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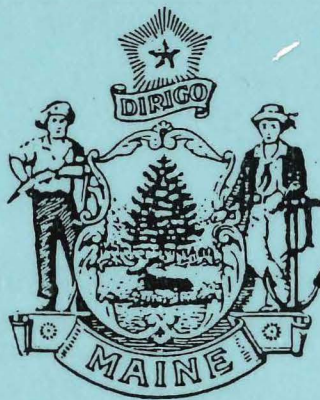
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MAINE GROUNDWATER MANAGEMENT STRATEGY



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MAINE GROUNDWATER MANAGEMENT STRATEGY

June 1989



Ground Water Standing Committee



Prepared by Paul W. Dutram
State Groundwater Coordinator

AUG 6 1990



STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA, MAINE
04333

JOHN R. MCKERNAN, JR.
GOVERNOR

August 2, 1989

Mr. Robert E. Mendoza, Chief
Ground Water Management Section
Water Management Division
United States Environmental Protection Agency
Region I
John F. Kennedy Federal Building
Boston, Massachusetts 02203-2211

Dear Mr. Mendoza:

I am pleased to submit the Maine Groundwater Management Strategy in conformity with the requirements of the federal Clean Water Act.


I believe the public interest is best served by a clear and comprehensive groundwater strategy that coordinates and directs all state groundwater efforts to assure that these essential resources are utilized to their best and fullest extent. I am sure you will find that the Maine Groundwater Management Strategy sets forth the necessary elements for a sound groundwater management program to protect, conserve and manage the state's groundwaters.

By their signatures, the appropriate members of the Maine Land and Water Resources Council concur with the Maine Groundwater Strategy as the groundwater management program of the state and as the state's articulation of groundwater policy. The signatory agencies will implement the Strategy through appropriate administrative and legislative means.

The Groundwater Standing Committee of the Maine Land and Water Resources Council will oversee the implementation of the Strategy and produce biennial updates in accordance with federal statute.

I hope you will join with me in recognizing the Maine Groundwater Management Strategy as a milestone in the state's wise management of its natural resources, especially the clean groundwater supplies that are essential to the health and welfare of Maine citizens and the continued vitality of Maine's economy.

Sincerely,



John R. McKernan, Jr.
Governor

JRM/rds





STATE OF MAINE
EXECUTIVE DEPARTMENT
LAND AND WATER RESOURCES COUNCIL

JOHN R. McKERNAN, JR.
GOVERNOR

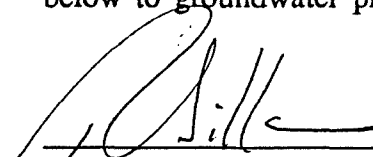
RICHARD H. SILKMAN
CHAIRMAN

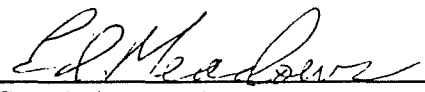
Governor John R. McKernan, Jr.
State House
Augusta, Maine 04333

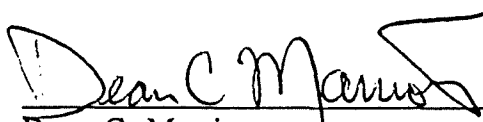
Dear Governor McKernan,

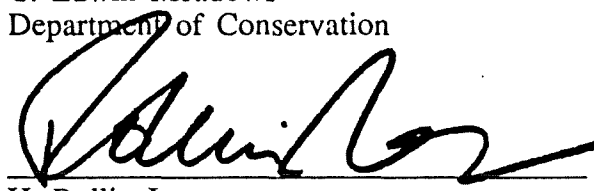
The appropriate members of the Maine Land and Water Resources Council concur with the Groundwater Management Strategy developed by the Ground Water Standing Committee.

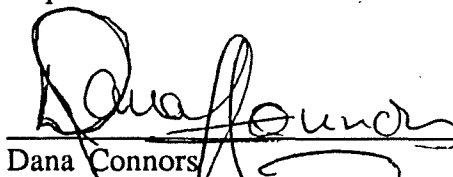
The Strategy represents the continuing commitment of the State agencies represented below to groundwater protection and management in Maine.

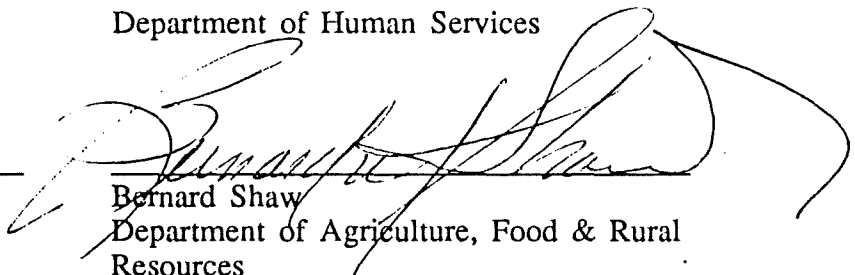

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STATE OF MAINE
EXECUTIVE DEPARTMENT

GROUND WATER STANDING COMMITTEE

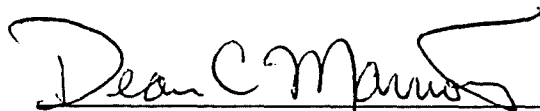
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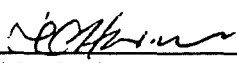
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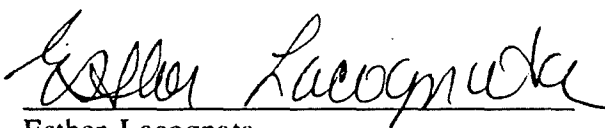
Dear Governor McKernan,

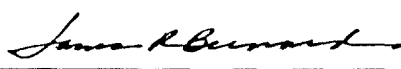
The Ground Water Standing Committee is pleased to present the first Maine Groundwater Management Strategy for your approval. This Strategy was the goal of a process begun in 1985 to address all facets of groundwater management including groundwater protection, use, classification, health risk assessment, education, and the interagency coordination necessary to make programs work. The Strategy has become a federal requirement, however, it has always been a state goal. This Strategy addresses ten areas of groundwater management, as suggested by the National Groundwater Policy Forum and the U.S. EPA: 1) program coordination, 2) research, 3) classification, 4) data management, 5) contamination controls, 6) compliance evaluation and enforcement, 7) technical assistance, 8) emergency response, 9) education, and 10) public involvement. The Strategy is a dynamic plan that identifies the State's goals for groundwater management and protection. It will serve as a general guide to outline the development and implementation of State groundwater management programs. It will be modified each biennium as our work continues.

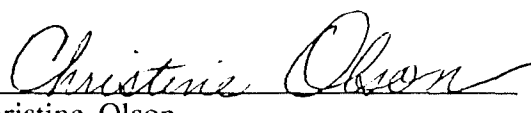

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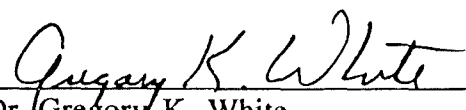

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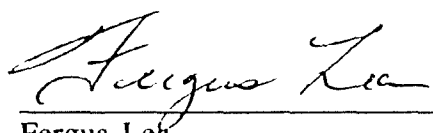

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The Ground Water Standing Committee wishes to acknowledge past members of the Committee and their staff, and subcommittee representatives of state agencies and public interest groups, whose dedication to this effort was instrumental in producing this Strategy.

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FORWARD

Following three years of intensive effort by the broadest assemblage of state, business, and public interest group representatives ever to work on a state policy, this State Groundwater Management Strategy represents Maine's plan for managing its most precious natural resource. This State Groundwater Management Strategy was begun following recognition of the need to coordinate a multitude of state groundwater programs, and later became a requirement of the federal Clean Water Act. Its format was defined as a result of the latter. Its substance was substantially left to the discretion of the state, following modern precepts of groundwater management.

The Strategy's ten major elements are interdependent and necessary parts of a whole. Each depends upon the implementation of the others. Each is vitally important. Together, they will ensure the continued availability of clean groundwater for the growing needs of our state.

The Strategy is a dynamic document. It will be reviewed and updated every two years to reflect progress, new challenges and the state's actions to meet them. This two year cycle is necessitated by Maine's biennial legislative process. The Strategy reflects current state efforts and those to be accomplished within the next two years. It identifies unaddressed opportunities for better management of the resource. As such, it will be obvious to the reader that all the issues have not yet been addressed, all the problems have not yet been solved. Future iterations of the Strategy will mark our progress in groundwater management.

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MAINE GROUNDWATER MANAGEMENT STRATEGY

I. INTRODUCTION

Status of Maine's Groundwaters

More than sixty percent of Maine households draw their drinking water from groundwater, supplied by means of private wells, public wells or springs. Approximately sixty percent of the water needs of Maine's livestock are supplied by groundwater. Industrial self-supplied groundwater use is only slightly less than public and private drinking water withdrawals combined. Increased federal treatment requirements for surface waters used for public water supplies are increasing the shift to groundwater for use in public water supplies. Although most of Maine's groundwater is still of high quality, the growth and dispersion of Maine's population and associated land use activities are threatening the quality of Maine's groundwater resources and increasing the need for potable groundwater.

Numerous contaminated pockets of groundwater exist within Maine in association with a variety of land uses. For a majority of these sites, the full extent of the contamination has not yet been determined. These pockets, including attenuation zones surrounding residential subsurface wastewater disposal systems, are estimated to contaminate at least 1% of Maine's total land area (A Report on Indirect Discharges in Maine, DEP, 1988). Virtually all of this contaminated groundwater, however, lies under the unforested portions of the State (11% of the land area), where most of Maine's population resides.

The discovery in 1979 of about forty private wells in East Gray contaminated by hazardous waste marked the beginning of a tremendous increase in statewide concern for groundwater protection. Hazardous wastes have been discovered at approximately 150 sites, eight of which are currently Superfund cleanup sites. Other contaminated groundwaters underlying waste lagoons, landfills and sludge disposal sites have also been documented. Aging underground fuel storage tanks and road salt storage areas threaten groundwater quality in nearly all of Maine's populated areas. Pesticide use in agriculture has also become a concern.

At the same time, competition for potable groundwater is growing in areas not favorably blessed with abundant resources, particularly in coastal Maine. New home construction is expanding faster than the public water supply infrastructure. Recourse to private wells is not always feasible as the extent and yield of the coast's bedrock aquifers are seldom known. Salt water intrusion due to overuse of the groundwater resource in developing areas is becoming more prevalent. Other natural contaminants, such as iron and radon, limit the use of some bedrock formations. Conflicts between public water districts, private well owners, and commercial interests are growing. Suitable supplies for future needs and growth are not always apparent. The possibility of large interbasin and interstate transfers of water introduces additional competition and policy issues.

State Groundwater Goals, Policies and Principles

State Enabling Legislation

The Legislature adopted the State Groundwater Protection Program in 1979 (38 MRSA §401-403). The initial effort was directed towards mapping of sand and gravel aquifers, however, Legislative intent regarding groundwater protection and management is explicit.

§401. Findings; purpose

The Legislature finds and declares that the protection of groundwater resources is critical to promote the health, safety and general welfare of the people of the State. Aquifers provide a significant amount of the water used by the people of the state. Aquifers and aquifer recharge areas are critical elements in the hydrologic cycle. Aquifer recharge areas collect, conduct and purify the water that replenishes aquifers.

The Legislature further finds and declares that an adequate supply of safe drinking water is a matter of the highest priority and that it is the policy of the State to protect, conserve and maintain groundwater supplies in the State.

The Legislature further finds and declares that groundwater resources are endangered by unwise uses and land use practices.

The Legislature further finds and declares it to be the purpose of this Article to require classification of the state's groundwater resources.

The Legislature further finds and declares that there are numerous existing state agencies, commissions, boards or similar entities administering various statutes and programs relating to groundwater. Because of the importance of groundwater to the safety and well-being of the State, there is an urgent need for the coordination and development of the programs to assess the quality and quantity of and to protect groundwater.

It is the intention of the Legislature that the Bureau of Geology provide coordination and development programs for the collection and analysis of information relating to the nature, extent and quality of aquifers and aquifer recharge areas.

It is further the intention of the Legislature that existing programs related to groundwater continue in their present form and that the Department of Environmental Protection provide coordination for the protection of groundwater through existing statutes and regulations.

§402. Research

The Bureau of Geology in cooperation with the Department of Environmental Protection, is authorized to conduct research and studies to determine recharge and cleansing rates of groundwater in different sand and gravel and bedrock formations.

§403. Groundwater quality

1. **Legislative intent.** The Legislature finds that sand and gravel aquifers are important public and private resources for drinking water supplies and other industrial, commercial and agricultural uses. The groundwater in these formations is particularly susceptible to contamination by pollutants and, once polluted, may not recover for hundreds of years. It is the intent of the Legislature that information be developed which shall determine the degree that the state's sand and gravel aquifers have been contaminated and shall provide a base of knowledge from which decisions may be made to protect the aquifers.

2. **Determination of groundwater quality.** The Department of Environmental Protection and the Department of Conservation shall delineate the primary recharge areas for all sand and gravel aquifers capable of yielding more than 10 gallons per minute. Utilizing existing water supply information and well drilling logs, the Department of Environmental Protection and the Department of Conservation shall determine depth to bedrock, depth to water table, surficial material stratigraphy and generalized groundwater flow directions of the aquifers. The Department of Environmental Protection and the Department of Conservation shall also determine the extent and direction of contamination plumes originating from distinct sources within each area studied. The primary recharge areas, flow directions and contamination plumes are to be shown on maps of a scale of 1:50,000.

In 1987, primacy was given to beneficial domestic use (38 MRSA §404), by establishing a means of legal recourse whenever any groundwater use, other than another domestic water supply well, interferes with a pre-existing domestic water supply well.

In 1988 the state prohibited the transportation of water in containers larger than 10 gallons beyond municipal boundaries where it is naturally located. Special permits and exemptions are given if the transportation does not threaten public health, safety, or welfare, if the water is not available at the proposed destination, or if failure to permit transportation would create a substantial hardship for the recipient (22 MRSA §2660-A).

Municipal Enabling Legislation

The Legislature gave further powers to municipalities to:

1. enact police power ordinances to provide for the protection and conservation of the quality and quantity of groundwater to promote the health, safety and general welfare of the public (30 MRSA §2151), and
2. adopt regulations governing the surface uses of sources of public water supply or land overlying groundwater aquifers used as sources of public water supply to protect their quality (22 MRSA §2642).

Establishment of Maine Ground Water Standing Committee

In establishing the Maine Ground Water Standing Committee in 1985, the Governor issued Executive Order #14, FY84/85 articulating the state's groundwater policy.

MAINE GROUND WATER POLICY

WHEREAS, groundwater supplies the drinking water for more than half of Maine's people, and is virtually the only source available to our rural residents; and

WHEREAS, serious incidents of groundwater contamination have endangered public health in Maine communities as diverse as Gray, Saco, Winthrop, and Houlton; and

WHEREAS, population growth in some areas of the State, coupled with increasing demand upon groundwater for uses other than domestic drinking water supply, may result in conflict over the allocation of the resources; and

WHEREAS, the future health and security of Maine's people and the continued vitality of our economy depend greatly upon abundant, clean groundwater supplies; and

WHEREAS, the groundwaters of Maine are a public resource, and their protection and management are proper subjects for the exercise of stewardship by the State; and

WHEREAS, implementation of the recommendations of the 1981 Ground Water Protection Commission, as well as other subsequent State and Federal groundwater initiatives, has entrusted specific and sometimes overlapping protection and management responsibilities to all levels of government; and

WHEREAS, the public interest is best served by a clear and comprehensive policy that will direct and coordinate all State groundwater protection and management efforts to assure that program staff, resources, and regulatory activities are targeted toward Maine's highest priority needs;

NOW, THEREFORE, I, JOSEPH E. BRENNAN, Governor of the State of Maine, establish the following statement of Maine Ground Water Policy:

It is the policy of the State of Maine to allocate, protect, and monitor Maine's groundwater resources, through measures which expand our knowledge of groundwater hydrogeology, protect public and environmental health, meet future water supply needs, and encourage a sound economy. Accordingly, the State shall:

1. Ensure that State groundwater priorities are responsive to changing conditions and related health risks, and assure that State groundwater programs are organized, coordinated, managed, and funded accordingly;
2. Ensure that waste disposal and other land use decisions are made only after full consideration of their likely impacts on groundwater;
3. When considering impacts, place greatest emphasis on protecting groundwater resources from contamination, thereby maintaining their fullest use;
4. Give highest priority for protection to significant aquifers -- both sand and gravel and bedrock -- which are found to be especially vulnerable, of regional significance, indispensable for drinking water supply or essential to the protection of sensitive ecological systems;

5. Assist municipalities and water suppliers in protecting locally important groundwater supplies;

6. Foster greater public awareness of the importance of groundwater, and provide information and technical assistance toward this end; and

7. Ensure consistent and equitable decisions related to the allocation of groundwater resources.

IT IS FURTHER ORDERED, that actions of Executive Departments and Agencies shall be consistent with the policy stated in this Order; and

IT IS FURTHER ORDERED, that independent regulatory, quasi-judicial, and judicial agencies shall receive a copy of this Order, and are urged to take action consistent with it; and

IT IS FURTHER ORDERED, that the Maine Land and Water Resources Council establish a Standing Ground Water Committee to oversee implementation of this policy.

State Principles

The Ground Water Standing Committee has developed the following groundwater principles for the State of Maine:

1. Prevention of groundwater contamination is better than cleanup, in terms of health, engineering and cost.
2. Because geologic factors cause considerable differences in yields and attenuative capacities, not all groundwater of usable quality is equally valuable or vulnerable to contamination.
3. A classification scheme offers the mechanism to offer special protection to that groundwater which, due to current or potential use, is most valuable.
4. A classification system offers municipal officials and developers information and a planning tool to anticipate development and protection needs.
5. Flow systems are the basic unit requiring protection. Flow systems include recharge areas (commonly hill tops and slopes) and discharge areas (near surface water or wells). Flow systems cut across mapped aquifer boundaries but can be defined by hydrologic analysis. Due to the extent of some flow systems, differential protection within a flow system may be warranted.
6. Geologic and hydrologic analysis is never complete. New information may require new decisions on classification. Lack of information demands strong protective measures.
7. Groundwater eventually discharges to surface water. Groundwater quality should not degrade surface water quality.

8. Threats to groundwater come principally from land use. Thus protection of groundwater requires land use controls commensurate with the current and projected demand for that groundwater.
9. Private water supplies are important groundwater resources and require adequate basic protection.
10. The burden of showing that compliance with the non-degradation goal and with groundwater quality protective measures is attainable rests with the applicant for development approval and should be determined prior to development approval.
11. Accidental leaks and spills of chemicals may pose as great or greater a threat to groundwater as regulated discharges from industrial, municipal, domestic or agricultural sources. Thus proper siting is good prevention.
12. There is a likelihood that areas of long-term industrial, commercial, or dense residential use may be underlain by contaminated groundwater. This in itself should not be justification for further contamination.

State Goal

Based on these findings and principles, the State of Maine declares its Primary Goal:

IT IS THE GOAL OF THE STATE OF MAINE TO PROTECT, CONSERVE, AND MANAGE MAINE'S GROUNDWATER RESOURCES TO PROTECT THE PUBLIC HEALTH, SAFETY, AND GENERAL WELFARE; TO MEET FUTURE WATER SUPPLY NEEDS; AND TO SUSTAIN ECONOMIC GROWTH.

State Policies

In achieving that goal, the following Policies are established:

Policy 1

There shall be no discharges of pollutants to groundwater 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 groundwater quality.

This policy is based on the recognition that certain normal human activities result in discharges to the soil and that local geologic deposits have various degrees of attenuative capabilities. In implementing this policy, local officials have to consider the extent to which these activities threaten the groundwater. For example, septic systems are currently expected to attenuate leachate within a "reasonably limited area," and the application of certain pesticides is prohibited within a buffer zone around existing wells. Similar standards should be reviewed and mandated for other potential pollution sources such as landfills, heavy oils leaking from underground storage tanks, certain stored hazardous wastes, and pesticide and fertilizer spreading.

Policy 2

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

This policy is based on the recognition that artificial cleanup of groundwater is expensive and, therefore, would be unrealistic to mandate in all cases.

Policy 3

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

Policy 4

The State Groundwater Classification System, with assessments of current and future groundwater use, should be used by State agencies, municipalities, and water districts in protecting groundwater 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 groundwaters in order to minimize damage.

Policy 6

Groundwater 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.

State Groundwater Management Strategy

The groundwater resource, like other important natural resources, requires wise management to ensure its best use in the present and its availability for the future. It may not be visible, but it can't be ignored or taken for granted. This State Groundwater Management Strategy was developed to accomplish the State's groundwater management goals and to implement the State's groundwater management policies. The State Groundwater Management Strategy describes the necessary elements for sound groundwater management. These elements are interdependent and are necessary parts of a whole. Each depends on the implementation of the others. Each is vitally important. Together, they ensure the continued availability of clean groundwater for the growing needs of our state.

The State Groundwater Management Strategy was submitted to the Governor's Land and Water Resources Council and the public for a fourteen day public comment period. Comments were addressed by the Ground Water Standing Committee. The Strategy was submitted to the Governor for signature.

The State Groundwater Management Strategy will be reviewed and updated every two years by the Policy Subcommittee of the Ground Water Standing Committee. A two-year action plan will be developed at the same time to implement elements of the Strategy.

Water Quality Management Responsibilities

The responsibility for groundwater management in Maine is distributed among eight state agencies and Maine's 495 municipalities. The lead regulatory agency with responsibility for groundwater protection is the Department of Environmental Protection. The Department of Human Services is responsible for the State's public drinking water supplies and regulation of septic systems. Groundwater research is the responsibility of the Maine Geological Survey (MGS) of the Department of Conservation and is also performed by the University of Maine's Land and Water Resources Center and the local office of the U.S. Geological Survey (USGS). The Department of Agriculture, Food and Rural Resources is responsible for pesticides control and soil and water conservation efforts; and the Department of Transportation is responsible for proper siting and construction of State and municipal sand-salt piles and roads. The Maine Association of Regional Councils coordinates the planning and technical assistance programs of the State's eleven regional planning agencies. The State Planning Office is responsible for coordination and implementation of the State's groundwater programs. The Department of Economic and Community Development is responsible for coordinating technical assistance to municipalities in furthering groundwater protection and management efforts. Municipalities carry out delegated functions, such as permitting of household septic systems, and are responsible for local protection efforts in connection with those facilities not regulated at the State level.

Water Quantity Management

Maine currently makes little attempt to regulate groundwater quantities used for any purpose. The right of capture and the ability to withdraw the required quantity have historically been the operative factors in a state where groundwater, until very recently, has been taken for granted. In 1987, the growing competitiveness for water was recognized. The Legislature authorized a study by the Public Utilities Commission (PUC) into the possibility of revamping the State's water rights and management framework. The State Groundwater Coordinator participated fully in this study as a representative of the Ground Water Standing Committee. The PUC drew on the expertise of the Departments of Environmental Protection, Human Services, and Agriculture, Food and Rural Resources, the State Planning Office, and the Office of the Attorney General in accomplishing its task. Both groundwater and surface waters were addressed.

The PUC report recommended that local management units (LMUs) be considered in each of Maine's significant river basins. These LMUs would draw the necessary technical assistance from State agencies, but would be responsible for assessing current and future supply and demand in their river basin and for drafting a water management plan that

addressed the needs in each river basin. The management plans would be reviewed and approved by a State authority. State permitting of new large quantity uses was recommended as was permitting of all new uses in stressed areas. Interbasin and interstate transfers of water would be addressed by the State authority.

In 1988, the Legislature authorized a Water Supply Study Commission to determine the necessary mechanism for water supply management. A report to the Legislature was made in February 1989.

The Commission recommended:

1. Formation of a two-year temporary Water Resources Management Board, which would:
 - a. recommend a permanent water supply management bureaucratic structure,
 - b. recommend the appropriate extent and level of state regulation of water use,
 - c. implement a strategy for coordinated collection of water supply and use data,
 - d. develop a strategy for coordination of state and local water supply management agencies,
 - e. recommend a process for adjudication of disputes over water use rights,
 - f. review the process for obtaining water rights under existing law and recommend changes,
 - g. recommend priority uses when supplies are inadequate,
 - h. catalog publicly granted water rights,
 - i. recommend a policy for inter- and intra-state water diversions,
 - j. recommend ways to improve and encourage conservation, and
 - k. develop technical assistance programs.
2. Participation in the National Water-Use Information Program.
3. A watershed boundary mapping project.

