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GROUND WATER MONITORING STRATEGY FOR WASHINGTON:

Report 1.
Objectives for Ground Water Monitoring

by

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The figure on the cover is taken from Geraghty and Miller, Inc., 1983. The Fundamentals of Ground Water Quality Protection, New York, NY.

I. Abstract

The State of Washington relies on an adequate supply of high-quality ground water. To date, a reliable, systematic process for assessing ground water quality around the state is lacking. This report is the first of five that, collectively, will present a comprehensive approach to ground water monitoring in the state.

The first report outlines, objectives for an integrated ground water monitoring program: (1) Characterize the ground water resource, (2) Promptly identify new problems, (3) Assess known problems by establishing cause-and-effect relationships, (4) Ensure compliance with regulations, and (5) Evaluate program effectiveness.

The goal of the objectives when integrated is to provide information to prevent or solve ground water problems. Each objective can be met by one, or a combination of two or three, types of ground water monitoring: ambient, intensive surveys, or compliance. Information obtained to fulfill one objective may be useful or necessary for meeting other objectives. A brief description of the three types of monitoring is presented in relation to the applicable objective(s).

Network and operational design considerations common to ground water monitoring efforts are listed, and a few related considerations and constraints. Future reports will build upon the framework developed in this report.

II. Acknowledgments

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III. Introduction

Ground water is an unseen yet vital resource. About 50 percent of Washington State residents depend directly on ground water for domestic use (Peeler, 1987). Over 9,500 public supply sites withdraw ground water, and several times that many wells are privately owned. Ground water is also a critical source of water for industry and agriculture.

Less obvious, but perhaps equally important, is the sizable contribution of ground water to rivers, streams, lakes, and wetlands around the state. These surface waters are used for drinking, irrigation, commercial and industrial uses, fish and wildlife, and recreation.

Ground water contamination can result from many activities related to industry, commerce, agriculture, and residences. Changes in ground water quantity can also lead to ground water quality problems. For instance, changing irrigation patterns have raised water table elevations and caused increased migration of agricultural chemicals in some parts of the state.

High-quality ground water will be an ongoing need to ensure the physical and economic health of Washington and its residents.

No systematic ground water monitoring program exists in Washington to identify or assess new cases of ground water contamination, with the exception of the Spokane County "208" program. Ground water contamination has been reported from a variety of point- and non-point sources around the state (Ecology 1986, 1985). However, such discoveries are usually unplanned. By the time contamination is verified, the problem is often beyond the point where inexpensive measures can stabilize or remediate the situation. If effective cleanup is possible, the cost is usually very high. Also lacking is a standard procedure for timely follow-up on documented ground water quality problems. This is especially true for problems not regulated by the federal and state detection and cleanup programs, such as RCRA and Superfund.

The importance of sufficient high-quality ground water, and the need for a mechanism to guarantee the continued availability of this resource, are driving forces behind the state Ground Water Quality Management Strategy (Ecology, in press). The management strategy will depend to a large extent on reliable ground water monitoring information to be successful.

A coordinated data collection and analysis program is needed that can detect and assess significant ground water contamination problems and improvements in a timely manner.

IV. Purpose and Scope

This report is the first in a series of five that together will comprise the Ground Water Monitoring Strategy for Washington. The monitoring strategy will be used by planners, scientists, and engineers to develop and support ground water management goals in Washington. The Ground Water Monitoring Strategy will be a working document that is adapted to fit priorities as they change over time.

The reports that will make up the strategy can be summarized as follows:

- Report 1: Objectives for Ground Water Monitoring

  Describe objectives for ground water monitoring in Washington and general types of monitoring. This report develops the framework for the following reports.

- Report 2: Summary of Recent Ground Water Monitoring Activities

  Describe existing and recent, major ground water monitoring activities in Washington. Important details of monitoring design and objectives will be presented for comparison.

- Report 3:

  Compare current ground water monitoring activities in the state with monitoring objectives described is Report 1. This report will point out data deficiencies and information needs.

- Report 4:

  Describe and compare alternative ground water monitoring approaches including associated resource requirements, and present recommended plan.

- Report 5:

  Evaluate ground water monitoring data management in the context of the four preceding documents. Existing data management systems will be compared and improvements suggested.

The purpose of this initial report is to define objectives for ground water monitoring that will guide the remaining strategy development. The basis for ground water monitoring is presented in terms of legal and policy background. Five objectives are described along with three general types of monitoring to accomplish these objectives. A brief explanation of how the monitoring types can be tailored to the appropriate objectives is given. A summary of considerations and constraints for developing a ground water monitoring program is also included.

