United States
Environmental Protection
Agency

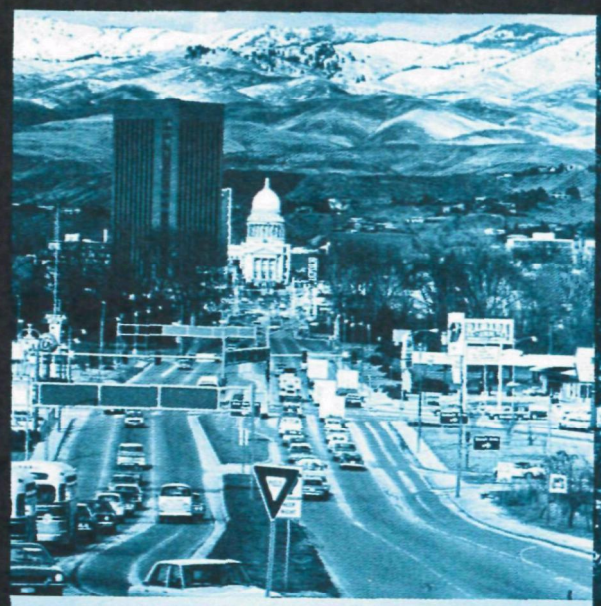
Region 10
1200 Sixth Avenue
Seattle WA 98101

December 1979

EPA

Idaho

Environmental Quality Profile



Preface

This is the third annual report to the people of the State of Idaho regarding the status of their environment. Information presented has been compiled by the Environmental Protection Agency (EPA) from numerous sources in state and local government, especially the Department of Health and Welfare, as well as from other institutions.

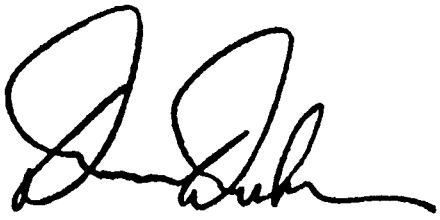
The report discusses progress in environmental preservation that has been made to date, addresses some of the related problems and issues faced by the people of the state, and identifies some solutions to those problems and issues.

The Northwest is growing—more industry attracts more people—and the results of that growth are not always environmentally beneficial. Consequently, the state faces a challenge: accommodating increased growth while retaining its greatest resource, a beautiful and healthy environment.

Naturally, the traditional industrial and muncipal pollution sources are of concern, but many of the region's problems are due to nontraditional sources of pollution. Agricultural and forest practices can significantly affect water quality especially on rivers with consistently low stream flows. Many chemicals, including some pesticides and herbicides have serious health effects that have been recognized only recently. Urban development itself, separate from industry, creates diverse pollution problems affecting the air, water, and land.

While Idaho and the Northwest may be seen as relatively environmentally "clean" when compared to other parts of the nation, continuing efforts are necessary to maintain that status, as well as to better understand and resolve current regional problems. An informed public is essential to this effort, and it is hoped that this document will provide a better perspective on some crucial resource management issues facing the state as well as the nation.

Space limits a complete presentation of many complex technical issues, therefore the reader interested in additional information is invited to contact the Region 10 office of EPA in Seattle for other publications that contribute to increased understanding of specific topics. Comments and suggestions are also solicited regarding improvements to future issues of this publication.



Donald P. Dubois
Regional Administrator, Region 10
U.S. Environmental Protection Agency
Seattle, Washington

September, 1979

Contents/Summary

1 Air Quality

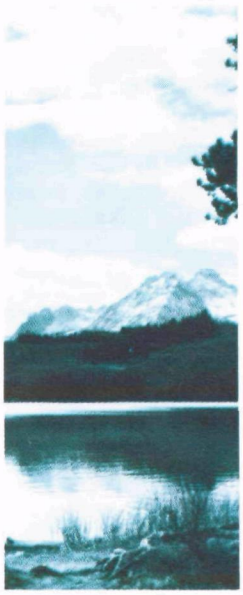
In 1978, most areas in Idaho met air quality standards, and there was relatively little change in air quality from the previous year, except that total suspended particulates increased in Lewiston and Pocatello, and decreased in Soda Springs and Boise. Problems with rural fugitive dust remain, but more stringent controls on industrial fugitive emissions and other area sources are expected to enable total suspended particulate standards to be met by 1982. Industrial sulfur dioxide emissions resulted in ambient levels in excess of standards in the Kellogg, Conda-Soda Springs, and Pocatello areas; however, some improvement was observed, and additional control measures are planned to achieve compliance. Idaho complied with nitrogen dioxide standards in 1978. No data was available for ozone for 1978, however the state is assumed to be meeting ozone standards. The lead standard was exceeded in the Kellogg area, but other hazardous substances, particularly asbestos, are under control.

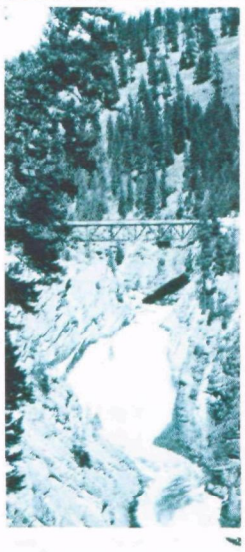
7 River Water

A number of Idaho's principal rivers and streams have marginal or unacceptable water quality during some portion of the year, and water quality has exhibited little apparent change over the last six years. The state's hot, arid summers account for some degradation which is aggravated by human influence in many areas. Existing pollution arises from point sources, such as food, metals, and phosphate processors, and municipal sewage treatment plants. These sources are controlled through National Pollution Discharge Elimination System permits. Non-point sources of pollution such as irrigation return flows and precipitation runoff from farmlands, feedlots, mining and forestry operations, are controlled by areawide wastewater management programs. The water quality criteria most often exceeded are those for temperature, aesthetics turbidity, bacteria, nutrient levels, solids, and inorganic toxicity (heavy metals).

17 Lakes

Most impairments to Idaho's recreational lakes and reservoirs appear to be due to algal blooms stimulated by nutrients from agricultural runoff and septic tanks, although industrial wastewater, treated sewage, urban runoff, and naturally occurring nutrients also contribute. A variety of measures have been implemented to restore lake quality in Idaho.





Noise 21

In Idaho there is no active state noise control program for stationary or motor vehicle noise sources, but local governments have ordinances for nuisance noise.

Drinking Water 22

The water systems that serve 83 percent of the population using community water systems in Idaho comply with regulations for bacterial contamination. The compliance status of approximately one-quarter of the systems in the state is unknown due to inadequate data. The state has implemented several preventive public health programs to improve drinking water quality.

Solid Waste and Hazardous Substances 24

Past problems with traditional methods of solid waste disposal have prompted the use of new approaches in Idaho. Landfills for municipal solid waste and sewage sludge are being more carefully engineered and operated to avoid odors, methane production, disease transmission, and leaching of pollutants.

Production, use, and disposal of hazardous materials has been a source of concern. However, both mandatory and voluntary programs have been implemented to better manage these materials. EPA requires stringent monitoring of radioactive materials and pesticides, although the state has primary enforcement duties for controlling these substances.

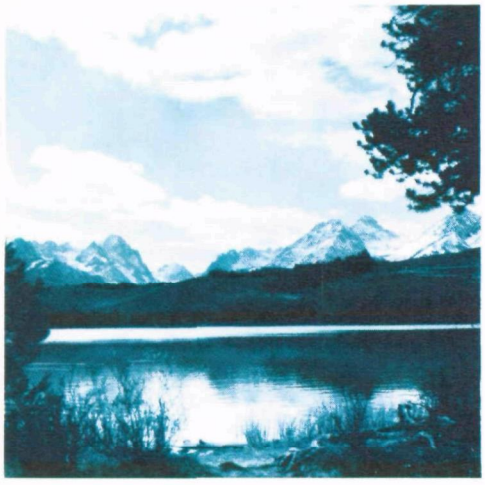
U.S. EPA LIBRARY REGION 10 MATERIALS

RX000003733

Summary of Environmental Indicators for Idaho

MEDIA	INDICATOR	CURRENT STATUS	TREND
Air Quality	Number of areas exceeding standards	5	Little change
River Water Quality	Percentage of monitoring stations meeting water quality goals (based on worst 3 months)	35%	Little change
Lake Water Quality	Percentage of major recreational lakes with little or no use impairment	57%	Little change
Drinking Water Quality	Percentage of population served by water supplies in compliance with regulations for bacterial contamination	83%	Improving
	Percentage of community water supplies in compliance with regulations for bacterial contamination	55%	Improving
Noise	Percentage of population living in areas with local noise control standards meeting state objectives	0%	Little change
	Degree to which noise control regulations are enforced	Poor	Little change
Solid Waste Disposal	Number of resource recovery or recycling facilities available	7	Improving
	Number of hazardous waste handling sites	2	Little change

Air Quality



The task of improving air quality in the Northwest continues to be a cooperative effort among Federal, state, and local environmental agencies, industry, and a concerned, informed public. Since the 1970 Clean Air Act, considerable investment has been made in time and money in the search for solutions to the most pressing pollution problems. However, much remains to be done, and this section gives some insight into the types of air quality problems faced by the citizens of Idaho.

Air Quality Standards — Their History and Definition

The Clean Air Act of 1970 directed EPA to establish National Ambient Air Quality Standards ("ambient" refers to outside or environmental conditions rather than indoor air quality). In 1977, amendments to the Act required that all standards be met as soon as possible and practical. In the case of primary (health-related) standards, the new deadline is December 31, 1982. An extension to December 31, 1987 can be granted for carbon monoxide and ozone.

The more highly concentrated a pollutant is, the worse its effect on humans and their environment. Because some pollutants have both chronic and acute effects on health, standards are based on their average concentration over various lengths of time with a margin of safety included. Pollutants that exceed established "primary standards" pose a threat to public health. Exceeding "secondary standards" has detrimental impacts on agriculture, results in deterioration of many consumer products and, in addition, has other economic and non-health related impacts. If the pollutant concentration reaches the "alert level," individuals, industry, and government should take immediate action to protect human health by curtailing outdoor activities, use of automobiles, and certain industrial operations.

In Idaho, standards have been set and concentrations established which meet or exceed Federal standards for five major pollutants. Table 1 lists the effects on health and property that are the normal result of exceeding those standards.

How Air Quality is Measured

Air quality data are collected at monitoring stations located throughout Idaho, primarily in concentrated population or industrial centers (the most likely sources of air pollution). Monitoring sites are designated in this report as commercial/industrial, residential, or rural. However, air pollution can originate away from the monitoring site. High pollutant levels in a residential area, for example, do not necessarily indicate the source is located in that area. Not all pollutants are monitored continuously at all stations; and

Table 1.
Effects of Major Air Pollutants on Health and Property

POLLUTANT	HEALTH EFFECTS	PROPERTY EFFECTS
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 (3000 ug/m^3), correlated 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 psychomotor 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 metal; damages vegetation.
Nitrogen Dioxide	Combines with hydrocarbons in the presence of sunlight to form photo-chemical smog; irritates eyes, nose, throat; damages lungs.	Corrodes metal surfaces; deteriorates rubber, fabrics, and dyes.

monitors are not located in all counties, primarily because of the high cost of installation and operation. However, all concentrated urban or industrial areas are monitored. EPA has estimated the percentage of days during which concentrations of the various pollutants exceeded the standards in Idaho during 1978, then compared this information with 1977 data to obtain short-term indications of changes in air quality.

Air Quality in Idaho

Areas where a combination of high emissions and weather conditions cause air quality standards to be exceeded have been designated as "non-attainment." Currently, five urban and industrialized areas in Idaho fall in this category. The original determination of non-attainment was based on data for 1975 through 1977; therefore, areas that are presently classified as attainment may have exceeded the standards in 1978. It is difficult to determine precise boundaries for areas in which standards are exceeded, especially for ozone, because it is transported for long distances, so county boundaries are used for display purposes, although only a portion of the county may be affected by the pollutant.

Idaho's major air pollutants and their sources are discussed in the following sections along with the progress being made to meet air quality standards.

Suspended Particulates

Suspended particulates are solid or liquid particles of different sizes and have health effects that vary with size and composition. Particulates can aggravate asthma and chronic lung diseases and increase coughing and chest discomfort. Some particulates can be toxic or cancer-causing (lead or asbestos particles, for example). Particulate pollution may interfere with visibility, injure vegetation, and increase cleaning and maintenance costs.

Some of the particulate emissions in Idaho come from what are called "point sources," which are easily identified sources of emissions, such as smokestacks. The rest cannot be pinpointed to a specific source and are termed area sources. These include mobile sources (motor vehicle tailpipe emissions), space heating (residence and commercial heating units) and fugitive dust. The latter includes dust created by certain industrial and agricultural operations, and vehicles on unpaved roads. In rural areas with little major industrial development and low population density, this fugitive dust is composed mostly of natural dust, pollens and soil particles and is believed to be less harmful to the health. For this reason, rural areas are considered to be attaining air quality standards although particulate standards are exceeded. The Boise area is considered to be affected by rural fugitive dust and is classified as an attainment area since the city has no significant industrial sources. Future analysis may be needed to evaluate this classification in light of Boise's recent urban growth.

Figure 1 shows the Idaho areas that exceeded suspended particulate standards; i.e., at least one monitoring site in the county exceeded one or more of the standards for total suspended particulates (TSP) in 1978. Aside from counties where rural fugitive dust accounts for exceeding TSP standards, most violations are focused around four urban and industrial areas. Data from these areas are charted in Figure 2, which shows the percentage of days monitored on which samples exceeded the standards.

