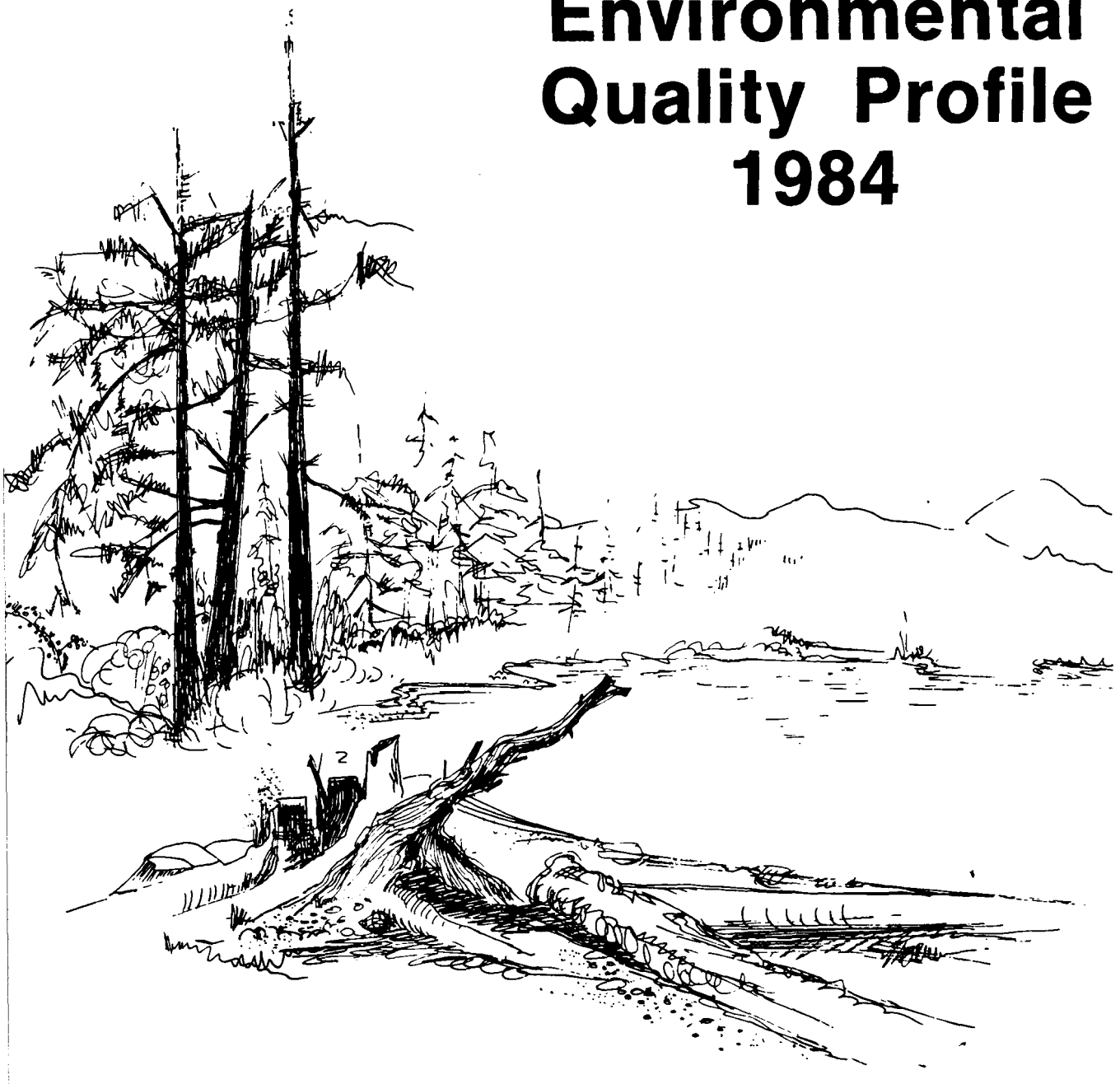
# Idaho Environmental Quality Profile 1984



**State of Idaho**
**Department of Health & Welfare**
**Division of Environment**
**450 W. State St.**
**Boise, ID 83720**

John V. Evans
Governor, State of Idaho

Rose Bowman, Director
Department of Health and Welfare

Lee W. Stokes, Administrator
Division of Environment

Al Murrey, Chief
Water Quality Bureau

Robert Olson, Chief
Hazardous Materials Bureau

Kenneth Brooks, Chief
Air Quality Bureau

Cover: Pen and ink sketch done in 1970 by Dan Smede, Channel VI

Computer Graphics: By Susan Lowman, Division of Environment

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# PREFACE

Pollution control programs in Idaho are administered through the joint efforts of the Idaho Department of Health and Welfare and the United States Environmental Protection Agency. The State/EPA Agreement, developed each fiscal year by the two agencies, is a contractual document which outlines work the Division of Environment and the Environmental Protection Agency will perform, part of which is supported by federal dollars.

This Profile is our way of providing the public with a current assessment of environmental problems in Idaho and giving interested Idaho citizens the opportunity to provide guidance in the planning process for the FY 86 State/EPA Agreement (July 1985 through June 1986). We are interested in knowing if there are environmental problems of a higher priority than those described in this report. If you feel there are, please supply us with sufficient information to be considered in the planning process. Some questions that should be answered are:

- What are the most serious environmental quality problems in Idaho?

- Where should we be directing our declining resources for environmental cleanup?

- Are there better methods for tackling these environmental problems?

- Do we need to place more emphasis on specific geographical environmental problems areas? If so, where?

Please direct any comments, concerns or questions to:

Dr. Lee Stokes, Administrator
Division of Environment
Idaho Department of Health and Welfare
Statehouse
Boise, Idaho 83720

# AIR

# QUALITY

# BUREAU

# AIR QUALITY

## AIR QUALITY STANDARDS--HISTORY AND DEFINITION

The first response to growing public concerns about air pollution in Idaho was in 1959 when the State Legislature passed the Idaho Air Pollution Control Act. This Act created the Idaho Air Pollution Control Commission. However, Commission activities during the next eight years were limited by funding which totalled only $31,000.

In 1967, the Air Pollution Control Act of Idaho was passed. This Act repealed authorization for the Commission and established a new Air Pollution Control Commission with increased funding to carry out its duties. The new Commission, with cooperation of the State Board of Health and Department of Health published the first Comprehensive Study of Air Pollution Problems in Idaho which, in turn, supported the State's first set of rules and regulations to control air pollution.

In order to consolidate State efforts to control air pollution, the Legislature transferred all powers and duties of the Air Pollution Control Commission to the Idaho Department of Health and Welfare (IDHW) pursuant to the Environmental Protection and Health Act of 1972. The Act also created the Division of Environment within IDHW. Within the Division of Environment, the Air Quality Bureau became responsible for delivering an effective program that would: provide statewide monitoring of ambient air, analyze air quality problems and prepare control plans, determine compliance with emission regulations, inform the public and respond to concerns and determine requirements for new sources of air pollution.

The first significant response to air pollution as a national issue occurred in 1970 when Congress passed the Clean Air Act. Recognizing existing State programs such as Idaho's, Congress found "... that the prevention and control of air pollution at its source is the primary responsibility of states and local governments." Based on the complexity and sometimes interstate nature of air pollution problems, Congress also found "... that Federal financial assistance and leadership is essential for the development of cooperative Federal, State, regional and local programs to prevent and control air pollution." Within this conceptual framework, the Act created the U.S. Environmental Protection Agency (EPA) and directed EPA to establish National Ambient Air Quality Standards (NAAQS)--primary standards to protect public health and secondary standards to protect public welfare. Following establishment of an NAAQS, each state was required to develop a plan to assure the standard was attained and maintained. For a plan to be approvable, it has to include: (1) an analysis of current ambient and emissions data, (2) consideration of alternative control strategies, (3) necessary rules and regulations,

(4) appropriate source operating permits, (5) adequate authority and resources to implement the plan and (6) opportunity for public participation.

In 1971, EPA promulgated the first set of NAAQS. It included standards for sulfur dioxide ($SO_2$), suspended particulate matter (TSP), carbon monoxide (CO), photochemical oxidants (Ox), hydrocarbons (HC) and nitrogen dioxide ($NO_2$). Since then EPA has reviewed and revised the NAAQS. Table 1 shows the NAAQS as they currently exist. Table 2 provides a brief summary of effects of the six NAAQS upon health and property.

**TABLE 1.**
**National Ambient Air Quality Standards**

| POLLUTANT | EXPOSURE | PRIMARY STANDARD(a) | SECONDARY STANDARD(a) |
|---|---|---|---|
| Total Suspended Particulates (TSP) | Annual Geometric Mean | 75 ug/$m^3$ | 60 ug/$m^3$(c) |
| | 24-hour maximum(a)(b) | 260 ug/$m^3$ | 150 ug/$m^3$ |
| Sulfur Dioxide ($SO_2$) | Annual Arithmetic Mean | 80 ug/$m^3$(0.03 ppm) | No Standard |
| | 24-hour maximum(b) | 365 ug/$m^3$(0.14 ppm) | No Standard |
| | 3-hour maximum(b) | No Standard | 1300 ug/$m^3$(0.5 ppm) |
| Carbon Monoxide (CO) | 8-hour maximum(b) | 10 mg/$m^3$(9 ppm) | Same as primary |
| | 1-hour maximum(b) | 40 mg/$m^3$(35 ppm) | Same as primary |
| Ozone (Ox) | Maximum hourly average(d) | 235 ug/$m^3$(0.12 ppm) | Same as primary |
| Nitrogen Dioxide ($NO_2$) | Annual arithmetic mean | 100 ug/$m^3$(0.05 ppm) | Same as primary |
| Lead (Pb) | Maximum arithmetic mean per calendar quarter | 1.5 ug/$m^3$ | Same as primary |

(a) ug/$m^3$ - means micrograms per cubic meter
mg/$m^3$ - means milligrams per cubic meter
ppm - means parts per million parts
(b) Not to be exceeded more than once per year.
(c) As a guide to be used in assessing implementation plans to achieve the 24-hour standard.
(d) The standard is attained when the expected number of days per calendar year with maximum hourly average concentration above the standard is equal to or less than 1, as determined by Appendix H, 40 CFR 50.