A range of monitoring and data management options will be developed through the Ground Water Monitoring Strategy. One of these approaches will be recommended with estimated benefits and costs (Report 4). The monitoring strategy will not provide a completely finished monitoring

design with specific sample locations, definite sampling frequency, nor a final list of parameters to be analyzed. The monitoring strategy will, however, provide the basis for setting priorities and effectively accomplishing them. The strategy will also guide the state ground water monitoring effort.

IV. Background

Efforts to ensure ground water quality in Washington, as well as most other states, have been neither comprehensive nor integrated. Attention and laws have focused on portions of the problem, causing a fragmented approach to protecting and monitoring ground water (Selig, 1983).

Table 1 lists existing federal and state laws that refer to ground water monitoring. Some state laws correspond to federal legislation while others are unique to only one jurisdiction. A brief description of each law is presented in the appendix.

The Department of Ecology has developed a ground water management and protection strategy for the state (Ecology, in press). Public comment and legal requirements were incorporated into the management strategy policies and goals. The monitoring plan initiated through the Ground Water Monitoring Strategy for Washington will provide an essential tool for implementing and modifying the management strategy.

Table 1. Corresponding federal and state laws that address ground water monitoring.*

Federal	State
• Federal Clean Water Act	• State Water Pollution Control Act - State Waste Discharge Permit Program • Water Resources Act of 1971 • Solid Waste Management-Recovery and Recycling - Minimum Functional Standards for Solid Waste Handling
• Resource Conservation Recovery Act (RCRA)	• Hazardous Waste Management Statute - Dangerous Waste Regulation
• Comprehensive Environmental Response Compensation and Liability Act (CERCLA)	• Hazardous Waste Fee Statute • Regulation of Public Ground Waters - Ground Water Management Areas and Programs - Odessa Ground Water Subarea Management Policy - Regulation of Artificially Stored Ground Water - Protection of Upper Aquifer Zones - Measuring Devices for Water Diversion and Withdrawal Facilities
• Safe Drinking Water Act (SDWA)	• Public Water Systems
• Surface Mining Control and Reclamation Act (SMCRA)	
• Toxic Substances Control Act (TSCA)	
• Uranium Mill Tailings Radiation Control Act (UMTRCA)	

*For a complete list of laws related to ground water quality, see Ecology, (in press).

A range of activities can potentially cause ground water contamination. Some of these activities are listed below. Contaminants may include metals, organics, inorganics, or microorganisms.

- Agricultural use of chemicals
- Animal feed lots
- On-site wastewater disposal
- Leaking sewer systems
- Solid waste disposal
- Leaking underground storage tanks and pipes
- Stormwater injection
- Mining activities
- Infiltration of contaminated surface water
- Inter-aquifer transfer of contamination
- Improper well construction
- Unlined pits, ponds, and lagoons
- Land application of wastewater
- Product storage on ground

VI. Ground Water Monitoring Objectives

Five objectives for ground water monitoring that together support the state's ground water protection efforts are (modified from EPA, 1985a):

1. Characterize the ground water resource.

2. Promptly identify new problems.

3. Assess known problems by determining cause-and-effect relationships.

4. Ensure compliance with regulations.

5. Evaluate program effectiveness.

Each objective is defined below. Specific examples of how monitoring may meet an objective are also given.

1. Characterize the Ground Water Resource

This objective involves describing the properties of Washington ground waters. Components of this objective include:

a. Provide a statewide perspective on ground water quality e.g., a "ground water Atlas"

b. Detect regional trends in ground water quality

c. Determine background levels of physical, chemical, and biological ground water conditions (account for variability over time and space within aquifers and among different aquifers)

d. Determine aquifer characteristics that influence ground-water quality, e.g., hydraulic conductivity, transmissivity.

e. Serve as a data base for preliminary local land-use planning and facility site investigations

f. Develop and verify regional models

g. Provide background data to compare with data collected by regulated facilities.

h. Provide background data to compare with data collected to assess non-regulated practices, such as agricultural methods.

Information collected to characterize ground water in the state also is useful, and often times essential, to meet the other four monitoring objectives.

2. **Promptly Identify New Problems**

Ground water problems are most effectively addressed if discovered early. New problems usually fall into one of two categories (EPA, 1985a):

a. New incidences of known problems (individual sites or areawide)

b. New types of problems (areawide or regional)

An example of new incidences of known problems is the discovery of new contamination apparently from a typical source such as a leaking lagoon. The second problem category, a new type of problem, refers to an entirely new kind of ground water problem previously unrecognized. For instance, if an activity that had previously not been considered a threat to ground water quality is found to be related to contamination discovered in a number of locations or over a large area.