In the Pocatello area and the Conda-Soda Springs area, the major point sources of total suspended particulates are fertilizer and industrial chemical processors. In the second area, fugitive dust from roads and

STANDARDS ATTAINED
SECONDARY STANDARDS EXCEEDED
PRIMARY STANDARDS EXCEEDED
ALERT LEVELS EXCEEDED
NO MONITORING OR INSUFFICIENT DATA
STANDARDS EXCEEDED DUE TO FUGITIVE DUST

Figure 1.
Air Quality Status — Suspended Particulates

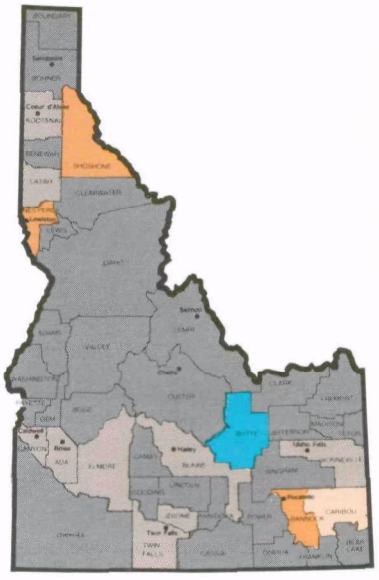
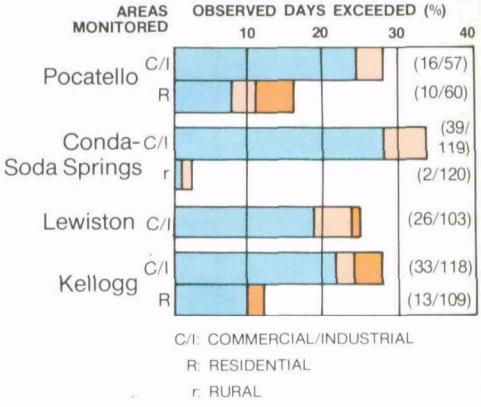


Figure 2.
Percent of Observed Days Suspended Particulates Exceeded Standards



NOTE: Number in parentheses represents total number of days exceeding standards per number of observation days.

fields also contributes to TSP levels in excess of the standards. Idaho will require more stringent controls on existing industrial sources, including fugitive industrial emissions, to control suspended particulates. In Lewiston, where the wood products industry and a kraft pulp mill in particular are the chief point sources, the state will set more restrictive limits on emissions, and will study non-traditional TSP sources to determine the reason for elevated particulate levels. In the Kellogg area where the Bunker Hill Company's smelting operations are a major source of TSP, the Company installed two 700-foot stacks in 1977 to disperse particulate emissions. Since these stacks were activated, the particulate levels have decreased. However, dispersion techniques are not considered a permanent solution and the state may require additional operation controls to reduce TSP levels.

Sulfur Dioxide

Sulfur dioxide is formed when coal or oil containing sulfur is burned, or when sulfur is burned in an industrial process. This gas can combine with moisture in the air to form sulfuric acid. Breathing air containing sulfur dioxide can produce adverse health effects similar to those described above for suspended particulates. Rain that comes in contact with sulfur dioxide in the atmosphere corrodes buildings, is harmful to vegetation, and can deteriorate the water quality of lakes and streams far from the source of the pollutant.

In the State of Idaho, the principal cause of sulfur dioxide pollution is the smelting of nonferrous ores (lead and zinc), and the manufacture of phosphate fertilizer. In recent years sulfur dioxide pollution has declined due to the installation of pollution control equipment.

Primary standards for sulfur dioxide were exeeded during one percent or less of the days monitored in 1978 in the Kellogg, Conda-Soda Springs, and Pocatello areas (Figure 3 and 4). In Kellogg, where the Bunker Hill Company smelts and refines lead and zinc, the rugged terrain of the Silver Valley inhibits adequate dispersion of sulfur dioxide, though the plant's two 700-foot stacks have improved the situation. However, during frequent thermal inversions, the plant must reduce or discontinue production to keep sulfur dioxide levels within the standards. EPA and Bunker Hill Company will conduct further studies to determine where maximum sulfur dioxide concentrations occur. The results of these studies will provide the information necessary to improve Bunker Hill's dispersion program to safeguard the population until additional controls are installed. Air quality in both the residential and industrial areas of Kellogg improved over 1977.

The major source of sulfur dioxide in the Pocatello area is J.R. Simplot, which processes fertilizers and industrial chemicals. The company is installing additional controls that should further reduce their emissions by 25 percent. For the first time since monitoring began in 1975, sulfur dioxide standards were exceeded in the commercial/industrial area of Conda during 1978. Ambient sulfur dioxide levels in the rest of the monitored areas of Idaho were less than 0.01 part per million, which is well within standards.

Carbon Monoxide

Carbon monoxide is a colorless, odorless gas—high concentrations cause unconsciousness and death. At concentrations above the primary standard, this pollutant can interfere with mental alertness and physical activity, especially for persons with heart or lung disorders.

Carbon monoxide is a by-product of fossil fuel combustion. Its major source is motor vehicles, which are responsible for more than 90 percent of carbon monoxide emissions in Boise, the only area where concentrations in excess of the standards have been monitored (Figures 5 and 6). Carbon monoxide levels have remained unchanged from 1977.

Plans for reducing carbon monoxide levels center on improvements to individual automobiles and to the transportation

Figure 3.
Air Quality Status — Sulfur Dioxide

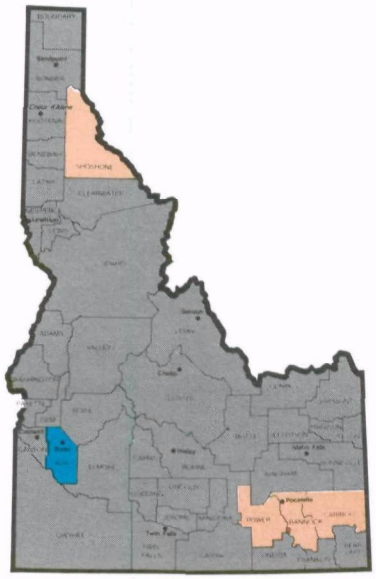
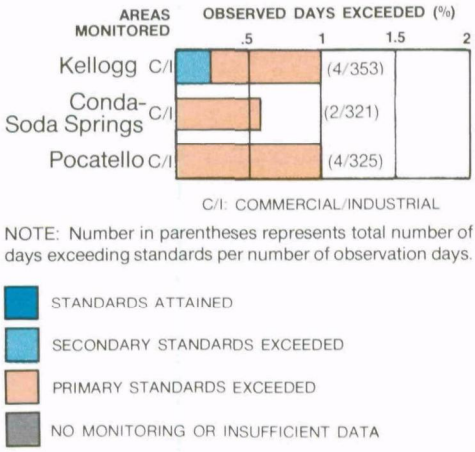


Figure 4.
Percent of Observed Days Sulfur Dioxide Exceeded Standards



system as a whole. As older cars are replaced by models with up-to-date pollution control equipment, carbon monoxide should decline. Regular vehicle inspection and maintenance will ensure that emission control devices are functioning effectively. Other measures for mitigating the carbon monoxide problem are based upon reducing vehicle miles traveled and include measures such as traffic flow improvements, transit improvements, carpooling, bike lanes, and parking management.

As part of a draft transportation control plan, Idaho will examine the feasibility of an inspection and maintenance program for automobiles and a carpool program. Improved traffic flow and transit service should also help to reduce carbon monoxide levels. The City of Boise is also considering a parking management program that would reduce on-street parking.

Ozone

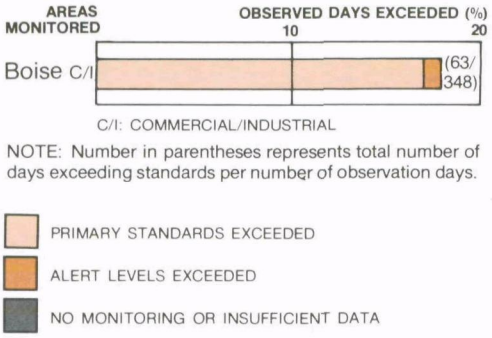
Unlike the other air pollutants discussed in this report, photochemical oxidants are not given off by industries or automobiles. Rather, they are product of a chemical reaction that occurs in the atmosphere when two other pollutants are present. These are oxides of nitrogen (which are discussed below) and hydrocarbons. The chief source of hydrocarbons is automobile exhaust. Volatile organic compounds (VOC), such as solvents and gasoline, also add to hydrocarbons when they evaporate. Besides oxides of nitrogen and hydrocarbons, sunlight is necessary for the reaction. When all three are present, a class of chemicals known as photochemical oxidants is produced, the most common of which is the gas, ozone.

Ozone irritates the eyes and respiratory system, aggravates asthma and chronic lung disease, and reduces lung and heart capacity. It probably causes more damage to plants in the U.S. than any other pollutant. Because both of the substances that give rise to ozone come from automobiles, measures taken to reduce other automobile emissions, such as carbon monoxide, are also effective in controlling ozone.

Idaho has been designated as attaining ozone standards, even though no monitoring stations are located in the state. The State of Idaho is placing two ozone monitors in the Boise area so the attainment status of this area can be verified.

Figure 5.
Air Quality Status — Carbon Monoxide

Figure 6.
Percent of Observed Days Carbon Monoxide Exceeded Standards



Nitrogen Dioxide

Oxides of nitrogen are gases formed mainly by combustion. Sources include automobiles and power plants. Besides irritating the eyes and respiratory tract and damaging metal, rubber, fabric and dyes, oxides of nitrogen contribute to photochemical oxidants, as described above.

During 1978, Idaho complied with the nitrogen dioxide standard. In the state, as elsewhere in the nation, emission levels of nitrogen dioxide from vehicles seem to be stable (even though the number of vehicle miles driven has increased in recent years) because each year proportionately more vehicles are equipped with better emission control devices.

Lead

In 1978 EPA established an air quality standard for lead. This standard is to be achieved by October of 1982. At this time, the states, in cooperation with EPA, are gathering data to identify areas where the standard is being exceeded. Violations of the lead standard occur in the Kellogg area where the major sources are the Bunker Hill Company's lead smelter and general areawide contamination resulting from 60 years of milling and smelting operations.

Other Hazardous Materials

In addition to the five major air pollutants discussed above, there is one known point source of asbestos in Idaho which complies with national and state standards. EPA is analyzing other potentially hazardous pollutants, and standards for these will be developed if necessary.

Trends in Idaho Air Quality

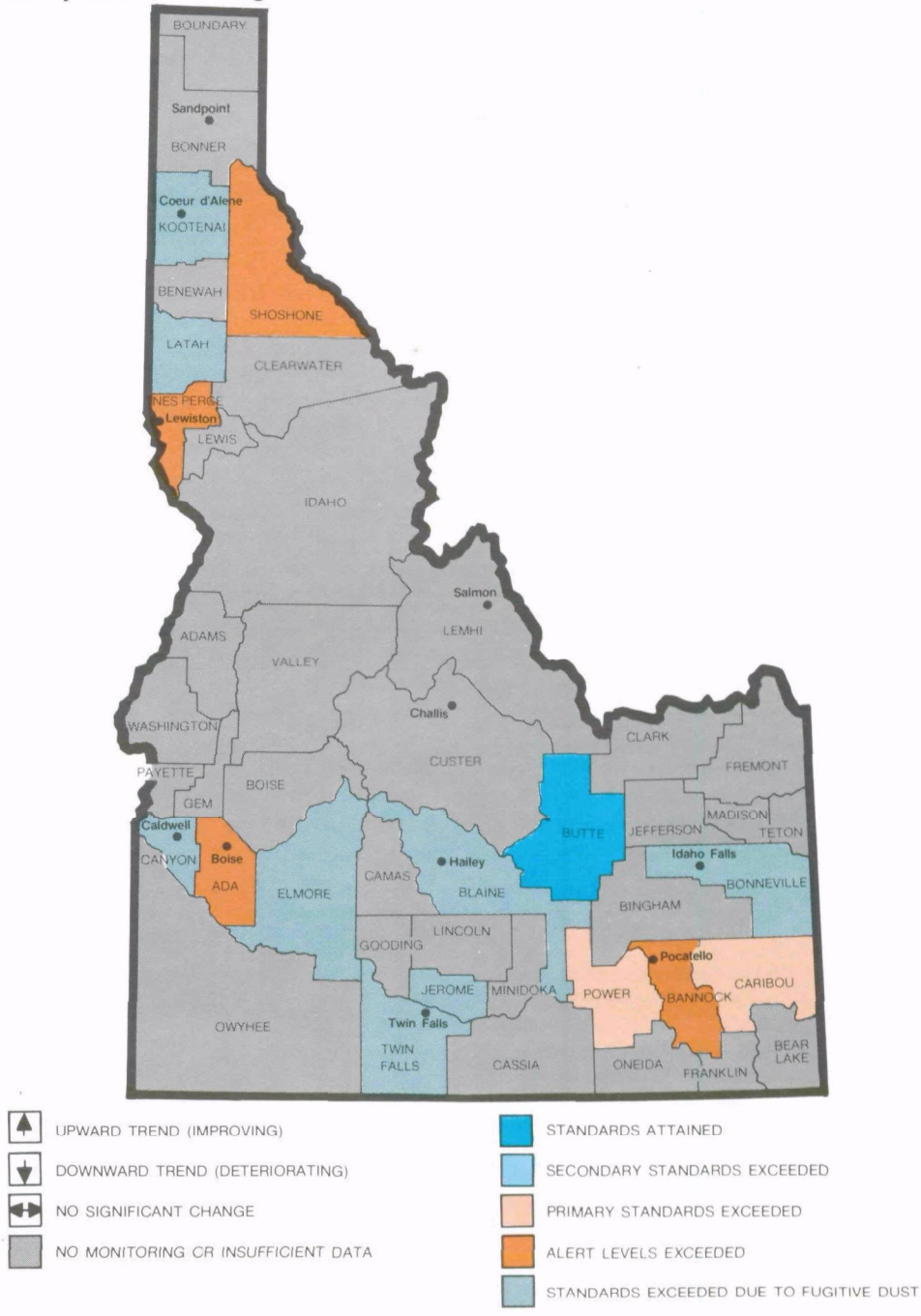
Trends in air quality indicate whether past air pollution control activities have been effective. Figure 7 shows the areas in Idaho in which air quality standards were exceeded in 1978. It also illustrates a two-year comparison of 1977 and 1978 data. Most of Idaho's air quality has remained relatively unchanged from 1977 except for the increase in TSP

concentrations in the Lewiston and Pocatello commercial/industrial areas and a decrease in Conda and Boise rural areas. Sulfur dioxide concentrations improved in both the Kellogg and Pocatello areas, but deteriorated in the Conda area.

The areas exceeding standards during 1978 have been color coded in Figure 8 to reflect the worst exceedance of any pollutant standard experienced in at least one monitoring site within a county. The figure indicates that, except for Idaho's problems with fugitive dust, the most severe violations of air quality standards are mainly in the heavily populated or industrialized areas of the state.

Figure 7.
Air Quality Trends in Five Idaho Areas (Based on 1977-1978 data)

Figure 8.
Idaho Areas Exceeding One or More Air Quality Standards During 1978



The Regional Air Quality Outlook

Region 10 has relatively few heavily populated urban centers; in the 4 states there are only 6.5 million residents. While air pollution is not confined to urban areas, it is most severe where human activity, especially vehicular activity, is heavily concentrated, namely in the 20 communities shown in Table 2. Some violations of National Ambient Air Quality Standards occur in every state of Region 10, as shown in Table 2. Idaho, Oregon, and Washington each exceeded standards for three of the major pollutants during 1978, while Alaska exceeded standards only for carbon monoxide.