Legislation was introduced in 1989 to accomplish these recommendations. The Ground Water Standing Committee will continue to review the effort being made in this area and will provide advice, comments, and recommendations as necessary. Once a state water supply management program is implemented, this Strategy will be amended to reflect the necessary coordination.

II. PROGRAM COORDINATION

Ground Water Standing Committee

To effectively coordinate the State's diverse groundwater interests, an Executive Order was issued in 1985 that established a Ground Water Standing Committee under the State's Council on Maine's Environment (formally the Land and Water Resources Council). The position of State Groundwater Coordinator was also created in 1985 to staff the Standing Committee. The Coordinator's office is in and draws on the resources of the State Planning Office. The Ground Water Standing Committee is composed of the Commissioners and Directors (or their representatives) of the State Planning Office (SPO), the Departments of Agriculture (DAFRR), Conservation (DOC), Environmental Protection (DEP), Human Services (DHS), and Transportation (DOT), the University of Maine Land and Water Resources Center (L&WRC), and the Maine Association of Regional Councils (MARC). These Commissioners and Directors are responsible for the implementation of groundwater programs in their respective agencies. The Standing Committee maintains contacts with all public and private interest groups with groundwater concerns in the State and draws on their expertise in its deliberations.

The Ground Water Standing Committee is charged with:

- (1) ensuring the implementation of the State's groundwater management and protection programs;
- (2) advising the Governor, the Legislature, State agencies, and the public on sound groundwater protection and management policies and programs;
- (3) assessing priorities in the groundwater management program; and
- (4) assuring the cost-effective allocation of funding and staffing resources within State agencies involved in groundwater management.

The Ground Water Standing Committee meets as necessary (at least quarterly) to address proposals and new developments and to provide direction for the groundwater management effort.

The Standing Committee's Policy Subcommittee prioritizes groundwater management program requirements each year and schedules key activities that provide for increased protection and better management. The Policy Subcommittee develops and prioritizes draft groundwater legislation for each legislative session. The Policy Subcommittee is comprised of representatives of the eight State agencies of the Standing Committee and includes bureau directors of the Water, Land, and Oil & Hazardous Materials Bureaus of the DEP and a representative of the local USGS field office. Its membership is flexible and can be augmented when the need arises. The Policy Subcommittee was augmented, for example, to prepare this Strategy by including representatives of the Governor's Office, Legislative staff, and the U.S. Environmental Protection Agency. The Policy Subcommittee will provide review and updates of the State Groundwater Management Strategy, and a two-year action plan, every two years.

The day-to-day activities of the Standing Committee are carried out by the State Groundwater Coordinator, a groundwater hydrologist. The Coordinator oversees and assists in the implementation of all groundwater programs, ensures program coordination among State agencies, and acts as a source of technical and managerial expertise. He provides a statewide focus for communication and education efforts for a rapidly increasing number of organizations and citizens seeking information and assistance regarding groundwater issues. The Coordinator also tracks federal groundwater legislation and programs and provides a consistent state voice in federal decision-making procedures. He acts as Maine's representative in national and regional groundwater management efforts; and publishes The Water Tap newsletter of State and national groundwater news. The Coordinator's primary assistance is from a hydrogeologist position at the DEP and an engineering-hydrologist position at DHS. These three also enjoy the cooperation of the staff of MGS, and in particular its hydrogeologists.

Annual Coordinated Workplan

This Strategy and its revisions will serve as the framework for the State's Annual Coordinated Workplan. The Workplan will consist of individual workplans for each of the federal programs administered in Maine (groundwater elements of 106, UIC, 205j, Non-point Source Pollution Control, Wellhead Protection, Sole Source Aquifer, Public Water Supply, USGS Co-op, etc.), details of State groundwater programs to be undertaken, and summaries of groundwater legislation to be introduced. To meet federal and State Legislature deadlines, this Workplan will be prepared by the preceeding September 1 of each calender year. The Workplan will be the responsibility of the Policy Subcommittee of the Ground Water Standing Committee and will employ the staffs of the Subcommittee's members in its preparation.

Annual Legislative Package

The Policy Subcommittee of the Ground Water Standing Committee is responsible for recommending priorities for groundwater management and protection efforts and drafting necessary legislation for each legislative session. Each draft legislative proposal will be written by the agency with primary interest in its intent.

Agencies represented on the Ground Water Standing Committee will endeavor to present groundwater legislative proposals to the Executive and Legislative branches in a coordinated manner. Legislative proposals will be compiled by the Groundwater Coordinator, who will prepare a written briefing paper explaining the role of each piece of legislation in advancing the goals and programs of the State Groundwater Management Strategy. In this way the interdependence of, and need for, these legislative proposals may be succinctly presented.

The agency with primary interest will testify in behalf of the Ground Water Standing Committee at legislative hearings on groundwater bills. The Groundwater Coordinator will be available to the Legislature as an information source at any time, will attend work sessions on groundwater bills, and will track each bill through the legislative process. A summary of legislative action on groundwater bills will be prepared and distributed at the end of each legislative session.

III. GROUNDWATER RESEARCH

Hydrogeologic Investigations, Aquifer Mapping, Groundwater Monitoring

The Maine Geological Survey (MGS), the lead state agency for groundwater research, is currently conducting mapping programs for sand and gravel and fractured bedrock aquifers, and is responsible for studies of pesticides in groundwater in Maine. In cooperation with the Maine Geological Survey, the U.S. Geological Survey monitors long-term surface and groundwater levels in the State. A summary of these research projects is provided below.

Sand and Gravel Aquifer Mapping Project

The Significant Sand and Gravel Aquifers Mapping Project was initiated in 1981. This project, a cooperative effort by the Maine Geological Survey, the Maine Department of Environmental Protection, and the U.S. Geological Survey, has produced 27 maps showing aquifer boundaries, characteristics of the aquifers, and potential sources of contamination to the aquifers. Each map, published at a scale of 1:50,000, encompasses an area equivalent to nine 7.5 minute topographic maps. Reports accompanying these maps discuss the aquifer characteristics in detail, and assess water quality in the sand and gravel aquifers. The maps and reports have been used extensively for the siting of new landfills, gasoline storage tanks, and other potential groundwater contamination sources; as a basis for municipal groundwater protection zones; and as an aid in the exploration for new municipal or community water supplies. The maps are also used by well drillers and sand and gravel excavation contractors to aid their work.

Aquifer mapping was conducted in the York County area in 1981, in the Portland-Augusta-Farmington areas in 1982, in western Maine in 1983, in the Waterville-China area in 1984, in Hancock and Washington Counties in 1985, in northern Aroostook County in 1986, and in Waldo and Penobscot Counties in 1987-1988. Mapping is being conducted in the northern portion of Oxford County in 1989.

Identifying valuable aquifer areas is a primary means of preventing degradation of groundwater resources. The significant sand and gravel aquifer maps and texts contain a combination of information on aquifer characteristics and use, and indicate to local municipalities areas where groundwater resources need special protection.

Bedrock Aquifer Characterization

The bedrock aquifer characterization program was initiated as a pilot project in 1985, and was established as a systematic, long-term project in 1988. For this program, all known information on bedrock well characteristics in an area will be compiled; a lineament analysis of aerial photography will be performed to identify potential areas of intensely fractured bedrock; and brittle fracture analysis of selected areas will be completed, noting major fault/fracture locations. All of this information will be entered into the Geographic Information System computer data base. Information on well yields will be correlated with rock type, surficial geology, fracture traces, overburden thickness, and other factors. Those features found to have positive correlations with yield will be determined. In areas with these features, seismic, resistivity, gravity, and terrain conductivity surveys will be run.

If the geophysical information indicates highly fractured rock (irregular bedrock surface, high conductivity, low gravity) the area will be considered a potential high yield zone. To the extent funding allows, wells will be installed and tested to determine yield and aquifer properties, and to confirm geophysical methods.

In addition to determining the quantity of groundwater available, information on groundwater quality in bedrock aquifers will be obtained. This information will be used to establish baseline water quality conditions, to test for salt-water intrusion in coastal areas, and to monitor water quality in areas near potential contamination sources.

Characterizing fractured bedrock aquifers throughout the state will take at least 10 years. The pilot project was conducted in the Presque Isle area; work is currently being conducted in mid-coastal Maine.

Pesticides in Groundwater

From 1985 to 1987 the MGS, in cooperation with numerous state agencies and the USGS, conducted a statewide study of pesticides in groundwater. This study found a number of pesticides present in groundwater in Maine, particularly in bedrock wells near potato fields. However, values of all detectable pesticides were very low, and it was determined that pesticide use did not represent a widespread threat to groundwater in Maine. A report summarizing these findings is available from the MGS.

A more focused study correlating the detection of pesticide residues to hydrogeologic factors and agricultural management practices will be undertaken in the summer and fall of 1989. This study is being jointly funded and conducted by the MGS, DAFRR, and EPA.

DAFRR Production Development Research and Demonstration Program

Reduction in the use of pesticides and fertilizers requires appropriate research and educational programs to find alternatives and to establish best management practices based on the latest technology.

The Technology Transfer and Special Research Projects Program has funded projects through Technology Transfer Grants to minimize pesticide and fertilizer use and to test new pesticide application technology designed to minimize groundwater pollution by agricultural chemicals. In addition, the Technology Transfer and New Crop Development Program will fund crop breeding research through Technology Transfer Grants in order to develop and test new disease resistant varieties, thereby eliminating the need for pesticides.

Issue

Funding is necessary for Integrated Pest Management (IMP), bio-control and other programs designed to reduce pesticide use through Cooperative Extension Service programs.

Action

The DAFRR Division of Plant Industry will seek legislative funding in 1989.

Groundwater Monitoring Network

The Cooperative MGS-USGS groundwater monitoring network was begun in 1939. Monitoring wells have been added slowly to the system since that time, (some have also been deleted), so that there are now 33 wells in the system.

Most of the wells are designed to monitor long-term trends in water levels due to climatic conditions. Other wells are used to study the effects of topography or groundwater withdrawals on the water table. Nineteen wells are equipped with continuous recorders, fourteen wells are measured monthly by local observers. Water levels are reported both in a monthly news release entitled "Current Water Resources Conditions in Maine" and in yearly Water Resources Data reports published by the USGS. Information on all observation wells is stored in the USGS Groundwater Site Inventory Computer file and all current and historic water level data are available from the USGS National Water Information System.

University of Maine, Land and Water Resources Center

The Land and Water Resources Center provides leadership and focus to research efforts at the University of Maine dealing with issues of fresh water resources, including groundwater. With the assistance of a statewide advisory committee the Center develops an annual water research program based upon anticipated needs for water research. The program is partially funded through the State Water Institute Program which is administered by the United States Geological Survey.

The Center has always been active in groundwater studies. For example, a project sponsored by the Center twenty years ago documented contamination of soils and well water from highway salt. This research lead to subsequent actions that reduced use of salt on the state's roads. In recent years, the Center sponsored a project examining the effectiveness of marine clays used as liners for hazardous waste sites, and another project to evaluate methods of treating contaminated leachate draining from solid waste landfills and hazardous waste sites.

Two projects related to groundwater are being completed in 1988. One investigates the effects of forest harvest practices and fire on the mobilization of accumulated trace metals from forest floors and evaluation of possible acute or chronic trace metal contributions to groundwater resources. The other project has been evaluating alternative designs for on-site wastes disposal systems to reduce nitrate concentrations in the effluent.

From time to time other research projects related to groundwater may be undertaken by faculty at the University without necessarily a direct affiliation with the Land and Water Resources Center. In such situations, the Center tries to establish an informal relationship with the researchers for coordination and information transfer.

Issue: Basic Research Schedule

In 1979, the Legislature tasked MGS with the following:

- 1) delineate aquifer boundaries;
- 2) delineate primary recharge areas to all significant sand and gravel aquifers;
- 3) determine depth-to-bedrock;
- 4) determine depth-to-water table;
- 5) determine surficial material stratigraphy;
- 6) determine general groundwater flow directions;
- 7) determine recharge and cleansing rates of aquifers;
- 8) determine the quality of significant groundwater aquifers;
- 9) determine the extent and flow direction of contamination plumes;
- 10) classify the state's groundwater resources.

In approximately three years, Maine will complete a ten-year effort to map boundaries of significant sand and gravel aquifers, and has embarked on a ten-year effort to map significant bedrock aquifers. Much depth-to-bedrock and depth-to-water table data has been collected for sand and gravel aquifers; whether it is enough to create depth-to-bedrock and depth-to-water table contour maps should be determined. A large amount of surficial stratigraphy data also exists. The location, and sometimes the extent, of many contamination sites is known.

Many state water management programs, including Comprehensive Planning, Water Quantity Management, Groundwater Protection Planning, Pesticide Management in Critical Areas, Wellhead Protection Planning, Water Quality Data Recording and Reporting (305b), and others, require the basic delineation of watersheds. Watershed delineations, at the scales required, do not exist.

Action

In 1989 and 1990, the following efforts will be undertaken:

- 1) MGS, USGS, and DEP will continue mapping and publishing of sand and gravel aquifer maps, and MGS will continue mapping of bedrock aquifers;
- 2) MGS will coordinate with the appropriate agencies to develop watershed boundary delineation maps in 1989 if appropriate legislation is passed;
- 3) MGS will determine if sufficient depth-to-bedrock and depth-to-water table data exists to produce contour maps;
- 4) the Ground Water Standing Committee will develop an implementation plan and schedule for mapping classifications and non-attainment areas of the State's groundwater resources;
- 5) the Ground Water Standing Committee will develop an implementation plan and schedule for:
 - a) delineating recharge areas to selected significant sand and gravel aquifers;
 - b) completing depth-to-bedrock and depth-to-water table data gathering and mapping as necessary;
 - c) delineating general groundwater flow directions in selected significant sand and gravel aquifers;

- d) determining recharge and cleansing rates of selected significant sand and gravel aquifers; and
- e) determining parameters of selected contamination plumes.

Issue: Critical Research Needs

Several areas of the state are experiencing significant groundwater or general water supply problems. These areas must know all that can be learned about their water supply situation to intelligently address their problems. Comprehensive water supply studies could develop that information for these critical areas. One such study was undertaken from 1980 to 1982 in the Little Androscoggin River Valley by the USGS and the MGS at a cost of \$231,500. These studies are obviously resource intensive.

Action

The Ground Water Standing Committee will determine whether special efforts should be directed at critical areas to gather all data necessary to dealing with the situation, and whether this program should operate alongside systematic statewide data gathering or should assume priority.

Issue: Basic Water Use Information

Maine is the only state that does not participate in the federal USGS National Water-Use Information Program. This program provides a federal match to states which invest in gathering information on the quantities of water used by various segments of society (public water supplies, commercial, industrial, agricultural, etc.), information of great importance to Maine in managing state water supplies.

Action

The Policy Subcommittee will continue to address this issue in 1989. The Legislature is currently considering beginning a permanent water use program in Maine.

IV. GROUNDWATER CLASSIFICATION

State Classification System

The current State classification system for groundwaters is contained in MRSA 38, §363-B:

Standards of classification of groundwater

The board (Board of Environmental Protection) shall have 2 standards for the classification of groundwater.

Class GW-A shall be the highest classification and shall be of such quality that it can be used for public water supplies. These waters shall be free of radioactive matter or any matter that imparts color, turbidity, taste or odor which would impair usage of these waters, other than that occurring from natural phenomena.

Class GW-B, the second highest classification, shall be suitable for all usages other than public water supplies.

The procedure for classifying groundwaters is contained in MRSA 38, §371-B:

Classification of groundwater

All groundwater shall be classified as not less than Class GW-A, except as otherwise provided in this section. The board may recommend to the Legislature the reclassification of any groundwater, after careful consideration, public hearings and in consultation with other State agencies and the municipalities and industries involved, and where the board finds that it is in the best interests of the public that the waters be so classified.

No groundwaters have ever been classified GW-B. The requirement that GW-A groundwaters be of such quality that they can be used for public water supplies is interpreted to mean that they be usable with minimum common treatment. State drinking water standards, which are identical to federal drinking water standards, and State guidelines for drinking water which have been developed as needed where no federal standards exist, are used to evaluate whether groundwaters meet this requirement.

State policy requires that contaminated groundwaters be cleaned up to GW-A standards or to previous background quality levels by the application of cleanup technology or by natural cleansing processes over time. Natural poor quality groundwaters have not been adequately delineated. As this is accomplished (see groundwater research) the DEP will request that the Board of Environmental Protection (BEP) recommend to the Legislature the reclassification of these groundwaters.

Except for septic systems and certain other applications where a natural zone of degradation occurs by design, no permits are issued for any discharge to groundwaters that

would lower water quality (38 MRSA, §361-455). The requirement that discharges to groundwater meet drinking water standards necessitates pretreatment by the discharger.

Classification System Evaluation

On May 23, 1986, the Groundwater Classification Subcommittee of the Ground Water Standing Committee recommended a pilot project that would evaluate the feasibility of using a three-level groundwater classification system based on groundwater vulnerability to surface and near-surface contaminants. On July 1, 1986, the Standing Committee authorized this project to be undertaken with the cooperation of the town of Lamoine, Maine. Specifically, data was compiled and generated in an attempt to map the groundwater resources of Lamoine as highly, moderately, or least vulnerable.

On December 1, 1987, the results of this pilot project were presented to the Ground Water Standing Committee. Due to the limited variability of hydrologic conditions in Maine, the three-level designation was shown to be inappropriate. Furthermore, the adequacy of the State's hydrogeological data bases and the questionable success of adding to them with locally generated data creates uncertainty in accomplishing specific vulnerability delineations.

On December 22, 1987, the Ground Water Standing Committee discussed alternatives to the three-level vulnerability classification system. Options included: 1) a two-level vulnerability classification system (vulnerable and highly vulnerable) based on a few very simple parameters; 2) a classification system based on use (current public water supply, potential public water supply, private water supply, non-drinking water supply, etc. in order of priority); 3) a classification system based on yield (significant sand and gravel aquifers and high-yield bedrock fracture areas highest priority, everything else second priority); and 4) an option not to pre-classify at all.

The Standing Committee, at its October 5, 1988 meeting, decided that a classification system would, at the very least, be desirable as guidance to municipal comprehensive planning efforts. The Standing Committee re-activated its Classification Subcommittee, charging it to review the proposed system options and make recommendations for changes to and implementation of the classification system. The subcommittee met on October 25 and November 9 and proposed a classification system based on the following assumptions.

Classification System Assumptions

- 1) Not all groundwater is equal in value; therefore, differential levels of protection are required.
- 2) Groundwater protection goals are achieved through the control of those land use activities which have the potential to pollute, and through restoring the quality of groundwater already polluted.
- 3) It is not economically feasible to restore all groundwater in the state to drinking water standards.
- 4) It is not desirable to restrict all land use activities equally throughout the state.

- 5) Decisions about groundwater resources worthy of protection are best made at the local level, preferably as a part of the comprehensive planning effort.
- 6) Controlling land use is most effective at the local level.

Proposed Classification System

Purpose. A classification system sets the framework for a cooperative effort between the state and the municipalities to manage groundwater resources. It allows the identification and categorization of groundwaters to provide a basis for decisions on priority and stringency of prevention and remediation efforts. It serves to focus regulatory protection efforts on the most significant groundwater resources. It provides state and local officials and the public an opportunity to determine long-range groundwater protection goals.

With respect to state and local programs, it is not intended that this Strategy create or promote regulatory requirements more restrictive or stringent than those otherwise applicable under state or federal law. While such programs are to be administered in a manner consistent with the goals and purposes of this Strategy, enabling legislation for the execution of this Strategy should reflect the public need to minimize the regulatory burdens imposed upon such programs. It should include categorical exclusions for state and local programs where other state or federal regulations apply or where the agency or instrumentality demonstrates that its regular program procedures provide adequate environmental protection for the resource interests in question.

Classes. This classification system is based on the use of, demand for, and quality of groundwater. Groundwaters of the state are categorized into three classifications.

Class GA

The minimum groundwater classification shall be Class GA. All groundwaters of the state are classified GA except those groundwaters given a higher classification. Land areas associated with Zone 3 of public wellhead protection areas as delineated by groundwater experts shall be classified GA. The quality of this groundwater shall meet drinking water standards as set by the Department of Human Services. The quality of this groundwater shall be protected by the State's existing comprehensive system of statute, rules and regulations that protect groundwaters administered through state and local regulatory, permit and licensing programs. Land use activities which have potential for contamination of groundwater will be regulated through adherence to these standards.

Class GAA

The intermediate groundwater classification shall be Class GAA. Land areas associated with Zone 2 of public wellhead protection areas as delineated by groundwater experts shall be classified GAA. Areas around designated future water supplies as delineated by groundwater experts and approved by the Department of Human Services, or as delineated by municipalities through the State Comprehensive Planning Program shall be classified no less than GAA. Areas designated significant private water supplies as delineated by municipalities through the State Comprehensive Planning Program shall be classified no less than GAA. The quality of this groundwater shall meet drinking water standards as set by the Department of Human Services. The quality of this groundwater

shall be protected by land use controls which may be more stringent than those required in Class GA areas, administered through local regulatory, permit and licensing programs. These controls may include some prohibitions or extra protection measures such as requiring the installation of double-walled underground chemical and fuel storage tanks, restricting fertilizer use, establishing greater buffer zones around potential contamination sources, requiring larger leachfields, and establishing more extensive monitoring of groundwater quality.

Class GAAA

The highest groundwater classification shall be Class GAAA. Land areas associated with Zone 1 of public wellhead protection areas as delineated by groundwater experts shall be classified GAAA. Areas around designated future water supplies as delineated by groundwater experts and approved by the Department of Human Services, or as delineated by municipalities through the State Comprehensive Planning Program may also be classified GAAA. Areas designated significant private water supplies as delineated by municipalities through the State Comprehensive Planning Program may also be classified GAAA. The quality of this groundwater shall meet drinking water standards as set by the Department of Human Services. The quality of this groundwater shall be protected by land use controls as stringent as necessary to minimize the risk of any contamination. Restrictions may include prohibition of septic systems; home commercial uses; storage, use, and transport of hazardous substances. Use of pesticides, fertilizers, manures, or waste products may be limited or prohibited (pesticide use in this area may be managed by the Board of Pesticide Control pursuant to 22 MRSA 1471/M,s.4).

Non-attainment Areas

The state will identify known areas where the groundwater quality does not currently meet drinking water standards either because of manmade pollution or due to natural causes. Areas will be identified by point or land area as available data allows. The extent of remediation will depend upon the relative need for the resource for drinking water purposes. If the groundwater within a non-attainment area is deemed essential, the contamination should be cleaned up. For example, if a non-attainment area is within the delineated protection area of a current public well, or of a designated future water source which is needed in the next five years, then clean up will be required. If there are alternate sources for public or private water supply and if the hydrogeology is such that any movement of contaminant can be contained, then the town may designate this area as a site suitable for activities which may be severely limited in GAAA or GAA areas. The extent of remediation will also depend upon the technical feasibility of cleanup given the nature and extent of the contamination and the hydrogeology of the region.

Under no circumstances will further contamination of this groundwater be permitted. Activities will be subject to all the applicable statute, rules, regulations, permits, licenses and performance standards and enforcement provisions thereof.

Classification System Responsibilities

State Government

- 1) Provides criteria and standards for the system classes.

- 2) In cooperation with water utilities provides data to municipalities on land areas that require protection, i.e. wellhead protection areas and future water supply sources.
- 3) Provides data on non-attainment areas commensurate with funding provided.
- 4) Provides guidelines for appropriate protection methods, model ordinances, and best management practices.
- 5) Provides technical assistance in developing ordinances and in development reviews.
- 6) Reviews local ordinances and comprehensive plans.

Local Government

- 1) Through comprehensive planning efforts, identifies groundwater which is a current source of public water supply, is a future source of water supply which will be needed in the next five years, or is a significant private water supply which would be so difficult to replace with alternate sources that the municipality considers it essential to protect.
- 2) Using data and maps provided by the State, and locally generated data, delineates land areas over groundwater which require extra protection.
- 3) Disseminates and evaluates information on areas of non-attainment.
- 4) Drafts and adopts ordinances that afford sufficient protection to delineated areas.
- 5) Coordinates, with state government, restoration of non-attainment areas.