**TABLE 2.**
**Effects of Major Air Pollutants on Health and Property**

| POLLUTANT | HEALTH EFFECTS | PROPERTY EFFECTS |
|---|---|---|
| Total Suspended Particulates | Correlated with increased bronchial and respiratory disease, especially in young and elderly. | Corrodes metals and concrete; discolors surfaces; soils exposed materials; decreases visibility. |
| Sulfur Dioxide | Upper respiratory irritation at low concentrations; more difficult breathing at moderate concentrations ($3000mg/m^3$). correleated with increased cardio-respiratory disease, acute lung damage at high concentrations. | Corrodes and deteriorates steel, marble, copper, nickel, aluminum, and building materials; causes brittleness in paper and loss of strength in leather; deteriorates natural and synthetic fibers, "burns" sensitive crops. |
| Carbon Monoxide | Physiological stress in heart patients; impairment of psycho-motor functions, dizziness and headaches at lower concentrations, death when exposed to 1000 ppm for several hours. | Corrodes limestone and concrete structures. |
| Ozone | Irritates eyes, nose, throat; deactivates respiratory defense mechanisms, damages lungs. | Deteriorates rubber and fabrics, corrodes metals, damages vegetation. |
| Nitrogen Dioxide | Combines with hydrocarbons in the presence of sunlight to form photochemical smog, irritates eyes, nose, throat, damages lungs. | Corrodes metal surfaces, deteriorates rubber, fabrics, and dyes. |
| Lead | Primary concern with young children. Most pronounced effects on nervous system (damage may occur at low levels)kidney system and blood forming system (high levels may have severe and sometimes fatal consequences such as brain disease, palsy, and anemia). Blood levels 30mg deciliter are associated with an impairment in cell function. | Injures plants through absorption of soil. Affects nervous system of grazing animals. |

Based upon monitoring through 1978, the areas in Table 3 were found to be violating NAAQS. Table 4 shows the results of 1983 monitoring. A more detailed presentation of historical trends and analysis of data is contained in the 1983 Idaho Air Quality Annual Report, Part I--Air Monitoring Summary.

**TABLE 3.**
**Areas of Idaho Violating National Standards in 1978**

| | $SO_2$ | | TSP | | | | | |
|---|---|---|---|---|---|---|---|---|
| | PRIM. | SEC. | PRIM. | SEC. | Ox | CO | $NO_2$ | LEAD |
| Silver Valley | x | x | x | x | | | | x |
| Pocatello | x | x | x | x | | | | |
| Soda Springs | | | x | x | | | | |
| Lewiston | | | x | x | | | | |
| Boise | | | | | | x | | |

**TABLE 4.**
**Areas of Idaho Violating National Standards in 1983**

| | $SO_2$ | | TSP | | | | | |
|---|---|---|---|---|---|---|---|---|
| | PRIM. | SEC. | PRIM. | SEC. | Ox | CO | $NO_2$ | LEAD |
| Pocatello | | | x(1) | x(2) | | | | |
| Soda Springs | | | x(3) | x(4) | | | | |
| Lewiston | | | x(5) | x | | | | |
| Boise | | | | | | x | | |

(1) 12 square mile industrial area northwest of Pocatello.
(2) 336 square mile area from Schiller at the northwest to Inkom at the southeast, including Pocatello.
(3) 4½ square mile area encompassing Conda and the surrounding industrial area.
(4) 96 square mile area encompassing Soda Springs, Conda and the industrial area.
(5) Proposed for redesignation to secondary TSP nonattainment only.

Though there are still nonattainment areas, the improvement in air quality is significant. In five years Idaho has gone from five areas violating eight primary standards to four areas violating four standards. It is also important to note that the size of two of those areas, i.e., Pocatello and Soda Springs, has decreased by 96 percent and Lewiston has not violated a primary standard for more than two years.

## HOW DO WE KNOW ABOUT IDAHO'S AIR QUALITY?

Idaho's air quality is determined by a statewide monitoring network. In 1983, 45 pollutants were measured at 27 sites. Table 5 on page 5 shows where each pollutant was measured. It should be noted that monitoring for particulate matter less than 10 micrometers, $PM_{10}$, was very limited because a standard method has not yet been published. As soon as a method and equipment become available, a high priority will be given to expanding the $PM_{10}$ network. In addition, ozone was not monitored in 1983 because earlier results were very low.

The following sections briefly relate each NAAQS to air quality in Idaho:

### Particulate Matter

The NAAQS for particulate matter applies to 'total suspended particulates.' This means all particles in the air, regardless of size, are monitored. Recognizing that particulate matter greater than 10 micrometer poses minimal

TABLE 5.
1983 State Air Monitoring Network

| LOCATION | TSP | $PM_{10}$ | LEAD | $SO_2$ | CO | Ox | $NO_2$ | SPECIAL |
|---|---|---|---|---|---|---|---|---|
| **NORTHERN IDAHO** | | | | | | | | |
| Coeur d'Alene | | | | | | | | |
| 5th & Lakeside | x | | x | | | | | |
| Kellogg | | | | | | | | |
| 204 Oregon St. | x | | x | | | | | |
| Lewiston | | | | | | | | |
| State Office Bldg. | x | | | | | | | |
| Army COE Dike | x | | | | | | | |
| Osburn | | | | | | | | |
| Radio Station | x | | x | | | | | |
| Pinehurst | | | | | | | | |
| Elementary School | x | | x | | | | | |
| Smeiterville | | | | | | | | |
| Silver King School | x(1) | | x | x | | | | |
| City Hall | | | | | | | | x(3) |
| **SOUTHWESTERN IDAHO** | | | | | | | | |
| Ada County | | | | | | | | |
| 9500 Overland Road | x | | | | | | | |
| Boise | | | | | | | | |
| Fairview & Liberty | x(1) | x | | | | | | |
| 16th & Front | x(1) | | x | | | | | |
| 115½ 9th Avenue | | | | | x | | | |
| 401 N. Orchard | | | | | x | | | |
| Winstead Park | | | | | | | | x(4) |
| Twin Falls | | | | | | | | |
| Warehouse | | | | | | | | x(5) |
| **SOUTHEASTERN IDAHO** | | | | | | | | |
| Bannock County | | | | | | | | |
| Sewage Treat. Plt. | x(1) | | | x | | | | |
| Simplot Plant | | | | x(2) | | | | |
| Butte County | | | | | | | | |
| Craters-of-the-Moon | x | | | | | | | |
| INEL | | | | | | | x(2) | |
| Caribou County | | | | | | | | |
| Torgeson's Ranch | x | | | | | | | |
| North of Conda | x | | | x | | | | |
| Harris Ranch | x | | | | | | | |
| Beker Industries | | | | x(2) | | | | |
| Chubbuck | | | | | | | | |
| Elementary School | x | | | | | | | |
| Inkom | | | | | | | | |
| Central Park | x | | | | | | | |
| Pocatello | | | | | | | | |
| ISU | x | | | | | | | |
| Soda Springs | | | | | | | | |
| Hospital | x | | | | | | | |
| POLLUTANTS SAMPLED | 23 | 1 | 6 | 5 | 2 | 0 | 1 | 7 |

(1) Hi-volume sampler with colocated precision sampler.
(2) Industry operated monitor, data reported to the State.
(3) 3-month sampling for heavy metals (lead, zinc and cadmium).
(4) Winter sampling to determine impact of wood stove emissions on neighborhood levels of TSP, $PM_{10}$ and CO.
(5) Study of concentrations of pesticides in ambient air.

health risks because they do not penetrate into the alveolar region of the lungs, the EPA proposed a new $PM_{10}$ standard on March 20, 1984. However, until the $PM_{10}$ standard replaces the TSP standard, Federal regulations require attainment and maintenance of the TSP standard.

Sources of particulates in Idaho are classified as either 'point' or 'area' sources. Point sources are stacks or ducts emitting pollutants from industrial processes. Point sources in Idaho have been regulated for many years and as a result these sources are generally well controlled by devices such as baghouses, scrubbers and electrostatic precipitators. As Idaho's economy expands and new point sources are built, particulate emissions will be controlled by more efficient devices. In areas where NAAQS are not being met, new point sources will be required to 'offset' any new emissions by a greater reduction of existing emissions.

Area sources are simply all non-point sources. Area sources include particulate emissions from industrial roof vents and openings, storage piles and unpaved roads, open burning, residential space heating, and vehicles. Traditionally, area sources have been less controlled. However, given significant reductions of point source emissions, the contribution of area sources is now likely the primary cause of violations of the TSP standards in Idaho.

The control of particulate emissions from point sources by Idaho's industries has enhanced air quality. However, in areas where problems still exist, such as Pocatello and Soda Springs, improved operation and maintenance of control equipment on point sources and better control of area source emissions are still needed to meet national health standards.

As more wood is being used for residential heating, public concerns about health impacts have been raised in Idaho and in other states where wood is burned. It is known that wood smoke contains inhalable particulate matter composed of cancer-causing agents. Studies are proceeding to determine what concentrations and exposure to wood smoke pose unacceptable health risks.