Region 10's air pollution problems in 1978 were mostly due to carbon monoxide and/or ozone concentrations. EPA is working closely with Alaska, Idaho, Oregon, and Washington to control emissions from vehicles and to reduce the number of vehicle miles traveled in urban centers having high carbon monoxide levels through transportation controls previously discussed.

Ozone concentrations greater than the health standard have occurred in Western Oregon and Washington, and future monitoring may identify other areas. Many of the same transportation controls used to reduce carbon monoxide levels will be effective in reducing ozone levels. Also, meaures that control volatile organic compounds indirectly lower ozone levels; for example, floating roofs for oil storage tanks to reduce evaporative losses.

Suspended particulate matter is a widespread problem throughout the Northwest; it results from both stationary industrial sources and other sources (such as dust from roads, particulates from home oil heating, vegetative burning, etc.). Particulate control devices such as baghouses, electrostatic precipitators, and scrubbers have been installed on many industrial sources, and some plants are scheduled to further reduce emissions in the future. As existing plants are modified and new facilities are constructed, the best technology available to control suspended particulates will be required. Control of fugitive dust is more difficult to achieve. Paving roads and parking areas can help, as well as improved "housekeeping" in industrial areas (such as covering hoppers or conveyor belts or other equipment transporting raw materials). Construction sites can be wetted down to reduce dust. However, it is expected that reduction of fugitive dust will be very gradual due to the cost of control.

Table 2.
Air Quality Status in 20 Areas of Region 10

AREAS MONITORED		TSP	SO_2	CO	O_3
Alaska	Anchorage				
	Fairbanks				
Idaho	Boise				
	Conda-Soda Springs				
	Kellogg				
	Lewiston				
	Pocatello				
Oregon	Eugene-Springfield				
	Grants Pass				
	Medford-Ashland				
	Portland				
	Salem				
Washington	Clarkston				
	Longview				
	Port Angeles				
	Seattle				
	Spokane				
	Tacoma				
	Vancouver				
	Yakima				

SECONDARY STANDARDS EXCEEDED
PRIMARY STANDARDS EXCEEDED
ALERT LEVELS EXCEEDED

River Water Quality

When the U.S. Congress enacted amendments to the Federal Water Pollution Control Act in 1972, a national goal was set—"fishable, swimmable" waters by 1983. The State of Idaho also adopted that goal. The 1972 amendments subsequently stimulated new cooperative Federal, state, and local water quality improvement programs dedicated to reducing pollutants in the Nation's waters. This section discusses programs that have been instituted in Idaho, their effectiveness, and some problems that still remain to be resolved.

How River Water Quality is Determined

The purpose of the Federal Water Pollution Control Act is to protect the quality of U.S. waters for a variety of uses, including public water supply, wildlife, fish and shellfish, recreation, navigation, agriculture, and industry. Each water use depends on certain characteristics, such as temperature, concentration of dissolved oxygen, or absence of bacteria. These characteristics, called parameters, can be measured and used to evaluate water quality. They vary with the chemistry of the stream being meaured, the season, and other factors. This report is based on 10 related groups of the most commonly studied water quality parameters (see Table 3) which have been monitored at a network of 75 sampling stations throughout Idaho.

To measure water characteristics and evaluate water quality, a standard for comparison is necessary. Thus, Federal water quality goals have been established. They are a synthesis of state water quality standards, national water quality criteria, information in the technical literature, and professional judgment. Idaho, like the other states in Region 10, has specified certain water quality standards. When criteria are applied to a stream, they take into account the uses expected for that stream. For example, in Idaho, most streams are classified as "cold water fishery" streams and are expected to support trout and salmon. The Lake Milner reach of the Snake River, however, is considered a "warm-water fishery" stream, supporting bass and perch, and therefore has less stringent criteria for

Table 3.
Criteria/Parameter Groups[1] for the Water Quality Index

CRITERIA/PARAMETER GROUP	AND EXPLANATION
Temperature	Temperature of water influences the type of fish and other aquatic life that can survive in a river. Excessively high temperatures are detrimental to aquatic life.
Dissolved Oxygen	To survive, fish and aquatic life must have certain levels of oxygen in the water; therefore, low oxygen levels can be detrimental to these organisms.
pH	pH is the measure of acidity or alkalinity of water. Extreme levels of either can imperil fish and aquatic life.
Aesthetics	Refers to oil, grease, and turbidity which are visually unpleasant. This group is mostly represented by the turbidity parameter, which is a measure of the clarity of the water.
Solids	Dissolved minerals and suspended material such as mud or silt. Excess dissolved minerals (hard water) interfere with agricultural, industrial, and domestic use. Excess suspended solids adversely affect fish feeding and spawning.
Radioactivity	May be in water as a result of radioactive waste discharges or fallout. Excess levels can harm aquatic and other life forms.
Bacteria	Bacteria indicate probable presence of disease-related organisms and viruses not natural to water (i.e., from human sewage or animal waste).
Trophic (Nutrient Enrichment)	Indicates the extent of algae or nutrients in water. Nutrients promote algae growth. When algae (one-celled water plants) flourish they make the water murky, and the growths make swimming and fishing unpleasant. Decomposition of dead algae can decrease dissolved oxygen concentrations to levels harmful to fish.
Organic Toxicity	Includes pesticides and other organic poisons that have the same effects and persistence as pesticides.
Inorganic Toxicity	Heavy metals and other elements; excess concentrations are poisonous to aquatic and other life forms. Also includes percent saturations of dissolved gases in water which can affect the metabolism of aquatic life.

[1]Approximately 80 criteria/parameters were evaluated and condensed to the 10 groups shown here. More detailed information is available on request.

temperature, oxygen, pH, suspended solids, and toxic heavy metals than "cold-water fishery" streams.

The water quality of an individual stream can be determined by measuring each parameter group and comparing it to the criteria. But to compare one stream to another, a single, inclusive number for each stream is useful; consequently, a Water Quality Index has been formulated. The Index permits comparisons between very different situations, such as those arising from differing types of human usage and climatic conditions.

Figure 9 compares the water quality of 21 principal rivers in Idaho. The circle represents the annual average Water Quality Index for the river. The square represents the value for the worst 3 consecutive months.

Water Quality Index

In this report, the Water Quality Index compares water quality measured during the last 6 years with the recommended Federal criteria. The data used to make these comparisons come from various Federal, state, and local agencies and are stored in EPA's computer systems. The final Index number for each station takes into account the 10 pollution categories shown in Table 3, adjusted to reflect the severity by which the criteria are exceeded. The Index numbers span a scale from 0 (no measured evidence of pollution) to **100** (severe pollution at all times). In this report, the scale is divided into three color ranges as follows:

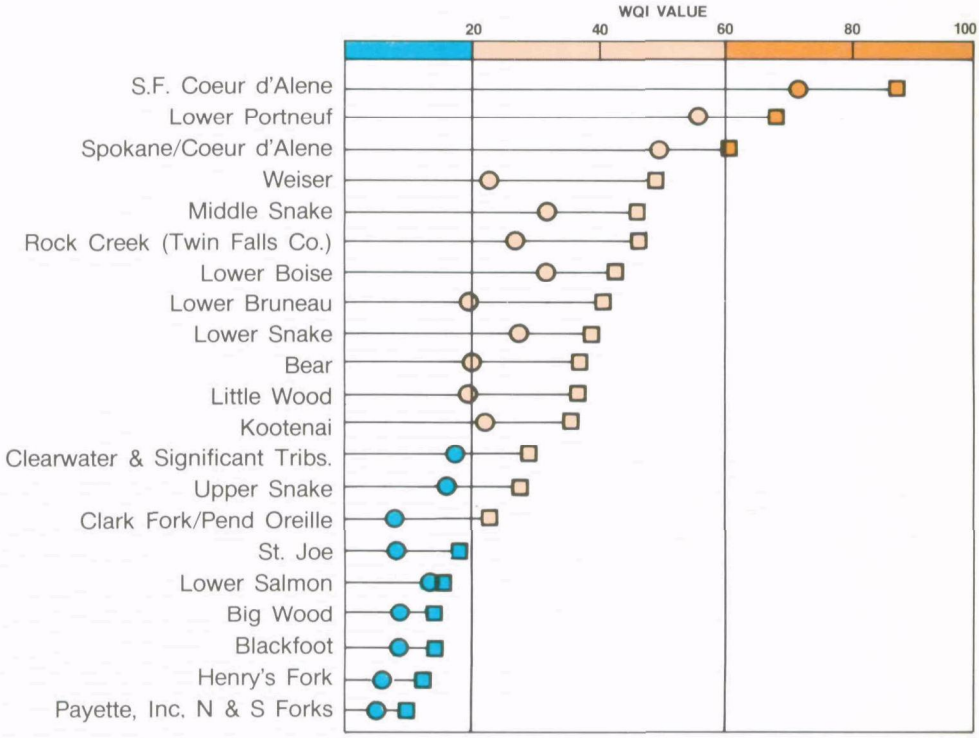
Blue represents streams with Index numbers between 0 and 20. These streams either have no pollution or are minimally polluted and therefore meet the goals of the Federal Water Pollution Control Act.

Light Brown represents streams with Index numbers between 20 and 60. Such streams are intermittently and/or moderately polluted and are considered marginal with respect to meeting the goals of the Act.

Dark Brown represents streams with an Index number greater than 60. These streams are severely polluted and do not meet the goals of the Act.

The neutral color gray is used in the graphs when the water quality status is unknown because of inadequate data.

Figure 9.
Water Quality Index Values for Idaho's Principal Rivers



The WQI values presented are derived from averaging WQI values from those river portions with adequate data. Except where indicated, river portions included are located only on the main river named.

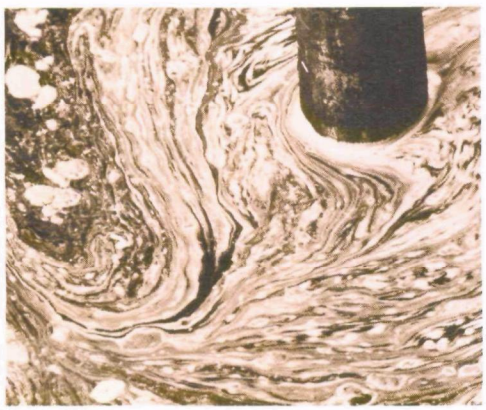
WORST 3 CONSECUTIVE MONTHS □
ANNUAL AVERAGE WATER QUALITY INDEX ○

Sources and Control of Water Pollution

Pollutants that reach Idaho streams have two general origins: "point source" pollution, such as wastewater from industries, sewage treatment plants, and the like, that enters streams at an easily identified location; and less easily identified "non-point source" pollution, consisting of stormwater from urban areas, irrigation water, and runoff from farm, forest, and mining lands.

Industries that discharge waste effluent to streams must have a permit to do so. The permits are issued by EPA under the National Pollution Discharge Elimination System (NPDES) or by states that have assumed this responsibility. By this means, EPA can require that point source pollutants be removed before wastewater reaches the river. Since non-point sources cannot be so easily treated, "best management practices" are required. For example, agricultural best management practices might include waste storage areas to keep organic wastes from reaching nearby streams, or contour plowing to prevent erosion of soil into rivers.

The responsibility for developing such means to control non-point source pollution has been given to local and state agencies assigned to develop water quality management plans as provided by the Federal Water Pollution Control Act.



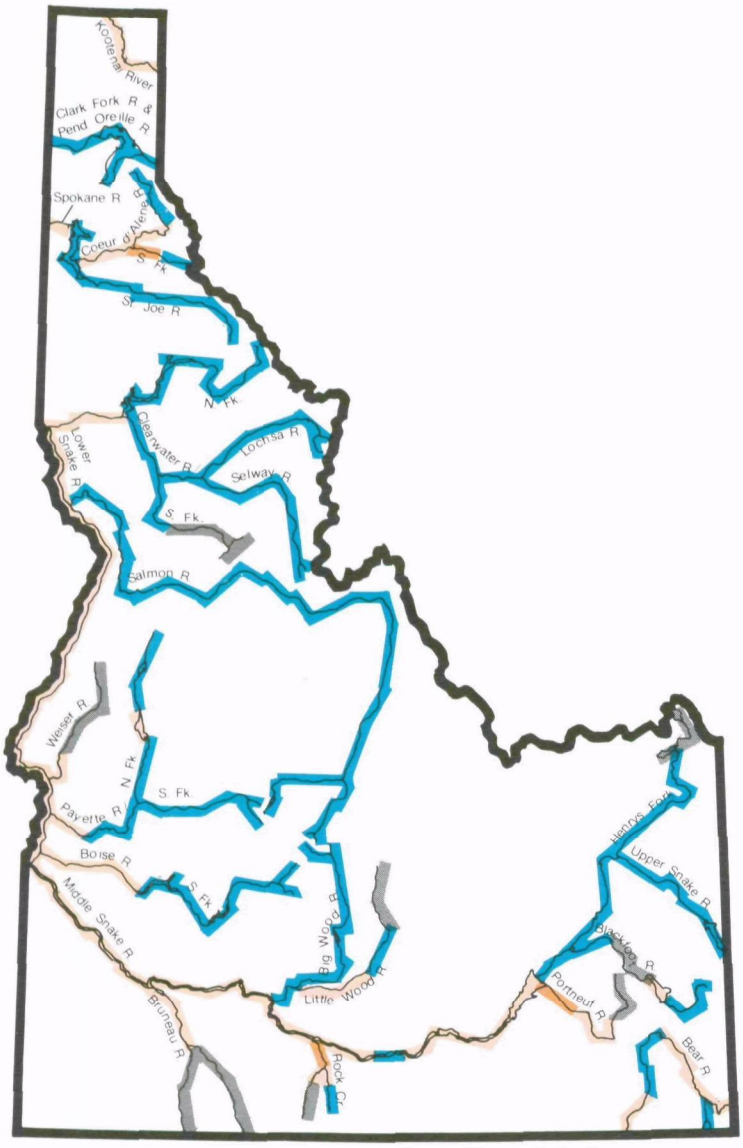
The Quality of Idaho's Principal Rivers

Idaho is a vast mountainous area in which precipitation varies greatly with topography. Portions of some river basins such as the Clearwater receive over 50 inches of rainfall annually, while less than 10 inches is not uncommon for some of the arid plains in southern Idaho. Agriculture, mining, and lumbering are important to Idaho's economy, though they also affect water quality in the state. Pollutants resulting from agricultural activities include sediments, nutrients, elevated temperatures, organic materials, and bacteria. Extensive irrigation further reduces the naturally occurring low flow of many Idaho streams. Sediment resulting from soil erosion is a particularly significant pollutant that affects the Upper Snake, Bear River, and Southwest Idaho basins. Hard rock mines in the Coeur d'Alene area and a variety of other surface, underground, and dredging operations throughout the state contribute large amounts of sediment, toxic metals, and acidic runoff to Idaho's rivers.

