A Pesticide SMP Advisory Committee will be composed of both Core and Pesticide-specific members. The Core will be composed of a member of the Board, in most cases a member which represents the public, who will also chair the committee. The BPC Toxicologist and other necessary staff will serve in an advisory capacity. Other Core members will be persons from the following technical fields with prior knowledge or experience with pesticide issues:

- a hydrogeologist[34],
- a soil scientist[35], and
- an agronomist[36].

---

[34]A hydrogeologist is defined as a specialist in the occurrence and movement of ground water.

[35]A soil scientist is defined as a person certified as a soil scientist by the Maine Board of Certification for Geologists and Soil Scientists who has expertise in soil taxonomy, morphology, and mapping.

[36]An agronomist is defined as someone who specializes in the development and management of the plant and soil sciences to produce abundant, high-quality food, feed, and fiber crops in a protected environment. (American Society of Agronomy)

The Board will solicit and review resumes for Core membership and will formally appoint these members at their regular public meetings.

Pesticide-specific members will provide pesticide-specific expertise in evaluation of use practices on the environment, production, and pest management. These members will be representatives of commodity and user groups in Maine related to the pesticide in question and additional technical experts, such as, but not limited to, a wildlife biologist, an ecologist, experts provided by the registrant, or an economist. In addition, citizens whose drinking water may have been affected by the pesticide or who live in areas where the pesticide is used will be asked to join the committee. Pesticide-specific members will vary depending on the pesticide in question, making each Pesticide SMP Advisory Committee a unique collection of individuals.

Representatives from affected commodities and the user community will be solicited from established commodity groups. When agricultural issues are involved, a member of the Department of Agriculture will be called upon to assist with the coordination of issues related to Best Management Practices. In addition, commodity specialists with IPM or pest management experience for each potentially affected commodity will also be included. Other pesticide-specific members with needed expertise will be invited to participate either by the BPC or by a Pesticide SMP Advisory Committee.

Duties

A Pesticide SMP Advisory Committee's primary duty is to respond to a mandate from either EPA or the BPC to develop a pesticide-specific state management plan. A Pesticide SMP Advisory Committee's first duty is to determine whether the value of a pesticide product to Maine users warrants development of a Pesticide SMP. Should a product warrant development of a Pesticide SMP, the Committee will develop the plan and submit it to the BPC. The Committee may not be able to reach a full consensus on all issues involved with a Pesticide SMP. Therefore, a plan may be presented to the Board with options where the opinions vary, and it will remain the responsibility of the BPC to select the option which is feels is most suitable. The Committee will assist the BPC with the public comment and/or hearing process as necessitated by the Pesticide SMP. Should the Committee decide not to develop a Pesticide SMP, they will then prepare their reasons for such a decision and submit them to the BPC for opportunity for public input. A graphical depiction of this process is located in Figure D-1.

When considering appropriate prevention and response measures, a Pesticide SMP Advisory Committee will consider the following information:

- the scope of crop and non-crop uses in Maine,
- current application practices in Maine,
- chemical characteristics of the pesticide,
- economic impact on user community(ies),

