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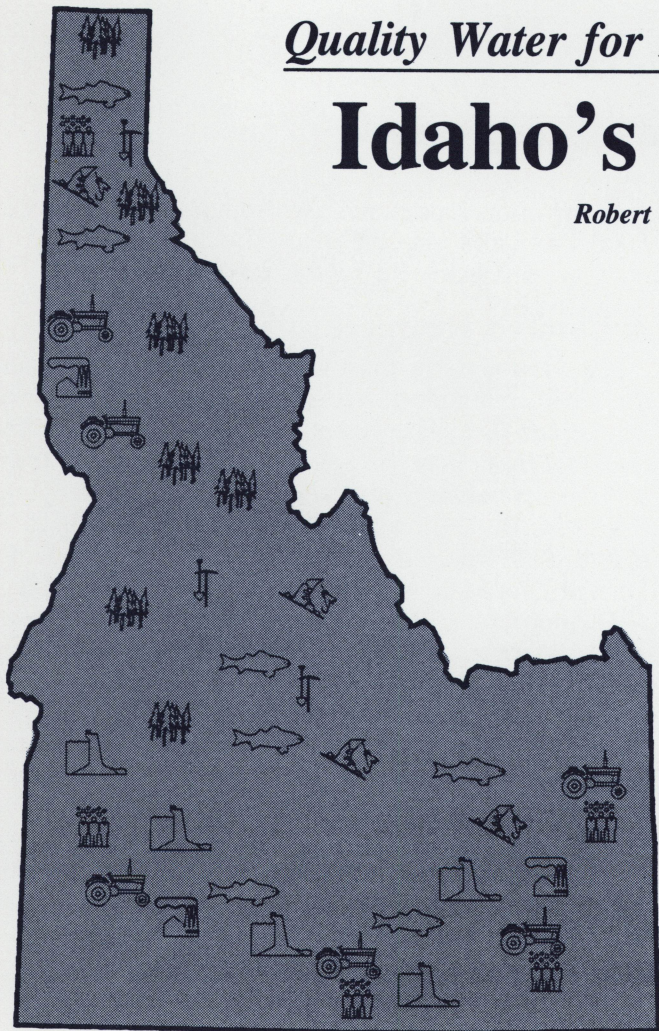
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Quality Water for Idaho

UNIVERSITY OF IDAHO

Idaho's Water Resource

Robert L. Mahler and Mark M. Van Steeter



Water is a finite resource essential to life. Water sustains Idaho's fish and wildlife, agriculture, industry, mining, forestry, hydropower generation, recreation and growing population (Fig. 1). Idaho's rivers and lakes are renowned for their water sports and provide some of the most spectacular natural scenery in the world. Water is precious, and its management determines the quality of Idaho's environment.

Water Use in Idaho

Idaho is the second-largest water user in the United States, consuming 22.3 billion gallons per day. Only California uses more. On a per capita basis, Idaho is the nation's top water user — 22,000 gallons per person daily (Fig. 2). Idaho is also the country's fourth largest user of groundwater. Groundwater comprises only 22 percent of Idaho's total water use, but it accounts for nearly 95 percent of our drinking water.





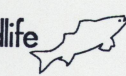



Water in Idaho's Past

Initially, water provided an abundant fishery and a means of travel for Idaho's Indians. In 1805, Lewis and Clark navigated Idaho's rivers on their journey west.

Irrigated agriculture in Idaho began in 1843. By 1899 more than half a million acres were under irrigation. By 1905 irrigation drew so much water from the Snake River that a 10-mile stretch near Blackfoot went dry. People then first realized the limits of Idaho's water resources. They responded in 1906 by building Milner Dam, Idaho's first large irrigation storage project. In 1945, surface water in southern Idaho became limited so irrigators turned to groundwater to help irrigate what is today more than 4.1 million acres.