Population is not dense in Idaho, but it is growing rapidly, especially in the southwest, with resultant water quality problems. The Boise River, for example, once an outstanding fishery, has deteriorated due to dams, channel alterations, municipal discharges, and irrigation return flows.

Water quality data obtained by state and Federal agencies from October 1976 through September 1978, where available, were utilized to describe the recent quality of 21 major streams in Idaho. Figure 10 shows the location of these streams in Idaho. Figure 11 compares the relative extent of water quality degradation within each stream on an average annual basis. Portions of the South Fork Coeur d'Alene River are severely degraded due to wastes from past and present mining and ore-producing activities in its basin. Pollution

Figure 10.
Water Quality Status of Principal Rivers in Idaho



BASED UPON THE AVERAGE ANNUAL WQI:

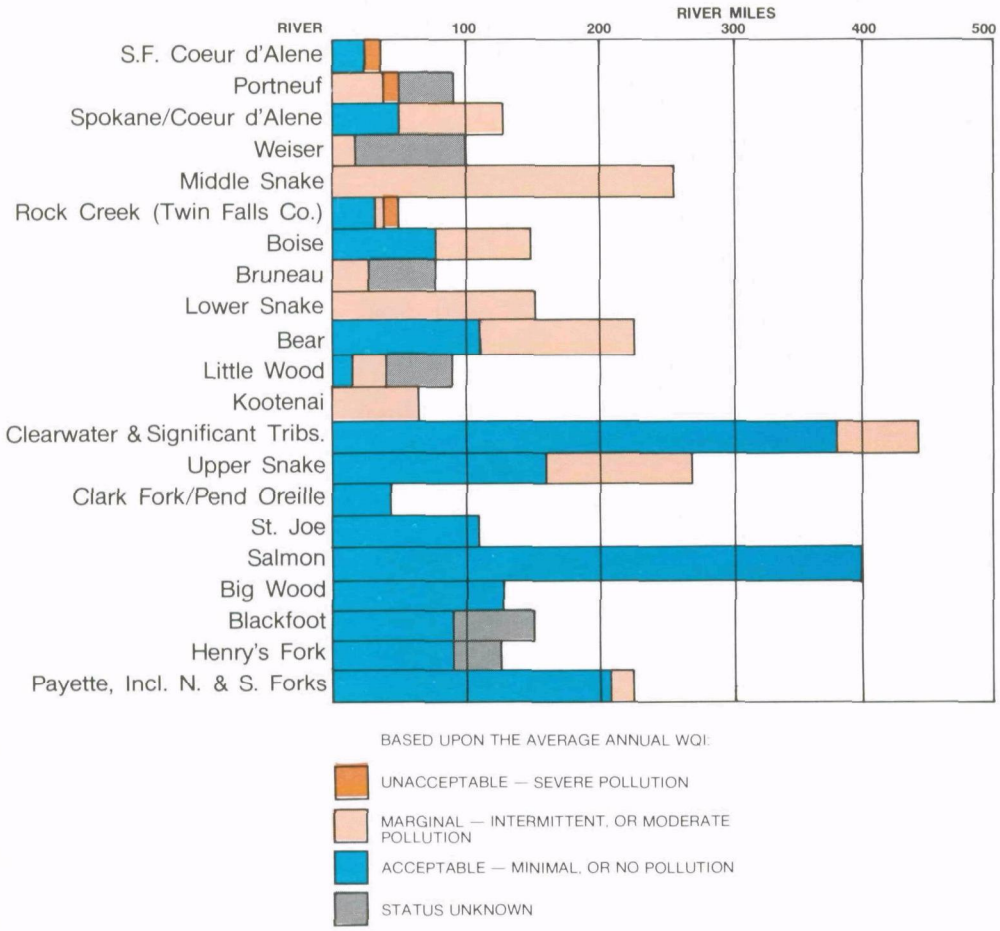
- UNACCEPTABLE — SEVERE POLLUTION
- MARGINAL — INTERMITTENT, OR MODERATE POLLUTION
- ACCEPTABLE — MINIMAL, OR NO POLLUTION
- STATUS UNKNOWN

from these activities is also responsible for causing the Spokane and main Coeur d'Alene Rivers to be rated "unacceptable" during part of the year. The Portneuf River is degraded by municipal (both urban runoff and secondary treated sewage) and industrial discharges below Pocatello, agricultural sources on Marsh Creek and nutrient-rich springs feeding into the river. Rock Creek, which flows through Twin Falls, has suffered from irrigation wastewater entering its lower reaches.

All or portions of an additional twelve streams only marginally meet the goals of the Clean Water Act during at least part of the year. Most problems in these streams may be atrributed to agricultural non-point sources, but some of these stream reaches are noticeably affected by point source discharges from sewage treatment and commercial/industrial plants. Examples are the Boise River, affected by municipal discharges, and the Milner and Lower Granite Reservoirs, located on the Snake River, which receive wastes from food processing operations and a pulp mill, respectively.

The remaining streams that generally meet the goals of the Act, such as the Salmon River and Upper Clearwater River, are located in the more remote areas of the state and lack significant agricultural, urban, and industrial activities.

Figure 11.
River Miles Meeting Water Quality Criteria In Idaho



Except where indicated, the river mileages shown pertain only to the main rivers named.

Causes of River Water Quality Problems

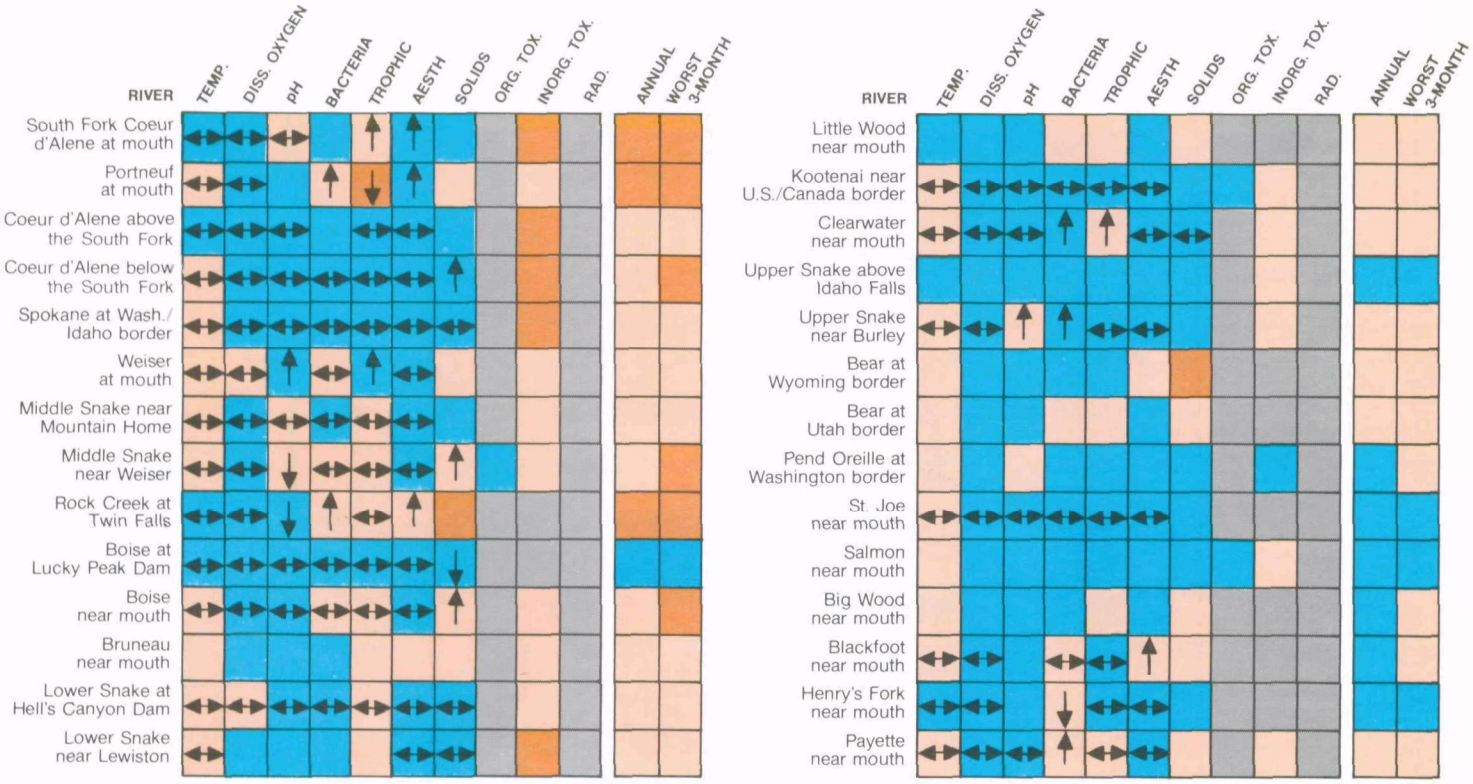
Figure 12 shows the status of 28 Idaho river stretches with respect to each of the 10 pollution categories comprising the Water Quality Index. Temperature criteria were exceeded in most of the streams evaluated, due partly to normal climatic conditions which cause low stream flows and high water temperatures during the summer and fall. These conditions may be aggravated by man-made irrigation diversions, dams and the destruction of stream bank vegetation.

Dissolved oxygen values have occasionally failed to meet criteria in the lower Weiser River and the Snake River at Hell's Canyon Dam and below American Falls Dam. In the former, low levels are probably caused by the combined summertime effects of respiration by algae and aquatic weeds and very low streamflows. The Snake River condition is probably due to the decay of algae in Hell's Canyon, Oxbow, and Brownlee Reservoirs, which result from nutrients supplied primarily by upstream agricultural sources.

Observed pH levels ranged outside of the desired criteria in several Idaho stream segments. Acidic waste from mining-related activities lowered pH levels in the lower South Fork of the Coeur d'Alene River. Spring and summer pH levels in the Pend Oreille River and in portions of the Upper and Middle Snake River were slightly higher than recommended. These occurrences were probably due to algal blooms stimulated by excess nutrients in the water or bottom muds.

Undesirable levels of bacteria were present in about one-third of the stream segments evaluated. Most of these segments are located in the lower portions of drainages where irrigation and livestock activities are common. Wastes from grazing lands and animal confinement areas often contaminate irrigation return flow and rainfall and snowmelt runoff. In a few cases, treated sewage may also be significant contributors to certain stream segments.

Figure 12.
Trends in River Water Quality Parameters, Idaho



UNACCEPTABLE — SEVERE POLLUTION

MARGINAL — INTERMITTENT, OR MODERATE POLLUTION

ACCEPTABLE — MINIMAL, OR NO POLLUTION

STATUS UNKNOWN

CONDITION IMPROVING

CONDITION DETERIORATING

CONDITION STABLE

INADEQUATE, OR NO DATA AVAILABLE FOR TRENDS ANALYSIS

The colors represent the recent water quality status during the worst three-month period for each parameter group. The arrows result from the comparison of 1976-1978 data versus 1973-1975. Each river entry is represented by only one sampling station.

One-half of the stream segments evaluated experience excessive levels of nutrients (trophic category) during at least part of the year. The lower Portneuf River has by far the highest levels, which are largely attributed to those sources described earlier. The other stream segments are mostly over-enriched by runoff from irrigated and dryland agriculture, although secondary treated sewage may be contributing to these problems in some stream segments, such as the Boise River. Natural high levels of phosphates contribute to elevated nutrient levels in southeast Idaho streams.

In this report, the aesthetic quality of the streams evaluated is largly related to the levels of suspended solids present. High suspended solids levels cause a stream to appear muddy and indicate soil erosion problems within a drainage. The greatest concentrations of suspended solids were found in Lower Rock Creek due to irrigation return flow, and in the upper Bear River, probably as a result of precipitation and snowmelt from dryland agricultural areas. These causes are also primarily responsible for the elevated solids and degraded aesthetic conditions in the other Idaho streams.

Currently there is concern over pesticides, polychlorinated biphenyls (PCB's), trihalomethanes, and other organic compounds in the waters of the Northwest. Although they are being studied intensely in connection with drinking water supplies, ambient river water quality, and point source discharges, relatively little is known about them compared to the "conventional" pollutants described above, because the sophisticated analytical methods and equipment necessary to detect minute concentrations of these toxicants were only recently developed. Limited monitoring for selected pesticides and herbicides on a section of the Middle Snake River and the Kootenai River has not revealed any significant levels of contamination in recent years. More widespread monitoring is needed to fully ascertain whether major streams in Idaho are contaminated by organic toxicants.

The inorganic toxicity parameter group is primarily represented by the heavy metals such as cadmium, lead, and zinc. High Index values shown in the Spokane and Coeur d'Alene stream reaches are due to active and inactive mining operations, with the Bunker Hill mining and smelting complex as a major point source of heavy metals. The origins of the high levels indicated in the Lower Snake River and the moderate levels in other stream segments are unknown.

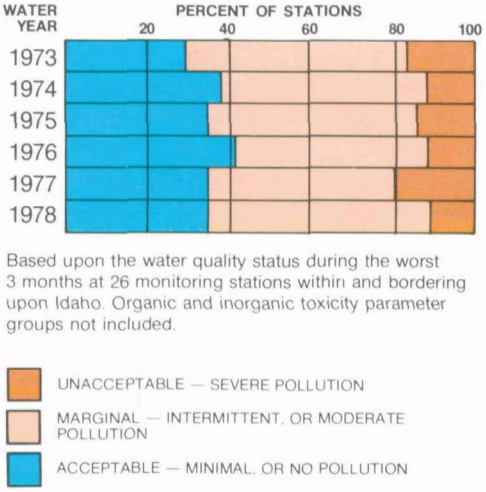
The EPA monitors radiation in the Snake River near Twin Falls on a quarterly basis. Because criteria levels to protect aquatic life have not been established, no Index values have been generated for the radiation parameter. Observed values at Twin Falls, however, have exceeded the EPA drinking water standard by less than five percent, which is well below any level of concern.

The Outlook for Idaho

Water quality in Idaho, as represented by the twenty monitoring stations evaluated in Figure 13, has exhibited little apparent change over the last six years. Stream segments with an "unacceptable" rating for at least one year were the Middle Snake River, Lower Portneuf and Lower Boise Rivers, and Lower Rock Creek. With the exception of the Lower Portneuf River, these stream segments are degraded mainly by irrigation return flows. The organic and inorganic toxicant parameter groups could not be included in this analysis due to significant changes in analytical techniques and reporting procedures over this time period.