Reliable background data are necessary to determine whether a potential problem is a natural condition or the result of cultural activities. In any case, if water quality standards or health advisory criteria are exceeded, or if ground water degradation is apparent, a problem exists. Once a problem is identified, further study of cause(s), extent of the problem, and recommended action may be needed as described under Objective 3 below.

3. **Assess Known Problems by Determining Cause-and-Effect Relationships**

When ground water problems are identified, a monitoring effort is needed to determine the cause(s), extent of the problem, and to determine the most appropriate solutions. Follow-up studies are usually necessary following implementation of corrective action to evaluate the effectiveness of the action(s).

Studies that assess known problems can address isolated site-specific problems or can focus on a number of sites with (a) common problem(s). Data and conclusions from similar sites can be used to improve the basis for regulatory decisions. For example, field tests of best management practices will indicate whether the practice adequately has protected or will protect ground water quality.

Another reason for undertaking a study to assess the cause and extent of a problem is to determine responsibility for further action. The source of ground water problems is not always apparent. Timely solution of such problems depends on a quick, reliable process for investigating responsibility.

4. **Ensure Compliance with Regulations**

Ground water monitoring is used to evaluate whether certain regulated facilities or activities adversely affect ground water quality.

State permits for facilities that discharge to ground usually require ground water monitoring. Such "self-monitoring" must be routinely reviewed and verified to assure that the information obtained is accurate and sufficient to detect problems.

Information on ground water conditions, related to but not required in a permit, is useful for investigating previously unforeseen or potential problems.

If a significant contamination problem is discovered at a regulated facility, the problem may be assessed as described under Objective 3, and corrective action taken.

5. **Evaluate Program Effectiveness**

Limited resources are available for ground water protection and monitoring efforts. Therefore, a portion of those resources must be reserved to measure how well existing efforts are accomplishing their intended purposes. A consistent, long-term ground water monitoring effort can assess the response, statewide or areawide, to management programs.

Data collected for this purpose are needed to modify existing programs or develop alternative actions. By continually evaluating the effectiveness of ground water management programs, problems can be more efficiently discovered, solved, or prevented.

The five objectives described above are interrelated. Together they support the goal of retaining and securing high quality in ground waters of the state (adapted from Chapter 90.48.10 RCW). Efforts to accomplish one objective will be useful, and in some cases necessary, to meet other objectives. Information gained from monitoring for one objective may also trigger monitoring under another objective. For instance, if a problem is identified under Objective 2, the problem may need to be assessed under Objective 3. Figure 1 shows how information from the objectives will be integrated.

One monitoring program cannot meet all five objectives effectively. Priorities must be established, and efforts to meet specific objectives integrated so that the maximum benefit is obtained for the resources expended.