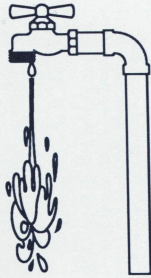
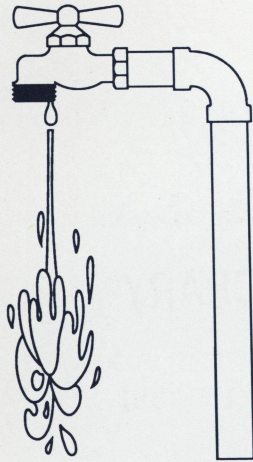
Water Users Today

Agriculture is Idaho's largest industry and its largest water user. Agricultural water use in Idaho averages 21.6 billion gallons per day. Agriculture accounts for 97 per-

- | | |
|---|--|
| Agriculture  | Hydropower  |
| Forestry  | Mining  |
| Fish & Wildlife  | Industry  |
| Recreation  | Population  |

1. Idaho's water users.

5
3
322



22,000 gallons/person/day
IDAHO

13,052
Wyoming

1,408
U.S. Average

1,385
California

Fig. 2. Total per capita water use.

cent of Idaho's total water use (Fig. 3) and about 15 percent of the nation's total agricultural withdrawals. Only California uses more agricultural water (Fig. 4).

Due in large part to irrigation, Idaho ranks first in the nation in the production of potatoes, barley and commercial trout; second in spearmint; third in sugarbeets, hops, peppermint and onions; fourth in prunes and plums; fifth in dry beans and sweet corn; and sixth in alfalfa hay and sweet cherries. Between 1987 and 1990, Idaho's average annual agricultural commodity sales exceeded \$2.2 billion.

Industry and mining account for 2 percent of Idaho's water use. Mining uses about half of this water; food processing operations and pulp and paper mills use the rest.

Domestic and commercial water use (for homes, restaurants and office buildings) comprises only 1 percent of Idaho's water use. Although the percentage of total use is small, per capita use is high. Idahoans use nearly 311 gallons per person per day in their homes and businesses — more than the residents of any other state (Fig. 5).

Recreation and tourism are also water dependent. Idaho's world-class fishing, backpacking and river run-

ning attract outdoor enthusiasts from all over the world. Tourist revenues contribute over \$1 billion annually to the state, at least half of it natural resource related.

A Limited Resource

Idaho is one of the most water-rich states in the country, with a multitude of rivers and lakes. It has the Snake, Salmon and Clearwater rivers and large lakes such as Pend Oreille, Priest, Henry's, Spirit and Coeur d'Alene. Idaho also has several large reservoirs such as American Falls, Dworshak, Lake Lowell and Anderson Ranch. Because of this abundance, some Idahoans take their water for granted. Yet Idaho's water is limited and vulnerable.

The population of Idaho is expected to increase by 10 to 30 percent in the 1990s. Growth will probably continue well into the following decade due to immigration from the Pacific Coast and the eastern United States and due to Idaho's relatively high internal birth rate. Population growth will increase the demand for clean, abundant water. At the same time, increased waste disposal and industry associated with growth may threaten water quality.

A larger population will demand more electricity from hydropower. Hydropower requires substantial stream

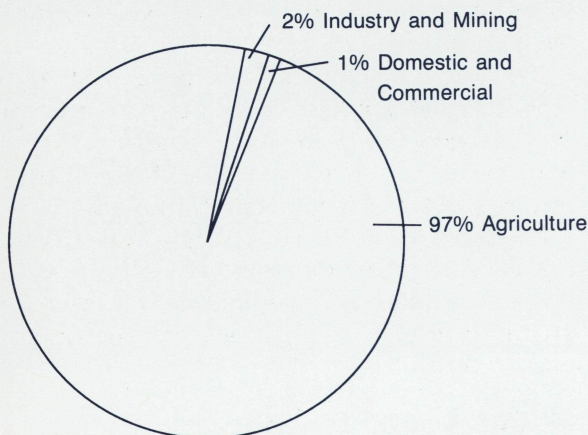


Fig. 3. Distribution of water use in Idaho. Agricultural water use includes trout farming.