## Sulfur Dioxide

National standards for $SO_2$ were not violated in 1983. In the past, there were $SO_2$ violations in the Silver Valley and Pocatello. The principal cause of $SO_2$ emissions in the Silver Valley was smelting and refining lead and zinc ores by the Bunker Hill Company. Since curtailment of this operation in late 1981, there have been no ambient $SO_2$ violations in the Silver Valley. The major source of $SO_2$ emissions near Pocatello is sulfuric acid production at the J.R. Simplot plant. Sulfur dioxide emissions from this plant have been reduced sufficiently to meet ambient $SO_2$ standards.

## Carbon Monoxide

Carbon monoxide standards were exceeded in Ada County in 1983. The primary cause was vehicle emissions. In response, the Ada Planning Association and local Air Quality Board prepared a transportation control plan, including a a mandatory inspection/maintenance program. The plan was submitted by the

State to EPA as a formal revision to the Idaho State Implementation Plan. The State will continue to monitor CO levels and provide technical assistance to local government but implementation and tracking progress of the current transportation control plan will be accomplished by local government.

## Lead

Lead standards were met throughout Idaho in 1983. The primary source of lead emissions was vehicles using leaded gasoline. Based on EPA actions to phase-down or eliminate lead in gasoline, ambient lead level in Idaho should remain well below national standards.

Prior to curtailment of lead and zinc smelter operation by Bunker Hill Company in late 1981, the Silver Valley greatly exceeded ambient lead standards. Since curtailment, the lead standards have not been exceeded. However, in order to assure lead standards will be met if the smelter is restarted, EPA is developing a plan which will limit emissions of lead from the smelter complex.

HAZARDOUS

MATERIALS

BUREAU

# HAZARDOUS MATERIALS

Improper storage, collection, transportation, treatment and disposal of solid and hazardous waste are cause for concern. Some concerns are:

- public health hazards can occur
- environmental damage may result
- reliance on land disposal gives a sense of false security
- resources and energy can be lost when materials are disposed of rather than recycled

## HAZARDOUS WASTE

The Federal Resource Conservation and Recovery Act (RCRA) of 1976 provides a mechanism by which Idaho can gain authority to completely manage hazardous waste activities within its borders. The state has continued to inspect and consult with hazardous waste generators, transporters, treaters and disposers since the federal regulatory program began, but final state authorization, including enforcement authority, has yet to be obtained. A major step in the process to obtain authority was the passage of the "Hazardous Waste Management Act of 1983" by the Idaho Legislature and a 1984 amendment to correct an omission in the Act. Those actions allowed the State to continue efforts to gain final authorization, which is expected by December of 1985. Meanwhile, the program will continue under a cooperative arrangement with the Environmental Protection Agency.

In addition to hazardous wastes being regulated by the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA) controls handling and disposal of PCB's and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) controls the use of pesticides used in Idaho agriculture.

Idaho is also involved with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), commonly known as "Superfund". Under this Act there is provision for a National Priorities List (NPL) which is a listing of hazardous waste sites where known or suspected releases of hazardous wastes have occurred or could threaten public health or the environment. The 400 highest rated sites for response action are to be designated, by law, as the top priority sites. Idaho currently has one site on the "400 list": Bunker Hill Mining at Smelterville. Two other sites, Pacific Hide and Fur Recycling Company and Union Pacific Railroad Company, both at Pocatello, have been recommended for inclusion on the NPL. Besides the NPL sites, Idaho has 107 sites on the ERRIS (Emergency and Remedial Response Information System) list which is a part of the "superfund" law. These are abandoned sites that have been reported from a number of sources. The State, in cooperation with the district health departments and other agencies, is preparing a preliminary assessment of these sites. It will be determined (1) if they are, indeed, valid sites,

(2) if the location identification is correct, (3) how much information is available about the kind and quantity of hazardous wastes buried at a site and (4) what the related problems are as well as who the legal property owners area. Potential problem sites will be added to the list of sites requiring further sampling and evaluation.

Adequate disposal capacity for Idaho's authorized hazardous waste generators exists at two commercial disposal facilities located in rural Owyhee County. These sites receive wastes from Idaho sources as well as large volumes of waste from sources outside the State. Questions about the adequacy of the sites from a hydrogeologic standpoint are being investigated in preparation for "Part B" permits.

Potential problems will remain, however, for less regulated small quantity generators who normally use municipal landfills for waste disposal. There have been instances of disposal site workers coming in contact with hazardous waste because the local disposal sites are not equipped the handle these types of wastes. The federal regulation presently requires control of facilities generating 2200 pounds per month or accumulating 2200 pounds at any time. This rate will probably be decreased to 220 pounds by 1986. In FY 84 the Division began a survey to find out how many small generators there are and began planning for adequate control measures.

The federal regulations require that facility inspections include review and evaluation of facility plans to assure that the facilities:

- are prepared to handle hazardous waste,
- have a program to train their employees to handle hazardous waste,
- have contingency plans in place for emergency incident response,
- are prepared to take proper precautions when a land disposal facility is closed and have made provisions for the site to be monitored for a minimum of 30 years after closure, and,
- have financial assurance for personal liability and environmental damage.

In FY 85 permitting actions will continue for hazardous waste land disposal operations as well as treatment/final disposal for the two commercial disposal facilities.

Inspections of authorized facilities, actions on small quantity generator requests for disposal, investigations of abandoned and/or unauthorized hazardous waste dumps and resolving complaints from the general public will continue.

## RESOURCE RECOVERY

The economics of recycled materials are typically good in heavily populated areas, but recycling programs in Idaho suffer from high transportation costs and small volumes.

Some municipal wastes that can be recycled are aluminum cans, newspapers, quality paper, cardboard, and glass. Much of the remaining waste can be incinerated to generate energy as steam or electricity.

Existing and planned or potential resource recovery projects in Idaho are described below.

- Cassia County was the first political entity in the state to plan, develop and begin operating a full scale solid waste energy recovery facility using municipal waste. The plant at Heyburn has a fifty ton-per-day incinerator with a heat recovery boiler providing part of the steam needs of the adjacent Simplot potato processing plant.

- In Kootenai County the Coeur d'Alene sanitary landfill has been retrofitted with a methane recovery system and is providing space heating for the city's shop complex.

- In Lewiston, the Potlatch Forest Products Company has on line an electrical generation complex that is powered by wood wastes.

- Bannock County has experienced some difficulties in securing financing for their proposed energy recovery facility. Bannock County has passed a bond election and proposes to build a 175 ton per day energy recovery plant to co-generate process steam and electricity.

- A feasibility study for an energy recovery plant for Payette County, Idaho and Malheur County, Oregon, was completed by Holliday Engineering Company. The study disclosed that it would not be economically desirable to build a plant at this time.

Other wastes with a potential for recovery include tires, lubricating oil and wood waste. Each presents disposal problems. Discarded tires cannot be compacted and gradually work to the surface in landfills where they can trap water and become a breeding place for mosquitoes. Waste lubricating oil has been used on roads as a dust suppressant but it can pollute air and water. Heavy metals and other contaminants in the oil make indiscriminate burning or disposal undesirable. Wood waste can pollute water resources and consume significant space in landfills.

## SOLID WASTE

Some of the problems related to solid waste disposal are:

- When garbage decomposes, methane gas is produced as a byproduct. Methane is toxic to vegetation and is explosive in certain concentrations. It has been detected at some landfills in Idaho. Methane gas problems can be reduced through proper site selections and construction. When methane gas is present it can be used as an energy source.