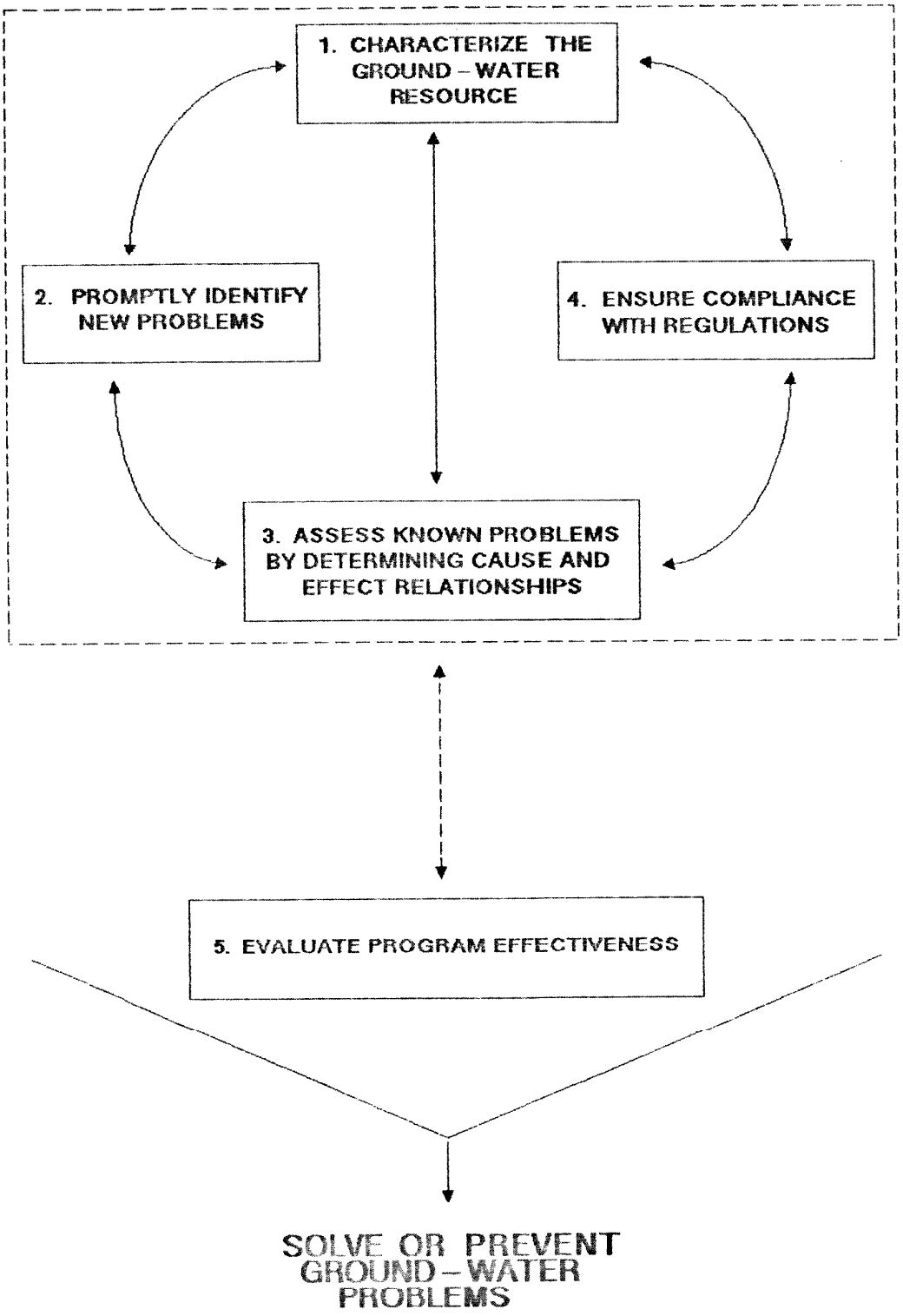

Figure 1. Schematic representation of the relationships among the ground water monitoring objectives and the goal of the integrated monitoring system, to solve or prevent ground water problems.

VII. Types of Ground Water Monitoring

Ground water monitoring can be divided into three general types: ambient, intensive surveys, and compliance. Each of the five objectives listed in the previous section can be accomplished by one or more types of monitoring, as shown in Table 2.

Table 2. Monitoring objectives and corresponding types of monitoring.

Monitoring Objectives	Types of Monitoring		
	Ambient	Intensive	Compliance
1. Characterize the ground water resource.	X	X	
2. Promptly identify new problems	X		
3. Assess known problems by determining cause-and-effect relationships		X	
4. Ensure compliance with regulations			X
5. Evaluate program effectiveness	X	X	X

Ambient Monitoring

Ambient monitoring refers to long-term, regional monitoring. Samples are usually collected relatively infrequently at fixed stations. An ambient monitoring network can be used to characterize the ground water quality, identify new problems, and evaluate program effectiveness over a large area.

Background water quality and broad-scale trends can be detected over time and space using ambient monitoring networks in areas where contamination is not expected (Characterize the resource).

Contamination problems may be found through trends in data from areas where contamination is expected (Identify new problems). Problems can also appear from verifiable changes in levels of contaminants as compared to previous levels, as well as from upgradient well data. Both of these ways of discovering problems depend on acquiring sufficient background information on which to base monitoring design decisions.

The large-scale effects of management programs over time and space can be evaluated via an ambient monitoring program (Evaluate program effectiveness).

The Spokane "208" Project operates an ambient ground water monitoring network to both characterize the resource and identify new problems (Esvelt and Miller, 1983). As management actions are implemented, their effectiveness in protecting the aquifer can be evaluated fairly reliably.

Intensive Surveys

Intensive surveys are detailed monitoring efforts that focus on localized sites. Samples are usually collected more frequently than for ambient monitoring. Intensive surveys are used to determine the source(s) and extent of ground water contamination, to decide legal responsibility, to develop recommended alternative actions, and to evaluate cleanup actions (Assess known problems). Both water quality and hydrogeological characteristics must be understood. Intensive surveys often end when follow-up data indicate that the problem is adequately corrected.

Intensive surveys of hydrogeologic and aquifer parameters are needed to characterize ground water flow patterns in some critical areas of the state. The effectiveness of the ambient water quality portion of the resource characterization objective depends on an adequate understanding of how ground water flows in key areas. This type of intensive study to supplement the ambient portion of objective 1 would cover a larger area in less detail than one to assess known problems.