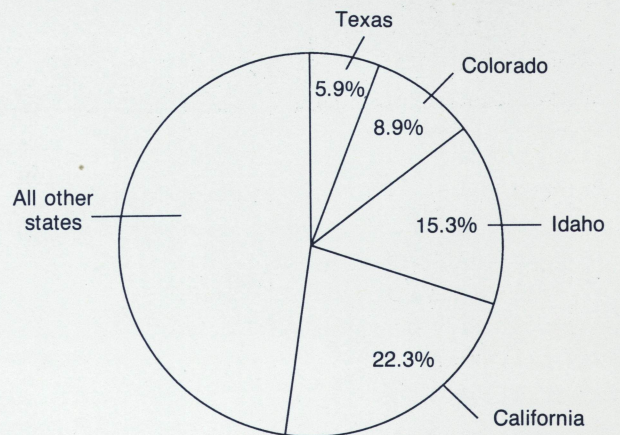


Fig. 4. Distribution of water withdrawals for agriculture in the United States.

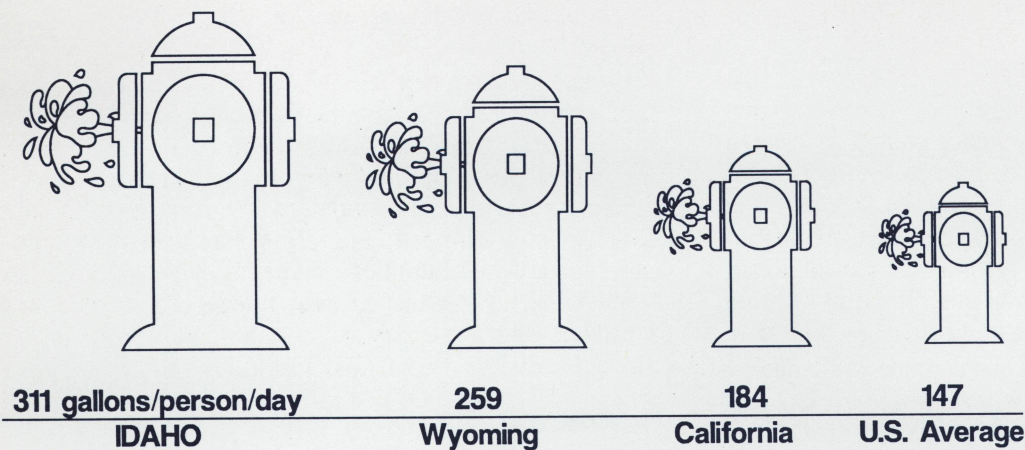


Fig. 5. Per capita water use in businesses and homes.

flows, which conflict with the needs of other users for water withdrawals. This conflict shows up in the Snake River, which provides southern Idaho with much of its irrigation water and is also the largest hydropower producer in the state. Conflicts among uses become even more complex when one considers recreation and fisheries.

Migratory fish of the Snake River drainage have been harmed by dams, and some are threatened with extinction. As a result, the National Marine Fisheries Service has been asked to list several species of salmon as threatened or endangered. Listing could lead to a decision by the federal government to manage the dams more for the benefit of the fish. If the government decides that the fishes' survival depends on greater river flows, listing could also limit agricultural withdrawals.

Groundwater is another excellent source of water, but it, too, is limited. Several aquifers (areas of underground rock, gravel or sand that contain water) in Idaho are shrinking because water removals exceed natural aquifer recharge. In a few aquifers the water table has dropped approximately 10 feet over the past 4 or 5 years. To stem aquifer level declines, water withdrawals have been limited in nine critical groundwater areas in the state. Idaho's critical aquifers include the Raft River Valley, Cottonwood-Oakley Fan, Blue Gulch and Mountain Home aquifers.

Just as Idaho's water supply is under increasing pressure, it is unlikely to expand to meet growing needs. Ecological concerns, the downstream water rights of other states and the end of large federally subsidized water projects all argue against increasing supplies. In addition, hydrologic data show a trend of decreasing precipitation in the mountains of the state over the past 30 years.

Idaho does not have enough water for all uses to grow indefinitely nor do all uses maintain water quality. Idahoans must carefully manage their limited water resources to ensure enough high-quality water for the future.

Water Quantity — What Idaho Can Do

Much can be done to increase the efficiency of water use in Idaho. The most water can be conserved by the agricultural sector mainly because it accounts for 97 per-

cent of the state's water use. For example, the flood irrigation now practiced on 1.3 million of Idaho's 4.1 million irrigated acres could be replaced by modern sprinkler irrigation. Investing in new sprinkler irrigation equipment, although initially costly, would save water without reducing crop yields. New water management strategies including surge and trickle systems would also save water.