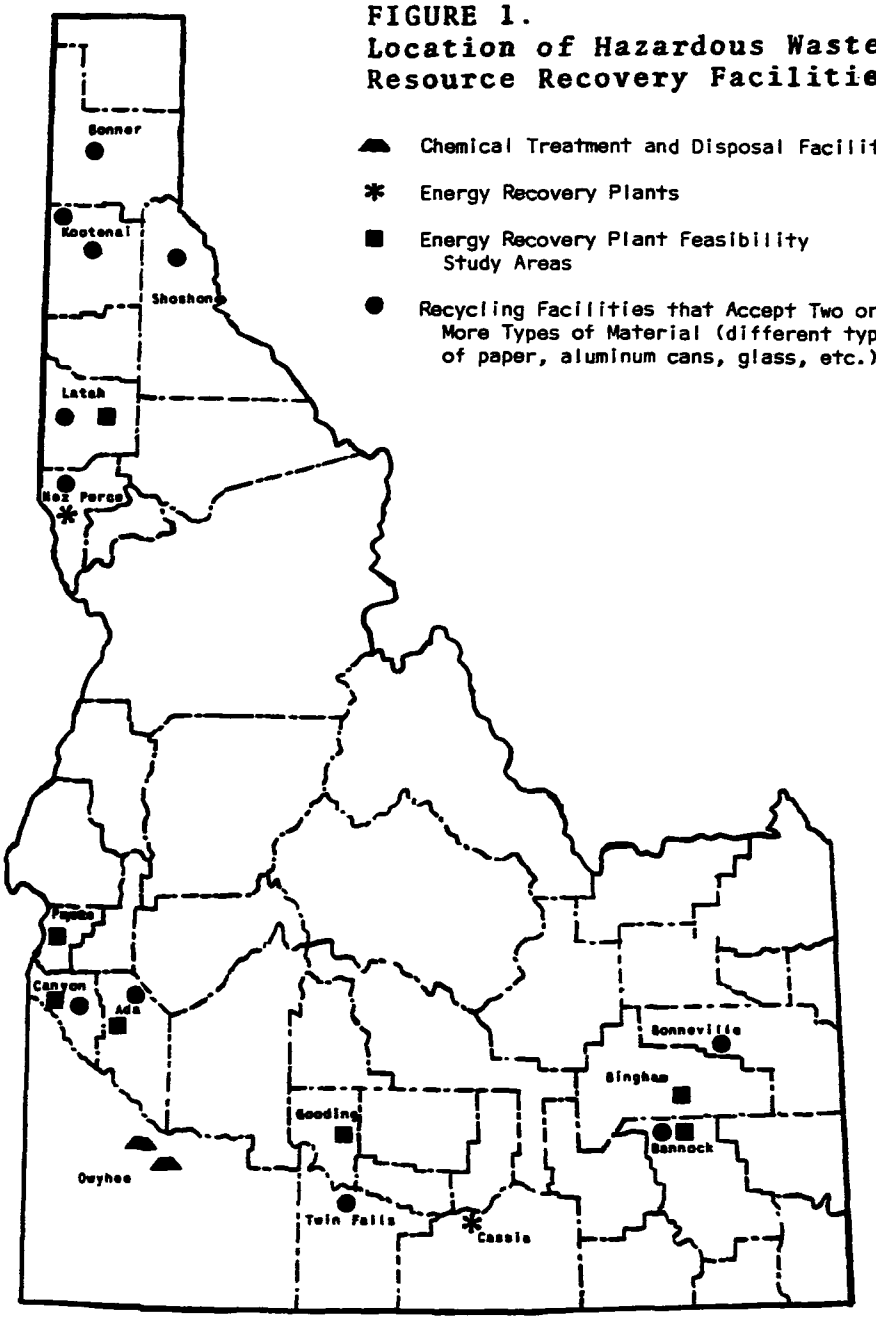



**FIGURE 1.**
**Location of Hazardous Waste and Resource Recovery Facilities**

- Chemical Treatment and Disposal Facilities
- Energy Recovery Plants
- Energy Recovery Plant Feasibility Study Areas
- Recycling Facilities that Accept Two or More Types of Material (different types of paper, aluminum cans, glass, etc.)

- Decomposition of refuse can produce offensive odors that may attract rodents and insects capable of transmitting disease organisms. Proper disposal and compaction of the refuse with daily soil cover will reduce the problem.

- Sewage sludge disposal is of increasing concern as water pollution control requirements for removal of wastes become more strict and space for disposal becomes more scarce. Some alternatives being used are incinerating the sludge or using it on farm and forest lands.

The lack of funds has caused considerable reduction in the surveillance of municipal solid waste disposal sites as well as continuation of the open dump inventory.

When a city or county has one or more open dumps, usually these sites are abandoned and sanitary landfills established or they are converted to sanitary landfills for more adequate sanitary management. Unfortunately, through improper management, a great many sanitary landfills are allowed to become little more than open dumps; another complicating factor is that establishing new sanitary landfills or extending them into adjacent areas is not a process that can be completed in a matter of weeks. Planning, public participation, technical reviews and formal legal processes require a great deal of time from many months to several years when there are no problems. When there are issues raised, usually because of the lack of planning, the process may take one to several years and still not result in a favorable resolution. In Idaho there seems to be a failure to fully recognize the significance of these time requirements. It is said that "time waits for no man"; neither does refuse. If a fill is not available to receive refuse when it is needed, the problems compound rapidly. One or several legal actions may be initiated by different parties.

One of the major concerns associated with problem sites is water pollution. Rainwater draining through or running over the wastes may carry harmful chemicals and bacteria into streams and groundwater and can contaminate wells and surface water used for drinking, cooking, swimming, and other public contact activities. Groundwater monitoring is being conducted at the solid waste disposal sites that have the highest potential for causing problems.

Open burning of garbage in populated areas in Idaho has been virtually eliminated, but there are still problem sites due to improper disposal of municipal solid wastes.

Solid waste program activities include:

- locating open dumps (open dump inventory) and working with cities and counties to upgrade open dumps to sanitary landfills,

- approving new disposal sites,

- maintaining the state solid waste plan,

- inspecting disposal facilities,

- responding to public complaints and

- answering inquiries from industry and governmental entities.

Some of the program activities have been delegated to the district health departments to conduct inspections and react to problems in their districts.

## RADIATION CONTROL

The use of radiation sources in medical, industrial or academic fields can be likened to a two-edged sword. If used properly they can be excellent tools for medical diagnosis. Improperly used they have the potential to cause ill health.

Radiation sources can be categorized as follows: ionizing radiation, which has enough energy to cause intermolecular destruction, and non-ionizing radiation.

Sources of non-ionizing radiation are microwave ovens, lasers, ultrasound and diathermy equipment, radio frequency propagators (televisions, computer terminals, etc.), and radar. The main areas of concern are use of microwave ovens in homes and restaurants and use of lasers in public displays, high schools and colleges. It is estimated that over 40% of all homes and a much higher percentage of all restaurants now have microwave ovens. About 1% of the microwave ovens are found to be faulty permitting excessive radiation leakage.

Ionizing radiation sources are classed into two categories: radioactive materials and electronic radiation producing devices.

Radioactive material possession and use is controlled through licensure and inspection by the Division's Radiation Control Section. Anyone wishing to use certain types or quantities of radioactive materials must submit an application for licensure, describe the proposed use and list their qualifications and criteria for safe use. A license is issued and inspections are conducted to verify that the user is complying with the regulations.

Examples of use are: nuclear medicine facilities in hospitals where radioactive tracers are injected into humans to detect cancer, blood clots, etc., industrial radiography where pipelines or tanks are evaluated for structural integrity, measurement of soil moisture content or material density for highway construction and agricultural uses, industrial gauges where thickness, density or level of a material is measured, and research facilities.

Users of radioactive materials can lead to environmental contamination, waste disposal and transportation problems even though precautions are taken.

The Idaho National Engineering Laboratory west of Idaho Falls is a facility operated by the federal government housing several active nuclear reactors, a waste processing facility and a radioactive waste disposal and temporary storage facility.

Monitoring of the environment must be conducted to ensure that people are not being subjected to unnecessary radiation exposure through contamination of the air, soil and groundwater.

Several years ago a uranium ore milling operation was conducted near Lowman, Idaho. The mill and tailings piles were later abandoned. The uranium level in the tailings piles is a potential health threat and action will be taken over the next several years to cover the material and return the site to its natural state.

Increased use of radioactive materials in both the nuclear and non-nuclear fields has led to increased transportation and disposal of radioactive materials. Idaho has entered into a compact with other northwest states to assure that an adequate low level waste disposal site is chosen to handle Idaho's radioactive waste.

Idaho is also participating in the national plan for selection of a final waste disposal site for high level and transuranic wastes (refuse contaminated with small amounts of plutonium).

To combat the increasing probability of transportation accidents involving radioactive materials and to lessen the potential health threats, the Radiation Control Section has implemented a Radiation Emergency Response Plan to react to accidents on Idaho's highways. This plan calls for the Department to provide a response team, equipment and training for reaction to a radiation incident.

Finally, electronic radiation producing devices encompass machines which produce radiation when energized, namely x-ray units, electron microscopes and x-ray diffraction units. Anyone wishing to possess or use such a device must have the unit registered with the Radiation Control Section within 10 days of acquisition. After registration the x-ray facility unit is subject to inspection.

Inspections of x-ray equipment are conducted on a priority basis depending upon the type of facility and workload involved. Busy facilities such as hospitals and therapy installations and industrial radiography units are inspected once every 18 months. Private medical and chiropractor x-ray units, veterinarians, facilities with electron microscopes and industrial x-ray units are inspected once every five years.

A major source of unnecessary radiation exposure comes from improper operation by the technician. User education courses have been provided for x-ray unit operators and the Radiation Control Section has cooperated with the local medical societies toward certification of the x-ray operators.

## VECTOR CONTROL

Vector control is concerned with the protection of the public from vector-borne diseases and nuisance pests. Rodents, and insects and other arthropods which are capable of transmitting diseases such as encephalitis, Colorado tick fever, relapsing fever, Rocky Mountain spotted fever, plague, tularemia and other diseases are present in the State and disease outbreaks do occur. General outbreaks of nuisance insects such as yellow-jackets, flies, mosquitoes, head lice, black flies and stored food pests are common.

The vector control program is one of consultation and technical assistance to local communities, the public and agencies, especially the mosquito abatement districts. There is a need to continually train people to deal with these problems.

Problem areas which may complicate program delivery include:

- pest populations developing resistance to control chemicals,
- environmental concerns for pesticide applications,
- shortage of trained personnel to operate the programs and
- the acceptance by the public of new control methods.

# WATER

# QUALITY

# BUREAU

# WATER QUALITY

## PROGRAM OVERVIEW

- What is the mission or goal(s) of the Water Quality Bureau?
- How is it organized to best and most efficiently achieve that goal?
- What are the principal activities the Bureau undertakes to achieve its goal(s)?

There are three major activity areas which have application to all Water Quality Bureau programs. These activities are monitoring, planning, and enforcement. All water quality programs have their respective goals, scope, and needs which are served by one or all of the principal activity areas. Goals change as they are achieved and, therefore, so do the activities that lead to their achievement. A summary of each activity will be given, followed by separate discussions showing specific applications to the Drinking Water Supplies, Municipal Construction Grants, Point Source Control and Nonpoint Source Control programs.

