



WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY GROUND-WATER STUDIES IN ALASKA

GROUND-WATER ISSUES

Ground water is largely an untapped resource in most of Alaska. Perennially frozen ground profoundly affects the occurrence and availability of ground water in all but the south-central coastal and southeastern peninsular areas of the State. In many areas, ground-water supplies far exceed current use. In 1985, 72 million gallons per day of water was withdrawn from aquifers in Alaska; this represents about 18 percent of the total water used in the State, excluding hydroelectric-power generation. Of the total quantity of ground water withdrawn, 56 percent was used for public supply, 13 percent for rural domestic supplies, 14 percent for agricultural activities (mostly aquaculture, but including livestock and irrigation needs), 11 percent for self-supplied industrial and mining activities, and 6 percent for coal-fired electric-generating plants. In 1985, ground water was the source for public supplies for about 338,000 people, or 61 percent of the population. The major issues related to ground water in Alaska are:

- Contamination of ground water from leaking fuel tanks, septic tank effluents, and landfill leachates;
- Ground-water levels near land surface in parts of the alluvial plain at Fairbanks;
- Locally declining water levels and decreased well yields at Anchorage and Juneau; and
- Construction and engineering problems caused by the thawing of frozen ground water near the land surface (especially critical to activities related to the exploration and development of petroleum and natural gas from Alaska's Arctic Coastal Plain).

U.S. GEOLOGICAL SURVEY PROGRAMS

The Water Resources Division of the U.S. Geological Survey (USGS) collects and disseminates most of the water data currently being used by various State, local, private, and other Federal agencies to develop and manage Alaska's water resources. This program includes the collection, analysis and dissemination of hydrologic data and water-use information, areal water-resource appraisals, and other investigative studies that address specific water-related problems. USGS activities in Alaska are conducted by scientists, technicians, and support staff located in offices in Juneau, Fairbanks, and Anchorage.

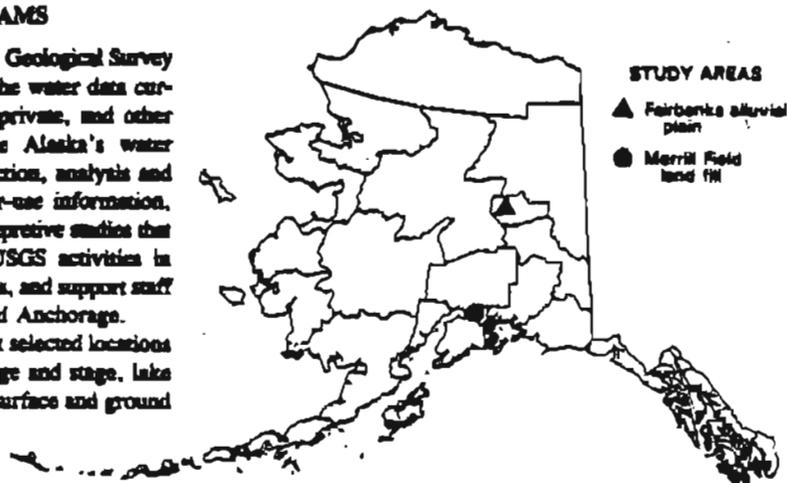
Hydrologic data stations are maintained at selected locations throughout Alaska to record stream discharge and stage, lake and ground-water levels, and the quality of surface and ground

waters. Water resources data are stored in the USGS National Water Data Storage and Retrieval System data base. These data are used by planners and others involved in making decisions that affect Alaska's water resources.

During 1987, the USGS, in cooperation with State, local and other Federal agencies, maintained about 275 observation wells in Alaska to monitor fluctuations in water levels. Most of these wells are used to obtain data for specific projects, but some wells are used to measure long-term changes in water levels. These measurements are used to monitor trends in water levels owing to natural fluctuations in recharge and discharge of the aquifers, and to detect the response of ground water to man-induced changes in the hydrologic system.