Another way farmers can save water is by closely monitoring soil moisture and irrigating only when the crop is in need. Lining irrigation canals can also save large quantities of water, but this practice can dry up the artificial wetlands created by leaky canals, destroying important waterfowl habitat.

Efficient water use in homes and businesses will become increasingly important as the population grows. Homeowners can save water by landscaping with native vegetation and watering in early morning. Native vegetation requires less water, and early-morning watering allows the water to penetrate the soil before the hot sun can evaporate it. Both homes and businesses can save water by installing low-flow faucets, toilets and shower heads. Together, these devices can cut indoor water use by one-third.

Water Quality — What Idaho Can Do

Even an unlimited water supply is of little use unless it is of adequate quality. Major players in preserving and enhancing Idaho's water quality include the mining, timber and other industries, agriculture and urban centers.

Logging practices have a major effect on water quality. The major threats from logging are erosion and stream sedimentation caused by improper road building and by transporting trees from the forest to the road. Sedimentation can degrade habitat for fish and interfere with river navigation.

To avoid erosion and sedimentation, timber harvests should be carefully planned to consider slope, soil stability and distance from streams and lakes. Riparian areas (streamsides and shorelines) and wetlands are important for preserving water quality because their vegetation filters out sediment and debris that otherwise would enter the water. Erosion and sedimentation can be minimized through careful road building, low-impact log removal

and preservation of uncut "buffer zones" around riparian areas.

Water quality is also affected by grazing in riparian areas. Livestock prefer the lush vegetation near water, and overgrazing may result in trampled vegetation, broken down stream banks and increased stream sediment, water temperature and bacteria from livestock defecation in and around the stream. A few management strategies include reducing the number of livestock in riparian areas, fencing off areas for rehabilitation and allowing riparian grazing only during seasons least sensitive to damage.

Mining and industrial activities can degrade water quality by polluting waterways with heavy metals and toxic chemicals. For example, the South Fork of the Coeur d'Alene River is limited to industrial use only because of high concentrations of lead, zinc, arsenic and cadmium from past mining.

Point source pollution (pollution that can be tracked to one source, such as a factory) from industry and mining is generally high in concentration and depends upon dilution to decrease toxicity. Where dilution is inadequate, pollutants can be treated at the source with modern pollution control equipment.

Agriculture can have a substantial impact on water quality in Idaho because it is practiced on more than 13 million acres of land. Both sediment and agricultural chemicals (fertilizers and pesticides) can impair water quality. Practices such as conventional tillage on steep slopes and excessive irrigation promote field erosion and sedimentation of lakes and streams. Farmers can minimize erosion by contour farming, leaving crop residues to hold back soil, building basins to catch sediment and protecting stream banks.

Pesticides and fertilizers have extended human lives, improved the quality of life and provided us with a safe and inexpensive food supply. However, when misused, many of them can be dangerous. Fish kills, reproductive failure in water birds and human illness have all been attributed to exposure to or ingestion of some agricultural chemicals in water, usually as a result of illegal use, misapplication, spills or careless disposal of unused pesticides or pesticide containers. To protect water quality, grow-

ers should use best management practices (BMPs) and follow pesticide labels.

Households can degrade water supplies by improperly disposing of common chemicals used around the home, workshop and garage. Furniture polish, antifreeze, lawn and garden pesticides and paint thinners are just a few of the chemicals that can impair water supplies if poured down sinks or dumped in landfills. Faulty septic systems can expose water supplies to harmful bacteria. And like farm fields, lawns and gardens improperly treated with fertilizers and pesticides can contaminate water supplies through erosion, runoff and leaching.

Summary

Today, Idaho is in the enviable position of having abundant water and water quality much better than the national average. Yet water use will increase. As that occurs, Idaho's water can be managed thoughtfully or abused and degraded. As Idahoans make decisions about preferred uses for their limited water, conflicts are inevitable. The challenge for all of Idaho's water users will be to cooperate in managing water efficiently, maintaining its quality and conserving its quantity.

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