## ACTIVITIES

### Monitoring

Idaho's water quality monitoring program was developed in 1967 for the primary purpose of establishing baseline conditions by which to measure progress toward achievement of state and federal water quality goals. The program was initiated with an ambient monitoring network, designed to measure general water quality conditions on a broad scale and detect gross changes or trends over time. Stations in the ambient network were located in major drainage basins, on main tributaries, where significant changes in land use occur, and on major interstate waterways. Special and intensive surveys were also designed and conducted to answer specific water quality questions on a smaller scale. As of October 1, 1983, Idaho's approach to water quality monitoring was revised to include only special or intensive surveys. Special surveys usually address cause/effect relationships and can be associated with either point source discharges or nonpoint source activities.

Monitoring activities provide a method to verify, characterize and document problem conditions among priority waterbodies or programs. Monitoring results may be utilized in formulating corrective action plans for site specific or program specific problems. The effectiveness of corrective actions may be evaluated through changes in water quality conditions detected by post-implementation monitoring.

## Planning

Many water quality planning projects in Idaho have been performed under combined federal and state funding since 1975. Detailed project descriptions can be found in Idaho's 208 Water Quality Management Plan and subsequent updates. Planning projects most often focus on point source or nonpoint source activity impacts, although some projects have been undertaken to support the drinking water supplies or municipal construction grants programs. Projects may prescribe pollution controls on a localized or statewide basis resulting in a variety of management plans or strategies, policies/standards, proposed legislation, permit guidelines, effluent limits, and information/education programs. Once developed, there is an ongoing need to evaluate and update prescribed control measures as deemed necessary through review of monitoring or enforcement activities.

## Enforcement

The Environmental Protection and Health Act of 1972 provides the authority to protect Idaho's environment and promote public health. Through this act rules, regulations, and standards are promulgated that afford specific protection from classes of activities that may be environmentally damaging and/or threatening to public health. The Environmental Protection and Health Act provides for enforcement of the provisions of the act and all rules and regulations pursuant thereto. Enforcement options include administrative, civil, and criminal actions. Immediate injunctive relief is also available in circumstances of imminent danger to public health.

The most comprehensive administrative rules relating to the protection of water quality are the Idaho Water Quality Standards and Wastewater Treatment Requirements. Enforcement of these rules spans many program areas and is probably the most significant single activity in achieving the Bureau's water pollution control goals. There are also program specific administrative rules that regulate certain kinds of activities which may impact water quality. The protocol whereby enforcement actions are pursued is described in the Division of Environment's Enforcement Procedures Manual. This manual provides guidance to enforcement staff on the proper procedure and timing for issuing notices of violation and requesting enforcement action. Requests for enforcement actions are prioritized and pursued by the Bureau's management and legal staffs.

# PROGRAMS

## Drinking Water Supplies

Goal: To ensure compliance with state and federal drinking water regulations.

Scope and status: The quality of Idaho's groundwater and surface water as sources of drinking water supplies is generally good. Quality is occasionally degraded by bacteria, seasonal turbidity, or localized contamination from petroleum storage facilities and/or wastewater land treatment sites.

Idaho's Drinking Water Program addresses source protection and safe delivery among more than 2,700 community and non-community water systems. Ninety percent of the total community and non-community water systems derive drinking water from groundwater sources which are considered potable without treatment. Because groundwater quality is generally higher than surface water quality, treatment costs may be greatly reduced in systems using groundwater. The remaining systems which utilize surface water sources are more commonly located in northern Idaho.

Surface water sources of drinking water are generally protected under the Idaho Water Quality Standards and Wastewater Treatment Requirements. Because sources which meet all of the Standards' requirements are not necessarily safe for use without additional treatment, Idaho Regulations for Public Drinking Water Systems control and regulate the design and operation of public water systems as well as the quality of water delivered by these systems. Many systems do not currently furnish turbidity monitoring data as required by the regulations due to the expense involved. Innovative funding sources should be sought for turbidity monitoring as well as repair or replacement of existing equipment among many antiquated systems.

Also essential to the proper operation and maintenance of water systems is the availability of competent, trained systems personnel. There are currently no federal or state funds being allocated for water systems operator training purposes.

## Municipal Construction Grants

Goal: To protect public health and improve water quality through responsible obligation of state and federal funds for construction of community wastewater collection and treatment facilities.

Scope and Status: Through FY83, approximately $206 million in federal, state and local funds were expended for construction and improvements of wastewater collection and treatment facilities within the state. Approximately one-half of Idaho's population is currently served by facilities funded under this program.

Past emphasis within the municipal construction grants program has been on designing facilities to meet specific effluent requirements for secondary treatment and protecting public health. The emphasis has diverted attention from the need to quantify actual impacts of municipal discharges on receiving water quality, consequently, the water quality data base used to assign funding priorities is limited. Factors currently considered in determing project eligibility include service population, development density, groundwater conditions, project cost, readiness-to-proceed, public health, funding availability, and Federal Clean Water Act requirements.

Operation and maintenance continues to be a problem with grant funded facilities. Although many communities have made a commitment to proper operation and maintenance, some have not.

Several efforts are underway to improve O&M. The state now funds an ongoing operator training program and is focusing on improving the local commitment to proper funding of O&M. This is accomplished through a financial capability analysis before a grant is issued. Prior to grant closeout, EPA now requires the grantee to certify that the constructed facilities perform to design expectations.

Effective with new grants on October 1, 1984, the EPA share is being reduced to 55% of the costs to construct a wastewater plant to serve existing population. With the additional funds dedicated to the Water Pollution Control Account by the 1984 Legislature, the state plans to provide a match to the EPA share such that the local share will be maintained at about 25%. The state also plans to fund reserve capacity. This reinstituted match to federal grants may, however, result in a reduction in the dollars that can be spent on state-only funded projects.

## Point Source Control

Goal: To insure that pollutant discharges comply with applicable state and federal water quality regulations.

Scope and Status: The point source control program generally consists of permitting, monitoring, inspection, and plan and specification review in conjunction with various point source activities. Activities most commonly regulated under Idaho's point source category include non-construction grants funded facilities, industrial facilities, feedlots and dairies, fish hatcheries, geothermal wastewaters and land application sites. Pollutants generated by point sources most commonly include bacteria and nutrients. The water quality impacts resulting from point source discharges may be determined through intensive monitoring surveys which are conducted as needed or indirectly through compliance data reviews.

The major mechanism for control of point source discharges is the National Pollutant Discharge Elimination System (NPDES), administered by the U.S. EPA with coordinated review by the state. EPA's current policy provides for regulation of "major discharges" only; however, greater than 75% of Idaho's discharges are minor with cumulative impacts suspected to be significant but unconfirmed to date. The state, therefore, is pursuing delegation of the NPDES program and plans to address "minor" discharges under its authorities. The major obstacles to state program delegation are limited funding for administration and EPA's determination that the state has insufficient penalty authority.

## Nonpoint Source Control

Goal: To eliminate or reduce adverse water quality impacts resulting from nonpoint source activities to a level compatible with beneficial uses of the affected waterbody.

Scope and Status: The majority of Idaho's surface water quality problems are associated with runoff from agricultural lands (irrigated and non-irrigated cropland, grazing). This is partially due to the extensive acreage devoted to agriculture in comparison to other nonpoint source activities. Other nonpoint source activity subcategories include: silviculture (timber harvesting, reforestation, chemical application and road building), mining (active or abandoned, underground, surface and dredge mining), construction (roads, recreational, homes and facilities, dams, hydroelectric facilities, pipelines, bridges, flood and erosion control structures), urban runoff (streets, roofs, sidewalks, and parking lots), and residual waste disposal (landfills, septage/sludge disposal). Pollutants most commonly generated by nonpoint sources include sediment, nutrients, bacteria and toxic chemicals.

Due to the widespread geographic distribution of nonpoint sources, their highly variable characteristics and manpower limitations on enforcement personnel, effective nonpoint source control is complicated and difficult. Nonpoint source pollution is currently controlled through required application of "approved" Best Management Practices (BMPs) or encouraged application of BMPs lacking legislative approval. As such, application of specific nonpoint source controls is essentially voluntary for activities other than silviculture or residual waste disposal. Public education and information programs which encourage BMP application are keys to the overall success of current nonpoint source control efforts.

The availability of State cost-share funds to local Soil Conservation Districts for application of agricultural BMPs provides additional incentive for agricultural landowners and has proven quite effective in controlling agricultural nonpoint source pollution problems. Idaho's agricultural cost-share program provides technical assistance, information activities and cost-sharing to farmers who install BMPs in high priority watersheds. Other federal programs for installing BMPs include the Resource Conservation and Development (RC&D) Program, Resource Conservation Act (RCA), and FHA Conservation Loans. The RC&D monies are granted in designated RC&D areas and involve such projects as critical area treatment and animal waste system installation. Farms pool together to solve a joint problem under this program. Some support for IDHW's nonpoint source control program is provided through enforcement of the Idaho Forest Practices Act (Idaho Department of Lands) and the Stream Channel Alteration Act (Idaho Department of Water Resources). There are presently several projects underway to refine and expand nonpoint source control requirements particularly with respect to silvicultural activities.

## QUALITY OF IDAHO'S PRINCIPAL RIVERS

Water quality conditions in Idaho's rivers vary across the state. Conditions can generally be related to the predominant land use in the area or the extent of local development or both. The central and northern regions of the state exhibit particularly high water quality. Geographic areas experiencing degradation are the southeast, southwest, and the Palouse area of

the Panhandle region. Rivers which are currently under study include the Spokane River, Billingsley Creek, Rock Creek, Big Wood River, Salmon River, and Blackbird Creek. Idaho can be broken down into six hydrologic basins for a more detailed discussion of current stream conditions (Figure 2). Water quality can be discussed following the flow direction of the major drainages in the state, beginning in the southeast where the Snake and Bear Rivers enter Idaho.