Ground water management programs aimed at localized sites can be evaluated using intensive survey information. Areawide or statewide success of a program can be determined for programs dealing with small-scale sites. The mechanism(s) of the program's success or failure can also be analyzed with intensive survey data--an advantage over ambient or compliance evaluations.

Ground water monitoring at State Hazardous Waste Cleanup sites exemplifies intensive surveys. These studies provide information to determine the source of hazardous waste contamination at a particular site and to evaluate corrective action alternatives before and after implementation.

Compliance Monitoring

Compliance monitoring is used to determine if a regulated facility or activity is meeting all permit and regulatory requirements. Like intensive surveys, compliance monitoring is usually carried out at localized sites. Samples are typically collected quite frequently, e.g., quarterly.

Compliance monitoring networks are designed specifically to fit the individual facility or activity, the local site conditions, legal standards, and local beneficial uses of the ground water.

If ground water contamination is detected through routine compliance monitoring or through periodic inspection sampling, an intensive survey may be required to assess the extent of the problem and continue through site cleanup.

By compiling and analyzing compliance monitoring data from a number of similar facilities, the effectiveness of a ground water management program can be evaluated. Sampling can be carried out at additional nearby wells or the facility wells can be sampled for parameters not specifically required under the permit. Such information could provide a better basis for evaluating the effectiveness of a program on a wider scale.

Monitoring to comply with federal RCRA or state dangerous waste regulations is an example of compliance monitoring. Networks are designed to either detect or assess leakage from hazardous waste disposal facilities.

A preliminary step in designing any monitoring effort is to evaluate existing data. Based on that evaluation, a reconnaissance sampling effort may be necessary to obtain sufficient information on the concentration of chemical, physical, or biological constituents in an area and their spatial distribution in order to design an effective monitoring network. Reconnaissance surveys also can provide general information on the hydrogeologic setting.

For any of the three monitoring types to be successful and thereby accomplish the stated objective, it is necessary to understand exactly how the data collected will be analyzed and what constitutes a significant trend or change (Loftis, et al, 1987).

VIII. Considerations and Constraints

Monitoring efforts discussed in future Ground Water Monitoring Strategy for Washington reports face similar considerations and constraints.

Considerations in developing specific monitoring networks to meet any of the five objectives previously described include (from Sanders, et al, 1983):

1. Network design

   - Number of stations
   - Station location
   - Variables sampled or measured
   - Sampling frequency
   - Data analysis procedures
   - Allowable uncertainty in conclusions
   - Duration of monitoring effort

2. Operational design

   - Type of station (well, piezometer, construction details)
   - Field procedures
   - Laboratory procedures
   - Data management procedures
   - Quality assurance (for field, laboratory, and data management activities)
   - Report preparation and distribution

A few common constraints to consider in the design of ground water monitoring programs in Washington include:

1. Complex, heterogeneous hydrogeology.

2. High degree of variation in ground water quality parameters, both temporally and spatially. (This is true for ground waters that are contaminated as well as those unaffected by human activity.)

3. Much of existing data is lacking in quality and/or quantity. Data are stored in separate databases that are difficult to access and integrate.

4. Resources for ground water monitoring are limited, including laboratory capacity for sample analyses.

IX. Summary

A comprehensive approach to ground water monitoring is needed in Washington to detect and respond to contamination problems in a timely, cost-effective manner. This report is the first of a five-part series that will present a Ground-Water Monitoring Strategy for Washington. The strategy should be adjusted over time to changing situations and priorities related to ground water protection.

Five objectives are presented for ground water monitoring:

1. Characterize the ground water resource

2. Promptly identify new problems

3. Assess known problems by determining cause-and-effect relationships

4. Ensure compliance with regulations

5. Evaluate program effectiveness

Three general types of monitoring are discussed as they relate to the five ground water monitoring objectives: ambient, intensive surveys, and compliance.

These objectives will provide the foundation for the four remaining strategy reports. One of the criteria for evaluating existing and recent ground water monitoring efforts will be these objectives. The outcome of the Ground Water Monitoring Strategy for Washington will be a firm basis for an integrated ground water monitoring program to protect the state's ground water.