Classification System Implementation

- 1) Because the need is great this classification system should be made available now as a guideline to municipalities which must begin their comprehensive planning process.
- 2) Legislation should be submitted to amend the current groundwater classification system to reflect this system.
- 3) Guidelines or rules shall be issued to municipalities on how to identify GAA, GAAA, and Non-Attainment areas. A menu of recommended protection methods, model ordinances, and best management practices shall be prepared for municipalities to consider.
- 4) Public water utilities will contract with professional hydrogeologists to delineate wellhead protection areas. Technical assistance and guidance will be provided by the State.
- 5) Funding for public wellhead protection zone delineation will be the responsibility of the public water system. PUC rate structures should be amended to provide for this expense. Funding for the delineation of private water supply protection areas will be the responsibility of the municipalities or local residents.

- 6) State agencies will provide existing data and information to the town on the nature and extent of current non-attainment areas commensurate with funding.
- 7) The town's groundwater designations, ordinances, and compliance shall be reviewed every five years by the Department of Economic and Community Development as part of the comprehensive planning process.

Sole Source Aquifer Designation Program

The Sole Source Aquifer Designation Program was established under Section 1424(e) of the Safe Drinking Water Act (SDWA) of 1974. The designation applies to any aquifer that is the sole or principal source of drinking water for an area for which no nearby economically feasible substitute exists. Sole Source Aquifer designation carries the following benefits:

- 1) education - Designation publicly identifies the resource is of special importance. Loss of this resource would result in severe consequences for the community and the state. Both the community and the state are, therefore, encouraged to enact policies and take steps that will lead to greater protection.
- 2) federal review - Upon request, the USEPA will initiate review of any development to be wholly or partially financed with federal funds in a sole source aquifer area to determine if the development would endanger the aquifer. If the review finds the development unsuitable, federal funds will be withdrawn.
- 3) funding - If designation was received prior to June 19, 1988, the designated area may be eligible to receive Sole Source Aquifer Demonstration Program funds, if provided by Congress, to provide demonstration projects that would develop, implement, and assess methods designed to protect critical aquifer areas.

The State of Maine received Sole Source Aquifer designation for the Monhegan Island Aquifer on June 17, 1988. Petitions for North Haven and Vinalhaven Islands are currently undergoing EPA review. The State intends to petition EPA in behalf of Matinicus, Islesboro, Swans Island, Frenchboro, Isle Au Haut, Deer Isle, Stonington, and Cranberry Isles. The State will also consider the need for designation of appropriate peninsula communities.

The State has also taken steps to encourage the U.S. Congress to extend the deadline for the Sole Source Aquifer Demonstration Program another two years and has encouraged EPA Region I to support this effort.

V. DATA MANAGEMENT

Maine Geological Survey Water Well Construction Reports

The MGS has on file approximately 30,000 well logs obtained through a voluntary (until 1987) and mandatory (since September, 1987) water well reporting system. Information on well type, use, depth, depth to bedrock, yield, and depth and yield of fractures is reported along with a location map of the well. The reports have been entered into three different computer data bases, but are being converted to a uniform GIS data base. Locations are presently stored on 7.5 or 15 minute topographic maps, but are being digitized and entered into a GIS computer data base.

A new series of maps displaying this information is scheduled to be published beginning in 1989.

Department of Human Services Well Water Quality Testing Program

The State Public Health Lab performs tests on water samples submitted by requirement by the state's regulated public water supplies and on voluntarily submitted samples from private wells. Most water quality testing procedures can be performed at reasonable costs. This water quality data will be made available during 1989 (see Groundwater Data Management Study).

Issue

Data collected from private well samples does not have accurate location parameters.

Action

DHS will consider and recommend a system for accurately locating private wells by 1990.

Groundwater Data Management Study

In 1986 the Ground Water Standing Committee commissioned a two-phase study of the State's groundwater data management capabilities. The first phase identified current capabilities and necessary improvements. The second phase evaluated existing equipment and recommended software and hardware able to meet our needs.

Current System

Currently 25 state and federal groundwater programs generate groundwater information. The types of data generated include (1) ownership information, (2) map locations, (3) water quality information, (4) well construction and installation information, (5) well yields, (6) hydrogeologic descriptions, and (7) delineations of bedrock fractures and sand and gravel aquifers.

Most information is filed manually. For large data bases, searches through these files are very cumbersome. Requests for information are difficult and expensive to fulfill.

Complicated sorts of the type needed to analyze trends in the quality and quantity of the State's groundwater resources are practically impossible.

A number of computerized data management systems are also used to manage groundwater related information. They include FRAMEWORK, WATSTORE, HONEYWELL DM-IV, MEGIS, BURROUGHS DataManager and RBASE 400, LOTUS, D-BASE III, PCS, STORET, and a number of unnamed IBM PC-XT systems. These vary in capability from simple data storage and retrieval to sophisticated geographic information system functions.

In general, little compatibility exists between groundwater data management systems currently in use. The lack of a common data organization scheme is the principal cause of this, and is a major obstacle to the development of an integrated and mutually accessible groundwater data management system.

Current data management systems are used primarily for data storage and retrieval. Needs which are not being efficiently met include (1) comprehensive knowledge of what groundwater information is available in Maine, (2) access to the most-up-to-date information available, (3) ability to answer inquiries and satisfy requests for data, (4) trend analysis of regional groundwater quality and quantity, (5) performance monitoring of pollution abatement systems and remedial containments, (6) rapid access to information for emergency response to hazardous materials spills, and (7) automated analysis and map-making from previously mapped information. In addition to these present needs, a number of additional data management requirements can be anticipated because of possible future groundwater programs.

Study Recommendations

A number of opportunities exist to improve accessibility to groundwater information. These range in complexity from a simple groundwater newsletter and information index to implementation of a geographic information system to sort data based on map location. The costs of implementation also vary a great deal. However, each contributes greatly to overall data accessibility.

As with most other computer programs, the usefulness of any system adopted by the State will depend primarily on the competency of those using and maintaining it. The true costs of training or hiring competent personnel are frequently grossly underestimated.

The Phase I report recommended that steps be initiated to insure the continued utility of a data management system once it has been implemented. The steps include (1) designation of an individual to be charged with overall coordination of the system; (2) formation of a group responsible for ensuring that the system continues to meet the needs of users; (3) implementation of a Memorandum of Agreement among agencies involved with groundwater which recognizes the need for cooperation to insure the continued success of the system; and (4) funding at an adequate level to maintain the data base, coordinate groundwater data reporting, and train personnel.

The Phase II report provided detailed evaluations of computerized groundwater data management systems for the State of Maine. Included in this report were (1) generic descriptions of various groundwater data management options; (2) specific recommendations

for database management systems and geographic information systems; and (3) system implementation guidelines. Cost estimates were also provided.

Three levels of groundwater data management were recommended for further consideration: (1) a groundwater data index/groundwater data coordinator, (2) a database management system (DBMS), and (3) an integrated geographic information system/database management system (GIS/DBMS). These levels represent three stages of increasing function, complexity, and cost. Each level also allows upward integration to the next. A "groundwater data index/groundwater data coordinator" management scheme can be built up to a full database management system, which can later be integrated with a geographic information system to provide GIS/DBMS capabilities.

This three-level concept permits a multi-phased implementation. Each element of the overall groundwater data management system can become operational over a relatively short period of time with demonstrable utility and benefits. Additionally, a phased implementation allows periodic assessment of actual benefits realized from the system based on usage experience.

Under this scheme, a groundwater data index is developed to serve as a source of current information on availability, location, and format of groundwater data in the State. This index would be a "road map" for individuals requiring access to groundwater data available from Maine government. The index need not store any of the groundwater data. The role of the groundwater data coordinator would be to facilitate access to data and to maintain the index.

Three DBMS configurations were considered: (1) stand-alone PC workstations; (2) networked PC workstations; and (3) a centralized mainframe system.

Approximately one hundred and seventy-five database management systems and seventy-five geographic information systems were evaluated against an extensive list of criteria that reflect Maine's near-term and long-term groundwater data management needs. Of these, four DBMSs and four integrated GIS/DBMSs were recommended to the State for further consideration.

Land and Water Resources Council Recommendations

The Land and Water Resources Council's Data Management Committee and the Ground Water Standing Committee's Groundwater Data Management Study Work Group met on February 3, 1988, to review and take action on the Final Report of the Maine Groundwater Data Management Study, Phase II. The following recommendations were made:

- 1) An integrated DBMS/GIS can and should be developed concurrently.
- 2) The DBMS should begin with available stand-alone PCs but should rapidly progress to a networked PC system as soon as feasible. Feasibility depends on our ability to convert current data bases to the new DBMS. In many cases, this will not take long. Consequently, a networked PC DBMS should be our short-range purchasing goal.

- 3) The computerized Groundwater Data Index prepared on speculation by Sewall Company is a key component of our system. At an estimated \$6-7000 purchase cost, it is very attractive and should be purchased by member agencies of the Ground Water Standing Committee.
- 4) STORET's data coding formats should be adopted and expanded as necessary.
- 5) System standards are a first priority. A technical committee was formed consisting of representatives from DHS, DEP, SPO, MGS, USGS, DAFRR, DOT, and UMO L&WRC. This group will begin formulation of standards within two weeks.
- 6) Appropriate DBMS software should be Oracle or Info. DEP, USGS, and MGS will evaluate these two systems in depth and make a final recommendation within two months.

The Ground Water Standing Committee approved these recommendations on March 10, the Land and Water Resources Council accepted them on March 24. The Ground Water Standing Committee has purchased the Groundwater Data Index. A DBMS Standards Work Group was formed and developed Groundwater Data Base Management System standards which were adopted by the Ground Water Standing Committee on October 5, 1988. ARC has been selected as the state's GIS and ORACLE as the state's midframe DBMS. System purchase and installation will be completed in summer-fall 1989. Additional funding for necessary software and hardware and for system personnel positions and training will be addressed in 1989.

VI. CONTROLLING SOURCES OF CONTAMINATION

Contamination Source Control Programs, as presently constituted, are explained in Appendix B. The following section details our future needs and opportunities to improve these programs.

The following State programs control sources of contamination:

Department of Environmental Protection (DEP)

Bureau of Water Quality Control (BWQC)

- Nonpoint Source Pollution Control Program
- Underground Injection Control Program
- Wastewater Treatment Plant Construction Program
- Wastewater Discharge Permitting Program
- Municipal Sand-Salt Storage Facility Program

Bureau of Land Quality Control (BLQC)

- Site Location of Development Program

Bureau of Solid Waste Management (BSWM)

- Solid Waste Disposal Program
- Sludge Management Program

Bureau of Oil and Hazardous Materials Control (BOHMC)

- Petroleum Facilities Control Program
- Hazardous Materials Management Program

Department of Human Services (DHS)

Division of Health Engineering (DHE)

- Subsurface Wastewater Disposal Program
- Drinking Water Control Program
- Wellhead Protection Program

Department of Conservation (DOC)

- Land Use Regulation Commission (LURC)

Department of Agriculture, Food and Rural Resources (DAFRR)

- Pesticides Control Program
- Soil and Water Conservation Program

Department of Transportation (DOT)

- DOT Sand-Salt Storage Facility Program
- Municipal Sand-Salt Storage Facility Program
- Road Salting Control Program
- Pesticides Application and Storage Program
- Hazardous Materials Storage Program
- Nonpoint Source Pollution Control Program

Issues and Actions for Current Programs

DEP/BWQC Nonpoint Source Pollution Control Program

Issue

The State of Maine Nonpoint Source Pollution Assessment and Management Program Report (1988), identifying nonpoint sources of pollution, currently available assessments of water quality, and control programs, has been transmitted to the Environmental Protection Agency. Assessments of groundwater contamination caused by leaking underground storage tanks, landfills, sand-salt storage piles, and roadside salting are essentially sufficient. Satisfactory assessments of septic systems, waste lagoons, some agricultural amendments, and uncontrolled hazardous waste sites are incomplete to non-existent.

Action

A plan to complete these assessments will be formulated in 1989. Best Management Practices (BMPs) for nonpoint sources of contamination will be developed and a plan of implementation will be formulated in 1989. In the absence of federal Clean Water Act Section 319 funding, Section 205j(5) funds will be utilized for the development of BMPs. BMP development will depend to some extent on the availability of these funds.

DEP/BWQC Underground Injection Control Program

Issue

Several Class V well categories are pertinent in Maine. They are: 1) floor drains; 2) septic systems serving more than 20 persons; 3) abandoned wells; 4) and several injection wells at hazardous waste sites used to re-inject cleaned-up water.

A 1988 review of approximately 10% of Maine's service stations indicated that almost half of them were discharging chemicals to surface and ground waters through unsewered floor drains. Unsewered floor drains are illegal injection wells in Maine.

Action

The following actions will be taken:

- 1) follow-up will be conducted on the existing questionnaires to insure that complete data is available;
- 2) Best Management Practice(s) for floor drains will be identified;
- 3) a "notice of regulation" stating Maine's discharge laws and explaining the Best Management Practice(s) for floor drains will be mailed to surveyed service stations with unsewered floor drains;

- 4) municipalities and/or sewer districts will be notified of service stations having floor drains connected to their sewer system;
- 5) a ranking system for determining the potential hazard posed by each facility will be developed and a facilities action list will be developed;
- 6) facilities discharging to surface waters through floor drains will be sent orders to cease discharges;
- 7) wells, near facilities discharging to groundwaters, found to be contaminated will be reported to Bureau of Oil and Hazardous Materials Control enforcement and remedial action personnel;
- 8) all other service stations will be surveyed by mail and numbers 3-7 above will be repeated;
- 9) other type facilities likely to contain floor drains will be identified and a plan to address them similar to that for service stations will be formulated.

Actions 1-6 were begun in 1988 and will continue through 1989; actions 7-9 will continue through 1989 and beyond.

Septic systems larger than 2,000 gallons are recorded by the Department of Human Services. DEP will develop a plan to obtain these DHS records and license all existing facilities as Class V Underground Injection Wells by rule in the future. Ultimately, DHS will report new systems of this type to DEP for licensing and reporting to EPA. The Ground Water Standing Committee will also consider a recommendation for some form of public notice of the location of these systems to encourage adjoining landowners to test their well water periodically.

The Policy Subcommittee of the Ground Water Standing Committee will address the issue of abandoned wells in 1989. Questions to be answered include:

- 1) what is the likely extent of the danger posed by these wells;
- 2) what is the suitable action required; and
- 3) what is the BMP for abandoned wells.

The fourth category, reinjection wells, will be licensed by DEP as they are needed.

DEP/BWQC Wastewater Treatment Plant Construction Program

No actions are required for this program.

DEP/BWQC Wastewater Discharge Permitting Program

Issue

State law exempts agricultural impoundments from state discharge licensing if they are addressed in a certified farm plan approved by a state Soil and Water

Conservation District. Only one farm in the entire state is in compliance with this provision.

Action

The Policy Subcommittee will address this issue in 1989.

DEP/BWQC Municipal Sand-Salt Storage Facility Program

Note: This program is a joint cooperative effort of the DEP and the DOT. See explanation under Municipal Sand-Salt Storage Facility Program in DOT section.

DEP/BLQC Site Location of Development Program

Issue

The BLQC estimates it would require twice as much staff and adequate computerization to be able to review development proposals in the reasonable amount of time expected by the public.

Action

The Policy Subcommittee will address this issue in 1989.

Issue

Only 20% of new development is State reviewed. Municipal review is admittedly often inadequate. Increased State review or an increase in municipal capabilities is necessary.

Action

The GWSC has taken the lead to produce a Municipal Review Guidelines Manual in 1989 that will inform municipal boards of concerns associated with specific facilities, submissions that should be required of the developer, and control mechanisms. In addition, the manual will inform code enforcement officers of the areas to be inspected in specific types of facilities.

The Policy Subcommittee, in 1989, will review whether site review responsibilities intended to protect groundwater are fairly distributed as currently constituted, and what staffing/funding changes would be required if a more equitable and responsible program is necessary.

Issue

Newly permitted gravel extraction operations are currently allowed to extract materials to within 2 feet of the seasonal high water table to protect groundwaters ("grandfathered" operations may sometimes be able to extract below the water table). The reasons for this buffer are:

- 1) to provide a natural aerobic filtering and absorption media for potential pollutants;
- 2) to prevent evaporation of groundwaters;
- 3) to allow for the natural variability in seasonal high water tables from year to year; and
- 4) to allow for the degree of accuracy inherent in determining the elevation of the high water table.

The adequacy of this 2 foot buffer has been questioned.

Action

The Policy Subcommittee will review the 2 foot buffer in 1989 by collecting information on the buffers required in other states and considering the 5-8 foot variability of seasonal high water tables in Maine.

DEP/BSWM Solid Waste Management Program

Issue

Both the Administration and a Legislative Municipal Solid Waste Committee are currently working on solid waste policy. Legislative proposals are expected in 1989.

Action

The Ground Water Standing Committee will track these efforts and comment and advise on groundwater topics and issues.

Issue

State law requires all municipalities to provide suitable septic tank and cesspool waste disposal sites. Only approximately 50% of Maine's municipalities have done so.

Action

The Policy Subcommittee will address this issue in 1989.

DEP/BSWM Sludge Management Program

No actions are required for this program.

DEP/BOHMC Petroleum Facilities Control Program

Issue

A Legislatively mandated study by the DEP BOHMC of the hazards associated with above-ground storage tanks and the regulations required to control these facilities will be completed in July 1989.

Action

The study recommendations will be reviewed by the Policy Subcommittee in 1989. Appropriate actions will be taken by the DEP to implement the needed regulations.

Issue

Federal Underground Storage Tank Regulations are different in some ways from State UST regulations.

Action

The BOHMC will take action to incorporate federal regulations into State statute in 1989.

Issue

Although financial assistance programs exist for commercial owners of underground petroleum storage tanks to aid in removal and replacement, no such program exists for residential tank owners.

Action

A \$2 million bond issue for this purpose was approved by Maine voters in fall 1988.

DEP/BOHMC Hazardous Materials Management Program

Issue

Maine has no regulations governing underground storage of virgin hazardous materials.

Action

DEP BOHMC is developing rules for hazardous materials underground storage tanks. These rules will be adopted in 1989.

Issue

A Legislatively mandated study by the DEP BOHMC of the hazards associated with above-ground storage tanks and the regulations required to control these facilities will be completed in July 1989.

Action

The study recommendations will be reviewed by the Policy Subcommittee in 1989. Appropriate actions will be taken by the DEP to implement the needed regulations.

Issue

A Legislatively mandated study on household and small quantity commercial hazardous waste disposal will be completed by the DEP BOHMC in April 1989.

Action

The Policy Subcommittee will review the recommendations of this study in 1989 and the DEP will take appropriate actions to implement needed programs.

Issue

Maine has no storage standards for hazardous materials.

Action

Hazardous materials storage standards will be developed by the DEP BOHMC in 1989 and imposed by rule or Legislative action as needed in 1990.

DHS/DHE Subsurface Wastewater Disposal Program

Issue

The current evaluation procedure for septic system suitability does not adequately address many non-typical situations.

Action

A new point system for evaluating site suitability for septic systems has been developed. System testing will be completed in 1990 and the system will be implemented in 1991.

Issue

The new point system for evaluating site suitability for septic systems does not adequately address neighboring systems. It does not, therefore, address the cumulative impacts of multiple septic systems.

Action

The new point system will be modified in 1989 to ensure that each new system does not create groundwater impacts beyond the property line. Where older neighboring septic systems already create impacts on the property undergoing evaluation, the new point system must compensate in the evaluation of the new property for those impacts.

Issue

The current degree of statewide contamination from nitrate and other leaching from septic systems has not been adequately assessed.

Action

A proper assessment of this potential problem is a goal of the federal Nonpoint Source Pollution Control Program. The feasibility of conducting research in this area as part of the NPS Pollution Control Program assessment will be determined in 1989.

Issue

The feasibility of use of alternatives to septic systems in Maine must be assessed. Onsite system technology is now better understood but as new methods of pretreatment and disposal are developed, the Department of Human Services needs to be able to evaluate, recommend, and adopt these sewerless land use techniques as they become available.

Action

The feasibility of conducting research in this area as part of the NPS Pollution Control Program in order to create BMPs will be determined in 1989.

DHS/DHE Drinking Water Control Program

No actions are required for this program outside the actions being taken under the Wellhead Protection Program described separately.

DHS/DHE Wellhead Protection Program

Issue

Public water supply wellheads are not consistently protected from potential contamination sources.

Action

To insure the protection of Maine's public water supplies from anthropogenic sources of contaminants which may have an adverse effect on the health of our citizens, Maine will develop a Wellhead Protection Program (WHPP). The Wellhead Protection Program will present a methodology to:

- 1) Specify the duties of State agencies, local governments, and public water supply systems in protecting public water supplies;
- 2) Delineate Wellhead Protection Areas (WHPA) around public water supply wellheads;
- 3) Identify anthropogenic sources of contamination within the WHPA;
- 4) Develop and implement potential pollution source management programs for existing and new public water supplies; and

- 5) Develop contingency plans that address emergency situations and future needs.

The Governor, on October 6, 1986, designated the State Groundwater Coordinator lead contact for development of the WHPP. The WHPP will be developed under the auspices of the State Ground Water Standing Committee (GWSC). Upon implementation, the Department of Human Services, Division of Health Engineering will assume Lead Agency status.

The Ground Water Standing Committee, on December 22, 1987, appointed a Work Group consisting of the Groundwater Coordinator and representatives of the Departments of Human Services, Environmental Protection, and Conservation (Maine Geological Survey), the U.S. Geological Survey, Maine's water utilities, and public members represented by the Maine Municipal Association and the Maine Association of Regional Councils, to develop the Wellhead Protection Program. The Work Group first determined the method(s) for delineation of Wellhead Protection Areas, the method(s) for identification of potential sources of contamination, and current and needed management approaches for control of potential sources of contamination. The Work Group recommended the framework for contingency planning and the duties of State agencies, local governments, and public water supply systems in implementing the WHPP.

The Ground Water Standing Committee will review the recommendations of the Work Group and submit the WHPP to public comment and/or public hearing. Following public comment/hearing, the WHPP will be submitted to the Governor through the Maine Land and Water Resources Council for any appropriate executive and legislative action. As stated previously, the Ground Water Standing Committee will function as the coordinating mechanism throughout the development phase.

DOC Land Use Regulation Commission

No actions are required for this program.

DAFRR Pesticides Control Program

Issue

While the level of pesticides found in groundwater underlying agricultural activities is generally not high, pesticides are toxic substances which persist in groundwater and therefore may pose a health hazard.

Action

The Board of Pesticides Control will develop a State Pesticides in Groundwater Management Plan in 1989 to prevent contamination and to standardize responses where contamination has occurred.

Issue

In 1988 the Legislature required that the Board of Pesticides Control promulgate criteria for designating "critical areas" where pesticide application could endanger groundwaters and other important resources. Each critical area will require an individual "pesticide management plan."

Action

The Board of Pesticides Control, together with other interested state agencies, has developed guidelines for the designation of a critical area and for the creation of a management plan in 1989. The BPC is proceeding to implement this program in 1989.

Issue

Best Management Practices for protection of groundwater from potential agricultural contamination have been developed and are being published.

Action

The DAFRR and the Cooperative Extension Service are publishing agricultural BMPs in 1989. These BMPs will be incorporated into the NPS Pollution Control Program and into the programs of the Soil and Water Conservation Commissions and the Cooperative Extension Service. An education and distribution system will be implemented in 1989.

DAFRR Soil and Water Conservation Program

Issue

Incorporation of agricultural BMPs into the programs of the S&WC Commissions.

Action

Agricultural BMPs developed in 1989 will be incorporated into the programs of the Soil and Water Conservation Commissions in 1989.

DOT Sand-Salt Storage Facility Program

Issue

Continued funding of this program is required biennially.

Action

The Department of Transportation will seek funding in 1989 for the FY90/91 biennium to continue this program.

DOT Municipal Sand-Salt Storage Facility Program

Note: This program is a joint cooperative effort of the DOT and the DEP.