FIGURE 2.
**Hydrologic Map of Idaho Showing High Priority Problem Areas.**

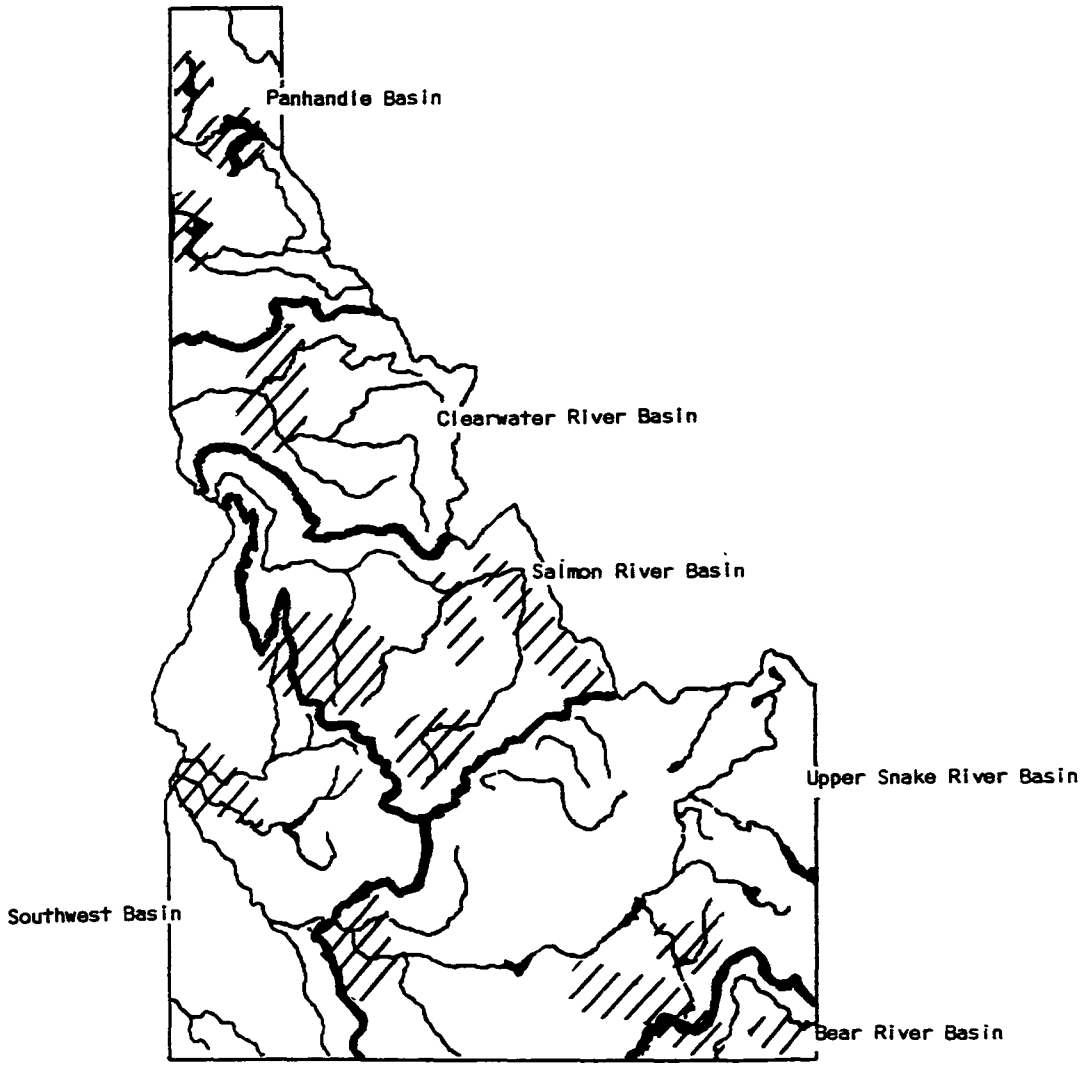


Table 6 identifies and prioritizes water quality problem areas among Idaho's six hydrologic basins. Where basin water quality management is split among two Division of Environment Field Offices, separate lists for each office appear under one basin heading.

Water bodies appearing on the basin lists have been targeted for management action and are distinguishable from others in that basin because water quality improvements have the greatest potential for: 1) management success; 2) public benefit; 3) environmental benefit and 4) reducing the extent of use impairment. Point and nonpoint source impacts are shown to the right of each waterbody as percentage estimates of the total pollutant loading to the waterbody.

## Bear River Basin

Water quality in the Bear River Basin is rated poor. The major activities impacting water quality are related to agriculture. Point sources of pollution affecting basin water quality include municipal effluents from Soda Springs and Preston. It is difficult to assess improvement or degradation of water quality in this basin as the natural flow of the Bear River is closely regulated. Power generation is a primary use and diversions for irrigation and return flows can readily mask true changes in water quality.

The beneficial uses of greatest concern in the Bear River Basin are recreation and fishing. Bear Lake, the most significant hydrologic feature in the basin, is a focal point for these activities. The Bear River is the major tributary to Bear Lake and therefore directly affects lake water quality. Although present lake quality is very good, nutrient and sediment loads from the Bear River present a very real threat. These pollutants originate higher in the drainage and are associated with agricultural activities and natural erosion of the river channel. A Clean Lakes Project was completed early in 1983 which identified and quantified the sources of pollutants entering Bear Lake. A series of management alternatives for reducing pollution impacts from the adjacent watershed and the upper Bear River drainage were proposed. Funding to implement these solutions is being sought from the states of Idaho, Utah, and Wyoming. Idaho has provided planning funds for the development of a basin water quality management plan and Utah has provided funding for additional monitoring activities and development of other management solutions.

## Upper Snake River Basin

Overall water quality in the Upper Snake River Basin can be described as fair. Quality is good as the Snake flows into Idaho from Wyoming; however, progressive degradation occurs as the river flows west. Water quality improves to a fair rating below Hagerman at the basin boundary. This is partly due to the Snake Plain Aquifer discharge at Thousand Springs.

Agriculture is the predominant activity impacting water quality in the Upper Snake River Basin. Irrigated and dryland agriculture on tributary

# TABLE 6. Priority Waterbodies by Basin

| | | SOURCES OF IMPACTS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONPOINT SOURCES | | | | | | | | | | | POINT SOURCES | |
| | | Irrigated Agriculture | Dryland Agriculture | Grazing | Silviculture | Mining | Road Construction | General Construction | Urban Runoff | Residual Waste Disposal | Hydrologic Modification | Other | Municipal | Industrial |
| **BEAR RIVER BASIN** | | | | | | | | | | | | | | |
| BB | 430 Worm Creek | | 70% | | | | | | | | | | | |
| BB | 471 Little Malad | 30%f | 70% | | | | | | | | | | | |
| BB | 4503 Cub River | | 90% | | | | | | | | | 10%b | | |
| BB | 10 Bear River | 20% | 20% | 40% | | | | | | | | 20%f | | |
| BB | 120 Bear Lake and Outlets | 10% | 5% | 75% | | | | 10% | | | | | | |
| **UPPER SNAKE BASIN** | | | | | | | | | | | | | | |
| | (Twin Falls) | | | | | | | | | | | | | |
| USB | 840 Billingsley Creek | 20% | | 15% | | | | 5% | | | | 10%c | | 50%a |
| USB | 810 Deep Creek | 60% | | 10% | | | | 5% | | | | 20%b | | 5%a |
| USB | 740 Cedar Draw Creek | 60% | | 10% | | | | | | | | 20%b | | 10%a |
| USB | 860 Magic Reservoir | 20% | 30% | 15% | | | | 20% | | | | 10%g | 15% | |
| USB | --- Groundwater; Cassia and Twin Falls Counties | | | | | | | | | | | | | 100%a |
| | (Pocatello) | | | | | | | | | | | | | |
| USB | --- Snake River Aquifer | 30-40% | | | | | | | | | | | | 60-70%a |
| USB | 420 Portneuf River | 20% | 30% | 20% | | | | 20% | 10% | | | | | |
| USB | 410 Portneuf River | | 40% | 50% | | | | | | | | | 10% | |
| USB | 510 Rock Creek | | 50% | 40% | | | | | | | | | 10% | |
| USB | 220 Island Park Reservoir | | | | | | 10% | 90% | | | | | | |
| **SOUTHWEST BASIN** | | | | | | | | | | | | | | |
| SWB | 270 Boise River | 30% | | 10% | | | | | 10% | | | 30%b | 20% | |
| SWB | 324 N.F. Payette River | | | 40% | 10% | | 10% | | | | | | 40% | |
| SWB | 310 S.F. Payette River | | | | 10% | 10% | 80% | | | | | | | |
| SWB | 340 Payette River | 50% | | 10% | | | | | | | | 30%b | 10% | |
| SWB | 233 Jordan Creek | | | 40% | | 40% | 20% | | | | | | | |
| **SALMON BASIN** | | | | | | | | | | | | | | |
| | (Pocatello) | | | | | | | | | | | | | |
| SB | 421 Blackbird Creek | | | | | 100% | | | | | | | | |
| SB | 430 Panther | | | | | 100% | | | | | | | | |
| SB | 310 Lemhi River | 50% | | 50% | | | | | | | | | | |
| SB | 120 E.F. Salmon River | 10% | 10% | 40% | | 30% | | | | | | 10%e | | |
| SB | 110 Yankee Fork | | | | | 90% | 10% | | | | | | | |
| | (Boise) | | | | | | | | | | | | | |
| SB | 511 EFSF Salmon River | | | | | 75% | 25% | | | | | | | |
| SB | 441 Monumental Creek | | | | | 95% | 5% | | | | | | | |
| **CLEARWATER BASIN** | | | | | | | | | | | | | | |
| CB | 154 Potlatch River | | 35% | 5% | 15% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| CB | 141 Lawyers Creek | | 30% | 5% | 5% | | 30% | 5% | 5% | 5% | 10% | | 5% | |
| CB | 151 Big Canyon Creek | | 40% | 5% | 10% | | 15% | 10% | | 15% | 5% | | | |
| CB | 156 Lapwai Creek | | 30% | 20% | 10% | | 10% | 5% | | 5% | 5% | 5% | | 5% |
| CB | --- Moscow Aquifer | | | | UNKNOWN | | | | | | | UNKNOWN | | |
| **PANHANDLE BASIN** | | | | | | | | | | | | | | |
| PB | 20P Lake Pend Oreille | | | | | | | | 5% | | | 90%f | 5% | |
| PB | 30P Lake Coeur d'Alene | | 75% | | 10% | 10% | | | | | | | | |
| PB | 430S Hayden Lake | | | | | | | | 25% | 75% | | | | |
| PB | 420S Twin Lakes | | | | | 25% | | | | 75%d | | | | |
| PB | 340P Priest Lake (East side and tributaries) | | | | | | | 100% | | | | | | |