Reductions in point source pollution in Idaho have been achieved by means of NPDES permits, which limit discharges from point sources and establish schedules for meeting these limitations. Earlier voluntary efforts by the food processing industry have also improved water quality in Idaho. Remaining problems with sewage treatment include inadequate treatment levels, overloading of facilities from infiltraton/inflow, and insufficient dilution of the sewage effluent due to low stream flows. The latter results in elevated nutrient levels, depressed dissolved oxygen and ammonia and chlorine toxicity. Some cities such as Nampa are constructing improved facilities, removing ammonia, and using other techniques to correct this problem. Food processing industries and mining and ore-processing facilities are other major point sources requiring improvements.

Figure 13.
Water Quality Trends in Idaho



Based upon the water quality status during the worst 3 months at 26 monitoring stations within and bordering upon Idaho. Organic and inorganic toxicity parameter groups not included.

In 1978, agriculture continued to be one of the most significant non-point sources of water pollution in Idaho. Irrigation return flows, livestock grazing and feeding, and dryland farming degrade water quality by increasing the sediment load and turbidity, and by contributing large amounts of nutrients. A Statewide Agricultural Pollution Abatement Plan was completed in 1979. This voluntary program is being implemented on a statewide basis, and specifically in four high priority areas: Rock Creek and Cedar Draw in Twin Falls County, Marsh Creek in Bannock County, and Paradise Creek and the South Fork Palouse River in Latah County.

Mining activities are another major non-point source of pollution. New and existing operations are controlled by reviewing new mining applications, inspecting existing mining operations, and implementing disposal guidelines for mine and mill wastes. Controlling polluted runoff from abandoned mine sites is more difficult and expensive. Even if the Bunker Hill Company's discharges were to meet EPA guidelines, runoff from abandoned and inactive mining operations would still create significant problems in the South Fork and main Coeur d'Alene Rivers. State plans to rehabilitate the South Fork have been hampered by lack of funds.

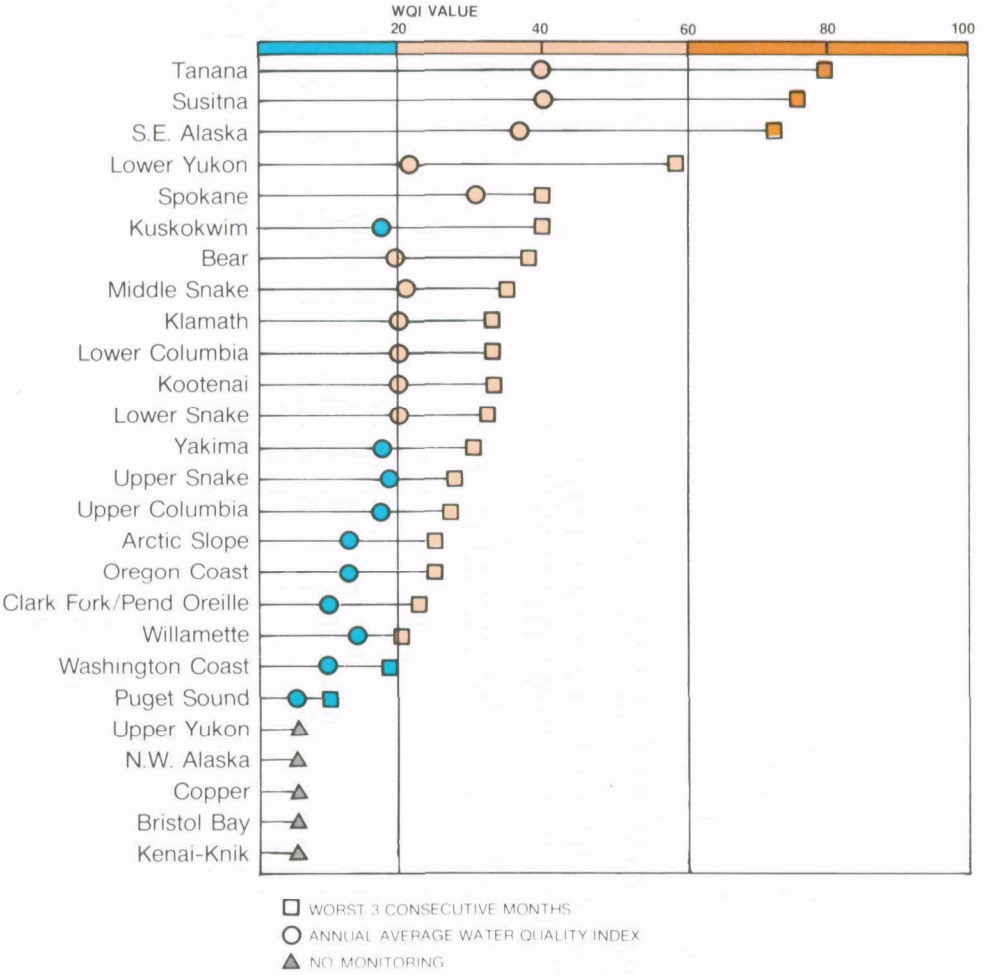
Besides mining and agriculture, forestry operations and individual sewage disposal systems are other non-point sources that pollute Idaho's rivers.

The Regional Outlook

The Water Quality Index is used in Figure 14 to compare 26 major Pacific Northwest River Basins within Alaska, Idaho, Oregon, and Washington. Figure 15 depicts the relative extent of water quality degradation for each river basin, and Figure 16 shows similar information on a regional map.

Figure 14 reveals that several Alaska river drainages have the highest Water Quality Index values in Region 10. These are caused by high levels of turbidity and suspended solids during spring and summer due primarily to glacial melting and natural streambank erosion. Placer mining operations, however, may be causing unnaturally high solids in some of

Figure 14.
Water Quality Index Values for Region 10 River Basins



the smaller streams. More data are needed to assess the impact of these activities and to provide a general indicator of water quality in the five Alaska basins indicated as having an unknown status.

Only two of the Region's river basins had Index values less than 20 and clearly met the Federal water quality goals. The majority of those that provisionally meet the goals drain arid or agricultural portions of the Region where non-point source pollution is difficult to control. Most criteria violations are in the categories of temperature, bacteria, trophic, aesthetic, and solids. In the Spokane Basin, high heavy metals concentrations from mining activities on the South Fork Coeur d'Alene River in Idaho are primarily responsible for the elevated Index values. Heavy metals of unknown origin are responsible for high Index values in the Lower Snake, Lower Columbia, and Kootenai Basins.

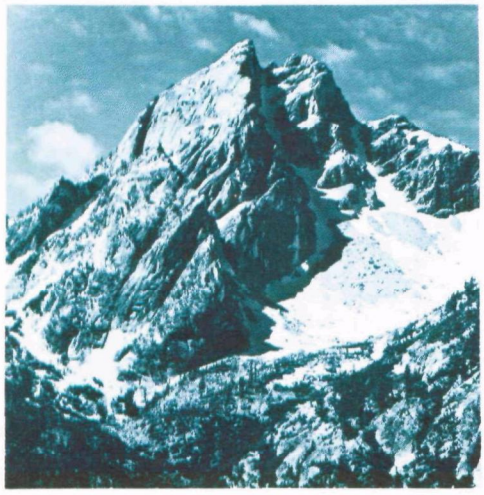
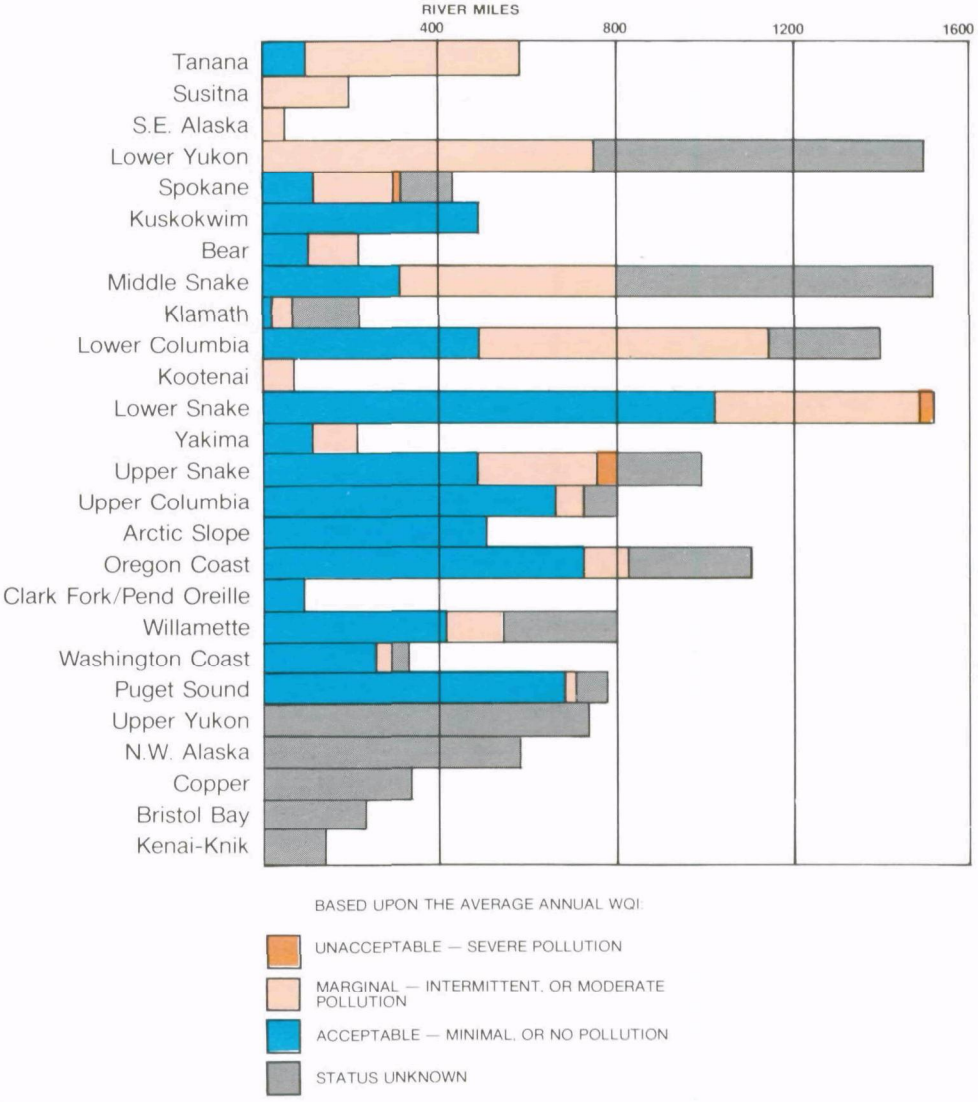
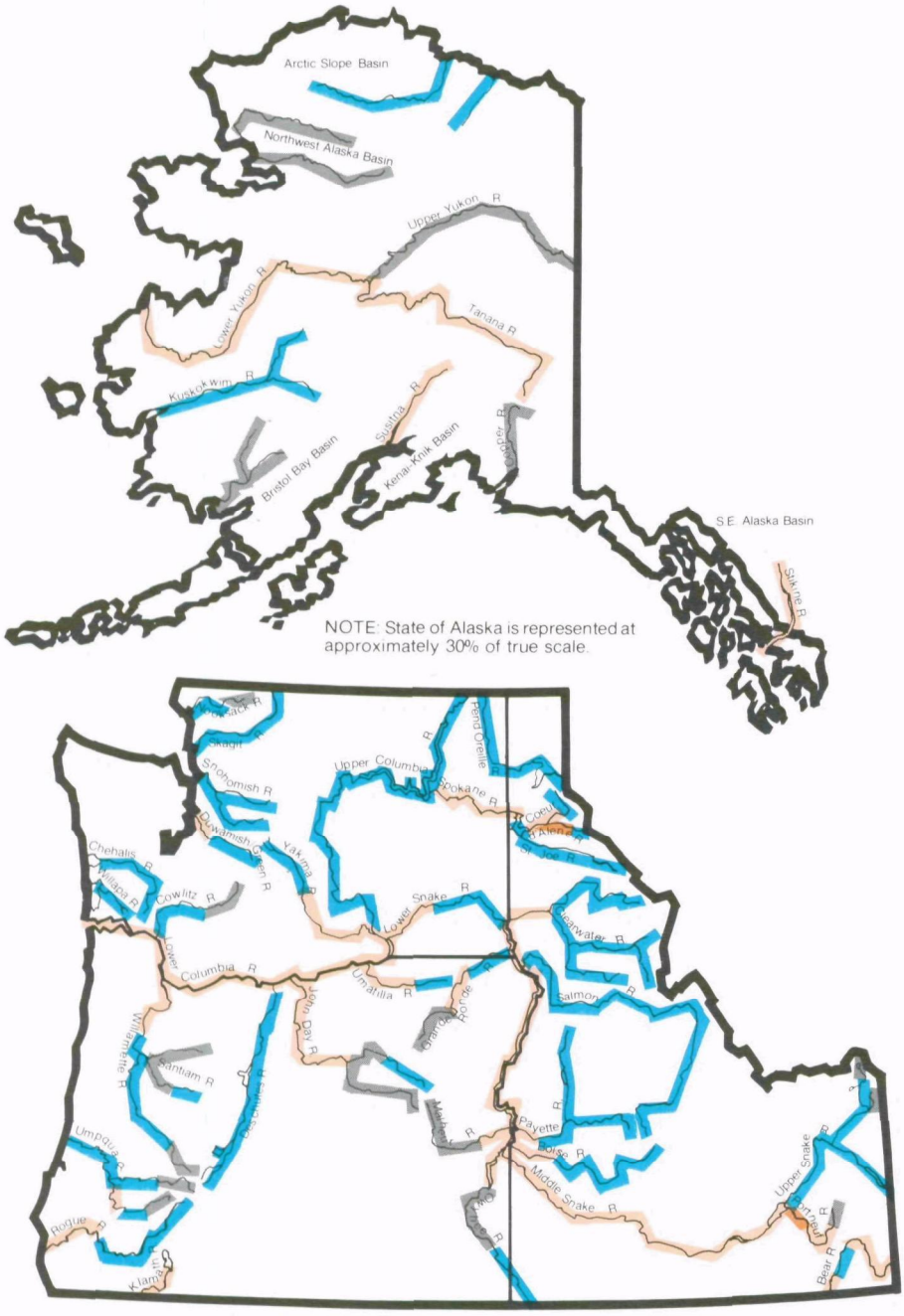


Figure 15.
Miles Within Principal Region 10 River Basins Meeting Water Quality Criteria



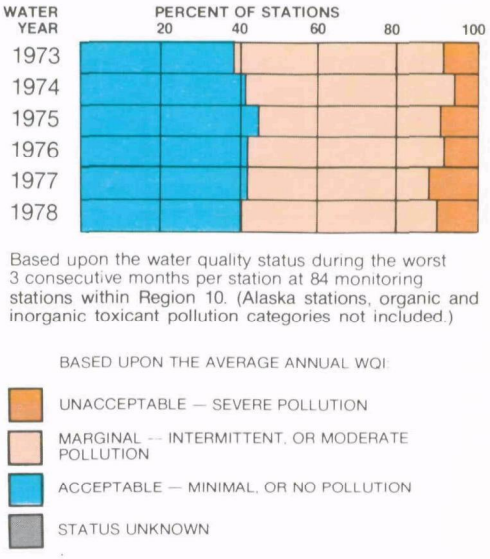
Only principal rivers and streams within each basin are included in the mileage totals shown.