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APPENDIX

A. Federal Laws Relevant to Ground Water Monitoring

CLEAN WATER ACT

The federal Clean Water Act mandates that EPA in cooperation with states monitor ground- and surface water. Under Sec. 104(a), the EPA is required to prevent, reduce, and eliminate pollution and as part of this requirement:

> "(5) in cooperation with the States, and their political subdivisions, and other Federal agencies establish, equip, and maintain a water quality surveillance system for the purpose of monitoring the quality of the navigable waters and ground waters and the contiguous zone and the oceans . . . and shall report on such quality . . ." [Emphasis and insertion added]

The EPA Administrator is not allowed under Section 106 to make any grant to any state which is not involved in:

> "(1) the establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor, and to compile and analyze data on (including classification according to eutrophic condition), the quality of navigable waters and to the extent practicable, ground waters including biological monitoring; and provision for annually updating such data and including it in the report required under section 305 of this Act; . . ." [Emphasis and insertion added]

Section 201 states that ground water monitoring should be carried out near wastewater land-application areas with specific requirements established on a site-by-site basis.

Section 208 provides limited funding for ground water monitoring related to non-point pollution sources. The states also are charged with the task of developing areawide water quality management plans under Section 208.

Monitoring may be required at sludge-application sites for effects on ground water under Section 405.

The Washington Department of Ecology, the Washington Conservation Commission, and a few local water quality management agencies have authority in carrying out the provisions of the Act.

RESOURCE CONSERVATION AND RECOVERY ACT

The Resource Conservation and Recovery Act (RCRA), enacted in 1976 and later amended, provides detailed regulations for extensive ground water monitoring at hazardous waste storage and disposal sites. Responsibility

for enforcement of this law is shared by the EPA and the Washington Department of Ecology.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT

The federal "Superfund" (Comprehensive Environmental Response, Compensation and Liability Act or CERCLA of 1980) facilitates cleanup of inactive contamination or spill sites. Extensive ground water monitoring is usually conducted as part of a Superfund cleanup project. The EPA is the CERCLA enforcement authority, although the Washington Department of Ecology is given responsibility to manage site cleanup at selected sites.

SAFE DRINKING WATER ACT

The Safe Drinking Water Act (SDWA) of 1974 sets interim primary and secondary drinking water standards that include 14 to 19 inorganic and six organic constituents.

The Underground Injection Control (UIC) Program, under Sec. 1442 of the SDWA, is intended to protect underground water supplies from injected wastes. The program allows ground water monitoring requirements as part of permit conditions for injection wells. EPA is required to determine the nature and extent of the impact on ground water of abandoned wells, pesticide and fertilizer application, ponds, lagoons, or other surface disposal of contaminants. The EPA, the Washington Department of Ecology, the Washington Department of Natural Resources, and the Oil and Gas Conservation Commission participate in carrying out the UIC provisions of the SDWA.

SURFACE MINING CONTROL AND RECLAMATION ACT

Ground water monitoring plans must be included in permit applications for piles and surface impoundments containing coal waste under the Surface Mining Control and Reclamation Act (SMCRA). The Office of Surface Mining enforces SMCRA.

TOXIC SUBSTANCES CONTROL ACT

The Toxic Substance Control Act (TSCA) of 1976 has ground water monitoring provisions for polychlorinated biphenyl (PCB) disposal operations and is under EPA's jurisdiction.

URANIUM MILL TAILINGS RADIATION CONTROL ACT

The Uranium Mill Tailings Radiation Control Act (UMTRCA) requires ground water monitoring at active uranium mill tailings sites, and makes monitoring at inactive sites a state responsibility. The Nuclear Regulatory Commission administers UMTRCA and authorized the Washington Department of Social and Health Services (DSHS) to enforce the Act.

B. Washington State laws relevant to ground water monitoring

Combined with the federal ground water programs is Washington's mandate to protect the quality and quantity of all surface- and ground waters in the state.

WATER POLLUTION CONTROL ACT

The State Water Pollution Control Act, Chapter 90.48 RCW, calls for the highest standards of water purity consistent with public health, industrial development, and other beneficial uses. The act declares it unlawful to discharge any material into the waters ". . .that shall cause or tend to cause pollution of any state waters."

The 1985 legislature amended the State Water Pollution Control Act to require that anyone who violates or ". . .creates a substantial potential to violate the provisions. . ." of the Act must comply with directives issued by the Washington Department of Ecology to control or investigate violations. This amendment gives Ecology additional authority to require ground water monitoring.

One of the rules adopted to implement the State Water Pollution Control Act, the State Waste Discharge Permit Program (Chapter 173-216 WAC), states that any permit to discharge wastes into ground- or surface waters must "specify conditions necessary to control" such discharges, including "any appropriate monitoring and reporting requirements as specified by the department, including applicable requirements" under the Federal Water Pollution Control Act.

WATER RESOURCES ACT

The Water Resources Act of 1971, Chapter 90.54 RCW, specifies that no reduction in water quality (including ground water) can be permitted unless in the clear "overriding interest" of the public.