Issue

Current program-responsible personnel, program guidelines for siting, program compliance and inspection procedure, and program responsibilities between DOT and DEP are insufficiently defined to fulfill the goals of this program.

Action

The Policy Subcommittee will address this issue in 1989.

Issue

Continued funding of this program is required biennially.

Action

The Department of Transportation will seek additional funding in 1989 for the FY90/91 biennium to continue this program.

DOT Road Salting Control Program

No actions are required for this program.

DOT Pesticides Application and Storage Program

Issue

Board of Pesticides Control Critical Areas Program will likely incorporate some areas where DOT operates.

Action

DOT staff have offered to participate on an advisory committee for the BPC Critical Areas Program.

DOT Fuel Storage Program

Issue

DOT must replace its own underground petroleum storage tanks.

Action

DOT has a five year program for replacing its tanks.

Issue

Continued funding of this program is required biennially.

Action

Although funding is available for the first two years of this program, DOT will have to seek additional funding in 1989 for the FY90/91 biennium to continue this program.

DOT Paint and Solvent Storage Program

Issue

DOT hazardous materials are temporarily stored in substandard buildings.

Action

DOT will begin a program to replace its hazardous materials storage buildings after hazardous materials storage standards are developed by the DEP BOHMC in 1990.

DOT Nonpoint Source Pollution Control Program

No actions are required for this program.

VII. COMPLIANCE EVALUATION AND ENFORCEMENT

DEP/BWQC Compliance Evaluation and Enforcement Program

DEP BWQC issues licenses for waste lagoons, land application systems, septic tank and cesspool waste disposal sites, and some special types of subsurface systems (Class V Underground Injection Wells). Most licenses require monitoring around sites. The operation and performance of each licensed wastewater discharge system is periodically inspected and monitored. Licensing and Enforcement staff review and file the observation well data and conduct a detailed evaluation of the system at least once every five years when the license is proposed for renewal. If warranted, improvements in groundwater monitoring capabilities and the applicant's self-monitoring program may be required as a condition of renewal. When contamination is indicated, full enforcement authority is provided by 38 MRSA Section 413.

Issue

It is estimated by the DEP BWQC that the location of approximately 80% of the state's unmonitored abandoned waste lagoons (surface impoundments) is known. Only a few have been tested to determine their contents and if they pose a threat to groundwater resources.

DEP BWQC estimates that to locate all lagoons would require five years, and to initiate remediation where necessary, on a priority schedule, would require ten years. DEP further estimates that ten new positions would be required for this effort.

Action

The Policy Subcommittee will address this issue in 1989.

Issue

Unsewered floor drains which discharge chemicals to ground or surface waters are illegal injection wells in Maine. Preliminary surveys project that approximately 50% of all service stations have unsewered floor drains.

Action

Enforcement action will begin in 1988 (see Underground Injection Control Program under Controlling Sources of Contamination Section).

Issue

Implementation and adequacy of BMPs under the Nonpoint Source Pollution Control Program will require compliance evaluation.

Action

The Nonpoint Source Pollution Control Program design committee will address necessary compliance evaluation in designing the NPS program in 1989.

DEP/BLQC Compliance Evaluation and Enforcement Program

The DEP BLQC reviews suitable developments under the Site Location of Development Program. Potential sources of groundwater pollution are generally required to be monitored.

DEP/BSWM Compliance Evaluation and Enforcement Program

The DEP BSWM reviews landfill, transfer station, and waste-to-energy construction and expansion. Sites utilizing storage areas for materials capable of contaminating groundwaters are engineered to be non-polluting. Most are generally required to be monitored as well. The BSWM also periodically monitors sludges approved for landspreading and any landspreading sites which require monitoring as a license condition.

Issue

More than one hundred old landfills have been identified which were located over vulnerable geologic deposits.

Action

The BSWM is proceeding on a priority schedule to properly close out these old landfills. Groundwater sampling has or will occur during close out to determine the need for remedial action.

DEP/BOHMC Compliance Evaluation and Enforcement Program

The BOHMC compliance evaluation and enforcement program is designed to ensure that all operations of hazardous waste generators, transporters and facilities are conducted in accordance with standards established in Chapters 850-857 of the DEP rules and corresponding EPA regulations. This includes compliance with licenses issued by the State. The standards under which these facilities operate are designed to be protective of ground water.

There are several ways by which the BOHMC implements compliance programs. The BOHMC conducts RCRA inspections of hazardous waste storage sites using a RCRA inspection checklist. The BOHMC also responds to numerous citizen complaints and inquiries some of which may lead to full RCRA inspections and, if required, appropriate enforcement. In addition, the BOHMC tracks hazardous wastes "from cradle to grave" and, in conjunction with the Maine State Police, conducts periodic checks of hazardous waste transporters. Such inspections are unannounced and include both the enroute vehicle and the related in-state facilities.

The BOHMC receives water quality reports from those UST and hazardous waste storage facility owners who must monitor for leaks. The BOHMC also conducts final inspections before covering of all new and replacement USTs.

Issue

A severe shortage of inspection and enforcement staff hinders necessary operations.

Action

Two additional staff have been requested in 1989. Appropriate supplemental appropriation legislation is pending.

Issue

Several pilot projects have been completed, in particular the MACC hazardous waste inventory pilot project and the DEP call-in project, to evaluate mechanisms for identifying uncontrolled hazardous waste sites. A permanent program has not been instituted.

Action

The DEP BOHMC will evaluate the options and the need for such a program in 1989.

DHS/DHE Subsurface Wastewater Disposal Program

The primary responsibility for the permitting of, supervising and enforcement of subsurface wastewater disposal installation rests at the municipalities' level. The Division of Health Engineering (DHE) has the statewide oversight responsibility, certifies the local inspectors and licenses the designers of systems. On larger systems (greater than 2000 gallons per day) DHE approves the design but the municipality is responsible for ensuring proper installation.

DHS/DHE Drinking Water Control Program

The Drinking Water Program requires all public water suppliers to test the quality of their water at periodic intervals. The testing periods are dependent on the type of raw water source, whether the supply serves residential or transient populations, and the size of the population served. Since 1977 these suppliers have been required to test for nineteen (19) potential pollutants. In the very near future, the number of potential pollutants which must be tested for will be increased to eighty (80).

The Drinking Water Program conducts periodic surveys of the water suppliers checking for source protection, water treatment efficiency, disinfection practices, cross-connection control, etc. Violations or discrepancies are noted, and the suppliers are placed on an engineered compliance time table. The water quality monitoring and the engineer compliance time tables are tracked by computer.

DOC/Land Use Regulation Commission

The Land Use Regulation Commission monitors compliance with and enforces state regulations, similar to the DEP, in the State's unorganized areas, an area equal to one-half of Maine. The number of compliance complaints received has been increasing in recent

years. Limited compliance surveys indicate that the number of land use violations occurring is substantially higher than the number of complaints received. The Commission's investigative enforcement staff was increased to six persons in 1988 to respond to these complaints.

DAFRR Pesticides Control Program

The Board of Pesticide Control's enforcement staff routinely conducts pesticide use inspections to insure that:

- 1) the pesticides are applied at the proper rate and to the specified site;
- 2) container and equipment rinsates are reused;
- 3) pesticides are stored and transported safely; and
- 4) all other applicable laws and regulations are observed.

Furthermore, compliance is monitored for protection of sensitive areas, rinsing and disposal of containers, wellhead set backs and other use regulations designed to protect groundwater resources.

VIII. TECHNICAL ASSISTANCE

DEP/BWQC Impacts-of-Development-on-Groundwater Technical Assistance Program

Three geologists (one man-year work time) in the DEP Bureau of Water Quality Control offer technical assistance services to municipalities for groundwater related problems. The purpose of this program is to assist town planning boards in assessing the potential groundwater impacts of development proposals submitted to them.

The assistance can be handled either in-house, or passed to one or the other of two private consultants on retainer to the program as a result of a \$50,000 appropriation from the Maine Legislature.

About 25 projects have been served by the program since its inception in June of 1986. Projects vary greatly in complexity and style. Some examples are as follows:

- 1) Helping a town to plan a groundwater monitoring system.
- 2) Assessing the impact of car wash wastes discharged to a septic system.
- 3) Helping a town develop a plan to deal with salt water intrusion.
- 4) Working with a Regional Planning Commission to write model ordinances making the assessment of septic waste impacts on groundwater more straightforward.

The program has been advertised in the Maine Townsman and copies of that article have been sent to all planning boards in the State. In addition, the DEP staff are working with other New England states (coordinated by NEIWPCC) on a handbook of guidelines for groundwater review. It will tell planning boards which review paths to take when faced with a specific type of development proposal.

Issue

Continued funding of the program.

Action

DEP BWQC requested continued funding for FY89 and 90 (\$12,500/yr) in its budget submission.

DEP/BOHMC Remedial Action Program

This program provides technical support to groundwater cleanup projects at uncontrolled hazardous waste sites and sites of underground tank leaks. It also reviews license applications for facilities where hazardous waste is temporarily stored prior to transport. It provides technical support to the Maine Radioactive Waste Commission and the Board of Underground Oil Storage Tank Installers and also develops regulatory programs for underground oil and hazardous material storage tanks.

Field staff investigate spills and leaks in order to determine their origin, to clean up if possible, and to prescribe remedial actions including the monitoring of groundwater. The DEP Commissioner has the authority to order the responsible party to clean up the site and provide pure drinking water to any affected parties. Adversely affected third parties may file a monetary claim to the state for damages to property, including loss of a drinking water well. In addition, DEP administers a \$3 million fund to initiate remedial work, including the development of new water supplies, and attempts to replace the fund's costs from the responsible parties.

Two additional programs carried out by BOHMC are concerned with hazardous materials "loose" in the environment. The Field Services Division responds to citizen complaints and other indications that a spill has occurred or contamination is suspected. Staff determine the existence and extent of any problem, then recommend remedial action as needed.

Closely related is the Uncontrolled Sites Program, including both federal and state components, as authorized by the Uncontrolled Hazardous Substance Sites Act. This program coordinates the detailed investigations and remedial work for designated uncontrolled sites. These include the five federal "Superfund" sites in Gray, Saco, Winthrop, Augusta and Washburn which are the worst of the presently known hazardous waste sites in Maine. This program also includes 200 sites not yet on the federal Superfund list which have been designated as uncontrolled by the State. The State program provides for the investigation and clean-up of uncontrolled hazardous waste sites.

As previously noted, the handling of hazardous matter is a widespread practice, without procedural and operational standards in regulation. Subsequently, there is no licensing program at present. The protection program is thus limited to investigation of reported spills or leaks and direction of clean-up efforts.

Issue

Funding is inadequate for the cleanup of 200 state hazardous waste sites on a reasonable schedule.

Action

The DEP received \$5 million from a voter approved bond issue in 1988 and, in 1989, requested three additional positions to implement cleanup.

Issue

Maine has no technical standards for the handling of virgin hazardous materials.

Action

The BOHMC will develop standards in 1989.

DEP Laboratory Services

The Department of Environmental Protection's Division of Laboratory Services is one of the State of Maine's major chemical analytical facilities. From its beginning in 1969 as a two man operation, it has grown with the Department in maturity and scope of service.

The Division of Laboratory Services is the primary source of chemical analytical support for the environmental programs administered by the State of Maine through the Department of Environmental Protection. Of particular interest is the groundwater protection program and related activities. Historically, road salt is a contaminant of concern which the laboratory has addressed since its inception. The McKin incident (East Gray) rapidly changed the nature of the analytical approach to groundwater problems. The situation at McKin demanded development of an entirely new field of analytical technology to deal with the organic contaminants found there. Consequently, the Department's laboratory has developed outstanding analytical capabilities to deal with hydrocarbons (gasoline and fuel oil) and chemical solvents (from the EPA priority pollutant menu) requiring highly trained personnel and highly sophisticated instrumentation and methods. The Department's commitment to gas chromatography and mass spectrometry to assure the best available technical solution to the groundwater analytical problem is approaching one million dollars. Other major instrumental additions have recently been made to deal with the problem of metals in groundwater. Likewise, the laboratory has recently made major updates in computerization and automation to deal with the ever-increasing demand of emerging groundwater problems throughout Maine.

Groundwater pollution is actually a multi-matrix (water, sludge, soil, etc.) problem. Although the final product of interest is the quality of groundwater, beginning and intermediate pathways need to be addressed. Consequently, the laboratory has considerable experience in dealing with the analysis of hazardous wastes, sludges, soils, and petroleum products as well as groundwater and leachate. Where standardized analytical methods do not exist, the laboratory has developed its own. The lab supports a major quality assurance effort. It is routinely involved with EPA quality assurance programs involving on-site inspections and check samples. The laboratory is certified by the State of Maine drinking water program to perform bacteria analysis. All results are fully documented and traceable to quality assurance.

In summary, the Laboratory is a major analytical facility. It is experienced and well equipped to deal with the State's groundwater programs and problems. Although primarily a high volume production facility, the staff is available to offer creative solutions for unique problems.

DOC/MGS Technical Services Program

The Maine Geological Survey does not have a formalized technical services program, but does offer advice and information on water supplies, aquifer mapping, well installation, the impacts of subdivisions on groundwater, radioactive and solid waste disposal, and other groundwater issues. The Survey also publishes and distributes groundwater reports, including the Groundwater Handbook for the State of Maine, sand and gravel aquifer maps, and water resources maps describing the characteristics of bedrock aquifers.

DHS/DHE Private Water Supply Technical Assistance Program

The Drinking Water Program (Division of Health Engineering, Bureau of Health, Department of Human Services) exists primarily to ensure the safety of the water being delivered by public water systems in Maine. The expertise necessary for this purpose is also available to Maine citizens when they contact this office with a question or problem.

Historically the Drinking Water Program has provided the following services on an "as needed" basis:

1. Discussion of real or perceived water quality problems leading to recommendations for laboratory test and/or treatment.
2. Interpretation of Lab results (Public Health Lab and others).
3. Discussion of hydrogeology and well location and construction.
4. Education as to the effects of land use practices such as farming, septic systems, gravel extraction and other wells on water quality and quantity.
5. Determining eligibility for fee waiver program.

Referrals are made to other agencies and organizations including MGS, DOT, PHL, Agriculture, DEP, Extension Service, treatment equipment vendors, local conservation groups, private testing labs, consultants (geology and hydrogeology), AG office, legal aid groups, SPO, etc.

The Drinking Water Program has sponsored and/or participated in seminars for or about problems dealing with private water supplies. It has also published or purchased for distribution brochures dealing with private water systems.

DHS/EHU Environmental Toxicology Program

Groundwater-related activities of the Environmental Toxicology Program and Environmental Health Unit include the following:

1. Development of drinking water guidelines (Maximum Exposure Guidelines) for a variety of chemicals, especially those for which federal guidelines are inadequate or do not exist. Maine MEG's are used as levels of concern for groundwater contaminants by DHS, DEP and the Department of Agriculture.
2. Conduct health studies in areas of known or suspected groundwater contamination in order to determine if exposure to chemicals through use of contaminated groundwater has resulted in any health effects in the exposed population.
3. Occasionally initiate groundwater sampling and analysis in areas of suspected contamination, or in order to rule out groundwater contamination or a contributing factor in possible disease clusters identified through our cancer registry or other surveillance activities.

4. Review Superfund/hazardous waste site endangerment assessments and clean-up proposals for groundwater to ensure protection of public health.

Issue

Concise health risk assessments for chemicals with known standards or guidelines written for public understanding are needed.

Action

DHS toxicologists will prepare these brief written assessments in 1989.

DHS/DHE Indoor Air Quality Program

The Division of Health Engineering, Department of Human Services, is the lead State agency to address radon. The Occupational and Residential Health Program has prime responsibility to provide available literature to the public free of charge, interpret laboratory results, provide technical assistance and possibly offer alternative methods to correct radon-related problems. Water radon and Gross Alpha can be removed from water supplies by several methods of available technology. Anyone concerned about radon or radiological problems must test ones private water supplies because this is an extremely variable condition.

Radon is a radioactive gas which occurs in nature. It is colorless, odorless, and tasteless. Radon comes from decomposition (radioactive decay) of uranium. In Maine, it is suspect if certain grades of granite or sandy soils exist. Very high concentrations of water radon (radon gas dissolved in groundwater) plus other radioactive solid material have been documented in Maine. Two of the highest water radon concentrations in the world have been found in Maine.

The health concern associated with water radon is primarily due to breathing the radon gas which easily leaves the water rather than drinking the water. Radon (in the air) has been documented to be the second major cause of lung cancer; second only to smoking. It is the most significant health concern caused by natural means. The health risk of breathing radon, even at low concentrations, is extremely high.

Another health concern associated with radon is that of dissolved radium or uranium found in many groundwater supplies. A screening test, called Gross Alpha, can identify if this material is present. A more detailed analysis is necessary to specifically identify the solid material present in water. The health risk associated with Gross Alpha is significant but not as severe as for air radon. The health concern for this material is in drinking water. Gross Alpha causes other types of cancer different from lung cancer.

We presently have a recommended action level of 20,000 pCi/l of water radon established to take appropriate corrective action. It appears EPA will shortly promulgate rules pertaining to water radon and Gross Alpha which are significantly lower than the above level. The EPA rules will most likely effect many public water supplies. Indirectly, the rules will create a very expensive and emotional situation for those on private water supplies.

DECD Comprehensive Planning Program

The state, in 1988, implemented a comprehensive planning program which requires municipalities to complete comprehensive plans by 1996 that address, among other things, the protection and use of natural resources, including water supplies. The Department of Economic and Community Development, Division of Community Assistance is responsible for implementing this program. As much of the effort as possible will be conducted in cooperation with the state's Regional Planning Councils.

The Planning Process for Local Groundwater Protection has been proposed as the methodology for protecting groundwater. For communities with public groundwater supplies the Maine Wellhead Protection Program will be accepted by DECD as meeting the State Comprehensive Planning Program goals for public water supply protection. Whatever mechanism is adopted by the state to manage water supplies will also be accommodated in this comprehensive planning program. The Ground Water Standing Committee will be heavily involved in coordination of these programs in 1989.

Issue

The Comprehensive Planning Program will request the necessary technical assistance from several other agencies. Currently the state's groundwater technical staff dedicated to this effort consists of one hydrologist at DHS who works with communities having public water supplies and one hydrogeologist at DEP who works with communities that do not have public water supplies. This staff may be inadequate to the task.

Action

The Policy Subcommittee will address this issue with DECD in 1989.

Regional Planning Organizations

Regional Planning Organizations in Maine have various types of names (e.g., Councils of Governments, Regional Planning Commissions, etc.) but are collectively known as Regional Councils. Maine's Regional Councils have been established to:

- 1) Provide technical assistance for municipal planning projects including the preparation of draft ordinances.
- 2) Provide a forum for local officials to exchange ideas, express views, and work with State and Federal officials to improve intergovernmental responsibilities and set priorities for public investments.
- 3) Provide assistance to local officials in understanding and implementing state programs.
- 4) Assist State and local governments in identifying effective services to local governments.

The State of Maine presently has eleven Regional Councils. These organizations provide planning assistance to 369 of the 491 municipalities in the State. The full time staff employed by Maine's Regional Councils range from 24 to 32.

The eleven organizations in the State that are designated Regional Councils are:

- 1) Androscoggin Valley Council of Governments
- 2) Eastern Mid-Coast Planning Commission
- 3) Greater Portland Council of Governments
- 4) Hancock County Planning Commission
- 5) North Kennebec Regional Planning Commission
- 6) Northern Maine Regional Planning Commission
- 7) Penobscot Valley Council of Governments
- 8) Southern Kennebec Planning and Development Council
- 9) Southern Maine Regional Planning Commission
- 10) Southern Mid-Coast Regional Planning Commission
- 11) Washington County Regional Planning Commission

The Regional Councils have offered technical assistance through a variety of projects. This was accomplished in one region through a project that produced 44 maps for member towns that depicted the location of known threats to groundwater and surface water (e.g., underground storage tanks, sand/salt piles, landfills, hazardous waste activities, etc.).

Another example of technical assistance is the development of "Best Management Practices to Minimize Discharges of Pollutants on Construction Sites" which is presently being done by another Regional Council. This will be a technical reference for contractors and town officials.

Regional Councils have recently worked to advise municipalities on planning for control of nonpoint source pollution including draft ordinance preparation. The Regional Councils work closely with their respective Water Quality Advisory Committee which were established in the last few years through a cooperative effort between the Regional Councils and the Maine Department of Environmental Protection.

A couple of the Regional Councils have also created a "Technical Advisory Committee" to bring various local and regional expertise into the water quality improvement process.

Recently a Regional Council produced a handbook ("Protection for Private Wells") to be used as an advisory planning tool for ordinance development purposes. The handbook was published and sent to interested towns throughout the state. The demand for this booklet appears to be very widespread and many positive comments have been given its authors.

Maine's Regional Councils recently took delivery of a video tape and a manual explaining the state approved "Process for Local Groundwater Protection". The Process was developed jointly by state groundwater agencies and a lead regional council. The Regional Councils have taken the responsibility of providing, together with the Department

of Economic and Community Development, resources and expertise to local groups desirous of creating a local groundwater protection plan. This groundwater planning process will be assimilated into the state's Comprehensive Planning Program in 1989.

Soil and Water Conservation Districts

Maine's 16 Soil and Water Conservation Districts (SWCD's) were established to provide for the protection, proper use, maintenance and improvement of the soil, water and related resources of the State of Maine. The Districts identify soil and water conservation problems, develop programs to solve them, and enlist and coordinate help from all public and private sources in carrying out programs to solve problems.

Soil and Water Conservation Districts are legal subdivisions of State government, responsible under State law for conservation work within their boundaries just as townships and counties are responsible for roads and other services and school districts are responsible for education. Maine's 16 Soil and Water Conservation Districts cover virtually all of the privately-owned land in Maine, except for portions of Maine's unorganized territory. District boundaries are usually drawn along county lines. One county, Aroostook, has three Districts, while two Districts include two counties. Maine's 16 Soil and Water Conservation Districts are:

Androscoggin Valley SWCD	Penobscot County SWCD
Central Aroostook SWCD	Piscataquis County SWCD
Cumberland County SWCD	St. John Valley SWCD
Franklin County SWCD	Somerset County SWCD
Hancock County SWCD	Southern Aroostook SWCD
Kennebec County SWCD	Waldo County SWCD
Knox-Lincoln SWCD	Washington County SWCD
Oxford County SWCD	York County SWCD

Each of Maine's 16 Soil and Water Conservation Districts is managed by five local citizens who know area problems. These five members are the governing body and are called the Board of Supervisors. Three are elected by cooperators within the District and two are appointed by the State Soil and Water Conservation Commission.

The working arrangements that SWCD's have with federal and state agencies, institutions, groups, and private landowners provide a mechanism to achieve land and water quality goals. Maine's Soil and Water Conservation Districts share the recent concerns of environmental agencies about reducing water pollutants from agricultural enterprises.

The responsibilities of each SWCD's Board of Supervisors are to plan and direct the program, obtain assistance, coordinate the help of government agencies, assign priorities to resource development tasks, and serve as a community clearinghouse for information and services.

District Supervisors inventory resource needs and problems and, using public and private assistance, analyze agricultural, economic, and other trends. This inventory forms the basis for a long-range plan of action that records the facts about local resources and outlines what must be done to correct problems and develop resources for wider and better use.

To meet these goals, Districts work in two ways: (1) they provide technical assistance to individual landowners in planning and installing scientific land use and treatment systems, and (2) they initiate and carry out project type programs as required. Districts also participate actively in group projects and regional resource development programs that benefit citizens in widespread areas. These include watershed projects, economic development projects, river basin development, comprehensive planning and environmental improvement programs.

These programs are important because through demonstration and subtle persuasion they encourage land-users to adopt best management practices (BMP's). The major problems dealt with in almost all of Maine's SWCD programs are sedimentation, erosion, and animal waste management. All of these problems affect water quality and all solutions to these problems improve water quality.

Soil and Water Conservation Districts, in addition to their own resources, rely on the personnel and facilities of the USDA Soil Conservation Service (SCS) for trained manpower. Several other federal agencies provide services, including resource-oriented agencies of the United States, such as those in the Departments of Agriculture and the Interior.