Figure 16.
Water Quality Status of Principal Rivers in Region 10



Regional water quality trends have been analyzed by comparing data from 84 representative monitoring stations over a 6-year period (Figure 17). Due to inadequate data, Alaska rivers could not be included in the analysis, nor were organic or inorganic toxicants included, since there have been significant changes in analytical techniques and reporting procedures over the time period considered. There has been little significant change at the stations since 1973. Although point source controls have made many improvements in Regional water quality, further plans to identify and control non-point sources are needed in order to improve water quality at those stations still not fully meeting water quality goals.

Figure 17.
Water Quality Trends in Region 10



Based upon the water quality status during the worst 3 consecutive months per station at 84 monitoring stations within Region 10. (Alaska stations, organic and inorganic toxicant pollution categories not included.)

Lake Water Quality

Inland lakes and waterways constitute one of Idaho's most important recreational and commercial resources. Moreover, the quality of these waters affects the beauty and aesthetic character of the state. It is generally felt that the lake water quality in Idaho and the Pacific Northwest is good. However, many of the major recreational lakes in the state have significant water quality problems which impair their recreational use.

How Lake Water Quality is Determined

A numerical water quality index has not been developed for lakes, as it has been for rivers. Instead, the water quality of Idaho lakes is evaluated on the basis of their ecological conditions and how they affect persons wishing to use the lakes for recreation.

If a lake is undisturbed by human activities, it undergoes a natural process of aging known to ecologists as eutrophication. Once a lake is created, by whatever means, it begins to fill in. While it is filling in, the water chemistry and types of organisms that can survive in the lake also change. At first, the water is clear (pristine) and has few nutrients and low populations of aquatic life. As the lake cotinues to age and becomes "eutrophic," sediments and nutrients from the surrounding watershed accumulate, stimulating frequent algae blooms. Floating mats of algae and aquatic plants cover much of the surface, and the water may appear bright green. The process by which dead algae are decomposed by bacteria can consume nearly all the dissolved oxygen in the water, which in turn kills fish. Fish populations in eutrophic lakes are typically stunted. Finally, the lake fills with soil and dead plants and becomes land.

The whole process happens naturally; it often takes thousands of years. But man can significantly accelerate the process by adding nutrients and other substances to lake water—a process referred to as "cultural eutrophication." Land use practices on farm land, forests, and construction sites often result in erosion of soils into streams and subsequently lakes. Nutrients, mainly nitrogen and phosphorus, are chief constituents of discharge from sewage treatment plants, urban runoff, pastures and feedlots, and certain industrial processes.

How Trophic Conditions Affect Recreational Uses

Water quality agencies are concerned with the trophic status of Idaho lakes because many uses of lakes are closely related to their ecological condition. For example, growths of algae or other water plants may directly curtail or eliminate water recreation activities such as swimming, boating, and fishing; impart tastes and odors to water supplies; and hamper industrial and municipal water treatment.

To analyze the extent to which recreational uses are impaired in any given lake, and to compare one lake to another, the measurement scheme shown in Table 4 has been used. This scheme results in a numerical score for each lake ranging from a minimum of 4 to a maximum of 12. A score of 4 indicates that there is little, if any, impairment of swimming, fishing, boating or aesthetics (visual enjoyment). A score of 12 indicates that all uses are severely impaired.

Figure 18 shows the lakes analyzed in this report. Table 5 provides more detailed information on recreational uses and trophic status of each lake, including the source of water quality and use impairments. Most impairments to Idaho's recreational lakes appear to be due to algal blooms stimulated by nutrients from agricultural runoff and septic tanks. Runoff from agricultural non-point sources entering the Snake River upstream of Oxbow and Brownlee Reservoirs has degraded these two lakes. Lake Lowell, an off-stream reservoir near Boise, receives heavy recreational usage by residents of the Boise Valley. Excessive algal growth in the summer impairs such use. The photosynthetic activity and eventual decomposition of the algae reduce the dissolved oxygen levels, which may be adversely affecting the fishery resource of the reservoir. These conditions are primarily due to the nutrient enrichment of summer inflows by agricultural non-point sources.

Water quality of American Falls Reservoir is degraded by nutrients from dryland and irrigated agriculture, wastewater from the J.R. Simplot phosphate processing plant near Pocatello, treated sewage effluent from Pocatello, phosphate deposits in the soils and from the many springs in the area. Pend Oreille Lake is another popular recreational lake that is being affected by erosion from developing residential areas.

How Recreational Use is Being Restored

Some measures being implemented to improve lake water quality include dredging to remove nutrient-containing sediments and decomposing plant material that consumes oxygen, flushing, bank erosion control, aeration, physically removing aquatic plants, and both chemical and biological controls to prevent eutrophication. The wastewater from the Simplot Plant at Pocatello is scheduled to be removed from the Portneuf River, which flows into the American Falls Reservoir. This, plus the

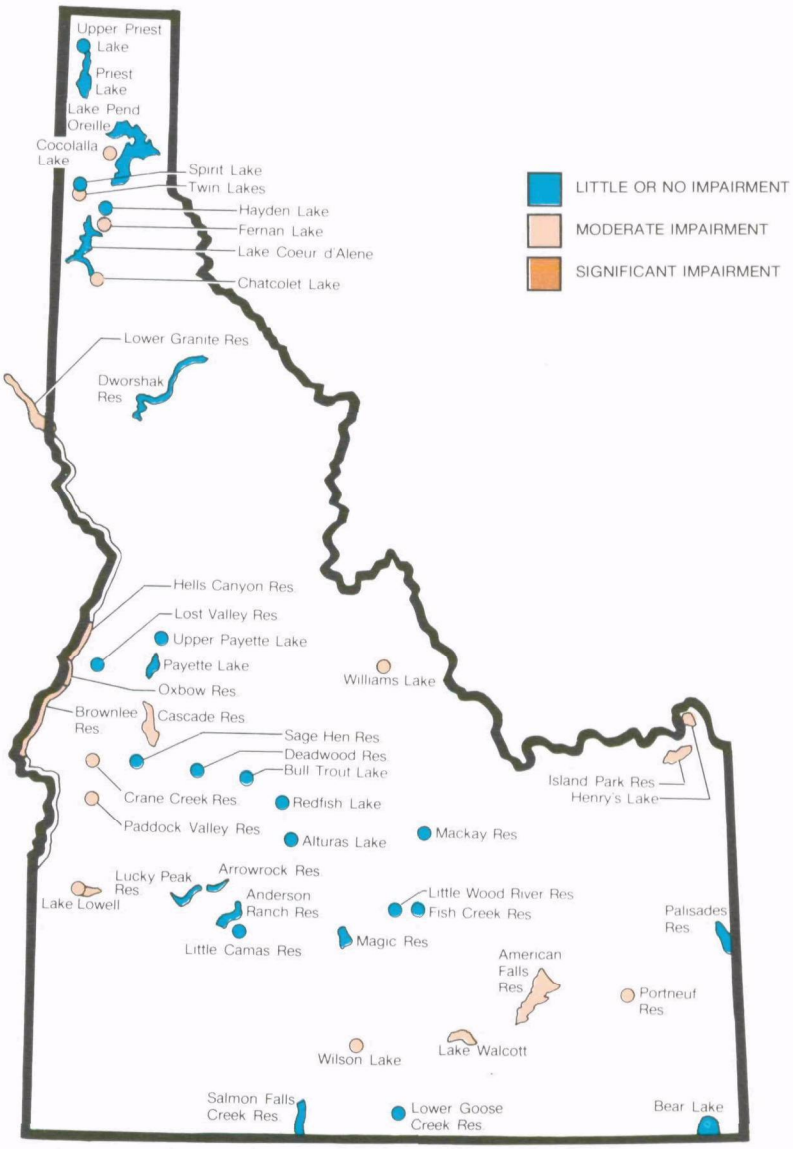
Table 4.
Criteria for Evaluating Impairment of Lakes

RECREATIONAL USE	DEGREE OF IMPAIRMENT: NONE — CRITERIA	SCORE
Swimming	Very low bacteria levels (Fecal coliforms geometric mean less than 50 per 100 ml)	1
Fishing	No adverse conditions. Healthy fish population.	1
Boating	Less than 10% of surface area affected by aquatic weeds	1
Aesthetics	Objects visible in water to depth of 10 feet or more and low phosphorus (Secchi Disc* at 10 feet; total phosphorus of less than 10 ug/l**)	1
SCORE	(No uses impaired)	4

RECREATIONAL USE	MODERATE — CRITERIA	SCORE
Swimming	Moderate bacteria levels (Fecal coliforms 50 to 200 per 100 ml)	2
Fishing	Slightly adverse conditions. Slight reduction in fish population.	2
Boating	10% to 30% affected	2
Aesthetics	Objects visible from 1.5 to 10 feet and moderate phosphorus level (Secchi Disc at 1.5 to 10 feet; total phosphorus 10 to 20 ug/l)	2
SCORE	(All uses moderately impaired)	5-8

RECREATIONAL USE	SIGNIFICANT — CRITERIA	SCORE
Swimming	Unhealthy bacteria levels (Fecal coliforms greater than 200 per 100 ml)	3
Fishing	Adverse conditons. Significant reduction in fish population.	3
Boating	More than 30% affected	3
Aesthetics	Objects not visible beyond 1.5 feet or high phosphorus level (Secchi Disc at less than 1.5 feet; total phosphorus greater than 20 ug/l)	3
SCORE	(All uses significantly impaired)	9-12

Figure 18.
Water Quality Map of Idaho's Principal Lakes and Reservoirs



*A Secchi Disc is a round black and white plate suspended on a chain and used to determine water clarity.

**ug/l = micrograms per liter, a measurement used for low concentrations of dissolved substances.

Table 5.
The Recreational Impairment and Trophic Status of the Principal Recreational Lakes in Idaho

NAME	SURFACE AREA (ACRES)	SWIMMING	FISHING	BOATING	AESTHETICS	TOTAL RATING	TROPHIC STATUS	CAUSE OF PROBLEM
Brownlee Res.	15,000							Upstream Sources
American Falls Res.	56,000							Natural/Agric. Nonpoint/ Municipal/Industrial Pt. Sources
Wilson Lake	600							Upstream Sources
Lake Walcott	12,000							Upstream Sources
Portneuf Res.								Agricultural Runoff
Williams Lk./Lemhi Co.								Recreational Impacts
Crane Creek Res.								Natural/Agric. Runoff
Lake Lowell	9,600							Agricultural Runoff
Lower Granite Res.	8,900							Upstream Sources
Oxbow Res.	1,500							Upstream Sources
Hell's Canyon Res.	2,500							Upstream Sources
Paddock Valley Res.								Natural/Agric. Runoff
Fernan Lake	300							Septic Tanks/Agric. Runoff
Chatcolet Lake	600							Agricultural Runoff
Cascade Res.	30,000							Agric. Runoff/Munic. Pt. Source
Henry's Lake	2,500							Recreational Impacts
Island Park Res.	7,000							Septic Tanks/Natural Runoff
Magic Res.	1,800							Agric. Runoff/Munic. Pt. Sources
Twin Lakes/Kootenai Co.	850							Septic Tanks/Agric. Runoff
Cocolalla Lake	800							Agric. Runoff/Recr. Impacts
Salmon Falls Cr. Res.								
Lower Goose Cr. Res.	1,000							
Fish Cr. Res.	250							
Lost Valley Res.	800							
Palisades Res.	16,000							
Upper Payette Lk.								
Dworshak Res.	17,000							
Sage Hen Res.								
Anderson Ranch Res.								
Alturas Lake	1,200							
Lucky Peak Res.	2,800							
Arrowrock Res.	4,000							
Priest Lake	24,000							
Lake Pend Oreille	94,000							
Lake Coeur d'Alene	30,000							
Hayden Lake	4,000							
Payette Lake	1,000							
Deadwood Res.	3,000							
Redfish Lake	1,500							
Bear Lake	25,000							
Spirit Lake	1,300							
Upper Priest Lake	5,000							
Bulltrout Lake	900							
Mackay Reservoir	1,000							
Little Camas Res.								
Little Wood Res.	600							

NON-EUTROPHIC
MODERATELY EUTROPHIC
EUTROPHIC
STATUS UNKNOWN

LITTLE OR NO IMPAIRMENT
MODERATE IMPAIRMENT
SIGNIFICANT IMPAIRMENT

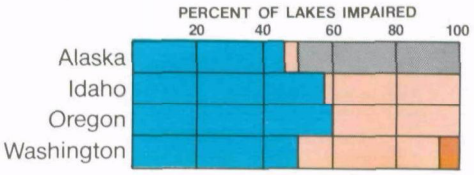
eventual application of best management practices to agriculture should reduce the reservoir's problems considerably. A master plan for the area around Pend Oreille Lake is being developed to control construction practices and the density of development, thereby improving lake water quality.

A Regional Overview

Lakes are one of the most important resources of the Pacific Northwest and Alaska.