Proper utilization and management of state waters is the goal of the Water Resources Act. Water allocation should be based on obtaining the maximum net benefits to the people of the state. One of the major benefits listed in the regulation is adequate and safe supplies of water to be protected in potable condition for domestic needs.

SOLID WASTE MANAGEMENT ACT

Authority to protect public health and the environment by setting minimum functional standards for handling solid waste is given to the Department of Ecology under Chapter 70.95 RCW, the Solid Waste Management Act. Landfills are required, under Chapter 173-304 WAC, to establish ground water monitoring networks similar to those required under the State Dangerous Waste Regulation and federal RCRA requirements. These rigorous monitoring stipulations also apply to surface impoundment sites that contain a total of over two million gallons of liquid waste,

land-spreading disposal facilities, and waste piles larger than 10,000 cubic yards (unless an approved leachate detection, collection, and treatment system is in place). Woodwaste landfills are excluded from the ground water monitoring requirements under this Act. Local health departments enforce this law.

HAZARDOUS WASTE MANAGEMENT STATUTE

Washington's Hazardous Waste Statute, Chapter 70.105 RCW, delegates authority for conducting studies and research programs related to extremely hazardous waste management to the Department of Ecology. Surveillance and monitoring of extremely hazardous waste disposal practices is likewise a duty of the department, as is provision of technical assistance to dangerous waste generators and state and local agencies involved in hazardous waste.

The Dangerous Waste Regulation, Chapter 173-303 WAC, implements the federal RCRA legislation with additional provisions for petroleum products. This regulation is authorized under the Hazardous Waste Management Statute. The Department of Ecology is responsible for keeping track of dangerous and extremely hazardous wastes until they are detoxified, reclaimed, neutralized, or disposed of safely. Detailed ground water monitoring is required at a designated facility.

HAZARDOUS WASTE FEE STATUTE (State Superfund)

Funding for hazardous waste cleanup efforts is provided under the state Superfund law, Chapter 70.105A RCW. Provisions include studying, planning, implementing, rehabilitating, and removing hazardous wastes that have been deposited improperly. Funds are also to be used for matching federal CERCLA monies.

REGULATION OF PUBLIC GROUND WATERS

All public ground waters are subject to appropriation for beneficial uses under the Regulation of Public Ground Waters, Chapter 90.44 RCW. Beneficial uses include, among other uses, drinking water, stock watering, industrial, commercial, irrigation, hydroelectric power production, fish and wildlife maintenance and enhancement, and recreation.

Several provisions of this law call for ground water monitoring to plan, manage, and maintain sufficient quantities for beneficial uses. The Department of Ecology regulates appropriations and can limit withdrawal by ground water appropriators to maintain safe, sustaining yields from ground water bodies within a reasonable pumping lift.

The Department of Ecology is authorized, when necessary, to carry out investigations into the location, extent, depth, volume, and flow of all ground waters in the state. Ground water appropriators may be required to submit documentation of the amount of public ground water withdrawn and how it is used.

Several rules have been adopted in accordance with the Regulation of Public Ground Water. Three ground water management subareas have been designated: Quincy, Odessa, and Duck Lake (Chapter 173-130A) in addition to subarea designation. These areas were designated in order to address and remedy ground water management problems.

Future ground water subarea designations will likely be made under a new rule, Ground Water Management Areas and Programs, Chapter 173-100 WAC. Cooperative efforts among local, state, tribal, and federal agencies are already accelerating in many critical ground water areas. Once a subarea is designated by Ecology, comprehensive management programs will be developed to address existing and potential water quality problems. A monitoring system is required to evaluate the effectiveness of these programs.

Inspections and tests may be required under Protection of Upper Aquifers, Chapter 173-154 WAC, to ensure compliance with construction requirements. Such investigations would aim at preventing excessive water level declines, stream flow reductions, and degraded water quality.

Under Chapter 508-64 WAC, anyone withdrawing ground water may be required to have an accurate measuring device to determine the amount of water utilized. The regulation states that such information may be needed by the Department of Ecology to characterize the water available, to plan and manage that water, or to resolve conflicts under existing water rights.

PUBLIC WATER SYSTEMS

The State Board of Health is charged with responsibility to adopt rules and regulations to protect water supplies for public health and to develop standards for quality of water delivered to the consumer under Chapter 43.20 RCW.