Districts have entered into written memorandums of understanding with individual landowners and cooperating State and federal agencies. These documents spell out goals, working relationships, and how each partner will function. Basically, SWCD assistance in conserving or developing soil and water or related resources is based on the following major elements:

- Public Information and Education Assistance: Informing and educating the public about resource management through the media, schools, civic forums, and other organizations.
- Inventory and Evaluation Assistance: Providing basic inventory data, such as soil surveys, hydrologic data, vegetative information, and other technical data and interpretations and evaluations of these data.
- Planning Assistance: Providing technical assistance to land users in determining alternative land uses and treatment needs and assisting in development of a conservation plan reflecting the specific land use and treatment decisions.
- Application Assistance: Providing technical assistance to cooperating land users to help them install planned conservation practices which include engineering and vegetative measures. Assistance may include site investigations, designs and specifications, construction plans, layout of practices, and supervision of installation.

Cooperative Extension Service

The University of Maine Cooperative Extension Service has agents and specialists located in 16 county offices and on the Orono campus of the University of Maine. They will provide recently developed information on Best Management Practices for cropping systems, pest management, and fertilizer and animal manure use that will minimize the

impact of nutrients and pesticides on water quality.

The staff can also help municipal officials with the process of developing resource inventories. Staff will also seek to interest rural communities, where their contacts are strong, in local groundwater protection planning. The state has provided information materials to assist in this effort. The COE staff will help with initial local organization and call in Regional Planning Council staff when appropriate.

Maine Association of Conservation Commissions

A conservation commission is a municipal advisory board which may be created by a town, city or plantation through its legislative body (i.e. town meeting or city council). The commission has certain statutory duties, but it may also undertake a variety of other environmental, recreational and land use planning functions. Some have called conservation commissions "the environmental conscience of the community." In many municipalities it may be this role more than any other that can provide commission members with a continued sense of purpose.

Maine's Municipal Conservation Commissions are established at the option of the municipality. About 130 of Maine's 491 municipalities currently have active conservation commissions. The commissions consist of three to seven members appointed by the municipal officers.

Each Commission conducts research and gives advice (often to the Municipal Planning Board) as to the protection, development and use of the natural resources located within the territorial limits of the town. It seeks to coordinate its activities with existing municipal agencies, commissions, departments, and conservation bodies organized for similar purposes. It prepares and keeps an index of all open areas, publicly or privately owned, within the municipality including, but not limited to, open marsh lands, swamps, and other wetlands for the purpose of assimilating and retaining information pertinent to the proper utilization, protection and potential development or use of such open areas and may recommend to the municipal officers or others, a program for the better utilization, protection, development or use of such areas.

The Maine Association of Conservation Commissions (MACC) believes that groundwater protection is one of the most pressing environmental and public health concerns facing Maine today. Discoveries of polluted groundwater supplies are growing at an alarming rate, as is the realization that a wide diversity of pollutants are involved. Heightened concern has led to a growing awareness that Maine and much of the nation lacks the data to determine what groundwater is polluted or at risk of becoming polluted. This lack of information frustrates preventative action.

MACC has addressed this information gap and assisted the State in confronting groundwater contamination in a comprehensive and directed manner. A program has been implemented to increase public awareness on groundwater protection through education and provision of technical assistance to selected municipalities to support municipal inventories of existing and potential threats to groundwater supplies. The inventories focused primarily on the identification of abandoned underground fuel tanks as well as potential sources of hazardous waste contamination.

The project represented the third phase of MACC's groundwater protection effort. The first phase was the publication of several educational booklets and articles and a series of seminars conducted in the early 1980's. The second phase, financed by the Fund for New England, was the preparation of a handbook entitled "Groundwater Quality: A Handbook for Community Action." This publication outlines a process by which a community can conduct an inventory of sites to identify those that may contain substances that threaten groundwater quality. In the third phase, MACC used its handbook to encourage and guide detection and prevention activities at the local level.

IX. EMERGENCY RESPONSE

DEP/BOHMC Emergency Response Program

The State's role in response operations in the event of a hazardous materials incident is to provide technical assistance, particularly field testing and assessment, clean-up and disposal of the material, site management and evacuation. DEP is the primary State agency responding to hazardous materials incidents from field offices in Portland, Augusta, Bangor, and, to a lesser extent, Presque Isle. DEP's efforts are often supplemented by DOT, EPA, the State Fire Marshal's Office, the Bureau of Health, and private agencies such as CHEMTREC (a service of the chemical manufacturers). Such incidents must be reported to the National Response Center (an agency of the Federal Government). The NRC notifies regional offices of EPA or the Coast Guard which can offer assistance to state or local officials. Site management is handled by the State Police or local public safety agencies with assistance from DOT; and evacuations are generally undertaken locally, but may be assisted or coordinated by MEMA. State officials operate at the direction, or at least with the concurrence, of local officials, usually fire departments.

State law requires that discharges of hazardous matter, as identified by the Board of Environmental Protection, be reported to the State Department of Public Safety. Notification to Public Safety will result in notification to the Department of Environmental Protection and MEMA and such other agencies as necessary.

There is a toll-free line operated round-the-clock by the chemical manufacturers known as CHEMTREC. CHEMTREC can assist with identification, assess potential risk of damage and injury, and advise as to material and site containment, and cleanup control measures. If on-site assistance is requested, CHEMTREC will notify the manufacturer of the related material who will provide further advice and dispatch a response team if necessary. CHEMTREC also plans to make an on-line data base available to local officials to assist them in making evaluations on-site. This data base may also become available to regional and statewide response organizations.

Issue

Adequacy of equipment. The equipment and materials available for responding to a hazardous materials incident may not be adequate to manage the situation effectively and to protect the health and safety of response personnel. Additionally, the Presque Isle unit is not a fully operational unit.

Action

The Policy Subcommittee will address this issue in 1989.

Issue

The DEP Division of Response Services has the responsibility for post-emergency clean-up and the mechanisms to accomplish this task. This responsibility includes provision of drinking water and filters, contaminant clean-up, and long-term solutions. Federal and state funds are dedicated for the resolution of petroleum and hazardous waste contamination events. Funding for emergency hazardous waste

clean-ups through the Maine Hazardous Waste Fund was inadequate. The funding level was to reach \$600,000 but was seldom greater than \$120,000. Full funding may not even be sufficient. Several serious incidents could easily deplete the current fund and seriously affect Response Services' ability to contract for clean-up. The funding mechanism was altered in 1987 to increase funds.

Action

The Policy Subcommittee will review the progress of the new funding process and further evaluate this issue in 1989.

Issue

The DEP has no written standard procedures for its emergency response operations. Personnel turnover and the need for others outside of the agency to know these procedures makes documenting them desirable, however.

Action

The Policy Subcommittee will evaluate this issue in 1989.

DHS/DHE Emergency Response Program

The DHS Drinking Water Program is responsible for assuring response to physical and natural disruption of public water supplies. The Department has developed a Comprehensive Emergency Response Plan for Drinking Water which addresses disruption of service. Lab analysis, risk assessment, standby equipment, and technical advice are available. Duty personnel are on call by pager 24-hours a day.

Issue

The DHS needs to update their Comprehensive Emergency Response Plan and ensure its dissemination to water utilities.

Action

DHS will update and disseminate its plan.

Maine Emergency Management Agency, Emergency Response Program

The Maine Emergency Management Agency (MEMA) is the lead agency for comprehensive emergency management planning and coordination of emergency response for wide-scale emergencies. This planning is accomplished at state, county and local levels of government with guidance provided by the Federal Emergency Management Agency and assistance provided by MEMA.

To be effective, the planning process begins with a careful analysis of the hazards to which each jurisdiction is vulnerable, and of existing capabilities in personnel, equipment, resources and expertise to respond to emergency situations. The designation of emergency management functions in a systematic process, consistent with other local,

county and state agencies, creates a comprehensive plan. The current State of Maine, Hazard Identification Report was compiled from information provided by county and local emergency management agencies as well as state agencies with response or support roles.

Elements of these plans include:

- o A summary of general policies, responsibilities and procedures used in emergency management.
- o Annexes describing emergency functions such as direction and control, evacuation, shelter, resource management.
- o Organizational sections that describe emergency tasks and procedures.

MEMA has not incorporated groundwater specifically into its State, county and local Emergency Management Plans. MEMA has informally asked for help in incorporating groundwater contamination into this process and has asked for technical assistance in updating MEMA's Hazard Analysis, as it relates to groundwater contamination and Emergency Management Plans.

When emergencies occur, The Emergency Response Team is activated. These team members are representatives from those State agencies which have a major response role (DOT, DEP, State Police, etc.). Additional activation of the Disaster Response Team may occur to provide additional services and support if the emergency situation warrants it. The Disaster Response Team includes agencies such as the Red Cross, Civil Air Patrol, Coast Guard, U.S. Army Corps of Engineers and Small Business Administration.

These representatives work cooperatively with the MEMA Operations Officer and decision-makers to gather information, provide advice and implement decisions in a coordinating role.

Issue

Most communities do not identify and take into account potential types of problems before contamination occurs. A few communities have adequate Emergency Preparedness Plans and have designated lead agencies, most usually fire departments, with the capacity to respond to immediate threats. These plans, however, are general and do not specifically address groundwater. Response in most communities is ad hoc, especially in regard to what to do as a first response, whom to call and what State services are available for assistance. In some communities, people don't even know whom to contact within their own local governments.

Action

In 1986, Public Law 494, Sec. 4 required an Emergency Response Study of the State's ability to respond to Hazardous Materials Incidents jointly conducted by MEMA, the Department of Environmental Protection, and the Bureau of Health with input from the State Department of Public Safety, the Department of Transportation, the Maine State Fire Chiefs Association, the Legislature, municipal governments, and others. The study considered issues such as 24-hour central dispatch of

emergency response teams, mobile sampling, training of local and state officials, onsite emergency decision making, and advance planning, reporting its recommendations to the Legislature on January 1, 1987.

To address these recommendations and other Hazardous Materials planning and response issues a nine member Emergency Response Commission (ERC) was established by Public Law 763 on April 22, 1988. This action was consistent with Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986. That act established a comprehensive and detailed program for community involvement in planning, notification, response and enforcement in the event of an accidental release of a hazardous substance. The ERC expects to meet the SARA implementation schedule.

The ERC is chaired by the Director, Maine Emergency Management Agency, and will address such topics as:

- A. Receiving chemical release notifications;
- B. Establishing planning districts;
- C. Appointing local emergency planning committees for each planning district.
- D. Supervising and coordinating the activities of planning committees.
- E. Reviewing emergency plans.
- F. Establishing procedures for receiving and processing requests from the public for information regarding emergency response plans, material safety data sheets and lists of EPA's extremely hazardous substances, including the names of Maine's industries possessing such chemicals.

X. EDUCATION

Publications

The Water Tap, Groundwater Newsletter --

The Ground Water Standing Committee is charged to "Foster greater public awareness of the importance of groundwater, and provide information... toward this end..." The State Groundwater Coordinator is to act as an information source for the Administration, the Legislature, State agencies, and public interests. One means of providing timely state and national groundwater information to the widest number of interested people is through a newsletter. The Groundwater Data Management Study also recommended a newsletter as a means of keeping state groundwater professionals informed. In July 1986, the State Groundwater Coordinator began publishing The Water Tap, a monthly newsletter of state and national groundwater news, views, and issues. The Water Tap is distributed to state groundwater professionals, state groundwater program administrators, key state and federal representatives, cooperating federal agencies, and public interest groups. It ensures that groundwater issues remain at the forefront.

Maine Groundwater Handbook, second edition --

This 135 page publication produced by the Maine Geological Survey presents hydrologic principles, information on Maine's waters and existing data on them, and case studies on specific problems with groundwater pollution. This is the most comprehensive document on Maine's groundwater available. It has been recommended to Maine school system science teachers as a teacher's reference handbook.

Ground Water... Maine's Hidden Resource, second edition --

This 34 page booklet produced by the Maine Association of Conservation Commissions with State financial and technical assistance is an excellent groundwater primer especially suited to school children and the general public. It presents hydrologic principles, pollution threats, and protection suggestions. It is distributed by Maine Conservation Commissions and has been recommended to Maine school districts.

Groundwater Quality: A Handbook for Community Action, second edition --

Published by the Maine Association of Conservation Commissions, with the financial and technical assistance of the state, this handbook provides an inventory process for local communities wishing to survey local threats to groundwater resources. This process has also been incorporated into the state's ten-step Planning Process for Local Groundwater Protection. This handbook is distributed on request by the Maine Association of Conservation Commissions.

The Planning Process for Local Groundwater Protection --

This ten-step planning process prepared by Paul Dutram, State Groundwater Coordinator, presents a voluntary methodology for municipalities leading to a local groundwater protection plan. This process allows for significant financial savings by utilizing professional assistance only where absolutely necessary. The process is facilitated

by the Department of Economic and Community Development through Maine's Regional Planning Councils and the state's Cooperative Extension Service. Its place within the State's Growth Management/Comprehensive Planning Program, facilitated by the Division of Community Development of the Department of Economic and Community Development, will be determined in 1989.

Development Evaluation Handbook for Municipalities --

The Ground Water Standing Committee has recognized the need for a guidelines document for local officials offering suggestions on evaluation and control of development proposals that may pose a threat to groundwater. This handbook will be prepared by state staff, possibly with interstate assistance from EPA and the New England Interstate Water Pollution Control Commission, during 1989.

The Land and Water Resources Center Groundwater Digests --

The University of Maine Land and Water Resources Center cooperates with State agencies in producing a series of groundwater digests. Each digest contains 4-12 pages of information on a specific subject. Titles to date include: Play It Safe With Groundwater, Maine's Groundwater, Private Wells, and Safe Drinking Water, the latter a consumer primer on proper water well construction. The L&WRCenter will cooperate in 1989 on a digest highlighting Maine's Local Groundwater Protection Planning Process. These digests are distributed by the L&WRCenter, the Cooperative Extension Service, and state groundwater agencies. They have been recommended to Maine science teachers as a resource.

Science and Natural History: A Maine Studies Sourcebook, Vol. 2: Earth Science Topics: Groundwater --

This teaching resource by Dean Bennett contains a section on groundwater that presents suggestions for laboratory experiments and field trips for students. Published by Down East Books, it has been recommended to Maine science teachers as a resource.

Threats to Groundwater in Maine --

A large format chart prepared by Dr. Peter Garrett, formally with the Maine Department of Environmental Protection, this compendium of data on groundwater threats offers a succinct view of Maine's groundwater situation. The chart is distributed by the Department of Environmental Protection and the Department of Human Services and has been recommended to Maine science teachers as a resource. It was revised and reprinted by DHS in 1989.

Petroleum Contamination of Maine's Drinking Water Wells --

This seven-page booklet by Jean Scudder and Norman Anderson of the Department of Human Services, first published in June 1986, presents concise information for public consumption on one of the major threats to groundwater in Maine. Distributed by state groundwater agencies it is being revised and reprinted in 1988.

Video Presentations

The Planning Process for Local Groundwater Protection --

This 26 minute VHS VCR format tape parallels the written Planning Process described above. Produced with the cooperation of an actual Maine town for demonstrative purposes, this video not only presents the process in a visual medium, but creates confidence in municipal viewers that groundwater protection planning can be accomplished at the local level. Like the written document, this video is facilitated by Maine's Regional Planning Councils, County Cooperative Extension Service offices, state hydrologists, and is available on loan through the Maine State Library, Film Services Division.

Play it Safe With Maine's Groundwater --

Produced by the State Cooperative Extension Service, with the technical assistance of state hydrologists, this 16 minute slide-tape presentation presents general groundwater principles and major threats to the resource in a manner targeting school children and the general public. It is facilitated by Cooperative Extension Service agents and state hydrologists. The slide-tape show has also been transferred to VHS VCR format tape which is available for loan through the Maine State Library, Film Services Division. This production was upgraded in 1989.

Groundwater --

The working title for a, as yet unproduced, video on Maine's groundwater. Recommended by the Ground Water Standing Committee in 1986, this professionally produced 30-45 minute video production would target both the general public and the more sophisticated audience. It would be suitable for high school and college audiences, business and public interest groups, legislators, administrators, and groundwater professionals, and state television stations. In addition to presenting general groundwater principles, it would present an overview of Maine's groundwater problems, state solutions, and work still to be accomplished. The estimated production cost is \$30,000.

Educational Programs

DEP/BOHMC Spills Response Training

The DEP Division of Response Services currently conducts a one-night spills response training session for local fire service personnel on an "as requested" basis. One staff person is designated for this task and is often assisted by other volunteer staff personnel. The session is organized for regional participation. The Division has staff for a limited program.

MVTIS Fire Service Training

The Maine Vocational Technical Institute System (MVTIS) is responsible for Fire Service Training via contractual service agreements with the State Fire Marshall's Office. Requirements that fire department personnel be training certified do not exist in Maine. A voluntary firefighter certification system however, is in place.

Fire Training curriculum is developed by Southern Maine Vocational Technical Institute's (SMVTI) Maine Fire Training and Education program (MFT&E). MFT&E personnel conduct field courses in local fire departments, regional settings and on a statewide basis. Approximately 1,200 of the states 12,000 firefighters are served annually.

Limited Spills Response training is offered in two of MFT&E's field courses, Identification and Recognition of Hazardous Materials and Hazardous Materials: The Pesticide Challenge. The latter course as well as a third field course Hazardous Materials: Incident Analysis are not in great demand at this time.

During 1988, MFT&E will train an estimated 18,000 first responder personnel (police, fire, E.M.S., public works, etc.) in Hazardous Materials Identification and Recognition. All other courses are sponsored by Regional Adult Education organizations or by Fire Attack School organizations.

SMVTI also offers a two year Associate Degree Program in Fire Science Technology, including a 45 hour course on Hazardous Materials Planning and Response. This course is offered on campus and periodically at other selected sites statewide.

MFT&E and SMVTI are willing to work with DEP Response Services personnel to broaden their curriculum and provide comprehensive Spills Response courses.

MEMA Fire Service Training Coordination

The Maine Emergency Management Agency has the capability to coordinate fire service training programs through University and Vocational Technical Institute (VTI) closed circuit television and public access cable television circuits equipped with satellite receivers. These video courses are produced by the U.S. Fire Administration. Currently only university campuses and hospitals have closed circuit television or receivers. State high schools and VTIs will be similarly equipped over the next three to four years. MEMA currently offers programs at its satellite receiver teleconference center at Camp Keyes in Augusta.

DAFRR/BPC Pesticide Applicators Training Program

Pesticides which are deemed more dangerous because of the risks they pose to the applicator, the public or the environment are classified "restricted use." Anyone using a restricted pesticide and persons applying any pesticide as a service are required to first be certified and licensed by the BPC. Initial certification consists of examinations administered by the Board's staff. Applicants are furnished with written training manuals by the Cooperative Extension Service in order to prepare for these tests. After having passed the initial exams, applicators may maintain their certification by obtaining two to three hours of continuing education credits per year.

The Board has been working with the Cooperative Extension Service to develop educational materials on groundwater protection to be included in the various training manuals. Eventually, the examinations will cover this subject matter. In addition, for the last two years there have been numerous continuing education programs that specifically addressed groundwater issues.

Finally, the Board's staff has been working with other governmental agencies on a set of "best management practices" intended to prevent or minimize pesticide contamination of groundwater. This document will be available to all prospective applicators, whether certified or not.

DAFRR/S&WCC Education Program

The Commission and Districts sponsor a Natural Resource Institute for teachers annually. This institute is designed to give teachers an appreciation for their direct and indirect dependency on the natural resource base. It also provides guidance for integrating natural resource conservation and ethics into their curriculum. The goal of the Institute is to provide the tools needed by teachers to inform students who otherwise have no direct contact with agriculture's resource base. The Commission and Districts also sponsor public information programs and educational programs which they voluntarily provide to schools. There is an opportunity through Commission and District educational programs to tell the story of groundwater.

Maine Association of Regional Councils

The efforts of Maine's Regional Councils, although primarily technical assistance in nature, are also generally educational. The projects undertaken by each RPC are usually designed to be transferable to other RPCs and thus serve as blueprints from which other RPCs learn of new methodologies. RPC projects funded by the state through the federal 205j Program have this purpose as a primary goal.

The RPCs local assistance efforts provide specific information to municipal officials in specific areas, such as the formulation of a capital improvements plan, and thus train as they assist. Larger and longer RPC efforts, such as local groundwater protection planning, typically begin with an educational phase designed to generate increased interest and general understanding before beginning actual tasks.

RPCs participate in the creation of "how to" pamphlets and manuals. They also typically hold training and informational workshops, and participate in developing educational materials for schools.

XI. PUBLIC INVOLVEMENT

Several mechanisms are employed to insure public involvement within Maine's Groundwater programs. The Ground Water Standing Committee includes a representative of the Maine Association of Regional Councils which represents the municipalities of Maine. Six subcommittees of the Standing Committee (Groundwater: Protection, Use, Classification, Education, Risk Assessment, and Interagency Coordination) are comprised of State agency employees and representatives of a wide range of public interest groups in approximately equal numbers. The subcommittees have been used to develop new programs and policies and will continue to be used as necessary in the future.

Most new programs, especially those requiring legislative authorization, are first submitted to a public work session, public hearing, or public comment process. The State Groundwater Management Strategy will undergo a public comment process. The Board of Environmental Protection and the Board of Pesticides Control provide for written and in-person testimony during their review procedures.

State and state-administered federal grant programs require a public input component and most are directed towards projects with significant public participation. The 205j Water Quality Management Program is an important example of this type of activity that often serves the State's Groundwater Management Program's needs.

The Soil and Water Conservation Commission and Districts also have an excellent record of public involvement. They have been able to attain a high degree of public input in the Resource Conservation Act (RCA), Challenge Grant Program, and Agricultural Viability Programs. The public participation generated in these three programs has increased District visibility and credibility statewide. Districts have limited financial resources but if the funding for a Public Involvement Program was made available to the Districts, they would be capable of attaining valuable local input to almost any issue area.

In addition, the State Groundwater Coordinator serves, at all times, as a focal point for public input, discussion, and information. The Water Tap, which contains monthly updates on state groundwater projects, is distributed to a list of interested parties and organizations. The State Groundwater Coordinator informs pertinent parties and organizations of activities and events of importance to them and routinely solicits their advice and assistance. A list of these cooperating organizations follows.

COOPERATING ORGANIZATIONS
(in alphabetical order)

Associated General Contractors of Maine
Maine Association of Regional Councils
Maine Association of Conservation Commissions
Maine Audubon Society
Maine Chamber of Commerce and Industry
Maine League of Women Voters
Maine Municipal Association
Maine Organic Farmers and Gardeners Association
Maine Peoples Alliance
Maine Petroleum Association
Maine Rural Water Utilities Association
Maine Water Utilities Association
Maine Well Drillers Association
Natural Resources Council

APPENDIX A

1989/1990 Action Plan

Program Coordination

- Continue, through the Ground Water Standing Committee, advising the Administration, the Legislature, State agencies, and the public on sound groundwater protection and management policies and programs; assessing priorities in the groundwater management program; assuring cost-effective allocation of funding and staffing resources; and ensuring the implementation of the State's groundwater management and protection programs.
- Track federal and regional groundwater legislation and programs and provide a consistent state voice in federal decision-making procedures.
- Update the State Groundwater Management Strategy and prepare a 1991/92 Groundwater Action Plan.
- Prepare 1990 and 1991 Annual Coordinated Groundwater Workplans for USEPA.
- Prepare 1989 and 1990 Annual Groundwater Legislative Packages.
- Redraft State Groundwater Protection Program statute (38 MRSA sS401-403) to reflect the goals and policies of the State Groundwater Management Strategy.
- Coordinate with the Maine Water Supply Study Commission.

Groundwater Research

- Define the State Groundwater Research Program (38 MRSA sS402).
- Address state cooperation in the federal USGS National Water-Use Information Program.

Groundwater Classification

- Request approval of the State Groundwater Classification System and necessary implementation funding from the Legislature.
- Ensure incorporation of the State Groundwater Classification System into state and local programs that protect groundwater.
- Continue to designate Sole Source Aquifers.
- Encourage the U.S. Congress to extend the deadline for participation in the Sole Source Aquifer Demonstration Program.

Data Management

- Initiate mapping of well log information.
- Investigate a DHS system for accurate private well location.