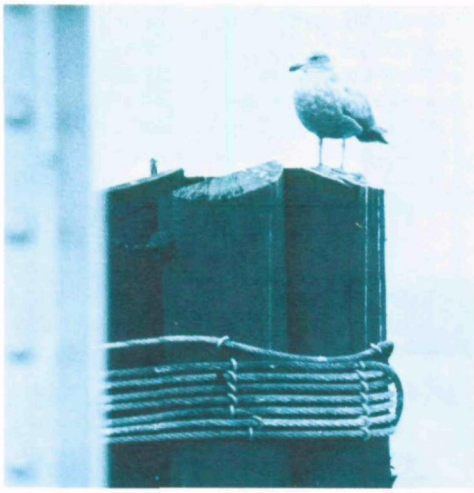
For the most part, the 145 most heavily-used lakes within Region 10 are of good quality, with few impairments related to human activities. Figure 19 compares the percentage of lakes impaired for recreational use in each state. More than half the lakes in Washington, Oregon, and Idaho have little or no impairment. Most of the lakes in Alaska for which data are available are unimpaired. However, some major lakes within the Region are approaching a level of eutrophication that interferes with their desired uses. Some is from the natural aging of the lakes. The challenge for the future is to prevent further cultural eutrophication and where possible to correct present problems. EPA's Clean Lakes program is providing for the rehabilitation of some damaged lakes along with a management plan to assure that the rehabilitated lakes remain clean. Through programs such as this, many of the high-use recreational lakes in the Region are being restored and preserved for future generations.

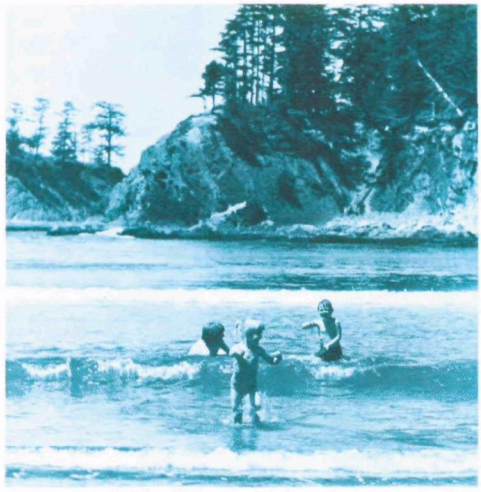
Figure 19.
Impairment Status of Recreational Lakes in Region 10

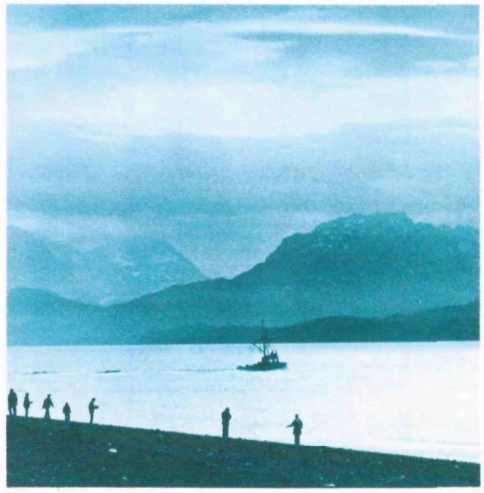


Based upon evaluation of 145 Region 10 lakes

Marine Water Quality







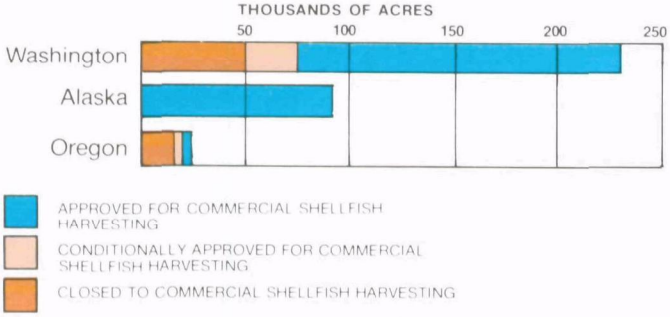
A Regional Overview

A total of 349,000 acres has been classified as commercial shellfish growing area in Region 10. This represents approximately 2 percent of the classified growing waters in the Nation. Of the regional growing area, 72 percent is classified as approved, 9 percent conditionally approved, and 19 percent closed (Figure 20). Regionally, Washington contains the largest percentage of the total classified area (65 percent of 228,900 acres), followed by Alaska (27 percent or 92,400 acres), and Oregon (8 percent or 28,100 acres), as shown in Figure 20.

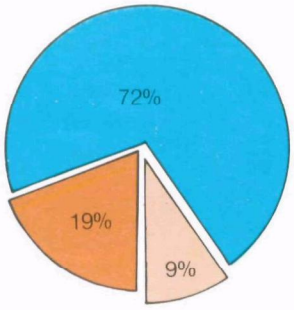
Fecal contamination or the great potential for such contamination due to proximity to municipal sewage treatment facilities accounts for most of the closed area. The conditionally approved areas are characterized by excessive coliform contamination from seasonal increases in freshwater runoff from agricultural and forestry activities as well as the occasional malfunctioning or bypassing of sewage treamtent plants. The presence in shellfish of a naturally occurring biotoxin, paralytic shellfish poison (PSP), has resulted in the closure of growing areas; however, commercial shellfish harvesting has not been restricted because of chemical or radioactive contamination.

Sewage wastes associated with population growth appear to pose the greatest threat to approved shellfish growing areas in Region 10. Because of the small size of Oregon's shellfish industry and the generally undeveloped nature of Alaskan clam resources, future changes in Washington's commercial shellfish areas would probably have the greatest impact on the regional economy.

Figure 20.
Status of Classified Shellfish Growing Areas in Region 10



Areas depicted represent only those portions of the total estuarine and coastal areas that have been classified by the state shellfish control agencies



Regional Summary: Percentage of the Region's active shellfish areas that are open for harvesting.

Noise

When sound levels become loud enough to be disagreeable and are instead called noise (unpleasantly loud sounds), they also become a threat to human health. The problem is not limited to acute situations such as occupational noise that can cause hearing loss, but also includes chronic community noise, which affects us physically and mentally by causing nervousness, tension, and loss of sleep.

In an annual housing survey conducted by the U.S. Department of Housing and Urban Development, noise has consistently been the most frequently cited undesirable condition in residential neighborhoods, and has been one of the leading reasons for residents wanting to move.

Noise generated by transportation dominates the problem—airplanes, trucks, passenger vehicles, and motorcycles, and even motorboats and snowmobiles are all contributors.

The Federal Noise Control Act of 1972 gives EPA authority to set standards for cars, trucks, interstate railroads, aircraft, etc. However, the primary responsibility for control of noise rests with state and local governments. EPA has assisted Oregon and Washington in developing noise regulations, has helped Anchorage, Seattle, and Portland in developing noise control ordinances, and has assisted with monitoring of noise levels from railroad locomotives, ferries, and auto and motorcycle racetracks. Table 6 lists the cities and counties in Oregon, as well as Alaska and Washington, that have passed noise ordinances, and indicates the level of enforcement by the agencies responsible.

In Idaho, however, there is no active state noise control program for stationary or motor vehicle noise sources. At the local level, only ordinances for nuisance-type noises exist. The city of Boise conducted a city-wide noise survey in 1977 for use in planning.

Table 6.
Region 10 Cities and Counties with Local Noise Ordinances

CITIES/COUNTIES WITH ORDINANCES	TYPE OF ORDINANCE	ORDINANCE CURRENTLY ENFORCED
WASHINGTON		
Columbia	E,M,N	E,M,N
Dupont	E,M	E,M
Everett	E (com & res only)	E - Safety
	M	M - Police
Lynnwood	N	N - Police
Monroe	N	N - Police
N. Bonneville	E	E - Police/Planning
Olympia	M	M - Police
Othello	N	N - Police
Poulsbo	E,M,N	EMN - Police
Seattle	E,M,N	E - Health Dept
		M,N - Police
Snohomish	E,M,N	E - City Manager
Winslow	E,M,N	M,N - Police
Clallam Co.	E	U
Clark Co.	N - dog control	N - Humane Society
Kitsap Co.	E	E - Sheriff
Snohomish Co.	E - res only	E - Sheriff/Health
King Co.	E,M,N	E - Health Dept
		M,N - Police
OREGON		
Eugene	M	M - Police
Milwaukie	N,O	N,O - Police
Dallas	N	N - Police
Monroe	M	M - Police
Portland	E,M,N,O	E - Neighborhood Env.
		M,N,O
Salem	N	N - Police
West Linn	N	N - Police
Winston	M	M - Police
Multnomah Co.	O	O - Police
ALASKA		
Anchorage	E,M,N	E - Health & Env. Protection

E- Environmental/land use N- Nuisance
M- Motor Vehicle O- Offroad Vehicles

Drinking Water Quality

In 1974, Congress enacted the Safe Drinking Water Act, which established a national program to ensure pure water from the Nation's quarter-million public water systems. There are 60,000 community water systems serving resident populations, and 200,000 non-community water systems serving non-resident populations in such facilities as campgrounds and highway rest-stops. The Safe Drinking Water Act regulations became effective for community water systems in 1977 and for non-community water systems in mid-1979.

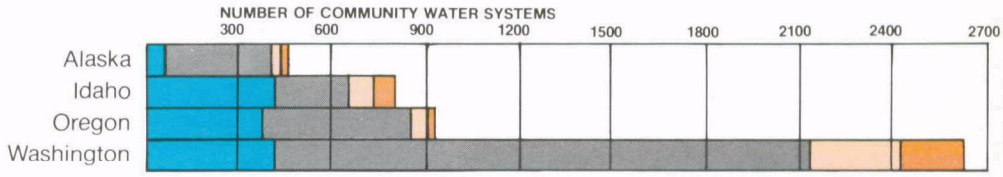
EPA's role under the Safe Drinking Water Act is to establish standards for drinking water quality and to assist states in developing preventive public health programs. The states in turn are to assure that public water systems comply with the EPA standards and to implement such preventive programs as proper construction, operation, and maintenance of public water system facilities. In Idaho, the Safe Drinking Water Act is being implemented by the State Department of Health and Welfare. Idaho has approximately 850 community water systems and over 1,400 non-community water systems.

The Safe Drinking Water Act regulations address contaminants which cause both acute (short-term) and chronic (long-term) diseases. Microbiological contaminants, turbidity (which increases the risk associated with microbiological contaminants), and nitrate all may result in disease if contaminated water is consumed only once or for a very short time. Heavy metals, pesticides, and radiochemicals, at the low levels commonly found in drinking water, result in disease only if contaminated water is consumed for several years or more. Therefore, Idaho has initially emphasized the acute contaminants, particuarly bacteria, in implementing the community water system program.

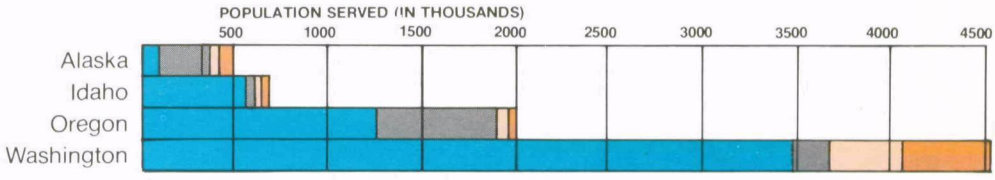
Figures 21a and b show the degree of compliance attained in Idaho in 1978 for EPA regulations for microbiological contaminants. There are 440 community systems (55 percent) that comply with EPA regulations; they serve 83 percent of the state's populaton. Data for 26 percent of the systems, serving 53,000 people, are insufficient to judge compliance. Nineteen percent of the community systems, serving approximately 11 percent of the population, experience major or minor violations.

Figure 21.
Compliance with EPA Drinking Water Standards

a. Community Water Systems



b. Persons Served by Community Water Systems



IN COMPLIANCE WITH BACTERIOLOGICAL CONTAMINANT LEVELS

MINOR (1 MONTH) VIOLATION OF CONTAMINANT LEVEL

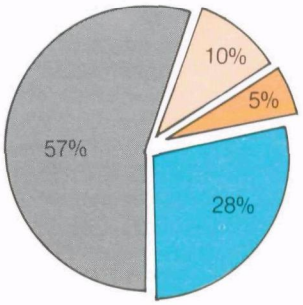
MAJOR (2 OR MORE MONTHS) VIOLATION OF CONTAMINANT LEVEL

SUFFICIENT DATA NOT AVAILABLE TO DETERMINE COMPLIANCE

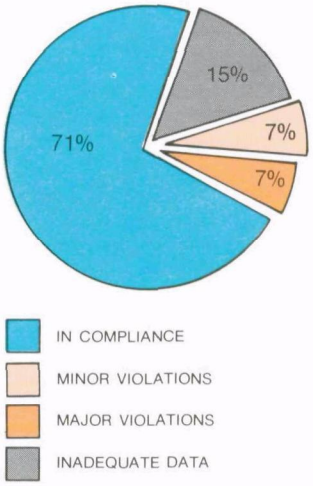
Idaho's preventive public health activities include detailed reviews of water system plans and specifications prior to construction of such facilities, routine inspections of water systems to locate public health hazards which may not be determined from evaluations of water quality information, and informal technical assistance to water treatment plant operators regarding operation and maintenance problems.

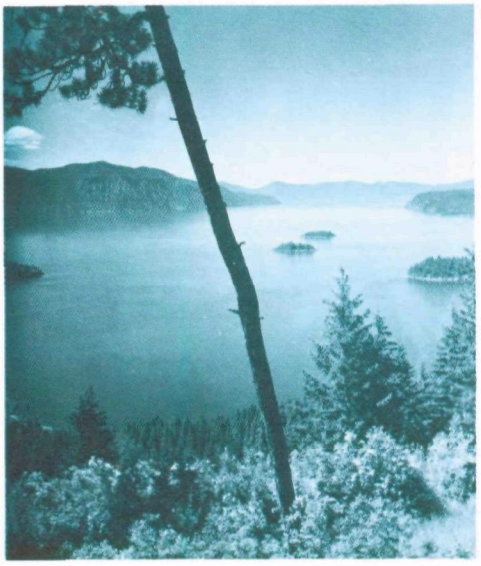
On a regional basis, only 28 percent of the community water systems comply with regulations for bacterial contamination; however, this includes 71 percent of the population served by such systems (Figures 22a and b). Data are inadequate to assess compliance in 57 percent of the systems, and in 15 percent, major or minor violations of regulations on bacterial contamination have been reported.