a - Land Application
b - Feedlots and Dairies
c - Fish Hatcheries
d - Subsurface Sewage Disposal
e - Natural Channel Instability
f - Upstream Sources

rivers and the main stem Snake both contribute to degraded conditions. Major point source discharges to surface waters within the basin include the cities of Idaho Falls, Pocatello, Twin Falls, and Burley; industrial discharges from FMC and numerous fish hatcheries. Several of these municipalities and industries converted to land application either in part or totally in 1980, which resulted in improved water quality.

The beneficial uses of greatest importance in the Upper Snake River Basin are recreation, cold water fisheries and salmonid spawning. Pollutant categories presenting the greatest threat to uses are bacteria, nutrients, and suspended sediment. Nonpoint source activities contribute the majority of these pollutants; however, point source discharges add to degraded conditions. Improvement in these specific pollutant categories has been shown in the Rock Creek watershed due to the application of Best Management Practices (BMPs).

Removal of some surface discharges from the Portneur River has also resulted in improved conditions for specific categories. This illustrates that successful implementation of both point and nonpoint source controls can protect or enhance existing and threatened beneficial uses.

## Southwest Basin

Water quality conditions in the Southwest Basin have changed very little since last reported. General conditions basin-wide can be characterized as fair. Major tributaries to the Snake River within this basin contribute high levels of bacteria, nutrients, and suspended sediment, reflecting the extent of agricultural development. There are also numerous point source discharges scattered throughout the basin which contribute to generally degraded conditions. The Lower Boise River exhibits particularly poor water quality conditions due to the extensive agricultural activities within the drainage. There are also several major point sources discharging to the Boise River. These include the cities of Boise, Meridian, Caldwell, and Nampa; however, all these cities provide secondary treatment or better and meet water quality standards with respect to their discharge. Meridian generally discharges to Five-Mile Creek, a tributary to the Boise River. In general, water quality is degraded from fair at the eastern basin border to poor at the western border due to a combination of point and nonpoint sources. As the Snake River flows north through Brownlee, Oxbow, and Hells Canyon Reservoirs fair quality is restored through the settling of sediment and associated pollutants in the reservoirs.

Water quality conditions indicate seasonal impairment to cold water biota and salmonid spawning, particularly in the Boise River drainage. Impairment to recreational uses also occurs in several area reservoirs. It is hard to separate the amount of use impairment caused by point sources versus nonpoint sources, as both are significant and they occur together. The greatest water quality benefits to be realized in this basin would result from improving land management practices relating to agricultural activities.

## Salmon Basin

The Salmon River drainage represents one of the last inland wild anadromous fisheries in the contiguous United States, therefore a priority has been established to maintain the high quality stream conditions necessary to support this unique resource.

Water quality within the basin is generally good with the exception of localized year-round mining impacts. Silvicultural and recreational impacts may be detected seasonally. The streams most heavily impacted by mining include: Monumental Creek, East Fork South Fork Salmon River, Sugar Creek, Thompson Creek, Blackbird Creek, Big Deer Creek and Panther Creek. Although scattered silvicultural and recreational impacts are limited by access, the cumulative effects of these activities are believed to be significant. In particular, the recreational pressures on the Salmon River during summer months is suspected to cause elevated bacterial concentrations on both the middle and main forks.

## Clearwater River Basin

Water quality in the Clearwater Basin is generally good. Pollution impacts are primarily nonpoint source in nature although there are several municipal dischargers in the lower drainage. Silvicultural and agricultural activities are the greatest potential threats to water quality in this basin. The Clearwater drainage is an important recreation area and supports both hatchery and wild anadromous fisheries. Close attention will be paid to the effects of timber production and agriculture activities to assure current high water quality conditions are maintained.

## Panhandle Basin

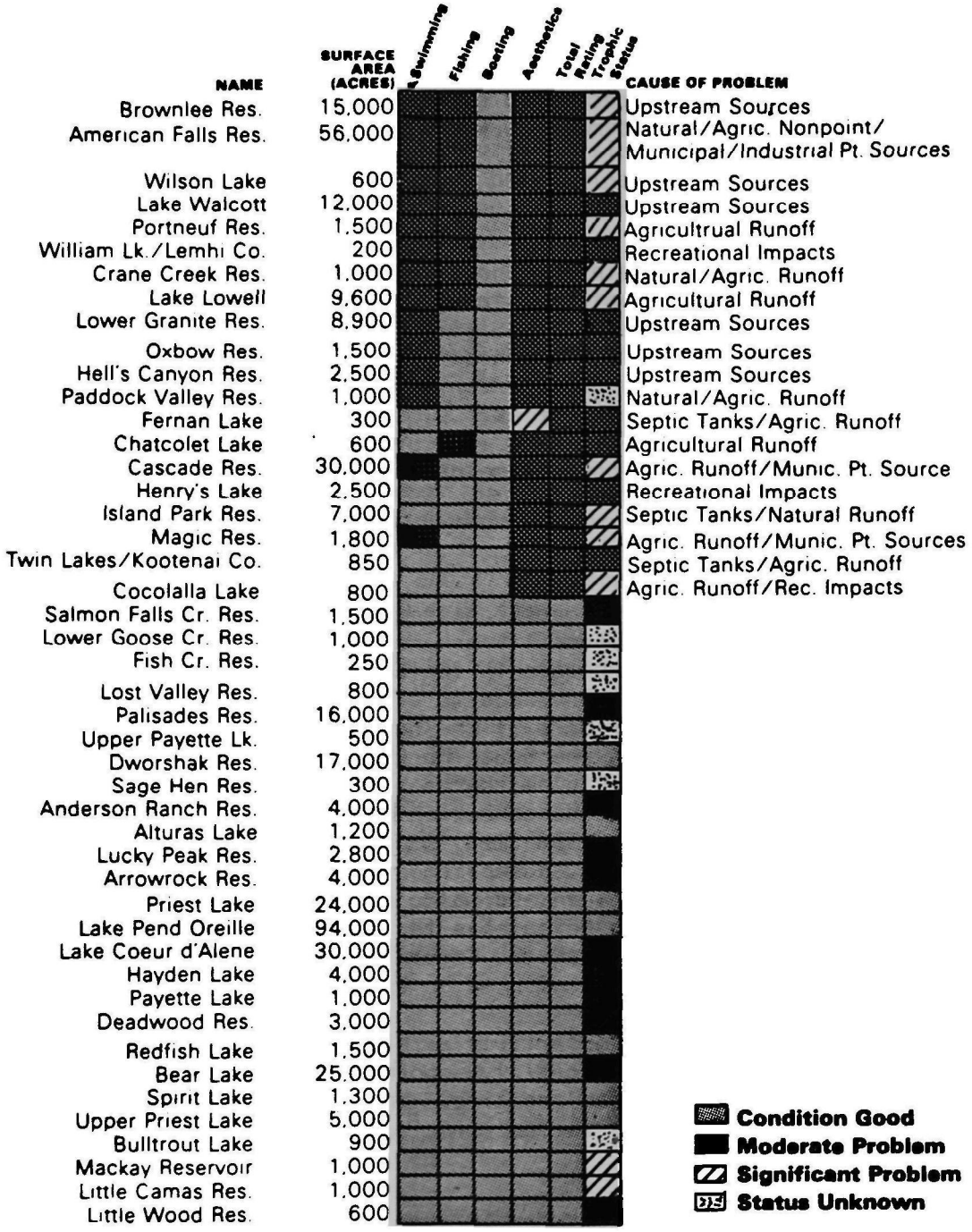
The Panhandle Basin contains some of the highest quality natural environments in Idaho. These excellent conditions are reflected in both current and historical water quality measurements in the Kootenai and Pend Oreille River drainages. The Coeur d'Alene drainage is also very scenic; however, water quality conditions in a major part of the basin continue to suffer the effects of mining activities on the South Fork of the Coeur d'Alene River. The major problem continues to be the high heavy metals concentrations resulting from current and abandoned mining operations. Since the closure of the Bunker Hill Mining and Smelting Complex in 1982, a measurable improvement in metals has occurred. Use impairment continues, however, and includes recreation, coldwater biota and salmonid spawning. Water quality impacts from heavy metals remain detectable as far downstream as Long Lake, Washington. Above the confluence of the Coeur d'Alene River and the South Fork, at Enaville, water quality continues to be excellent.