PSMP Development Process

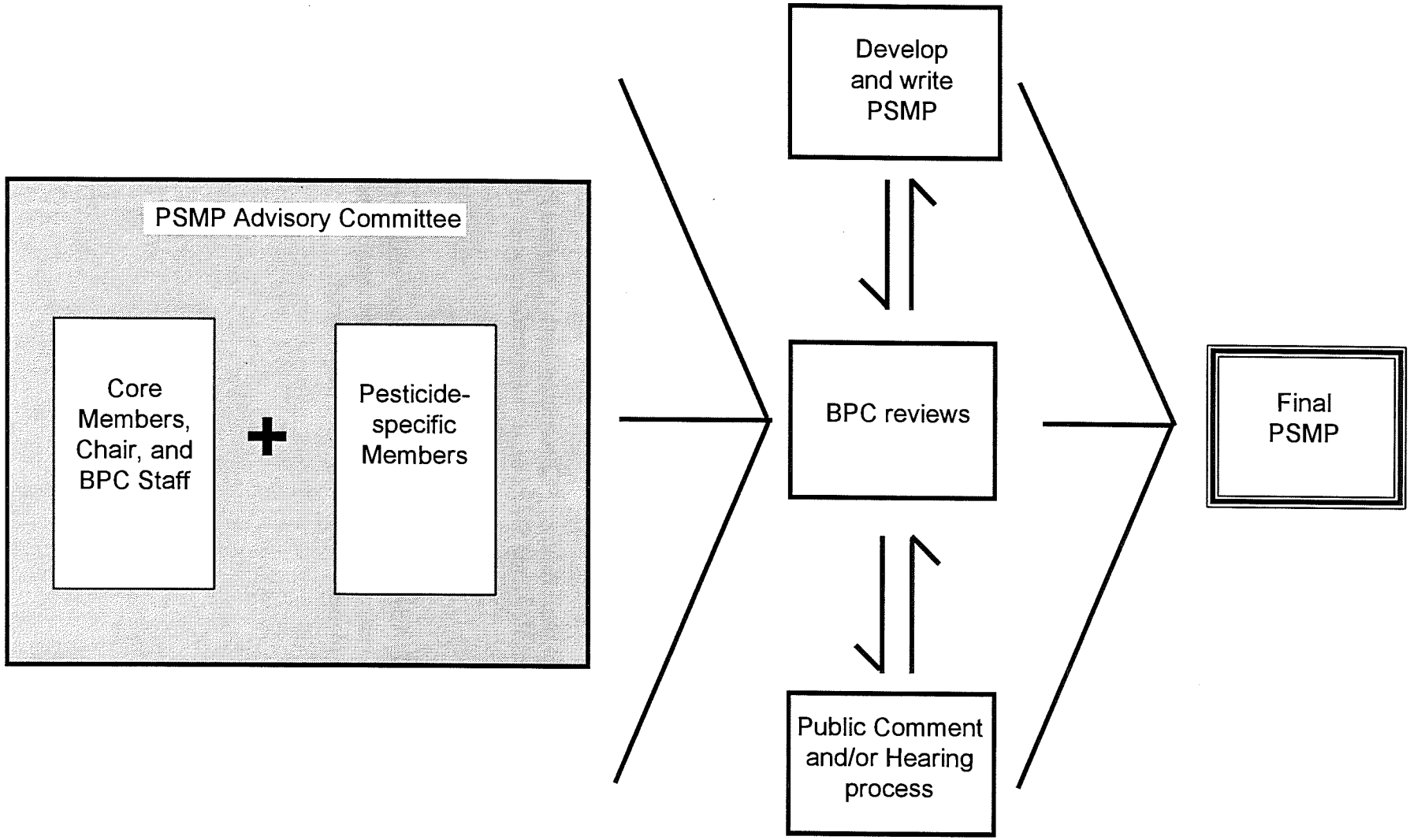


Figure D-1: Pesticide SMP Development Process

- available sales and use data in Maine,
- availability of efficacious chemical and non-chemical alternatives,
- environmental impact on Maine's ecosystem,
- practicality of changes in application practices,
- potential health impacts and the product's toxicity,
- geographic specificity of use which may yield identifiable geologic characteristics, and
- past groundwater monitoring data or the practicality of monitoring when no data exists.

Each Pesticide SMP Advisory Committee will biannually (or sooner) review its respective Pesticide SMP, as new information necessitates a re-evaluation of the prevention and response strategies adopted in the Pesticide SMP. Each Committee may then recommend changes to the BPC. For pesticides which do not have a EPA-mandated Pesticide SMP, a Committee may recommend that the Board proceed with development of one.

Term

Core members of the Pesticide SMP Advisory Committee will be appointed by the BPC for three (3) years of service with terms to be staggered. Pesticide-specific members will not be members in standing and will be called upon, as needed, in the development of Pesticide SMPs.

Meetings

An entire Pesticide SMP Advisory Committee, both Core and Pesticide-specific members, will meet as EPA requires Pesticide SMPs or at the specific request of the BPC.

Compensation

The Pesticide SMP Advisory Committee is voluntary and no compensation for services is available. However, all reasonable travel expenses will be reimbursed, subject to the approval of the staff director, in a manner consistent with State travel.