- Implement the State Groundwater Data Index.
- Establish a networked PC data management system among groundwater agencies.
- Secure approval of and institute DBMS standards recommended by the Groundwater Data Management System Standards Work Group.
- Participate in the State GIS operational pilot project.

Controlling Sources of Contamination

- Formulate a State Nonpoint Source Pollution Control Program.
- Institute a State Underground Injection Control Program (point source pollution) that addresses floor drains, large septic systems, abandoned wells, and reinjection wells (including heat pumps).
- Consider the need for increasing DEP Site Location of Development review staff.
- Investigate the adequacy of state and local site review programs.
- Produce a Municipal Review Guidelines Manual to aid municipal governments in site review and compliance evaluation.
- Review the adequacy of the state 2-foot buffer for gravel pits.
- Investigate the possibility of removing "grandfather" protection from gravel pits in the case of groundwater mining.
- Provide review and recommendations on the State's Solid Waste Policy.
- Encourage the establishment of suitable septic tank and cesspool waste disposal sites in all Maine municipalities.
- Determine why farms with agricultural impoundments are not completing SWCD-approved farm plans.
- Institute needed regulations for the control of above-ground hazardous materials storage tanks.
- Incorporate federal Underground Storage Tank Regulations into state statute.
- Adopt underground hazardous materials storage tank regulations.
- Review the need for a financial assistance program for owners of residential underground tanks which must be replaced.
- Request funding to continue replacement of DOT underground petroleum storage tanks.

- Request funding to implement a state household and small quantity commercial hazardous waste disposal pilot program.
- Develop hazardous materials storage standards.
- Begin modification or replacement of DOT hazardous materials storage buildings.
- Complete testing of DHS's new septic system site evaluation system.
- Modify the DHS septic system site evaluation system to address the effects of neighboring septic systems.
- Determine the feasibility of researching the degree of nitrate contamination in the state.
- Determine the feasibility of evaluating the adequacy of new alternatives to septic systems for Maine.
- Implement the State Wellhead Protection Program for public water supplies.
- Develop a State Pesticides in Groundwater Management Plan.
- Cooperate with the Board of Pesticides Control in developing a Critical Areas program for pesticide use.
- Incorporate DAFRR BMPs for pesticides in related state programs.
- Request funding for continuation of Sand-Salt Storage Facility Programs.
- Review the administration and operation of the Municipal Sand-Salt Storage Facility Program.

Compliance Evaluation and Enforcement

- Evaluate the need for a program to locate, sample and remediate where necessary all waste lagoons.
- Initiate enforcement action concerning illegal floor drains.
- Address the necessity for compliance evaluation of NPS Program BMPs.
- Continue the close-out of landfills located over vulnerable geologic deposits.
- Consider the need for increasing BOHMC inspection and enforcement staff.
- Evaluate the feasibility of a permanent uncontrolled hazardous waste site identification program.

Technical Assistance

- Secure continued funding of the DEP Impacts-of-Development-on-Groundwater Technical Assistance Program, including a State position for an administrator.
- Develop a program for remediating the 200 listed state hazardous waste sites within a reasonable time frame.
- Develop technical standards for the transportation and handling of virgin hazardous materials.
- Cooperate with DECD in incorporating the Local Groundwater Protection Planning Process into development of the State Comprehensive Planning Program and identification of state staff necessary to the program's success.
- Develop concise health risk assessments for public understanding.

Emergency Response

- Track and cooperate in the Maine Emergency Response Commission's creation of a State Emergency Response Plan.
- Review the adequacy of DEP emergency response equipment.
- Review funding of the Maine Hazardous Waste Fund.
- Develop written standard procedures for DEP emergency response operations.
- Update and disseminate DHS public water supply Comprehensive Emergency Response Plans.

Education

- Create a L&WR Center Digest highlighting Maine's Local Groundwater Protection Planning Process.
- Reprint "Threats To Groundwater In Maine" chart.
- Seek funding for a video presentation of Maine's groundwater characteristics and problems associated with Maine's groundwater.
- Cooperate in improving the State's fire service training program in the area of hazardous materials spills response.
- Cooperate with the Soil and Water Conservation Commission in adding groundwater education to its efforts.
- Cooperate with the state's Regional Planning Councils in providing groundwater education to schools and municipal governments.

- Support the groundwater education efforts of the state Cooperative Extension Service, the Maine Association of Conservation Commissions, and other pertinent groups.

Public Involvement

- Continue to involve public interest organizations in the policymaking of the State Ground Water Standing Committee.
- Endeavor to submit new groundwater programs to the public comment process.
- Make every effort to involve the public in active participation in state groundwater programs and projects.
- Disseminate "The Water Tap" to pertinent interested parties.

APPENDIX B

General Description

of

Contaminant Control Programs

DEP/BWQC Nonpoint Source Pollution Control Program

Nonpoint source pollution control programs are designed to minimize water quality impacts from land use activities through the application of Best Management Practices (BMPs). Implementation of nonpoint source control BMPs involves many state agencies, the Maine Association of Regional Councils, Maine's sixteen Soil and Water Conservation Districts, and local communities. Individual programs are described under the appropriate facilitating organization in other sections of this document.

Maine's Commissioner of Environmental Protection designated the Director of the Bureau of Water Quality Control's Planning and Grants Section to be the State Coordinator for Control of Nonpoint Source Pollution. At this time, this position's task is to coordinate the preparation of Maine's Nonpoint Source Assessment and Management Program. Once the Nonpoint Source Assessment and Management Program is approved by the USEPA Administrator, the NPS Coordinator's responsibilities will be twofold: (1) to coordinate implementation of the NPS Management Program and (2) to prepare addendums to the NPS Assessment and Management Program as more is learned about the nature, extent and causes of NPS pollution as well as the effectiveness of present and proposed Best Management Practices.

The identification of Best Management Practices (BMPs) and associated performance standards has two principal goals:

- (1) To specify minimum standards of performance for activities which generate nonpoint source water pollution. These minimum standards are oriented towards general protection and improvement of the State's waters. These minimum standards will have statewide applicability except in especially sensitive or vulnerable watersheds or areas where application of the minimum standards would result in a violation of Maine's Water Classification Program.
- (2) To specify supplemental standards of performance to be applied in especially sensitive or vulnerable watersheds or areas where application of the minimum standards would result in a violation of Maine's Water Classification Program.

The procedures for identification of BMPs are to incorporate them into Maine's Nonpoint Source Pollution Assessment and Management Program in accordance with the requirements of Section 319 of the Clean Water Act and such additional requirements which are in the best interests of the people of Maine. These requirements include the following:

- (1) BMPs shall be identified after consultation, where appropriate, with State agencies, municipalities, Councils of Government, Soil and Water Conservation Districts, interest groups representing commercial activities, citizen groups, individuals, and Federal and Interstate water pollution control agencies.
- (2) Public notice of the availability of copies of any proposed BMPs shall be published by the Department of Environmental Protection, Bureau of Water Quality Control at least 30 days prior to a public hearing on the proposal.

- (3) The Department of Environmental Protection, Bureau of Water Quality Control shall hold a public hearing or hearings to obtain comments on any proposed BMPs from all interested persons.
- (4) Approval by the Governor of Maine of any proposed BMPs.
- (5) Approval by the Administrator of the U.S. Environmental Protection Agency of any proposed BMPs.
- (6) BMP approval by the Administrator of the U.S. Environmental Protection Agency shall be submitted to the joint standing committee of the Legislature having jurisdiction over natural resources within 30 days of said approval.

Once the BMPs contained in the Maine Nonpoint Source Pollution Assessment and Management Program are approved by the Administrator of the U.S. Environmental Protection Agency, subsequent proposals to change BMPs shall also be subject to the aforementioned requirements and shall be treated as addendums to the Maine Nonpoint Assessment and Management Program.

The process for identification of BMPs is so protracted and cumbersome that it could serve to impede control of NPS pollution. For this reason, the State of Maine has opted to establish two levels of requirements for control of NPS pollution - BMPs and Performance Standards. The BMPs included in Maine's NPS Pollution Management Program are intended to be generalized rather than site-specific; providing information on the goals and technical basis of NPS control. The BMPs are planned to change little over time so only those practices which have been proven to be clearly necessary for water quality protection are identified as BMPs. To fully implement the goals of Maine's NPS Pollution Management Program, it is necessary to complement the BMPs with a series of publications which specify performance standards for NPS pollution control for all major types of activities generating NPS water pollution. These performance standards can be expected to change significantly over time as more is learned about the efficacy of practices for NPS control, as technology for NPS control advances, and as the list of especially sensitive or vulnerable watersheds or areas changes.

DEP/BWQC Underground Injection Control Program

Underground injection wells are in reality a specialized form of subsurface wastewater disposal. They are being discussed separately, however, because they are the object of a specific regulatory program established by the Federal Safe Drinking Water Act.

Sections 1421-1424 of the Federal Safe Drinking Water Act created the Underground Injection Control (UIC) Program to regulate underground injection wells. The U.S. Environmental Protection Agency has promulgated regulations at 40 CFR Parts 124, 144, 145, and 146 to implement the Federal Act. Both the Act and the EPA regulations include provisions for delegation of primary enforcement authority (Primacy) over the UIC program to states that demonstrate the necessary legal authority and technical and management capability. The DEP demonstrated the necessary authorities and capabilities and was awarded UIC Primacy effective September 26, 1983.

The Federal program groups underground injection wells into five classes as described below:

Class I -- wells which discharge fluid waste, including hazardous and radioactive wastes, beneath an aquifer;

Class II -- wells used to inject fluids associated with enhanced recovery from oil and gas wells;

Class III -- wells used for solution mining of minerals;

Class IV -- wells used to discharge hazardous or radioactive fluid wastes into or above an aquifer; and

Class V -- all other wastewater disposal wells.

The State UIC Program is established in rules of the Board of Environmental Protection, Chapter 543. The rules provide for review and, if appropriate, permitting of proposed Class I, II, and III wells using the procedures set forth in the Federal regulations cited previously. Class IV wells are prohibited based on statutory authority granted the Board by 38 MRSA 420, subsections 2 and 3. Class V wells will be handled in accordance with the Department's wastewater discharge licensing authorities established by 38 MRSA, Sec. 413 and 414. An inventory of injection wells conducted in 1981 found no wells of Classes I, II, III, or IV and only fourteen Class V wells. A 1986 reassessment of these wells indicated that none are still discharging pollutants, although monitoring continues to be required for some of these sites. Two new Class V wells were discovered in FY87 and actions are being taken to eventually eliminate the discharge of pollutants at these sites. During FY88, the Bureau of Water Quality Control, at the suggestion of USEPA Region I, evaluated threats to groundwater quality due to service station floor drains. On-site inspections at selected service stations were conducted concurrently with a survey-by-mail of Maine's 3000+ motor vehicle inspection stations. Appropriate enforcement and remedial actions will be coordinated with the pertinent DEP sections.

DEP/BWQC Wastewater Treatment Plant Construction Program

The Division of Municipal Services administers state and federal pollution abatement funds to construct municipal wastewater treatment facilities. The types of facilities that may effect groundwater are treatment lagoons, subsurface systems and land application systems. Projects that have three acres or more of unvegetated area are reviewed under the Site Location Act administered by the Bureau of Land Quality Control. Projects that require Land Bureau approval are reviewed by Water Bureau technical staff. Most lagoons are reviewed under the Site Location Act. Lagoon siting, leakage rates and site characteristics are reviewed under guidelines developed by the DEP. Mapped sand and gravel aquifers are avoided whenever possible. Lagoons are located near aquifers only when groundwater movement is away from the aquifer to surface waters. Lagoons under three acres are given the same site considerations by the Division of Municipal Services.

Subsurface systems are reviewed with the Division of Health Engineering of the Department of Human Services for compliance with the Maine Plumbing Code.

Land application systems are licensed by the Water Bureau after review of rates of application, nutrient loading and site characteristics are taken into account.

Monitoring wells are installed and monitored periodically around lagoon systems, land application systems and some larger subsurface systems.

DEP/BWQC Wastewater Discharge Permitting Program

The DEP regulates surface wastewater disposal systems as defined in 38 MRSA, Sec. 413, and issues a license to install or operate a system pursuant to Sec. 414-A. The Water Bureau Division of Licensing and Enforcement administers the cited regulating authority. There are no rules dealing with surface wastewater disposal systems. However, Board policy #10, "The Discharge of Hazardous Substance to Groundwaters of the State," indirectly applies to surface wastewater disposal systems in that discharge of hazardous substances to groundwater is prohibited.

The regulatory program is managed under the premise that all groundwater is classified as GW-A (Sec. 371-A) and must be suitable for public water supply, unless ambient water quality precludes such use. In all cases, a licensed discharge should not be the cause of violation of the GW-A classification. Staff has interpreted the statutes to require that water quality not be degraded beyond drinking water standards. Unfortunately, the standards do not include all parameters that may cause water to become unfit to drink.

Land application of wastewater generally involves disposal of a pretreated wastewater on the land surface, by one of several distribution methods. One of these methods is storage of wastewater in lagoons. Depending on the geologic setting, constant lagoon percolation may have a significant potential for contaminating groundwater. Because lagoons have not been recognized in the past as potential contaminators, groundwater monitoring plans associated with them have generally been inadequate. Although there are no thorough case studies of a groundwater problem associated with land treatment system lagoons, monitoring well data do indicate two lagoon sites in Maine are degrading groundwater quality. Generally, sanitary wastewater spray irrigation systems have minimal impact on groundwater quality, not enough to exceed primary or secondary drinking water standards. This finding is supported by national and local research, which indicates that a properly operated system does not adversely affect groundwater quality. Observation wells located at the downgradient perimeter of irrigation sites confirm these research findings, demonstrating that some effects from wastewater application do occur, such as nitrates above background, but that they are usually below drinking water standards. Industrial food processing wastewater disposal systems may also affect groundwater quality to some extent. Parameters of concern are organic loading (as measured by chemical oxygen demand), iron, manganese, nutrients, salts, and total dissolved solids. There are presently 27 land application sites in Maine licensed by the DEP. In addition, ten sanitary wastewater percolation lagoons were originally permitted by the DHS Division of Health Engineering. As previously mentioned, two lagoon sites have been associated with groundwater quality degradation. One industrial food processing disposal system is also being investigated in response to excessive sodium levels.

There are currently eight known dischargers of industrial wastewater to groundwater. Six of the eight dischargers are metal-finishing or electrical component facilities. All the

dischargers were in existence prior to DEP jurisdiction over groundwater discharges. Two facilities were granted permits by the Department of Human Services under the old Plumbing Code. In most of these situations, the wastewaters have contained metals which are toxic even in small quantities, such as lead, hexavalent chromium, and cadmium. The severity of the problems caused by these wastewaters varies. For example, a plating firm in one town discharged a moderate quantity (4000 gallons per week) of metal-finishing wastewater into a road ditch. The wastewater percolated into a shallow till overlying bedrock. Monitoring wells and analysis of downgradient drinking water wells did not show contamination. Nevertheless, the Department required the discharge to be eliminated. On the other hand, Maine Metal Finishing discharged its wastewater into unlined lagoons. As a result, both the adjacent Stroudwater River and the local groundwater were contaminated. The company's own well was rendered unpotable. The Licensing Division of the DEP Bureau of Water Quality Control regulates these systems under the authority of 38 MRSA, Sections 413 through 414-A. These statutes provide that no person shall discharge pollutants without a license, that a license is required for a subsurface disposal system, and that a license shall be granted only if the wastewater receives best practicable treatment and the quality of the receiving water is not lowered. In the case of groundwater, Sections 363-B and 371-B provide that GW-A shall be the highest groundwater classification, that all groundwater shall be classified not less than GW-A except as determined by the Legislature on a case-by-case basis, and that such water shall be suitable for public drinking water supplies. The Water Bureau's current policy in dealing with existing discharges is to require their elimination if practical. If not, the wastewater must meet drinking water standards prior to being discharged to the disposal system. Groundwater monitoring is required in almost all cases. When contamination is indicated, as in the cases cited above, full enforcement authority is provided by Section 413 and is vested in the Water Bureau's Division of Licensing and Enforcement.

Certain subsurface systems require review and approval under the Site Location Law and associated DEP Regulations. In those cases, evidence must be provided that any proposed wastewater disposal system will not degrade groundwater to less than state drinking water standards.

The storage, treatment, and disposal of liquid and semi-liquid materials in surface impoundments has long been suspected as a major source of groundwater contamination. Studies conducted for the Environmental Protection Agency clearly indicate that groundwater pollution is attributable to surface impoundments and that most surface impoundments leak. It is estimated that 118 billion gallons of fluids annually enter the groundwater (nationwide) as a result of planned or chance discharge from surface impoundments. Surface impoundments are used for a variety of purposes to handle a variety of materials. Users include municipalities, industry, and agriculture. Materials involved include municipal sewage, industrial wastewater (including hazardous wastes), and animal wastes. The purpose of the impoundment may be storage, disposal, or treatment.

Under a Federal grant to the DEP, a characterization and assessment of this issue in Maine was conducted in 1979. Identified during that study were 173 impoundment sites, accounting for 453 individual pits, ponds, and lagoons, both active and abandoned. Distributed generally in accordance with population, the most common uses of sites in Maine are municipal and industrial, with many of the latter type having been abandoned. A large majority of sites were also found to be poorly designed, constructed, and located from the standpoint of leak prevention and protection of groundwater. The study identified

twelve sites in Maine associated with contamination of groundwater with all but one having either active or abandoned industrial-use impoundments. Many more sites were considered highly suspect, but had not been investigated sufficiently to be certain. Eight of these sites are located in sand and gravel deposits and, in several cases, drinking water wells have been impacted. Other sites demonstrated a variety of characteristics which pose serious threats to groundwater, if not presently, in the near future. These include intentional (sometime designed) discharges to the ground, location in groundwater recharge areas, improper closure, and poor maintenance practices (e.g., overflows, leaks). There is no specific program within the DEP to comprehensively manage or administrate the design, construction, and use of surface impoundments in the State.

The DEP has authority under different statutes (for example, the Underground Injection Control Program) to regulate a variety of activities and materials related to surface impoundments. Other agencies also have legal responsibility for certain surface impoundments, and still others deal with impoundments outside a statutory framework but within their area of interest. When an impoundment is part of a wastewater treatment system, it is included in the licensing process required by 38 MRSA, Section 413-1, which includes design, construction, and operation review. If the site of the impoundment(s) exceeds a minimum size, then the Site Location of Development Law also applies, including the DEP Regulations governing environmental impact. Depending on the material to be handled at the site, the Waste Management Act may be the primary regulatory authority. When a site is being closed, guidance is provided by DEP Regulations concerning proper discontinuance procedures (Chapter 550).

Certain types of impoundments, however, are not regulated by DEP. Primary among these are those serving agricultural needs. In fact, under Section 413-2 of Title 38, discharges from agricultural activities are specifically exempted from the licensing requirement, provided a State Soil and Water Conservation District certified farm plan is in practice. It must be noted, however, that only one farm operation has applied for and been granted such an exemption. Pesticides are regulated by the Board of Pesticide Control, provided handling meets certain prerequisites. Less directly involved is the Department of Human Services, through the Safe Drinking Water Program. Title 22, Section 2601 et seq. gives authority to DHS to protect drinking water supplies, which includes right of access and power of closure and correction whenever a supply is jeopardized by a nearby activity. This authority is also extended to affected municipalities and water utilities, although it is rarely used.

DEP/BWQC Municipal Sand-Salt Storage Facility Program

Note: This program is a joint cooperative effort of the DEP and the DOT.

As of May 1986, 135 wells were known to have been contaminated in Maine due to the uncovered storage of road salt in sand-salt piles. One of these was the Sabattus municipal well, which was replaced at a cost of \$123,000. Some of the other sand-salt pile sites which have impacted groundwater (with number of wells affected) include the DOT lots in Freeport (8), Gardiner (6), Hermon (5), Jefferson (9), Rockwood (11), Turner (3), Unity (4), West Gardiner (6), and Winthrop (9), and municipal lots in New Gloucester (10) and York (18). The York site cost the town \$300,000 in a legal suit and an estimated \$550,000 will eventually be spent to run municipal water lines to affected homeowners. Other costs not easily quantifiable are the time and effort spent by State

staff to evaluate the claims of affected homeowners, and to advise on the provision of alternative water supplies. There is also the cost of the salt lost through leaching from the uncovered sand-salt piles.

All these costs, and the nuisance they represent, caused a change in the law regarding salt storage. Public Law 479, enacted in 1985, mandated that all sand-salt piles be covered by 1996 to prevent the generation of salty leachate from them. Exceptions are allowed if the piles are to be located adjacent to water bodies of such size or quality that the classification of that water body would not be violated by the discharge of salty leachate.

A registration of all sand-salt piles was also ordered by Public Law 479, and was completed in 1986, with about 800 municipal, DOT, and private sites documented. This list was then prioritized, following visits to all sites by staff geologists, so that those sand-salt piles for which there was documented impact on drinking water supplies would be covered first.

Bond issue monies were approved by voters in November 1987 to begin construction of sand-salt storage facilities. Over 100 communities will not receive DOT funds because of the cost sharing formula in the statute. These communities will have to comply with the time schedule for construction by 1996 while the statutes allow communities which would receive funds according to the formula to do nothing if continued funding is not available. Similar funds must be approved each biennium through 1996. DOT has initiated a program to evaluate the cost, utility, and ease of construction of different types of buildings as DOT will be responsible for issuing funds. Funding for these and future buildings will be based on a current priority list and time schedule enacted in Public Law 492.

Ongoing activities at the State level are chiefly concerned with the siting and construction of sand-salt storage buildings. The DOT is preparing generic specifications for the buildings, while the DEP is reviewing proposed sites for environmental acceptability. Work is still proceeding on revisions of the priority list, evaluation of well claims, and advising on replacement water supplies.

DEP/BLQC Site Location of Development Program

In implementing the Site Location of Development Program (38 MRSA Sections 481-490) of State review in 1969 the Legislature found that the economic and social well-being of the citizens of the State of Maine depends upon the location of state, municipal, quasi-municipal, educational, charitable, commercial and industrial developments with respect to the natural environment of the State; that many developments because of their size and nature are capable of causing irreparable damage to the people and the environment on the development sites and in their surroundings; that the location of such developments is too important to be left only to the determination of the owners of such developments; and that discretion must be vested in state authority to regulate the location of developments which may substantially affect the environment and quality of life in Maine.

The Legislature further found that certain geological formations particularly sand and gravel deposits, contain large amounts of high quality groundwater. The groundwater in

these formations is an important public and private resource for drinking water supplies and other industrial, commercial and agricultural uses. The groundwater in these formations is particularly susceptible to injury from pollutants, and once polluted, may not recover for hundreds of years. It is the intent of the Legislature that activities that discharge or may discharge pollutants to groundwater may not be located on these formations.

The purpose of this program is to provide a flexible and practical means by which the State, acting through the Board of Environmental Protection, in consultation with appropriate state agencies, may exercise the police power of the State to control by permit the location of those developments substantially affecting local environment in order to insure that such developments will be located in a manner which will have a minimal adverse impact on the natural environment within the development sites and of their surroundings and protect the health, safety and general welfare of the people.

For the purposes of this program, "development" means any state, municipal, quasi-municipal, educational, charitable, residential, commercial, or industrial development which:

- 1) occupies a land or water area in excess of 20 acres;
- 2) contemplates drilling for or excavating natural resources on land or water where the area affected is in excess of 60,000 square feet;
- 3) is a mining activity which extracts or removes more than 1000 cubic yards of product or overburden within 12 successive calendar months;
- 4) is a hazardous activity in that it handles, consumes, or generates hazardous wastes, hazardous matter, oil, or stores or disposes of low-level radioactive waste;
- 5) is a structure which occupies a ground area in excess of 60,000 square feet or contains a total floor area of 100,000 square feet or more, or which causes devegetation in excess of 3 acres;
- 6) is a conversion of an existing structure which meets the definition of structure in this statute;
- 7) is a subdivision consisting of a parcel of land of 20 or more acres divided into 5 or more lots to be offered for sale or lease to the general public during any 5-year period (with exceptions);
- 8) is a multi-unit housing development consisting of 10 or more units on a single parcel of land located wholly or in part within the 250 foot shoreland zone.