There are several other sources or activities within the basin which have the potential for degrading water quality. Nonpoint source activities include silviculture, agriculture, and grazing. The few substantial point sources, other than mining, include the municipal discharges from Coeur d'Alene and Sandpoint.

## QUALITY OF IDAHO LAKES

Idaho's lakes are one of its most important recreational resources. Most natural lakes exhibit excellent water quality while some of the large river impoundments are experiencing significant degradation. Figure 3 shows the principal recreational lakes in the state and ratings of their condition for various recreational uses.

**FIGURE 3.**
**Principal Recreational Lakes in Idaho and a Ranking of Their Condition**



All lakes undergo a natural process of aging known as eutrophication. When this process is accelerated by man's activities it is termed cultural eutrophication. Cultural eutrophication results when excessive nutrients and sediment are supplied to lakes from outside sources. Land disturbing activities such as agriculture, mining, silviculture and construction are the main nonpoint sources of lake pollution. Municipal and industrial treatment plant discharges are primary point sources of lake pollution. If the impacts from these pollution sources are left uncontrolled, the lifespan of many Idaho lakes will be shortened significantly.

There are several symptoms of eutrophication that are easily recognized. Excess nutrients serve to "fertilize" lake systems and result in dense growths of aquatic plants (algae). Some algae form floating mats which prevent recreational uses such as swimming, boating and fishing. Aesthetic value is also reduced by poor water clarity resulting from dense algal growth and sedimentation. Another characteristic of eutrophic lakes is low dissolved oxygen concentrations. When algae die and decay, oxygen is consumed. Sometimes so much oxygen is used that fish kills occur and other aquatic life becomes threatened. These conditions are eventually exhibited during the natural aging process of all lakes, but under man's influence they are amplified and accelerated.

Most of the eutrophication problems in Idaho lakes are due to increases in nutrient levels from agricultural return flows and runoff, as well as heavy development of lake shorelines (septic tank leaching). Examples of deteriorated lake quality are Brownlee and Oxbow Reservoirs, impacted by upstream agricultural activities along the Snake River and its tributaries. Lake Lowell, an offstream reservoir near Boise, is impacted by high summer nutrient loadings from agricultural nonpoint sources and a large population of waterfowl that uses the lake. The waterfowl impact is significant enough that control of agricultural nutrient sources may not solve the problem. American Falls Reservoir is impacted from dryland and irrigated agriculture, winter discharges of treated sewage from the city of Pocatello, and natural phosphate deposits in the underlying geology. Many Northern Idaho lakes which currently exhibit high quality are showing signs of degradation. These lakes are used extensively for recreation and are undergoing increasing development. To insure that future development occurs with minimal impact on these lakes, management plans for Kootenai County Lakes and Pend Oreille Lake have been developed. Planned growth and development around Idaho lakes and improved land use practices are the first necessary steps for protecting our valuable lake resources.

Funding to address lake water quality problems has been through the Water Quality Management Planning Program and the Clean Lakes Program. Two Clean Lakes Projects were completed before funding was discontinued in 1981. A Lake Classification Study was completed by the University of Idaho in 1983. The study resulted in a method of classifying lakes according to their trophic condition or "health" and a method of ranking lakes according to their need for management action. The second project was a diagnostic and feasibility study on Bear Lake. This study documented and characterized

the extent of water quality problems in Bear Lake, the adjacent watershed and the upper Bear River watershed. Specific management solutions were recommended for protecting and maintaining Bear Lake's water quality. Other funding sources are being pursued to implement the findings of both of these projects.

Lakes which are currently under study include Black Lake, Coeur d'Alene Lake, and Pend Oreille Lake, all in the Panhandle Basin of Northern Idaho.

## QUALITY OF IDAHO'S GROUNDWATER

Idaho's groundwater quality is generally good, with the exception of "background" or natural pollutants. Localized contamination as a result of man's activities is also know or suspected to be occurring in the problem areas shown in Figure 4.

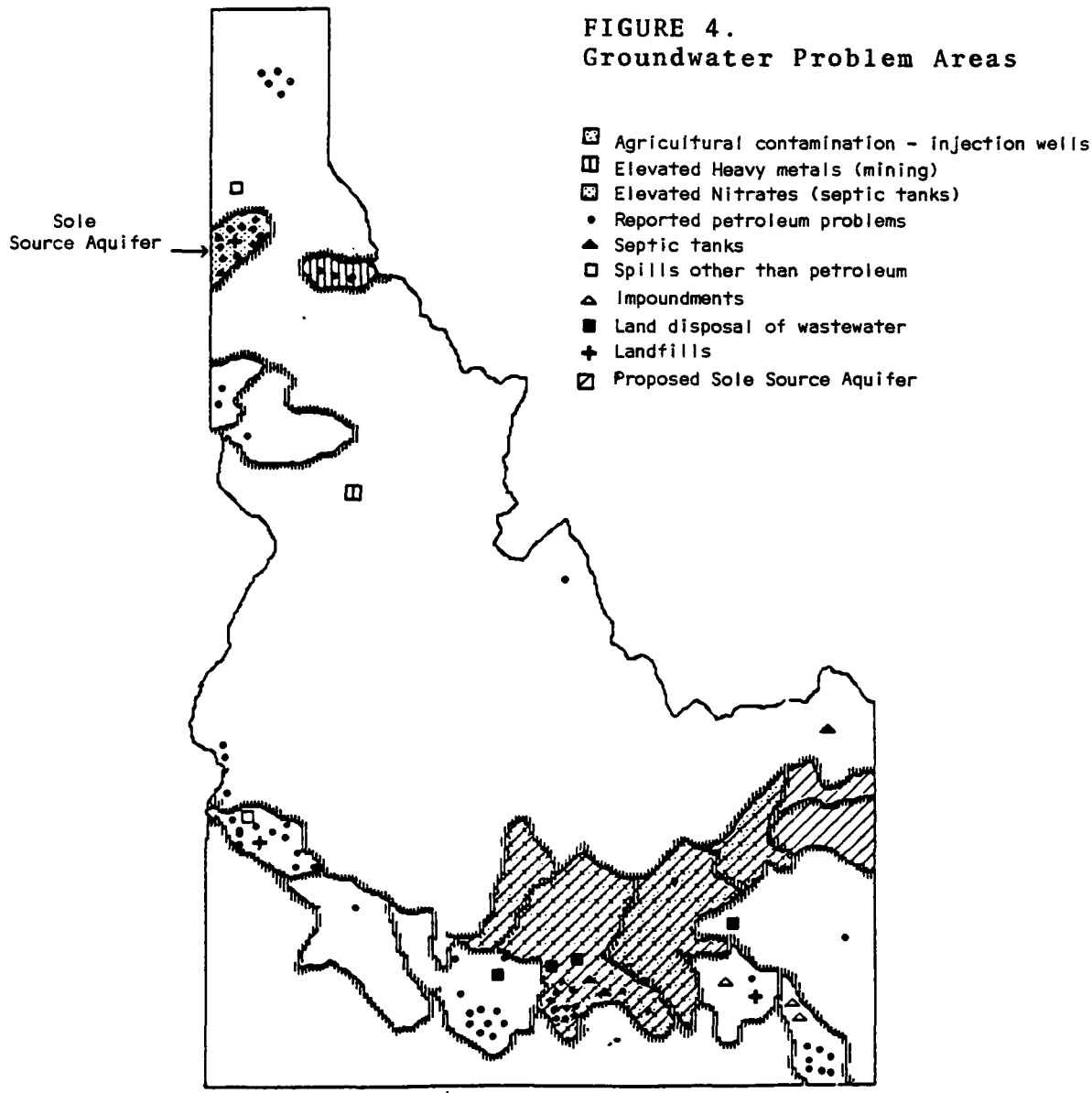



FIGURE 4.
Groundwater Problem Areas

Groundwater is naturally stored in permeable geologic formations called "aquifers". The ability of the soils surrounding an aquifer to transmit water affects pollution potential and well production capacity. In Southern Idaho, for example, porous geology can result in almost direct flow of fluids injected from the surface into the Snake River Plain aquifer. Disposal wells are commonly used in the area to inject various waste fluids, such as excess irrigation water and urban runoff. The volume of waste discharged to the extensive Snake River Plain, however, is not presently significant. In Northern Idaho, the Rathdrum Prairie-Spokane Valley (Eastern Washington) aquifer was designated a sole source aquifer in 1978 by the U.S. Environmental Protection Agency in response to a petition by the local citizens. The EPA felt that based on available information, this aquifer was the only drinking water source for the area, and that other sources (i.e. surface waters) could not be reasonably or economically developed. The "sole source" designation gives the Rathdrum Prairie-Spokane Valley aquifer a degree of special protection; any project developed over the aquifer using federal financial assistance is subject to extensive EPA review. The Snake River Plain aquifer is currently under consideration by EPA for a "sole source" designation also.

The goundwater resource in Idaho is used mainly as a source of domestic water and for irrigation supplies. There are also some areas where groundwater is used for industrial purposes. The Snake River Plain aquifer discharges through numerous springs in the Twin Falls to Hagerman area along the Snake River, and these springs have been developed extensively for aquaculture. Other industries use the groundwater resource in Idaho for cooling or processing water. Future uses of the groundwaters of Idaho will primarily be as sources of domestic water supply. As development and population growth continue, limitations on surface waters will lead to even greater emphasis on utilizing the groundwater resource. Irrigation demands especially will increase as agricultural lands farther from surface water sources are developed. In addition, industrial use of groundwater will continue to be significant, especially in the food processing industry.

The Division is currently developing standards for groundwater quality protection. The standards will initiate a statewide groundwater quality management strategy which was developed earlier this year.