Well ID: _____

☐ New ☐ Resample

WATER SAMPLE INFORMATION SHEET

Maine Board of Pesticides Control
333 Deering Building, Station 28
Augusta, Maine 04333-0028
Telephone: (207)287-2731

Section 1: Well Identification

7.5-min USGS map: _____

Name: _____

Physical location/directions to well: _____

Mailing Address: _____

_____

_____, ME _____

Section 2: Well Use and Construction Information

Well Use: PUBSP DMSTC IRRIG MONWQ UNUSD OTHER_____

Well Construction: DUG DRIVEN DRILLED SPRING OTHER_____

Well Depth at completion: _____ F ☐ Unknown

Depth of casing: _____ F ☐ Unknown

Is the well screened? Y N Screened Intervals (Top)_____F (Bottom)_____F ☐ Unknown
(Top)_____F (Bottom)_____F

Section 3: Sample Information

Sample Control Number: _____ Sample Time: _____EST

Analyses to be conducted: SP1 SP2 SP3 SP4 SP5 SP6 TQ1 TQ2 NO3N NO2N

Section 4: Pesticide Use Information

Crop/Site: _____ Distance to Treated Area: _____F

Is the well located ABOVE BELOW AT SAME elevation to treated area?

Section 5: Comments

Section 6: Sample Authorization

Well Owner/User: _____ Title:_____

Sampled By: _____ Date:_____

Relinquished by:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Additional Water Sampling Site Information

Well ID: _____ Name: _____

7.5-min USGS map: _____

Section A: Gegraphic Location

Latitude: (__) __ __ __ __ __ __ . __ [+/- DDMMSS.S] Accuracy: +/-2.00

Longitude: (__) __ __ __ __ __ __ . __ [+/-DDMMSS.S] Accuracy: +/-2.00

Altitide: (__) __ __ __ __ __ F [+/- XXXXX F]

Altitude Measuring Point: __L__ [L=land or ground surface]

Method of Determining Latitude/Longitude/Altitude: __MAP__
[MAP=digital or manual interpolation from a map or photo]

Map Information

Reference Datum

North American Datum Year: __ __ [YY - 27/83]

National Reference Datum for Altitude: __ __ [YY - 29/88/00]

Scale of Map: ___24,000___ [1:24,000 scale]

State FIPS Code: __ME__

Maine GEOCODE: __ __ __ __ __ [See attached list]

Section B: Well Log Information

Well log: ___U____

A=Acoustic
C=Caliper
D=Driller's
E=Electrical
G=Geologist's/Engineer's
R=Radioactive
T=Temperature
V=Video
U=Unknown

Section C: Other Observations/Comments

Inspector's Name: _____ Date: _____

APPENDIX F

PESTICIDE DRINKING WATER GUIDELINES

(all units are parts per billion)

Common Name	MEG[37]	MCL[38]
Acifluofen	10	
Alachlor	2	2
Aldicarb	2	7[a]
Aldicarb sulfone		7[a]
Aldicarb sulfoxide		7[a]
Ametryn	60	
Amiben	105	

---

[37]"Summary of State and Federal Drinking Water Guidelines", Maine Department of Human Services, Bureau of Health, Environmental Toxicology Program, revised September 1992.

The Maximum Exposure Guidelines (MEGs) are health-based guidelines intended to help risk managers, homeowners, and others make decisions regarding the suitability for human consumption of drinking water contaminated by chemicals.

The MEG for a carcinogenic compound in drinking water is the concentration of that compound in drinking water that is expected to result in a maximum lifetime cancer risk of one additional cancer case per 100,000 individuals. The MEG for a non-carcinogenic compound in drinking water is the concentration of that compound in drinking water below which no adverse health effects are expected to occur over a lifetime of exposure.

This MEG list has not been promulgated by rule-making and therefore the MEGs are not legally enforceable drinking water "standards". The MEGs represent the Bureau of Health's most recent recommendations for maximum levels of contaminants in drinking water. (Dr. Robert A. Frakes, State Toxicologist, October 1992.)

[38]"Drinking Water Regulations and Health Advisories," Office of Water, U.S.Environmental Protection Agency, Washington, D.C., December 1993.

APPENDIX F

PESTICIDE DRINKING WATER GUIDELINES (cont.)

Common Name	MEG	MCL
Ammonium Sulfamate	1500	
Atrazine	3	3
Azinphos-Methyl	25	
Baygon	3	
Bentazon	17.5	
Bromacil	25	
Butachlor	20	
Butylate	360	
Captan	100	
Carbaryl	164	
Carbofuran	40	40
Carboxin	700	
Chlordane	0.27	2
Chlorothalonil	15	
Cyanazine	1	
2,4-D	70	70
Dacthal	3500	
Dalapon	200	200
DDT	0.83	

APPENDIX F

PESTICIDE DRINKING WATER GUIDELINES (cont.)