Figure 22.
a. Regional Summary Based on Percentage of Community Water Systems

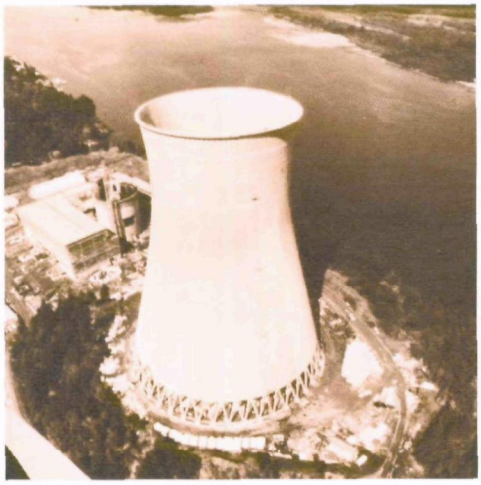


b. Regional Summary Based on Population Served by Community Water Systems





Solid Waste and Hazardous Substances



When a product has reached the end of its useful life, it is normally thrown away. Discarded items typically end up in a landfill or illegally dumped elsewhere—out of sight, out of mind. Scarcity of land for solid waste disposal, concern about limited resources, and serious health hazards arising from improper disposal of toxic substances prompted Congress to pass the Resource Conservation and Recovery Act (RCRA) in 1976. The following section summarizes the waste problems addressed through RCRA in the Pacific Northwest, as well as hazards dealt with by other means.

Solid Waste Disposal

The Resource Conservation and Recovery Act provides for criteria to be established for landfill operations. In the past, municipal landfills have often been open dumps. Open burning of wastes has been virtually eliminated from Region 10, but many environmental problems related to improper disposal of municipal waste remain. (Disposal of hazardous waste is discussed below.) Water pollution is the major concern. Rainwater draining over the surface of a fill, or filtering into the ground through the wastes, can dissolve (leach) such undesirable substances as chemicals and bacteria into streams and groundwater. Because of the higher rainfall and greater population west of the Cascades, leachate problems there have been more numerous and serious than in more arid parts of Region 10. As a result of RCRA, new landfills have been designed and some old landfills are being upgraded to include leachate collection and treatment systems. Recently constructed landfills such as those in Lane County, Oregon, and Snohomish County, Washington, have been engineered for leachate collection and treatment. Older landfills which had serious leachate problems, such as the Cedar Hills landfill in King County, Washington, are beginning to install leachate collection systems which pump leachate into the sewage treatment system. Other landfills may have to be closed altogether.

Sewage sludge disposal is an increasing problem as water pollution requirements become stricter and landfill space becomes scarce. Alternatives such as incineration and using the sludge on farm or forest land are being tried. Certain areas have special disposal problems. In Alaska, for example, severe cold makes disposal difficult.

There are other disposal problems, some of which result from improper practices. For example, when garbage decomposes methane gas is produced as a by-product. Methane is toxic to vegetation and is explosive in certain concentrations. Decomposition can also produce odors. Household wastes, in particular, may attract disease-carrying rodents and insects. Proper disposal operation, including daily cover and proper compaction, will reduce many of these problems.

Resource Recovery

RCRA provides financial assistance for cities and public solid waste management authorities to develop and implement comprehensive solid waste plans, including environmentally sound disposal methods and resource recovery and conservation programs. Some municipal wastes, such as glass, metal, and newspaper, can be recycled; and much of the rest can be converted to "refuse-derived fuel" (RDF) or burned to produce steam or electricity. Lane County, Oregon, and Tacoma, Washington, are testing RDF plants. Moscow, Idaho; Portland and Roseburg, Oregon; and Cowlitz County, Snohomish County, and King County, Washington, are also studying the feasibility of converting waste to energy. The economics of recycled materials are typically very good in the Portland and Puget Sound areas, but recycling programs in Idaho and Alaska suffer from higher transportation costs.

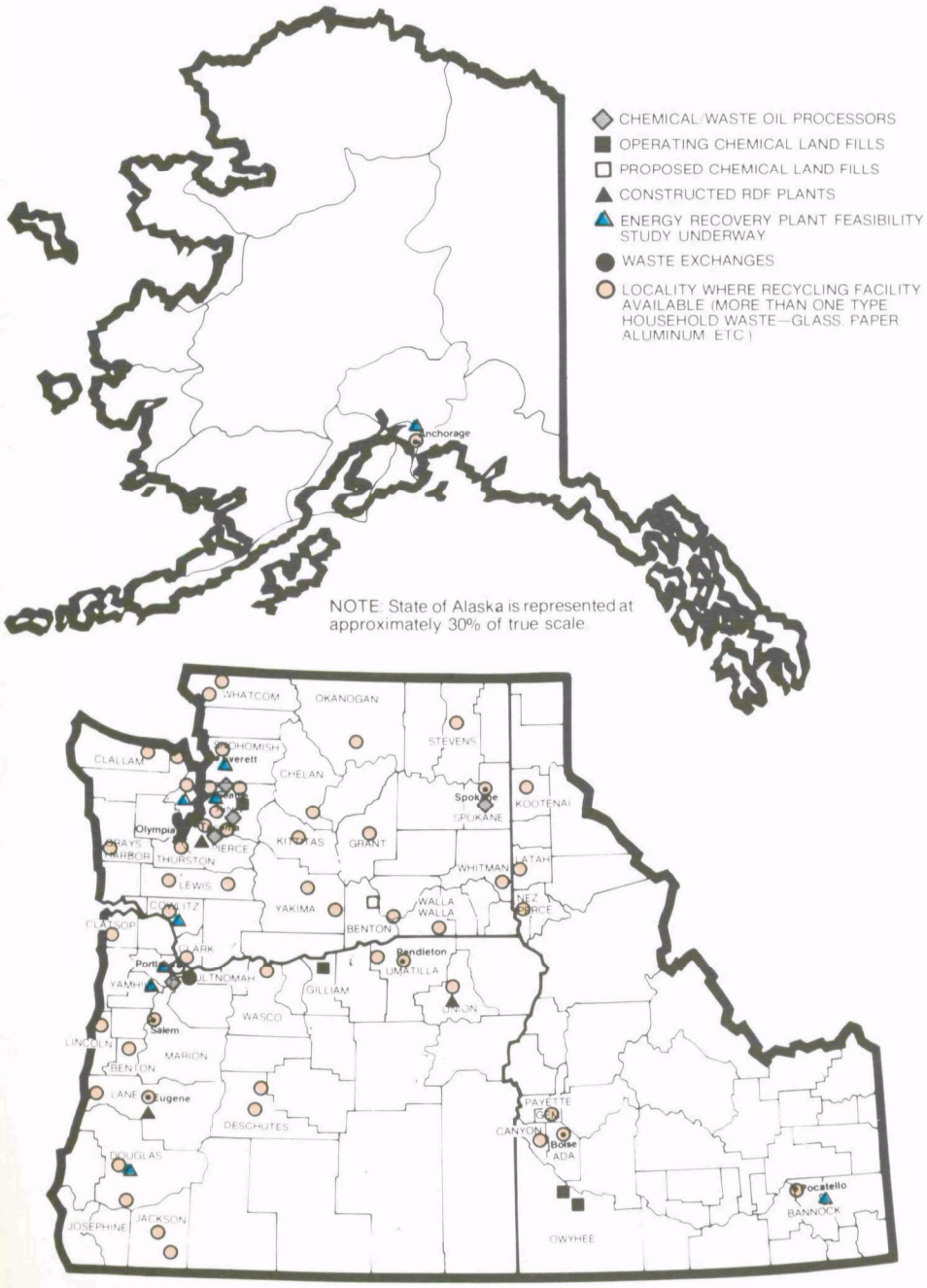
Other wastes which have potential for recovery and at the same time present serious disposal problems include tires, lubricating oil, and wood waste. Discarded tires gradually work to the surface in a landfill, where they trap water and become a breeding place for mosquitos; and they are a fire hazard. Recently, shredded tires have been used as a fuel in boilers at the Georgia-Pacific plywood mill in Toledo, Oregon. Waste lubricating oil used on roads as a dust suppressant can contaminate air and water, and lead in the oil makes indiscriminate burning or disposal undesirable. Oregon recently passed a Used Oil Collection Act, providing for designated collection centers, which will encourage re-refining of waste oil. Wood waste, which can pollute water resources and consume significant space in landfills, is presently being used to produce steam in several northwest timber mills and utilities. It may also be used in combination with refuse-derived fuel.

Hazardous Materials

The Resource Conservation and Recovery Act mandates government control of hazardous waste from its generation to ultimate disposal, including a manifest system and a permit system for treatment, storage and disposal facilities. Figure 23 shows locations of disposal sites in Idaho.

Compared to other parts of the country, there are fewer industrial sources of hazardous waste in Region 10. Most of it is created by manufacturers of chemicals, pesticides, and metals; petroleum refineries; and electroplating operations. These sources are concentrated around Puget Sound and in the Willamette Valley. In agricultural areas of the Region, the primary source of hazardous waste is discarded pesticide containers.

Figure 23.
Location of Hazardous Waste and Recovery Sites in Region 10



For RCRA to be effective, acceptable waste disposal sites must be available. There are two state-licensed chemical landfills in Region 10 at Arlington, Oregon, and Grandview, Idaho. A third has been proposed on the U.S. Department of Energy's Hanford Reservation in Washington. The availability of such landfills, coupled with the active involvement of Region 10 states in hazardous waste management, has helped prevent serious incidents involving hazardous wastes from occurring in the Region. Nevertheless, there is opposition to using these landfills to dispose of wastes from out-of-state. In addition, RCRA does not address the problem of abandoned facilities, which have posed serious health hazards elsewhere in the country in several documented instances. A national trust fund for cleanup of abandoned sites has been proposed and an inventory of such sites is being conducted.

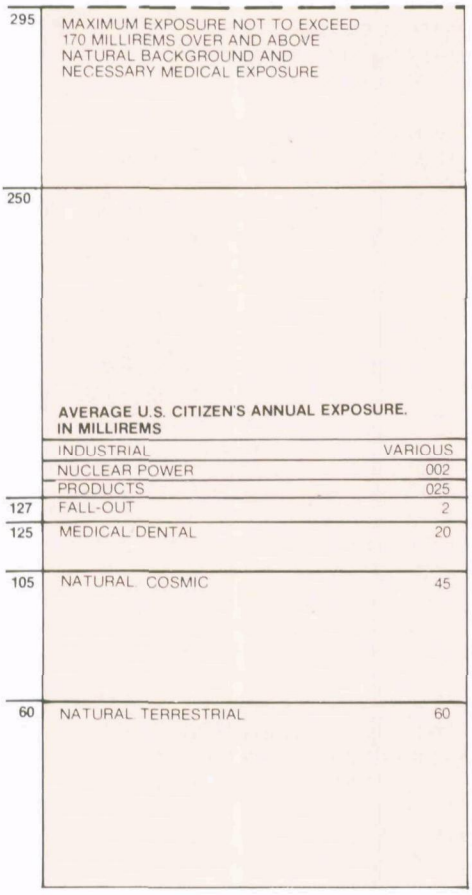
Besides landfilling, there are several other approaches taken to waste management in the Northwest. Waste exchanges in Portland and Seattle assist parties wishing to dispose of a hazardous substance in locating a second party that can use or recycle the material, thereby eliminating a need for disposal. The second party may be a chemical processor that uses the waste as feedstock for another product. Regulations determine how some substances are used; for instance, labeling and disposal procedures have been established for the more than 800 facilities in Region 10 using or storing polychlorinated biphenyl (PCB), a highly toxic substance used in electrical transformers and capacitors. Some efforts have also been made to rectify past uses of hazardous substances. Each state in Region 10 will participate in a voluntary national program to reduce the exposure of school children to asbestos fiber found in older school buildings. In addition to long-term management plans, emergency response plans have been developed. Units within several fire departments, including Seattle and Tukwila, Washington, have been trained to deal with incidents involving hazardous materials.

Radiation

As Figure 24 shows, every person is exposed to radiation from naturally occuring, inescapable sources like cosmic rays and soil. Normally, less than half a person's radiation exposure is man-made. The data in Figure 28 are based on national statistics, but are representative for Region 10 as well.

Because the genetic and cancer-causing effects of radiation are thought to be additive or cumulative, the radiation dose to individuals must be kept to the lowest practicable level. EPA limits the radiation dose to individuals and to the total population by monitoring radiation, and by setting and enforcing regulations on radioactivity in air, drinking water, surface water, and waste materials, and from nuclear power plants.

Figure 24.
Average Amount of Exposure to Radiation, Per Person Per Year



Pesticides

Pesticides are poisons for controlling insects, weeds, or rodents. Improperly used, they can harm other organisms besides their target, causing illness or death. The regulation of pesticides poses some complex policy and technical issues. Conventional chemical pesticides, by their very nature, are hazardous, but they are widely viewed as necessary to maintain agricultural productivity. In addition, the hazards of pesticides, especially the long-term effects, are difficult to assess.

The law that gives EPA authority to regulate pesticides is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Pesticide producers are inspected, and they and their product must be registered with EPA. Testing of pesticide products, labeling for consumer use, and annual reporting are also required of manufacturers.

The EPA and state agencies work together to regulate the manufacture and use of pesticides. During 1979, EPA had cooperative enforcement agreements with the Idaho, Oregon, and Washington State Departments of Agriculture. This means that primary enforcement responsibilities covering such things as fines, restricting use, and suspending licenses, rest with the state, but EPA can take further action if warranted.

The major thrust of the FIFRA program is directed toward pesticide users. Since 1976, EPA has worked with the states in developing training and certification programs. Applicators of restricted use pesticides (pesticides with greater potential for causing adverse effects) must be certified to ensure that they are competent in the use of these pesticides. EPA and the states combine efforts to see that pesticides are being used according to label directions.

After pesticides are used, the Food and Drug Administration is responsible for checking that pesticide residues on raw agricultural commodities are within required limits.

Environmental monitoring for pesticides, through the offices of EPA, is conducted by certain state health departments through EPA grants.

Pesticide registration and resulting use can be discontinued at any time EPA determines that unreasonable adverse effects outweigh the benefit from continued use of the pesticide. If further restricting use of the pesticide cannot correct the problems, ultimately the product can be cancelled or suspended. For example, EPA recently took emergency action to suspend products containing 2,4,5-T and Silvex.

Photo Credits

Cover (upper left)	Idaho Division of Tourism and Industrial Development
Cover (upper right)	Idaho Division of Tourism and Industrial Development
Cover (lower left)	Idaho Department of Commerce and Development
Cover (lower right)	Idaho Division of Tourism and Industrial Development
Page 1	R. R. Thiel
Page 7	Idaho Department of Commerce and Development
Page 8	Idaho Department of Commerce and Development
Page 9 (lower left)	Documerica
Page 13	Idaho Department of Commerce and Development
Page 15	Idaho Department of Commerce and Development
Page 17	Idaho Division of Tourism and Industrial Development
Page 20 (center)	Oregon State Highway Travel Section
Page 20 (right)	ATMS photo by Bob and Ira Spring
Page 22	C. Bruce Forster, Portland, Oregon
Page 23 (left)	Idaho Division of Tourism and Industrial Development
Page 23 (upper right)	Idaho Division of Tourism and Industrial Development
Page 24	Documerica