The Site Location of Development Program specifies standards for 1) financial capacity, 2) traffic movement, 3) adverse effects on the natural environment, wildlife, and fisheries, 4) soil types and erosion, 5) surface and groundwater protection, 6) infrastructure, 7) flooding, 8) sand dunes, 9) reclamation, 10) hazardous materials, 11) solid waste, 12) odors, 13) noise, 14) water supplies, 15) and wastewater disposal.

Specifically regarding groundwater, the Board recognizes the importance of protecting groundwater resources in order to promote the future health, safety, and welfare

of the citizens of Maine through the maintenance of an adequate supply of safe drinking water.

In determining whether the proposed development will have an unreasonable adverse effect on groundwater quality, the Board considers all relevant evidence to the effect that the development will not result in the existing groundwater quality becoming inferior to the physical, biological, chemical, and radiological levels for raw and untreated drinking water supply sources specified in the Maine State Drinking Water Regulations, pursuant to 22 MRSA, Section 601. If the existing groundwater quality is inferior to the State Drinking Water Regulations, the developer will not degrade the water quality any further.

The Board operates under the rebuttable presumption that the storage and/or disposal of solid wastes, hazardous wastes, and leachable or liquid wastes, including petroleum products and septage, pose serious threats to public health, safety, and welfare through the potential pollution of the groundwater when such storage and/or disposal occurs on or above sand and gravel aquifers or the recharge areas of sand and gravel aquifers. An applicant seeking approval for a development which involves one or more of the activities specified above, must overcome this presumption by persuasive evidence that the development is unique in some way that allows for compliance with the intent of this subsection.

Applications for approval of proposed developments must include evidence that affirmatively demonstrates that there will be no unreasonable adverse effect on groundwater quality, including information such as the following, when appropriate:

- 1) A comprehensive list, including physical and chemical characteristics and projected quantities of wastes to be disposed of or stored within the proposed development which may potentially contaminate the groundwater;
- 2) Methods for preventing groundwater pollution as the result of the disposal and/or storage of wastes;
- 3) An evaluation of the geological, hydrological, and soils conditions of the development site;
- 4) Data establishing background groundwater quality; and
- 5) A proposed plan of action, and alternatives, to be followed in the event the proposed development results in groundwater contamination.

The Board may, as a term or condition of approval, establish any reasonable requirement to ensure that the proposed development will have no unreasonable adverse effect on groundwater quality, such as requiring that:

- 1) A groundwater monitoring program be established and reports be filed with the Department at designated intervals.
- 2) Specified wastes not be disposed of or stored within the proposed development.

The Board also recognizes the importance of maintaining an adequate supply of groundwater for drinking purposes. The Board recognizes that the depletion of groundwater resources can result in the intrusion of salt water into potable groundwater supplies and can affect the hydrologic characteristics of surface water bodies (peak flows, low flows and water levels) resulting in adverse effects on their assimilative capacity and recreational use, as well as on certain wildlife habitats. Additionally, new wells can cause a lowering of the groundwater supply to the point where existing wells run dry, particularly during the late summer and early fall.

In determining whether the proposed development will have an unreasonable adverse effect on groundwater quantity, the Board considers all relevant evidence to the effect that the quality of water to be taken from groundwater sources will not substantially lower the groundwater table, cause salt water intrusion, cause undesirable changes in groundwater flow patterns, or cause unacceptable ground subsidence.

Applications for approval of proposed developments must include evidence that affirmatively demonstrates that there will be no unreasonable adverse effect on groundwater quantity, including information such as the following, where appropriate:

- 1) Estimates of the quantity of groundwater to be used by the proposed development;
- 2) In areas where salt water intrusion, the lowering of the groundwater level, or land subsidence have been or can reasonably be expected to be a problem, a report by a duly qualified person addressing the potential effects of groundwater use by the proposed development.

The Board may, as a term or condition of approval, establish any reasonable requirement to ensure that there will be no unreasonable adverse effect on groundwater quantity, such as requiring that:

- 1) A development obtain its water from a surface water source, public community supply, or utility;
- 2) Wells in the surrounding area be monitored to determine the effect of the development on groundwater levels;
- 3) People in the surrounding area, whose wells are adversely affected by the development, be provided with new wells or another source of potable water for their use and consumption.

The Site Location of Development Program currently reviews approximately 20% of new development in Maine and 1-5 conversions each year. Review may take from 2 months to 2 years. Compliance is monitored by review of data required to be submitted periodically by developers/owners. Review of the remaining 80% of new development in Maine each year falls to municipal review and permitting boards that, admittedly, are capable of this function to varying degrees, including in many cases, not at all.

DEP/BSWM Solid Waste Management Program

The Bureau of Solid Waste Management was formed in the Spring of 1988 to provide comprehensive management of solid waste issues in Maine. The creation of the Bureau consolidated a number of solid waste related programs that had previously been handled by different bureaus within the Department. The Bureau regulates a broad range of solid waste activities including: the management, processing, and disposal of municipal and special solid wastes; the removal and disposal of asbestos; and the utilization of sludge, ash, and other residuals.

In 1973, the Maine Solid Waste Management Act was adopted. It provided the Board of Environmental Protection with the authority to adopt, amend and enforce rules deemed necessary for governing solid waste management. This law also directed each municipality to provide a solid waste disposal facility for domestic and commercial solid waste generated within the municipality.

Solid waste management activities have been regulated by the Department since the mid 1970's. Since 1980, the Department has developed and updated an enforcement and closure priority list that identified those landfills that posed the greatest environmental, health, or safety threats. Sites highest on this list were targeted by the Department for immediate attention.

Decisions regarding enforcement actions were based in part on the priority list. The highest priority rankings were assigned to those sites that had documented groundwater contamination, threatened a drinking water supply or sand and gravel aquifer, or presented a health or safety threat.

Since 1979, more than 190 landfills that accepted municipal solid waste have closed. This represents a reduction in the number of municipal solid waste landfills of roughly 40 percent during the last 10 years. Many of these sites threatened aquifers or were contaminating groundwater. However, a large portion of the municipal landfills that are still in operation are either impacting or threatening groundwater resources.

Public Law 1987, Chapter 517, passed by the 113th Legislature, has substantially expanded the existing solid waste statute. One portion particularly relevant to the protection of groundwater establishes a remediation and closure program for solid waste landfills. Based on this law, the Bureau of Solid Waste Management ranked all open municipal landfills in December 1987 and is ranking all known closed or abandoned public and private landfills by January 1989. This program has been supported by two bond issues totaling 13 million dollars. This money is being used to provide technical and financial assistance to municipalities for the closure or remediation of their landfills.

Public Law 1987, Chapter 557 prohibits the location of any solid waste disposal facility if that facility would overlie a significant sand and gravel aquifer, a fractured bedrock aquifer, or if it would pose an unreasonable threat to the quality of a significant sand and gravel aquifer. All solid waste disposal facility applicants are required to provide a thorough hydrogeological assessment of the proposed site and any aquifers that could be affected by its operation. The Bureau is currently enacting revisions to the Solid Waste Management Rules that include all of the siting and disposal provisions of Public Laws 517 and 557.

Like other waste disposal facilities, those that handle septic tank and cesspool wastes have the potential to contaminate groundwater resources. Properly sited and managed, these facilities need not pose a serious threat. Since 1974, all municipalities have been required by law to provide a means of disposal for all septic tank and cesspool waste generated within the municipality. Many municipalities have not done so and it is likely that some wastes are being disposed improperly. There are 94 active licensed landspreading facilities for disposal of septage in Maine. A few of the earliest approved facilities (1974-1975) are on sand and gravel aquifers. Although these were approved for use under significantly reduced loading limits, these sites may result in the discharge of pollutants, especially nitrates, to groundwater and should be carefully monitored.

Regulation of septage handling and management is authorized under the Waste Management Act (39 MRSA, Section 1301 et. seq.). The Septage Management Rules were amended in 1986 to provide better management practices and improve protection of groundwater and surface water resources. These rules require review of septage sites under the Site Location of Development Law, provisions of which afford additional groundwater protection.

DEP/BSWM Sludge Management Program

Most of the 100+ sewage treatment facilities operating in Maine generate sludge. At most of them, sludge must be regularly removed from the treatment facility. Sludge contains most of the substances removed from the wastewater being treated. Nitrogen and other nutrients, bacteria, viruses, volatile organic compounds, and trace concentrations of heavy metals, are substances typically found in municipal sludge.

The 208 Water Quality Planning Programs conducted by regional planning agencies evaluated municipal sludge disposal practices and environmental impacts in Maine. During the time these studies were conducted (1975-1978), most municipal sewage treatment facilities disposed of sludge by landfilling. In a number of instances, the 208 agencies found reason to suspect that sludge was having a negative impact on the quality of nearby waters. Often the sludge was being buried in a trench, thus increasing the potential for groundwater contamination. Elsewhere, sludge was being spread at excessive rates or on inadequate soils when the ground was wet, frozen or otherwise unsuitable. Even in some situations where sludge was utilized in accordance with existing guidelines, an impending lack of storage space often was found to be a serious problem.

The situation has greatly improved. In response to the numerous sludge-related problems identified in the 208 assessments and through its own programs, the Maine Department of Environmental Protection has fashioned a program to help farmers, nurserymen, foresters and others use sludge and residuals from municipal and industrial facilities provided it is of a quality acceptable for agricultural or land reclamation purposes.

The Division of Municipal Services had assigned four persons to the task of overseeing the State's sludge and residual utilization program. The program's goal is to encourage landspreading of these wastes while safe-guarding the environment and public health. Approximately seventy sewage treatment facilities have established sludge utilization programs with landowners. Many of the remaining sewage treatment facilities either are not interested in landspreading due to abundant landfill capacity or because they

generate sludge with excessively high levels of heavy metals. The DEP and EPA have mandated the operators of many of these facilities to establish and enforce pretreatment agreements with wastewater contributors. Such pretreatment agreements are aimed at lowering the amount of heavy metals in the wastewater, thereby reducing the heavy metal content of the sludge.

In 1985, the Board of Environmental Protection adopted rules (Chapter 567) governing the use of municipal and industrial sludge and residuals on land. The rules, adopted under the authority of 38 MRSA Section 1304, apply to sludges and residuals which contain acceptably low concentrations of heavy metals or other compounds, and have been treated to reduce pathogenic organisms. The purpose of the regulations was to encourage, to the maximum possible extent, the safe use of sludge and residuals on farmland.

Sludges other than those which qualify for landspreading utilization under the present "Rules for Land Application of Sludge and Residuals," must be disposed of in accordance with the provisions of other DEP regulations. While almost all sludge which is not landspread in Maine is buried in landfills, sludges classified as hazardous are shipped out of State to approved hazardous material disposal facilities.

In 1988, the Sludge Management Program was transferred to the Bureau of Solid Waste Management.

DEP/BOHMC Petroleum Facilities Control Program

Of these types of facilities, the most serious potential problems are associated with underground tanks used to store petroleum products, in particular, gasoline and fuel oil. In 1985, over 500 million gallons of automotive gasoline were pumped in Maine. This product is stored in an estimated 28,000 underground tanks, many of which are the older steel-type tanks unprotected against corrosion. Since 1979, DEP has investigated over 600 leaking underground oil tanks. DEP staff indicate that over the past year, new cases of leaking tanks are being reported at a rate of about one a week. Making some conservative assumptions, DEP staff estimate that at least 30,000 gallons are leaked into the ground every day, or 11,000,000 gallons every year. In Maine, ninety percent of the rural population drinks groundwater and each year 50 or more wells are reported as contaminated by product from leaking underground tanks. The duration of the contamination, even after the source of the contamination is removed, may be measured in decades.

Less is known about contamination of groundwater from aboveground storage facilities such as terminals and bulk plants. In 1987, 43 spills were reported to the DEP from aboveground facilities with thirty-two of these (75%) involving bulk plants. Spillage invariably results in some groundwater contamination and often large volumes of product are involved. Overfilling of tanks, catastrophic failure of tanks, valves, pipes and hoses, and vandalism are the major causes of these spills. Spills at the large licensed terminals are generally quickly cleaned up and much of the product is recovered. This is rarely the case at bulk plants where leaks often go undetected and unreported for long periods of time. In 1983, a leak in Richmond did result in the contamination of a well, demonstrating that aboveground storage can pose a threat to groundwater in some circumstances. The Legislature provided funding in 1987 for a complete study of the

hazards associated with aboveground tanks and the regulations required to control these facilities. Funding lapses in July, 1989. Presumably, a report is expected from the BOHMC at that time.

Maine has four major pipelines: Portland to Bangor, Portland to Montreal, Harpswell to Brunswick Naval Air Station, and Sears-port to Loring Air Force Base. All four pipelines are cathod- ically protected. Two leaks were reported in 1987 from federal pipelines. Although pipelines generally have few spills or leaks, there is the potential for large volumes to be involved.

Protection of groundwater from the activities just described occurs under the coordinated authority of several statutes and their associated regulations. Most important are the Site Location of Development Law (38 MRSA, Section 481 et seq.) and the Oil Discharge Prevention and Pollution Control Law (38 MRSA, Sections 561 et seq.). Programs developed in accordance with these two laws are conducted by the DEP Land Bureau and Oil Bureau respectively.

The Site Location Law applies to certain oil handling facilities which are classified as hazardous activities and meet a minimum size requirement of more than 21,000 gallons. If such a facility will be located over a primary sand and gravel recharge area and will be likely to discharge pollutants to a significant groundwater aquifer, then an application to the BEP is required. As stated in Chapter 375 of DEP Regulations, "No Adverse Environmental Effect," Board policy presumes serious threat to sand and gravel aquifer systems from these activities and places the burden of responsibility for proving otherwise on the applicant. It is the policy of the Board to assume that discharges to aquifers are unlikely if effective secondary containment is in place.

In spite of these precautions, spills and leaks have occurred, at which time the Department has full response and enforcement authority under Sections 413 and 543 of Title 38. These statutes prohibit the discharge of oil and other pollutants to the waters of the State, including groundwater, and also establish a funding mechanism for carrying out the purposes of the Oil Discharge Law. As noted previously, leaking underground tanks pose a major threat to the resource. As a result, legislation amending the Oil Discharge Law (PL 1984, Chapter 785) addresses two previously excluded aspects of the problem: small storage facilities and design/construction standards. Chapter 785 also directed the Departments of Environmental Protection, Human Services, and Public Safety to develop a comprehensive plan to address, at a minimum, standards for new aboveground and underground storage facilities, appropriate procedures to improve leak detection capability in existing underground storage facilities, a strategy to identify and achieve proper abandonment of facilities out of service, the extension of these standards and procedures to underground storage facilities for materials other than oil and petroleum products (e.g., flammable, combustible and toxic materials), and the roles and responsibilities of each of the participating State agencies. The DEP was the lead agency for preparation of this plan, which formed the basis for much of the legislation enacted by the 112th Maine Legislature to regulate these sources. Chapter 496 superseded DEP's interim regulations and directed DEP to develop new regulations. Adopted in the Spring of 1986, the new regulations require that all underground storage tanks be registered with the DEP by May 1, 1986. The regulations also establish design and installation standards for new facilities, requires all tanks to be installed only by State-certified installers, and establishes abandonment procedures for all tanks out of service more than 12 months. In addition, recent legislation

requires the phased removal and upgrading of all nonconforming underground oil storage tanks over the next 10 years, beginning in October of 1989.

Board of Underground Oil Storage Tank Installers

The Board of Underground Oil Storage Tank Installers was established to safeguard the public health, safety, and welfare; to protect the public from incompetent and unauthorized persons who might otherwise make faulty installations of underground tanks; and to assure the availability of underground oil storage tank installations of high quality to persons in need of these services. The Board of Underground Oil Storage Tank Installers has established installation and certification procedures. Examinations are held which have resulted in the certification of over 240 tank installers. In addition, the Board conducts informational workshops throughout the state in conjunction with the Department of Environmental Protection.

DEP/BOHMC Hazardous Materials Management Program

Hazardous substances include both hazardous matter and hazardous waste. There are three types of hazardous waste handling facilities which are of concern: storage, storage and treatment, and disposal. A storage facility occurs when an industry generates and stores hazardous wastes prior to shipping to a disposal facility. In 1987, there were 16 Maine industries storing about 1145.03 tons of hazardous wastes on-site for more than 90 days. One of these has been shown to have polluted groundwater due to leakage from an underground storage tank. Any effect the others may have had on groundwater has not yet been demonstrated.

The number of industrial facilities across the state which generate hazardous wastes and store them in underground tanks for less than 90 days are few in number. By rule, these facilities were required to remove these tanks by December 1987 or in the case of ignitable wastes to install a double walled tank. However, an area of current non-regulation is the storage in underground tanks of "non-waste" chemicals, i.e.: raw product. This is an area which will be regulated as the Department develops chemical underground tank regulations.

A storage and treatment facility can be one of two types. One is where wastes from other industries and generators are accepted, stored, and treated with some wastes ultimately being sent to a disposal site. The other type is where a generator stores and treats its own waste on-site. Both types have wastes that are ultimately sent to an off-site disposal facility. There are approximately 25 storage and treatment facilities in Maine at present. In 1987, approximately 1807.60 tons of hazardous waste were treated in Maine at these facilities. Two former facilities, Union Chemical and Maine Waste Oil, were documented to contaminate groundwater, due primarily to spillage, and have since been closed. No water supplies appear to have been affected yet. Storage and treatment facilities with interim licenses that wish to continue treating and/or storing hazardous wastes, must obtain a permanent license and upgrade to meet new facility standards. This licensing requirement also applies to waste disposal facilities. Currently only two facilities are operating storage and/or treatment facilities under interim status standards. Under final standards these facilities should pose less of a threat to groundwater with the required upgrades in design features and improved operating requirements. Likewise, since most of

the treatment activities involve recycling and reuse of wastes, there will be less waste handled, transported and disposed of.

Contamination of groundwater in Maine from hazardous wastes has also resulted from improper disposal and leakage at landfills, leach fields, lagoons, dry wells and spills. To date, seventeen former disposal sites have been documented as contaminating groundwater, affecting at least 43 private wells. Included in this category are the sites in Maine designated as Federal "Superfund" sites and therefore eligible for federal funds for clean-up. Other sites suspected of contaminating groundwater are presently being investigated and several clean-up operations are underway. There are presently no licensed disposal sites in Maine, so the problem is limited to past disposal practices and, to an unknown extent, on-going illegal activities. Most individual problems come to the DEP's attention through citizen complaints or facility inspections. Clearly the full extent of the problem is not yet known although DEP has obtained information indicating that several contaminated sites have not been reported to DEP by the site owners. The DEP is becoming more involved in requiring, either through voluntary agreement or by issuing an order, the investigation and cleanup of groundwater contamination problems.

Another aspect of regulation which contributes to improved resource protection is the hazardous waste manifest tracking system. This administrative requirement under the Federal Resource Conservation and Recovery Act (PL 94-580) monitors the movement of hazardous waste "from cradle to grave" and provides a clear path of responsibility and liability.

The threats from hazardous matter facilities, especially storage facilities, are not well quantified. Raw materials that are defined as hazardous matter are stored in large quantities at many industrial facilities throughout the state. No standards regulating storage procedures presently exist and any limited site screening that occurs is primarily through local zoning ordinances or, if large enough, by the state through the Site Location of Development Act. Leakage of stored hazardous matter is the culprit in several groundwater contamination cases. Statutory authority to control hazardous materials is provided in the Maine Hazardous Waste, Septage, and Solid Waste Management Act (38 MRSA, Section 1301 et seq.) and the Uncontrolled Hazardous Substance Sites Act (38 MRSA, Section 1361 et seq.). Encompassed within the Hazardous Waste Act are several sections which specifically address hazardous matter (Sections 1317 through 1319-A). Although not for raw products, a more detailed authority is provided in DEP Regulations at Chapters 850-857 for the regulation of hazardous wastes. Through these provisions, several programs have been developed which afford substantial protection to groundwater resources. As a first step toward regulation, lists of substances which are either hazardous matter or waste have been written into regulation and "hazardous waste facility" has been defined. Also in regulation are facility standards for construction and operation with special location restrictions concerning groundwater aquifers and drinking water supplies. In addition, groundwater monitoring is a requirement as a part of any storage facility operation. These conditions must be addressed in the required application for any new facility.

The Division of Licensing and Enforcement maintains continuous oversight of the state's hazardous waste facilities consolidating federal and state licensing requirements. Since Maine currently has no licensed hazardous waste disposal facilities, the division's hazardous waste facility programs are targeted at the proper handling of wastes prior to disposal.

In addition, activities also occur through the uncontrolled sites program. Operational activities conducted at uncontrolled sites include preliminary assessments, investigations, remedial planning for clean-up and remedial action. Sometimes circumstances require that federal action be taken to accelerate remedial measures at uncontrolled hazardous waste sites. The division acts as coordinating agent between the U.S. Environmental Protection Agency and the communities involved. This program is an on-going priority effort to eliminate or reduce any danger posed by these uncontrolled sites to citizens of the state. To assess the effectiveness of uncontrolled hazardous waste site cleanups and RCRA cleanups, the division conducts a program of groundwater monitoring.

The division licenses over 100 hazardous waste and waste oil transporters. Bureau staff continue to maintain a close working relationship with State Police counterparts to assure compliance with State Law and rules by those who transport hazardous waste in Maine. The division processes over 17,000 hazardous waste manifest shipping forms per year. The division also processes licenses for facilities where hazardous waste is temporarily stored prior to transport.

DHS/DHE Subsurface Wastewater Disposal Program

The Wastewater and Plumbing Control Program dates back to 1933 with the adoption of the first plumbing code for interior plumbing. Septic tanks, cesspools, and direct discharges were first addressed in the Maine Plumbing Code in 1941. Today, under legislation adopted in 1973, the program (1) promulgates rules to establish minimum statewide standards for subsurface wastewater disposal and internal plumbing; (2) assists each town in Maine to administer a municipal plumbing control program providing technical assistance and record-keeping services; and (3) reviews all subsurface wastewater disposal systems designed to treat more than 2000 gallons of wastewater per day. All municipal plumbing inspectors are examined and certified under program auspices. The program staff also examines and licenses professionals who design subsurface wastewater disposal systems. In cooperation with the Plumber's Examining Board and municipal plumbing inspectors, the staff is responsible for assuring that all plumbing and subsurface wastewater disposal systems in Maine do not create a public health, safety, or environmental hazard.

The primary threats to groundwater associated with these systems come from nitrates, bacteria, nutrients, and viruses which are discharged from septic tanks to disposal fields and ultimately into the soil at various concentrations and at various rates. While the removal of these substances is a very critical function of these systems during the process of wastewater infiltration into the soil, the role of bacteria in the biodegradation of waste is also recognized. This degradation is the very basis of wastewater treatment using septic tank and disposal fields, so bacteria growth and metabolism are encouraged. Nitrogen in the form of nitrates is the principal concern. Nitrates in drinking water have been linked to cases of methemoglobinemia (blue baby) in infants; therefore, the ability of groundwater recharge to dilute nitrates is of paramount importance.

Less is known about the general behavior of pathogenic micro-organisms in subsurface disposal systems, in particular, the ability of soils to restrict the leaching of viruses to groundwater. The problem has received greater recognition with advances in medical technology and analytical capability. The interrelationships between viruses and

bacteria compound the problem, a particular concern in light of the dependence of most systems on bacteria for biodegradation. Other factors known to play a significant role in the kill-off rate of bacteria and viruses are the biomass layer and system layout design.

In the past, the priority for water pollution control efforts has been given to municipalities and urban areas. The traditional engineering approach has been to construct a network of sewers to convey wastewater to a central location for treatment, with subsequent discharge into surface waters. Present state-of-the-art requires secondary treatment which removes or lowers the biochemical oxygen demand (BOD) of the water. Although several attempts have been made at tertiary treatment for the removal of nutrients, these have not been successful because of the complex nature of the operation.

In suburban and rural areas the cost of constructing, operating, and maintaining even secondary treatment facilities has been prohibitive, hence the reliance on septic tank leach field systems. Although such systems have been in use in rural and suburban Maine for many years, their potential for operational problems is high primarily due to poor maintenance. Nonetheless, an adequately functioning subsurface wastewater disposal system can provide a high degree of tertiary treatment. Multiple subsurface discharges in a small area, as in the case of subdivisions, are a growing cause for concern in Maine. According to one estimate, each system in a subdivision may discharge as much as 12.5 kilograms (27.5 pounds) of nitrate-nitrogen per year. Large subdivisions, particularly those on sand and gravel aquifers or high-yield bedrock aquifers, thus have the potential for polluting substantial quantities of groundwater. Discharges may not only endanger water quality of wells within the subdivision itself, but also those of abutting property owners if the disposal systems are not properly designed, constructed and maintained.