Common Name	MEG	MCL
Diazinon	0.63	
Dibromochloropropane	0.2	0.2
Dicamba	200	
1,2-Dichloropropane	5	5
1,3-Dichloropropene	2	
Dieldrin	0.02	
Dimethrin	2100	
Dinitrophenol	31	
Dinoseb	2	7
Diphenamid	200	
Diquat	20	20
Disulfoton (Disystox)	0.3	
Diuron	14	
Endothall	140	100
Endrin	2	2
Ethylene dibromide (EDB)	0.005	0.05
Ethylenethiourea (ETU)	3	
Fenamiphos	1.8	
Fluometuron	90	

APPENDIX F

PESTICIDE DRINKING WATER GUIDELINES (cont.)

Common Name	MEG	MCL
Folpet	320	
Fonofos	14	
Glyphosate	700	700
Heptachlor	0.08	0.4
Heptachlor Epoxide	0.04	0.2
Hexachlorophene	2	
Hexazinone	210	
Lindane (BHC)	0.2	0.2
Malathion	40	
Maleic Hydrazide	3500	
Maneb/Mancozeb/Zineb	10	
MCPA	2.5	
Methomyl	50	
Methoxychlor	100	40
Methyl Parathion	2	
Metolachlor	100	
Metribuzin	175	
Oxamyl	175	200
PCNB	71	

APPENDIX F

PESTICIDE DRINKING WATER GUIDELINES (cont.)

Common Name	MEG	MCL
Paraquat	30	
Parathion	8.6	
Pentachlorophenol	1	1
Phorate	0.2	
Picloram	300	500
Prometon	100	
Pronamide	50	
Propachlor	92	
Propanil	40	
Propazine	14	
Propham	120	
Resorcinol	140	
Rotenone	4	
Simazine	4	4
2,4,5-T	70	
Tebuthiuron	500	
Terbacil	90	
Terbufos	0.9	
Thiram	10	

APPENDIX F

PESTICIDE DRINKING WATER GUIDELINES (cont.)

Toxaphene	0.3	3
2,4,5,-TP (Silvex)	1	50
2,4,6-Trichlorophenol	700	
Trifluralin	2	
Ziram/Ferbam	25	

MEG = State of Maine Maximum Exposure Guideline
MCL = U.S. EPA Maximum Contaminant Level
[a]MCL is currently in proposed status

APPENDIX G

Executive Summary from "POLICY FOR IDENTIFYING AND ASSESSING THE HEALTH RISKS OF TOXIC SUBSTANCES"[39]

Since the inception of its Environmental Health Unit in 1981 (M.R.S.A., 1981), the Maine Bureau of Health has become increasingly involved with conducting and evaluating risk assessments. With this responsibility has come the growing need for the Maine Bureau of Health to develop a risk assessment policy. This document describes the issues of potential concern in risk assessment, and the Bureau's policies regarding how these issues should be addressed.

The policy consideration contained in this document are guided by three basis principles: 1) that uncertainties associated with the assessment of health risk should be reflected by a conservative approach towards the protection of public health, 2) to the extent feasible, all relevant data should be evaluated in the assessment process, and 3) that risk assessments should reflect the best scientific understanding of chemically related health effects. Conformity to these principles results in a dynamic approach to risk assessment while ensuring that the public is given adequate health protection.

Risk assessments consists for four basic steps: exposure assessment, hazard identification, hazard assessment, and risk characterization. Within the first three risk assessment steps, specific parameters need to be evaluated. These parameters provide the basis for an overall characterization of risk. It is in the evaluation of these parameters that specific risk assessment policy choices must be made. Criteria are either followed or established to provide guidance in making these choices. Inadequacies identified in this process are incorporated into the recommendations for further study.

Risk assessment policy issues begin with defining the scop of the assessment and, subsequently, with the procedures by which studies are identified and selected for evaluation. The goal of identifying and reviewing all relevant data must be weighed against the limitations of data availability and the extent to which resources can be devoted to the assessment. The procedure should indicate how priority is given to studies critical to key risk assessment issues and specify those studies which were selected for review by could not be retrieved.