The Department of Social and Health Services (DSHS) administers Chapter 248-54 WAC, Public Water Systems, which conforms to the federal Safe Drinking Water Act requirements. All public ground water suppliers must monitor every three years for the primary drinking water inorganic constituents mentioned previously. Sampling for microbiological parameters is also required. The frequency depends on the number of system users. DSHS does not yet require ground water suppliers to analyze for the Safe Drinking Water Act organics (G. Plews, 1985, DSHS, personal communication).

The U.S. EPA recently adopted standards for eight volatile organic compounds (VOCs), and recommended maximum contaminant levels for 26 other synthetic organics. The state is now required to develop administrative rules for monitoring and enforcing the eight VOC standards. Final standards for the 26 other compounds will probably be issued by U.S. EPA in 1987.

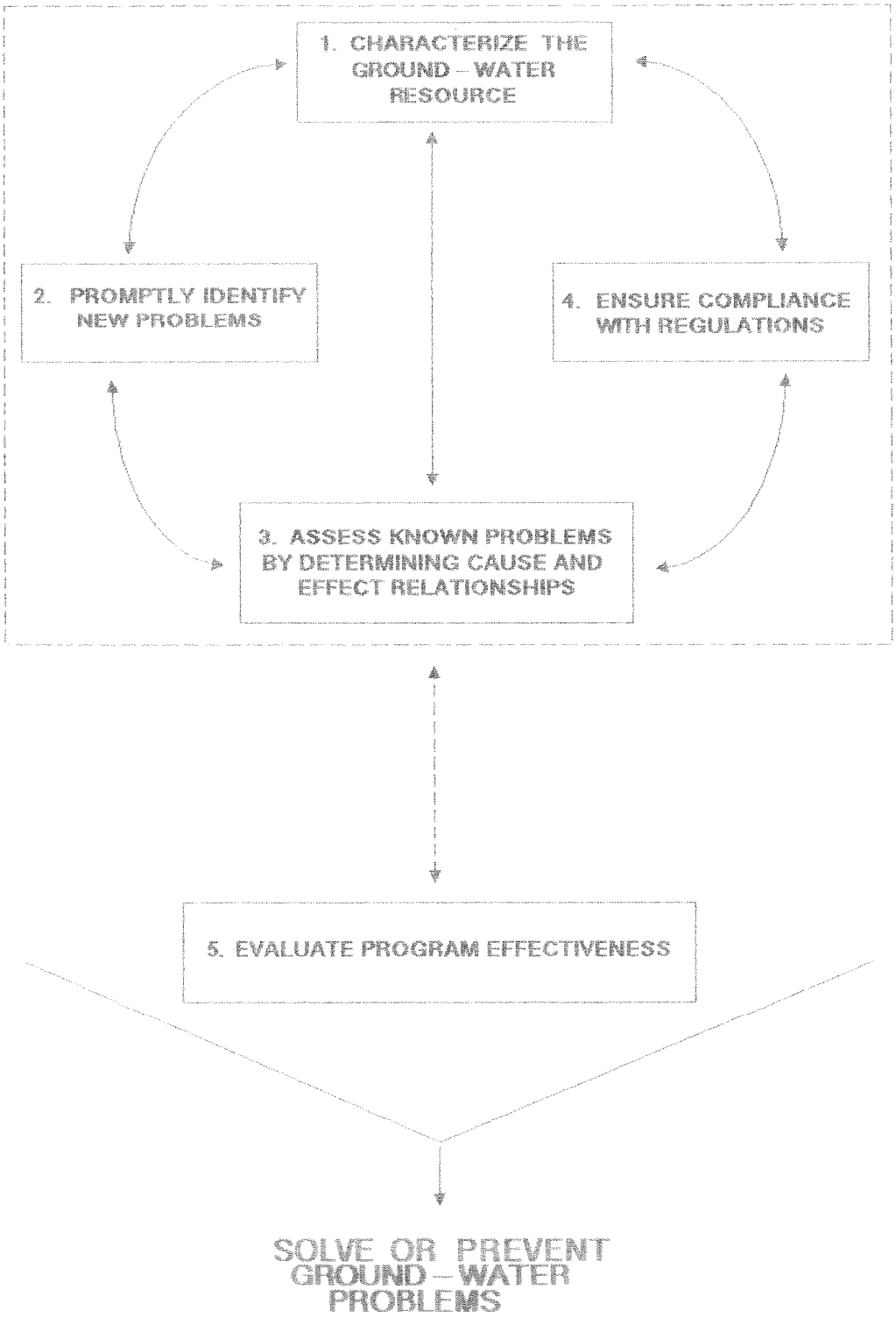

Figure 1. Schematic representation of the relationships among the ground water monitoring objectives and the goal of the integrated monitoring system, to solve or prevent ground water problems.