In recognition of these potential problems, statutes have been established (22 MRSA, Section 42 and 30 MRSA, Sections 3221-3225) governing plumbing activities and subsurface wastewater disposal. Appropriate rules are promulgated by the Department of Human Services, Bureau of Health, Division of Health Engineering. The Subsurface Wastewater Disposal Rules require on-site investigation and evaluation at each disposal site with specific attention to limitations and their application to siting of disposal systems is ensured through provisions for the licensing of site evaluators by means of written and field examinations. The focus of these statutes is on protection of public health, although consumer and environmental protection are also emphasized. In contrast with other laws with groundwater protection provisions, the legislative mandate emphasizes protection of public health but does not address groundwater protection. Certain subsurface systems require review and approval under the Site Location Law and associated DEP Regulations. In those cases, evidence must be provided that any proposed wastewater disposal system will not degrade groundwater to less than state drinking water standards. As has been noted in connection with other activities, the no degradation provision applies particularly to sand and gravel aquifers and their recharge areas.

Although concern has been expressed by several individuals and organizations, lack of specific documentation makes it extremely difficult to address this potential problem. Rules pertaining to subsurface wastewater disposal have been effective for many years. However, the statutes and rules were significantly revised effective 1973 and 1974 respectively. After considerable review of available research literature, the rules required a minimum disposal area depending on either specific soil criteria or the biomass layer, whichever was the limiting factor. The site evaluation concept assures improvement in

both accuracy of reported soil conditions and enforcement of various requirements. Numerous revisions to the statutes and rules have evolved since 1974 to keep abreast of the "state-of-the-art".

State drinking water standards, which apply to public water supplies, have been established under the authority of 22 MRSA, Sections 2601-2617. These standards, applied to the quality of the supply after treatment, also focus on public health, not water quality at the source. However, policy, as applied by both DEP and DHS, emphasizes protection of the source.

There is concern regarding nutrient loadings associated with subsurface wastewater disposal systems in terms of their contribution to lake eutrophication and groundwater contamination. Several studies and evaluations in the mid-1970's, however, either failed to substantiate the premise that disposal systems are the major culprit or indicated that other causes were more significant, such as animals (manure piles or pastures), application of fertilizer to lawns and gardens, and natural causes (e.g., rain, lightning storms, dust, decomposition of vegetation). Due to the complexity and cost involved, little work has been done in Maine to document the degree and cause of groundwater contamination which might be associated with subsurface disposal. Ironically, the lack of scientific documentation of contamination from subsurface disposal tends to minimize the concern with potential contamination from that source.

Not all authority in these matters rests with the State. In the case of both the Disposal Rules and public water supply regulation, municipalities are authorized to adopt appropriate local ordinances, provided they are at least as stringent as State law. Under the provisions of 22 MRSA, Section 2641, local land use regulations may be adopted to protect public water supplies, including aquifers located within the municipality. In the event of suspected contamination of public supply, Section 2647 extends right of access and authority to order correction to the affected water utility and municipality, as well as to DHS.

DHS/DHE Drinking Water Control Program

The Drinking Water Program provides surveillance of water quality and renders technical assistance to Maine's public water utilities. In 1976, the Department of Human Services accepted primacy for regulating community and non-community water supplies, as defined in the Federal Safe Drinking Water Act of 1974. State rules were adopted for the first time in 1977. The program's primary focus is on water served to the general public for consumption. A secondary role is the interpretation of water analyses for the private sector.

In the public sector, the Drinking Water Program staff monitors the water quality of approximately 400 supplies which serve residential users, and approximately 2500 supplies which serve transient populations throughout the year. The Drinking Water Program is also responsible for overseeing local programs designed to protect public water supplies from nonpoint pollution in their watersheds.

New surface water supplies must include plans for the protection of their watershed and the identification and location of all potential sources of nonpoint source pollution which could impact the quality of the water supply.

Areas within 200 feet of the intake of a new surface water supply must be land-use restricted by means of deed, easement, or other legal document. Surveys of the watershed are conducted at predetermined intervals to monitor for potential threats to the water supply.

For groundwater sources, the water supplier is responsible for determining the appropriate protection zone, based on the well's cone of influence and appropriate portions of the aquifer recharge area. The supplier must then control the land uses within that area. In the case of a bedrock well, the protection zone shall be no less than a 300 foot radius with the well at the center of the circle.

DHS/DHE Wellhead Protection Program

New program not yet implemented. See action being taken in section on Controlling Sources of Contamination.

DOC Land Use Regulation Commission

The Maine Land Use Regulation Commission was established in 1969 to serve as the planning and zoning board for the unorganized areas of Maine. The Commission itself is made up of seven citizen members appointed by the Governor. The Commission is served by a professional staff of 28 people.

The Commission is responsible for promoting the health, safety and general welfare of the people of Maine by planning for the proper use of the resources within its jurisdiction and guiding land use activities to achieve this proper use. The Commission's jurisdiction includes over 10 million acres in the northern and western parts of the State which occur in townships, towns, and plantations which would otherwise have no local land use controls.

The major responsibilities of the Commission are to prepare a comprehensive land use plan for these areas, to determine the boundaries of areas within the unorganized areas of the State that fall into the various land use districts (zoning), to prepare land use standards for each district, to review applications for development in the unorganized areas of the State, and to carry out an enforcement and compliance program.

DAFRR Pesticides Control Program

The Board of Pesticides Control is the agency charged with regulating the use, distribution and disposal of pesticides within the State. The regulatory objective is to provide Maine citizens with the benefits gained from safe and proper use of pesticides while protecting the public health and the environment from any potential adverse affects.

These goals are accomplished through three major programs which include registration of all pesticide products offered for sale; certification and licensing of dealers, applicators and contracting firms who sell or apply products; and monitoring pesticide sales and use to ensure compliance with the label and all applicable laws and regulations.

The Board operates under two state statutes and has been granted enforcement primacy by the U.S Environmental Protection Agency to enforce the federal pesticide law. In addition, the Board has promulgated regulations that define competency standards for licensing, classify pesticides according to the risk they pose to public health or the environment, and specify appropriate requirements for the safe storage, use and disposal of pesticides.

Before any pesticide can be sold or used in the State of Maine, it must be registered by the Board. In general, this process requires that the distributor complete the necessary forms and pay a fee. However, if the Board determines there is potential for a specific product to threaten the public health or environment (i.e. groundwater), they may take action to suspend, revoke or refuse registration; thereby prohibiting its use in Maine. The Board also has the option of requiring further safeguards on the use of a pesticide when warranted.

Pesticides which are deemed more dangerous because of the risks they pose to the applicator, the public or the environment are classified "restricted use." Anyone using a restricted pesticide and persons applying any pesticide as a service are required to first be certified and licensed by the Board. Initial certification consists of examinations administered by the Board's staff. Applicants are furnished with written training manuals by the Cooperative Extension Service in order to prepare for these tests. After having passed the initial exams, applicators may maintain their certification by obtaining two to three hours of continuing education credits per year.

Recently, the Board adopted regulations intended to minimize pesticide drift, with special consideration given to protecting specified "sensitive areas." Water bodies, wetlands, public and private wells and springs are some of the sensitive areas.

The Board has been working with the Cooperative Extension Service to develop educational materials on groundwater protection to be included in the various training manuals. Eventually, the examinations will cover this subject matter. In addition, for the last two years there have been numerous continuing education programs that specifically addressed groundwater issues.

Finally, the Board's staff has been working with other governmental agencies on a set of "best management practices" intended to prevent or minimize pesticide contamination of groundwater. This document will be available to all prospective applicators, whether certified or not.

Chapter 21 of the Board's regulations are designed to insure thorough rinsing and proper disposal of restricted use and limited use pesticide containers. These regulations were developed in direct response to the presence of numerous illegal container dumps threatening the ground and surface waters of the State.

Since 1972, the Board of Pesticides Control has been involved in the collection and disposal of obsolete (mostly banned or otherwise unuseable) pesticides. Originally, the Board cooperated with the Audubon Society to collect over seven tons of banned pesticides which were subsequently stored in a bunker at a naval center in Massachusetts. After this facility was filled to capacity, the Audubon Society dropped their participation. The Board continued to receive unsolicited inquiries regarding disposal of these types of products, and

in 1973, arrangements were made to store these unwanted pesticides in a section of Camp Keyes in Augusta. Eventually this space also became filled and in 1981, it became evident that this storage site did not conform to recently adopted regulations by the Department of Environmental Protection. In 1982, the Board utilized \$26,000 of surplus registration funds to ship six more tons of materials to out of state disposal facilities.

Since 1982, the Board has utilized two special appropriations (total of \$55,000) and \$35,000 from their registration fund to purchase a five ton truck to collect and dispose of another 15 tons of obsolete pesticides. Unfortunately, the funding has never been sufficient to service all the people having these chemicals and the staff maintains an active list of persons requesting this service.

The Board believes that if it were not for the previous programs, many of the collected products would have undoubtedly found their way into Maine's environment. Costs for disposal are prohibitive for most private entities, and the Board is hopeful that the Legislature will be able to appropriate additional funding for this popular and environmentally important program.

DAFRR Soil and Water Conservation Program

Maine's Soil and Water Conservation Commission (SWCC) was established in 1941 to coordinate the programs of local Soil and Water Conservation Districts (SWCD) and the State's Natural Resource agencies. The Commission and the Districts have statutory responsibility to provide for the protection, proper use, maintenance, and improvement of the soil, water and related natural resources (12 MRSA Chapter 1).

The Commission is composed of eleven members: the ex-officio Commissioners of the Departments of Inland Fisheries and Wildlife, Marine Resources, Agriculture, and Conservation, the Vice President for Research and Public Service, and six members representing the Soil and Water Conservation Districts.

By design and from its very inception, the primary means for the Districts and the Commission to carry out their mission has been through encouraging and persuading land users to adopt conservation practices voluntarily. They have traditionally provided the local and state support for the delivery of technical assistance and educational programs of the Soil and Water Conservation Service.

In recent years as federal funds are diminishing, the State Commission and Districts have also operated their own programs. Most notable among these is the Challenge Grant Program established by the State Legislature in 1983. It has allowed for many innovative demonstration and education projects.

The District's programs and services have been focused on preventing erosion from agricultural lands and contamination of surface water. They have been designed specifically to keep soil, pesticides, animal waste, and fertilizers in place thus preventing runoff. Groundwater is a new concern to this agency. In fact, the very conservation programs which are designed to protect surface waters could have the opposite effect on groundwater by concentrating those materials over sensitive aquifers.

The Commission and Districts serve as a review agency for the Department of Environmental Protection and the Land Use Regulation Commission and local planning boards. In that role, they have an opportunity to review proposed developments for erosion and sedimentation control and stormwater management. Their recommendations often become requirements of the permits granted.

DOT Sand-Salt Storage Facility Program

In order to address pollution problems associated with MDOT maintenance lots, a study was conducted of each lot by the Director of the Environmental Services Section of the Department's Division of Location and Environment beginning in 1980. Surface and groundwater quality data were collected and observations such as land use conflicts, aesthetic impacts, condition of existing storage buildings, and possible sources of water contamination were noted. This survey and the recommendations that came from it enabled managers to gain a statewide perspective of the Department's chemical storage situation and laid the foundation for the DOT Sand-Salt Storage Facility Program.

Pursuant to Public Law 479, enacted in 1985, which mandates all sand-salt piles be covered, the Well Claims Group of the Environmental Services Section prioritized its 147 sand-salt storage locations. This effort coincided with the DEP program to categorize all municipal, state and private stockpiles based on evidence of water supply contamination.

Under the DEP system, all sites within each category (there are a total of 5 categories) are treated as equally severe. The MDOT priority system allows its managers to focus on the most severe cases within each category since time and financial constraints exist.

The DOT Sand-Salt Facility Program is managed by the Bureau of Maintenance and Operations. The program includes housing all sand-salt stockpiles, enclosing all pure salt stockpiles (almost all are currently housed), modifying drainage at the lots to minimize contamination from runoff, and establishing housekeeping procedures for maintenance lot staff. During the current biennium the program has received \$2.8 million from a 1987 Highway Bond Issue which will be paid back by general highway funds. This funding will finance the first two years of the program and is directed at covering DEP's category 1 and 2 sand-salt piles.

DOT Municipal Sand-Salt Storage Facility Program

Note: This program is a joint cooperative effort of the DOT and DEP.

The Bureau of Maintenance and Operations has prepared guidelines for the construction of sand-salt storage buildings by municipalities, and is participating in a cost sharing program to help municipalities build sand-salt storage buildings. The Municipal Storage Facility Program received \$900,000 from a 1987 Highway Bond Issue, plus \$1.2 million from the Department's 1987 Supplemental Highway Program to address category 1 and 2 sand-salt piles. It is estimated that over \$18 million will be needed to completely fund the State's share of the municipal cost sharing program. (Also see DEP/BWQC Municipal Sand-Salt Storage Facility Program.)

DOT Road Salting Control Program

For winter maintenance, approximately 3600 centerline miles of highways are plowed and sanded by State forces. Approximately 60,000 tons of road salt are used by the Department annually. A portion of this is applied directly to highways and the rest is used to prepare approximately 500,000 cubic yards of sand-salt mixture (80-120 pounds pure salt per cubic yard sand). The road salt mixture is applied at a per application rate of less than 1/5 ton per centerline mile. Annual salt use is the lowest of any State Highway Agency in New England.

In 1968 the Bureau of Maintenance and Operations began a program to reduce salt use by modifying equipment so that it could be calibrated, developing calibration systems for sanders, requiring yearly instructional meetings for operators and keeping current inventories of salt use. Tons of salt used per lane mile in the 1980s is approximately half of the amount used in the 1960s.

DOT Pesticides Application and Storage Program

The Department's roadside vegetation management program includes annually applying EPA-approved herbicides to over 10,000 roadside miles. The program includes the following quality control measures: 1) no-spray agreements, 2) public notification, 3) chemical risk assessments, 4) employee health monitoring, 5) adherence to no-spray buffer zones established and defined by the Pesticide Control Board, 6) identification of environmentally sensitive areas for no-spray, 7) applicator training, licensing, and monitoring, and 8) low dose application of herbicides. During the past 9 years, spray complaints have declined from a high of 20 complaints per day to 2 per month during the spray season (May through September).

The Landscape and Mitigation Section of the Environmental Services Division manages the Department's vegetation management program for the Bureau of Maintenance and Operations. This involves a chemical spray program which advocates the application of a cost effective and safe dilute spray mix to specific roadside plants. A maximum of 1/5 gallon of herbicide is applied per roadside mile, one of the lowest herbicide application rates in the U.S.

The Department is receptive to public concerns over roadside spraying and attempts to aggressively manage its spray program with those concerns in mind. Pre-application public notification is made via the news media. The Department has instituted an ongoing health safety surveillance program for its spray crews. Risk assessments are performed under contract by a Maine health data analysis and research firm. The findings are utilized in selecting safer materials, improving risk management, and in efforts to avoid creation of any long-term environmental hazards. Residue monitoring of soils, off target plant tissues, and off target surface waters has been done on a small scale in the past. The Department is currently participating in the Maine Geological Survey's roadside water supply monitoring program for pesticides.

In addition, the Landscape and Mitigation Section oversees a loam conservation program on a project by project basis. The Group also designs and impacts landscape plantings, conducts ongoing agronomy research with the Soil Conservation Service, provides

erosion control training and develops erosion and sedimentation specifications and plans for the Department.

DOT Fuel Storage Program

The Motor Transport Service of the Bureau of Maintenance and Operations is involved in an ongoing program to test, remove and/or replace underground fuel storage tanks to comply with recent DEP regulations governing the underground storage of petroleum products. A priority list was developed by the Department to help identify tanks in the most environmentally sensitive locations.

A 1968 inventory found the Department had approximately 550 underground storage tanks. Since the summer of 1986, approximately 300 tanks have been removed, scrapped, and properly disposed of. Most of the tanks will not be replaced unless they are considered essential. So far, 45 to 50 new, dual walled, constant monitored, fiberglass tanks with dual walled, fiberglass pipes have been installed. DEP rules specify all single-walled, steel tanks in sensitive geologic areas that are over 15 years old must be removed and/or replaced, however the DOT's goal is to remove and/or replace all of its steel tanks, regardless of location, within 5 years. It is the goal of the Department to have approximately 250 storage tanks in-ground upon completion of the program. To date the Department has obtained approval of \$2.8 million from a 1987 Highway Bond Issue that is being used toward funding the first 2 years of the 5 year program.

DOT Paint and Solvent Storage Program

The Traffic Engineering Division of the Bureau of Maintenance and Operations designs, installs, and maintains traffic control devices. The division is responsible for the proper storage, use, and application of paints and solvents. Materials are purchased on an "as needed" basis each year and are stored in four locations throughout the State. Empty drums are handled in compliance with DEP rules. They are transported to an approved Augusta storage facility where they are collected by a private disposal company. In a recent year, 200,000 gallons of paint were used to apply centerline and edgeline pavement markings on the Interstate System and approximately 6000 miles of conventional highways.

DOT Nonpoint Source Pollution Control Program

Six Department divisions deal with the control of nonpoint source pollution. These are the Divisions of Construction, Design, Environmental Services, and Technical Services within the Bureau of Project Management and the Divisions of Bridge and Highway Maintenance within the Bureau of Maintenance and Operations.

Construction Division --

This division is responsible for constructing projects as they are developed including appropriate measures to minimize adverse environmental impacts. Soil erosion and water pollution control measures are outlined under section 107.26 of the Department's 1984 Standard Specifications for Highways and Bridges. Other responsibilities in the area of nonpoint source pollution include damage to adjacent property, reestablishment of vegetation in disturbed areas, proper siting of waste material off the project site and responsibility for underground storage tanks on projects.

Contracts for construction projects contain special provisions which may require the contractor to include steps or considerations to minimize potential environmental impacts. On such projects, representatives of both the Design Division and the Location and Environment Division and appropriate federal and state agency representatives are invited to a project preconstruction conference. As work progresses, such representatives may periodically visit the construction site to evaluate the success of mitigation measures and procedures applied. Reviews may be made of other projects when there is a particular interest in environmental concerns such as erosion control, stream alteration, borrow pit rehabilitation, etc.

Design Division --

This division is responsible for the actual design of highway and bridge projects. The Design Office Engineer is responsible for specifications, contracts, and project bid advertisements. The Department's Standard Specifications and Standard Detail Plan Sheets address routine environmental concerns. Special conditions are added, when necessary, to address special environmental situations. Following the approval of the design concept, the Design Division completes final design of the project. Refinements are made including incorporation of additional measures to minimize environmental effects and to respond to concerns expressed by abutting property owners, federal and state agencies, and the public.

Environmental Services Division --

The Environmental Services Division, initially through its Environmental Studies and Permits Section, is responsible for evaluation of potential environmental impacts of transportation improvement projects and for developing recommendations for avoidance, minimization, and/or mitigation measures as well as for environmental monitoring when appropriate. The Division is also responsible for documenting compliance with all federal laws pertaining to environmental protection and for providing data to support state and federal environmental permits. Projects that require permits under the Natural Resources Protection Act (Public law 809, 1988) are reviewed for their potential affects on water quality and receive a Water Quality Certification as part of the same permit application process.

The Water Resources Section's primary function is to investigate claims of damage to private water supplies due to highway construction or maintenance activities. In the past four years the Section has investigated approximately 50 claims alleging salt contamination. About half of these claims were found valid and the homeowners were fully compensated for their loss.

The Section conducts preconstruction well water sampling programs, and monitors ground and surface water on construction projects where needed, and also at many of the maintenance lots where problems have occurred. This monitoring program will be expanded to measure water quality changes after new sand/salt storage facilities are built.

Technical Services Division --

This division is responsible for providing support services to the operating divisions of the Department. The primary services are research and development, geotechnical investigations and design, field and laboratory testing, and technology transfer activities.

The division evaluates and investigates new products and procedures and has the responsibility of introducing innovative techniques to the operations of the Department. The division conducts research studies and performs field, physical and chemical laboratory testing for quality control of various materials used for highway construction and maintenance. The division also provides geotechnical services, such as soils reports, drainage studies, acceptance control and quality assurance services for practically all products used in constructing projects for the Department. The division administers the Department's pavement management process and provides design, construction, and maintenance support for items such as bituminous asphalt and concrete. It also conducts problem solving and research studies including studies relating to environmental issues such as the pilot study on "Soil and Water Monitoring of Herbicide Residues", "Evaluation of Both Traffic and Bridge Paints" to provide enhanced environmental features, and the "Determination of Levels of Free Cyanide in Surface and in Groundwaters Affected by DOT Salt Storage Facilities".

Bridge Maintenance Division --

This division is responsible for the maintenance and operation of approximately 2800 bridges. Routine maintenance includes the removal of winter sand, bridge flushing, touch-up painting, steel and concrete repair, and channel maintenance. In particular, bridge painting has been a major focus on several structures. Maintaining the paint system on major structures is considered a high priority and is essential to extending their service lives. Measures have been implemented on sensitive projects to control atmospheric and aquatic deposition of silica, paint, and solvents. Some measures include limiting work on windy days, using drop cloths under bridges and using paint brushes instead of paint sprays. Major bridge repair or replacement efforts involve the implementation and maintenance of appropriate soil erosion and sedimentation controls.

Highway Maintenance Division --

This division is responsible for summer maintenance, winter maintenance, and safety rest area programs. Road resurfacing is this division's major summer maintenance activity. During a recent summer, 269,134 tons of asphalt mix resurfaced 605 miles of roadway. Roadside summer maintenance activities such as culvert replacement and ditching involve the implementation of appropriate soil erosion and sedimentation control measures. Preconstruction well water quality analyses are performed before reconstruction projects. Each maintenance division now has a hydroseeder available for vegetative establishment and long-term erosion control.

APPENDIX C

Groundwater Laws of the State of Maine

to be completed in 1989-1990

APPENDIX D

Acronyms

AG	Attorney General
BEP	Board of Environmental Protection
BLQC	Bureau of Land Quality Control
BMP	Best Management Practice
BOHMC	Bureau of Oil and Hazardous Materials Control
BPC	Board of Pesticides Control
BSWM	Bureau of Solid Waste Management
BWQC	Bureau of Water Quality Control
CES	Cooperative Extension Service
CFR	Code of Federal Regulations
CME	Council on Maine's Environment (formally the Land and Water Resources Council)
COG	Council of Governments
DAFRR	Department of Agriculture, Food, and Rural Resources
DBMS	Data Base Management System
DECD	Department of Economic and Community Development
DEP	Department of Environmental Protection
DHE	Division of Health Engineering
DHS	Department of Human Services
DOC	Department of Conservation
DOT	Department of Transportation
EHU	Environmental Health Unit
EMS	Emergency Medical Services
EPA	U. S. Environmental Protection Agency
ERC	(Maine) Emergency Response Commission
GIS	Geographic Information System
GWSC	Ground Water Standing Committee
L&WRC	Land and Water Resources Center
LMU	Local Management Unit
LURC	Land Use Regulation Commission
MACC	Maine Association of Conservation Commissions
MARC	Maine Association of Regional Councils
MEMA	Maine Emergency Management Agency
MFT&E	Maine Fire Training and Education Program
MGS	Maine Geological Survey
MRSA	Maine Revised Statutes Annotated
MVTIS	Maine Vocational Technical Institute System
NEIWPCC	New England Interstate Water Pollution Control Commission
NPS	Nonpoint Source (of pollution)
NRC	National Response Center
PHL	Public Health Lab
PL	Public Law
PUC	Public Utilities Commission
RCA	Resource Conservation Act
RCRA	Resource Conservation and Recovery Act
RPC	Regional Planning Council
S&WCC	Soil and Water Conservation Commission
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SMVTI	Southern Maine Vocational Technical Institute



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SPO	State Planning Office
SWCD	Soil and Water Conservation District(s)
UIC	Underground Injection Control
UMO	University of Maine at Orono
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Program

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