Studies selected for risk assessment are used to identify and evaluate key exposure and health parameters. Because this process generally requires information from several lines of investigation, it is important that the selection process identify different types of studies as well

---

[39]Anderson, Norman T., "Policy for Identifying and Assess the Health Risks of Toxic Substances," Environmental Toxicology Program, Division of Disease Control, Bureau of Health, Maine Department of Human Services, February 1988, pp. x-xi.

as different risk assessment parameters. Exposure parameters need to be evaluated for different environmental media and for different exposure routes. Relevant exposure information may come from either monitoring or modelling studies. Health parameters should describe effects as a function of exposure duration and exposure dose. Relevant health information may come from epidemiological studies, controlled human exposure studies, animal studies, and cell culture studies.

Studies reviewed in the exposure assessment are used to determine how much is known about the extent and magnitude of population exposure. Studies reviewed in the hazard identification section are used to determine what is known and what needs to be known about the hazard potential of a chemical. Estimates of the health risks, which are derived in the hazard assessment section, need to consider both what is known and what is not known. Specific areas of uncertainty considered in the exposure assessment and hazard assessment sections should be identified. In addition, [the] manner in which these uncertainties are quantitatively or qualitatively addressed should be specified. The distinction between the contributions of the empirical findings and those of the uncertainty factors to the risk estimates should be clearly made in the assessment.

The findings of the hazard assessment section are commonly expressed quantitatively in terms of action levels. Exposures greater than the action levels indicate a basis for health concern; exposures less than the action levels indicate and insignificant health risk. For threshold effects, action levels are estimates of no adverse effect levels for the general population. For non-threshold effects, such as carcinogenesis, any level of exposure is associated with some degree of risk. Action levels for non-threshold effects thus depend on the level of risk which society is willing to assume. In the absence of specific risk management policy guidance, exposure doses corresponding to lifetime cancer risks of 10^{-5}, 10^{-6}, and 10^{-7} should be presented in the risk assessment. The action level is the exposure dose corresponding to a lifetime cancer risk of 10^{-5}. In the risk characterization section, the action levels for threshold and non-threshold effects are compared with the exposure estimates to determine whether a current or projected exposure warrants a significant health concern.

The derivation of action levels relies on the use of reasonable worst case assumptions for estimating the health risks associated with chemical exposure. By using worst case assumptions, a plausible upper bound can be set on the estimation of uncertainty. Uncertainty exists in both the exposure assessment and the hazard assessment. Worst case assumptions thus need to be developed in both of these steps, as well as in the final, risk characterization step. Given the uncertainties associated with risk estimation, risk assessments may also describe approaches using less conservative assumptions. Unless these alternative assumptions reflect a greater certainty in the estimation of the actual exposure and toxicity, however, estimates based on these less extreme assumptions lack the scientific confidence necessary to ensure that the public's health is adequately protected.

After the risk assessment has been completed and sufficiently reviewed, its findings should be communicated to the appropriate agencies or individuals. While a procedure exists for chemicals evaluated in the Hazardous Air Pollutant Program, risk assessments dome for other purposes have no defined risk communication procedures. The development of such procedures would enhance the effectiveness of risk assessment as a tool in public policymaking.

ADOPTED 9/19/84
AMENDED 9/7/90

APPENDIX H

BOARD OF PESTICIDES CONTROL ENFORCEMENT PROTOCOL

The Board adopts the following enforcement protocol to be utilized in routine enforcement matters arising under the Board's statutes and regulations.[40]

1. Persons wishing to report potential violations should refer such matters, as soon and in as much detail as possible, to the Board's staff. Where such reports are submitted by telephone, the Board requests that confirmation be made in writing. As a general rule, where requested by the individual making the report, the Board shall keep the identity of that person confidential, except as the Attorney General may advise in a particular case that such information is subject to public disclosure under the Maine Freedom of Access Law.

2. As soon as practicable after receipt of a report of a potential violation, the Board's staff shall investigate. The precise method and extent of investigation shall be at the discretion of the staff, considering the potential severity of the violation and its consequences, the potential the violation may have for damage to the environment or human health, and other matters which may place demands upon staff resources at the time.