The USGS has conducted more than 150 hydrologic investigations in Alaska. Assessment of Alaska's ground-water resources began in the late 1940's with reconnaissance-level studies of the occurrence and development of ground water in many areas throughout the State. More comprehensive investigations followed as demand for public supplies increased in the principal population centers. Other studies have addressed the distribution of permafrost, its effects on the distribution and availability of ground water, and the unique construction and engineering problems posed by frozen soils. USGS scientists in Alaska have also studied the intensive water demands and associated effects of urbanization on the hydrologic environment.

During 1987-88, 14 Federal, State, and local agencies entered into interagency or cooperative cost-sharing agreements with the USGS to conduct 23 hydrologic investigations in Alaska.



Ten of these investigations addressed some aspect of either the quantity or quality of ground water. Two examples of ground-water studies being conducted by the USGS in Alaska are described in the following sections.

Ground-water Levels in the Fairbanks Alluvial Plain

Shallow ground-water levels in the Fairbanks alluvial plain, especially those near the Chena and Tanana Rivers, concern those who occupy or plan for the use of those lands. Owners of homes and other structures built in low-lying areas have reported ground-water seepage into basements and septic tanks. Such "ground-water flooding" occurs as the water table rises in response to high water stages in the two rivers. The USGS, in cooperation with the Fairbanks North Star Borough, is collecting the information needed to prepare water-level maps and to analyze the relation between ground-water levels and stages of the Chena and Tanana Rivers. This information is needed by Borough planners, property owners, and developers to design and locate homes, septic systems, and commercial buildings in areas subject to minimal damage from ground water.

Contamination of Ground Water from Merrill Field Landfill

The Merrill Field landfill at Anchorage was closed in late 1987 after nearly 40 years of use as a solid-waste disposal site. The landfill covers part of a wetland area at the headwaters of the North Fork of Chester Creek. The water table is near the land surface in this area, and some of the refuse has continuously contributed leachate to the aquifer. Under a cost-sharing agreement with the Municipality of Anchorage, the USGS has recently completed a study that defined the extent of contamination of the shallow aquifer beneath the wetlands downgradient from the landfill. Results of the study will be used by officials from the municipality to design a network of sampling sites to monitor water quality.

GROUND-WATER MANAGEMENT

The Alaska Department of Natural Resources, Division of Land and Water Management, is responsible for planning and administering the appropriation of water in the State. The department's Division of Geological and Geophysical Surveys (DGGS) provides the water data, technical analyses, and interpretations of hydrologic conditions needed to manage Alaska's water resources. The DGGS cooperates with the USGS and other

Federal and State agencies to coordinate water-data collection and water-resources study activities. The Alaska Department of Environmental Conservation is responsible for implementation of the provisions of the Alaska Water Quality Standards. During 1987-88, the following agencies entered into cooperative cost-sharing agreements with the USGS to conduct ground-water investigations in Alaska.

Alaska Department of Natural Resources
City and Borough of Juneau
Fairbanks North Star Borough
Ketchikan Peninsula Borough
Matanuska-Susitna Borough
Municipality of Anchorage
U.S. Air Force, Space Command
U.S. Army Corps of Engineers
U.S. Coast Guard

SELECTED REFERENCES

- Snyder, E.P., compiler, 1987, Activities of the Alaska District, Water Resources Division, U.S. Geological Survey, 1987: U.S. Geological Survey Open-File Report 87-38, 24 p.
- U.S. Geological Survey, 1984, National water summary 1983—Hydrologic events and issues: U.S. Geological Survey Water-Supply Paper 2250, 243 p.
- , 1985, National water summary 1984—Hydrologic events, selected water-quality trends, and ground-water resources: U.S. Geological Survey Water-Supply Paper 2275, 467 p.
- Williams, J.R., 1970, Ground water in permafrost regions of Alaska: U.S. Geological Survey Professional Paper 696, 83 p.
- Zonow, Chester and Anderson, G.S., 1978, Summary appraisals of the Nation's ground-water resources—Alaska: U.S. Geological Survey Professional Paper 813-P, 28 p.

Information on technical reports and data related to ground water in Alaska can be obtained from:

District Chief
U.S. Geological Survey
Water Resources Division
4230 University Drive, Suite 201
Anchorage, Alaska 99500

Chief, Water Section
Alaska Department of Natural Resources
Division of Geological and Geophysical Surveys
P.O. Box 77-2116
Eagle River, Alaska 99577