3. Following staff investigation, if the staff determines that a violation has occurred of sufficient consequence to bring the matter to the attention of the Board, the staff shall prepare a written report. Copies of the report shall be mailed to the alleged violator and any complainants so they may make comments. The report and any comments will then be distributed to the Board prior to their next available meeting.[41] The staff will also notify the alleged violator and other involved parties about the date and location of the meeting at which the alleged violation will be considered by the Board.

---

[40]In emergency or other unusual situations, the Board and/or its staff may depart from this protocol, in a manner consistent with State law, when necessary to the handling of particular enforcement actions.

[41]In certain instances involving minor violations in which the violator freely admits guilt and willingness to pay a fine, the Board's staff may discuss terms of resolution with the Attorney General's office and then with the violator without first reporting the matter to the Board, provided that such terms shall be subject to the Board's subsequent review and approval, as provided in Section 6b.

4. At the Board meeting, the Board shall hear from its staff and, if requested, from the alleged violator(s) and/or their attorneys, as well as from other interested members of the public, to the extent reasonable under the circumstances and in a manner which the Board's chairman shall direct. Ordinarily, such a meeting will not be conducted as a formal adjudicatory hearing. Before making a decision regarding any action(s) which it may wish to take in response to an alleged violation, the Board may choose to go into executive session to discuss with its counsel the various enforcement options available to it and other related matters which are not subject to public disclosure under the Freedom of Access Law. However, all Board decisions shall be made on the public record and not in executive session.

5. Following receipt of the staff report and other information presented to it and completion of whatever further inquiry or deliberations the Board may wish to undertake, the Board shall make a decision regarding which course(s) of action, as described in Section 6, it deems appropriate in response to the alleged violation. Any such decision will ordinarily be based upon the Board's judgment as to whether a violation of its statutes or regulations appears to have occurred which is of sufficient consequence to warrant an enforcement action, but shall not require that the Board be satisfied to a legal certainty that the alleged violator is guilty of a particularly defined violation. In disputed matters, the ultimate decision as to whether a violation is factually and legally proven rests with the courts.

6. If the Board makes the determination that a violation appears to have occurred which warrants an enforcement action, the Board may choose among one or more of the following courses of action:

a. In matters involving substantial violations of law and/or matters resulting in substantial environmental degradation, the Board may refer the matter directly to the Attorney General for the initiation of enforcement proceedings deemed appropriate by the Attorney General. Also, with regard to more routine violations with respect to which the Board finds sufficient legal and/or factual dispute so that it is unlikely that an amicable administrative resolution can be reached, the Board may choose to refer the matter directly to the Attorney General.

b. On matters warranting enforcement action of a relatively routine nature, the Board may authorize and direct its staff to enter into negotiations with the alleged violator(s) with a view to arriving at an administrative consent agreement containing terms (including admissions, fines and/or other remedial actions) which are satisfactory to the Board, to the Attorney General and to the alleged violator(s). The Board will not ordinarily determine in the first instance the precise terms which should be required for settlement but may indicate to the staff its perception of the relative severity of the violation. In formulating a settlement proposal, the staff shall take into consideration all of the surrounding circumstances, including the relative severity of the violation, the violations record

and other relevant history of the alleged violator(s), corrective actions volunteered by the alleged violator(s) and the potential impact upon the environment of the violation. The staff shall consult with the Attorney General's office before proposing terms of settlement to the alleged violator(s). Following successful negotiation of an administrative consent agreement with the alleged violator(s), the staff shall report back to the Board the terms of such agreement for the Board's review and, if it concurs, ratification. All administrative consent agreements shall become final only with the Board's and the Attorney General's approval.

c. In the event that an administrative consent agreement cannot be arrived at as provided in paragraph b., the staff shall report the matter back to the Board for further action by it. Such action may include referral to the Attorney General for appropriate action.

d. In addition, in appropriate cases, the Board may act to suspend the license of a certified applicator as provided in its statute, may act to refuse to renew the license of a certified applicator and/or may request that the Attorney General initiate proceedings in the Administrative Court to revoke or suspend the license of any such applicator. Where provided for by its statute, the Board shall give the licensee involved the opportunity for a hearing before the Board in connection with decisions by it to refuse to renew a license or to suspend such license.

7. Whereas the Board is establishing this protocol in order to clarify and facilitate its proceedings for the handling by it and its staff of enforcement matters, the Board recognizes that the Attorney General, as chief law enforcement officer of the State, may independently initiate or pursue enforcement matters as he deems in the best interests of the State and appropriate under the circumstances.

APPENDIX I

SUMMARY OF PUBLIC COMMENTS

On September 14, 1993, the Board of Pesticides Control (BPC) mailed 148 copies of the *Maine Generic State Management Plan for Pesticides and Ground Water - Proposed Plan* to Ground Water Planning Committee members and others who, during the last three years, had expressed an interest in the development of the plan. This began a three-month, public comment period that invited review and critique of the plan. Following a news brief in the October 1993 *BPC Communicator,* fifteen additional copies were mailed out upon request while numerous individuals stopped by to pick up a copy at the BPC Augusta office. In all, a total of 240 copies of the plan were distributed.

Three public informational gathering meetings were then scheduled at locations around the state. A press release advising of the availability of the plan and public meeting schedule was mailed to all the major newspapers. Public meetings were held in Machias on November 4, 1993 (one in attendance), in Presque Isle on November 9 (fourteen in attendance) and Lewiston on November 16 (two in attendance). In general, those present at the meetings asked questions about the proposed plan and other topics while only one individual offered a couple of minor comments. Two articles concerning the meetings and the plan appeared in the *Bangor Daily News* in late October and early November.

Eight individuals submitted written comments on the plan prior to the December 15 close to the comment period. Many of these applauded the planning process and its results. Two sets of comments were largely editorial in nature. There were no identifiable trends or recurring themes to the comments. Specific comments of a substantive nature are as follows.

Commenter	Comment(s)	Response
Steven Pinette, Ground Water Specialist Maine DEP	Expressed concern that many licensed applicators may be relatively ignorant of important hydrogeologic principles and may be more familiar with some potentially dangerous groundwater folklore. Emphasize the importance of education starting with fundamental principles.	The BPC and UMCE have been training applicators on ground water protection principles since the late 1980's. Both are pledged in this plan to continue to educate growers about ground water protection using a variety of approaches (pp. 47-53).

Commenter	Comment(s)	Response
Esther Lacognata Public policy Consultant	Believes that systematic monitoring is critical because the plan is based on reaction to detection. If we don't initiate proactive monitoring, we aren't doing anything different. Supports firmer commitment to fund general monitoring program.	The plan describes stratified random sampling program which would periodically provide a baseline assessment of ground water in pesticides use areas (pp. 63-34). The first sampling program of this type was conducted in March/April 1994. This element reflects a proactive approach to ground water monitoring. However, federal grant funds are the only monies currently committed to monitoring projects.
Richard Stevenson Sr. Modern Pest Control	Concerned about having a public member of the Board chair the Pesticide SMP Advisory Committee, believes their environmental background will bias the outcome. Suggests having a co-chair representing a responsible user group.	The composition and possible biases of the Pesticide SMP Advisory Committee were discussed at length. The purpose of a Pesticide SMP Advisory Committee is to make recommendations to the BPC, a seven-member group representing all interests. Final decisions remain with the Board, not the Pesticide SMP Advisory Committee.

Commenter	Comment(s)	Response
Glenn Nadeau Maine Public Service Co. (electrical utility)	1) Cautioned about developing restrictions by soil type since not all the state is mapped. Also pointed out that right-of-way applicators would encounter widely varying soil types. 2) Believes Special Restrictions (pg. 56) should be site specific in nature.	1)Appendix D lists the issues which a PSMP Advisory Committee must consider when developing recommendations. These issues will be considered. 2)It is neither technically nor financially possible, or warranted, to implement solely site-specific measures in all cases. Site-specific considerations are left to the Limited Use Permit system (pp. 58).
Michele Notarianni Robert Koethe EPA Region I Office	1) Plan needs clarification on how Well Head Protection Areas will factor into Maine's approach to protecting ground water (pg. 34). 2) Plan needs to state how NPURG will be used to set priorities and determine management measures (pg.35).	1)The Well Head Protection Program has yet to be finalized by the Department of Human Services (DHS). The BPC, however, has been working in close cooperation with DHS on investigating instances of pesticide contamination of public water supplies and will continue to offer whatever assistance is needed (pp. 15, 20-21). 2)NPURG will help evaluate chemicals and uses with potential for ground water contamination. This will help the BPC prioritize its monitoring effort among the commodities and uses.