

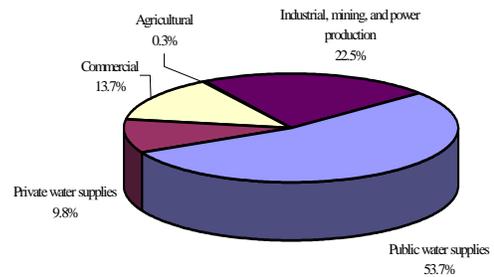
GROUNDWATER IN ALASKA

Groundwater Importance: Alaska’s groundwater resources may be among the greatest in the nation. However, very few of Alaska’s aquifers have been studied (or even located) and limited water quality data is available.

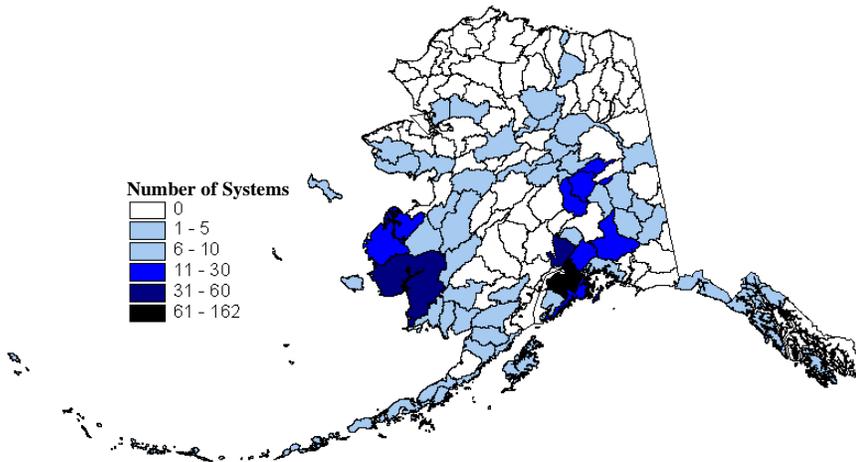
Alaska is sparsely populated by approximately 660,000 residents (approximately one resident per square mile). Urban development is concentrated in a few main population centers, with the majority of people living in southcentral Alaska. Nearly one-half of the state’s population lives in the Municipality of Anchorage. Other major population centers include Fairbanks in the state’s ‘interior’ and Juneau, the state capital, in southeast Alaska. Beyond these major population centers, communities tend to be small and generally not connected by roads.

Groundwater is a source of drinking water for about 50 percent of Alaska’s population, and 90 percent of the state’s rural residents. Eighty-seven percent of Alaska’s 1,546 public drinking water systems use a groundwater source. A small number of public water systems (e.g., Anchorage and several southeastern communities) serve a large number of people from primarily surface water sources. Ninety percent of the private drinking water supplies are groundwater. Of the approximately 330 million gallons of water used each day for domestic, commercial, industrial, and agricultural purposes in Alaska, roughly 23 percent is derived from aquifers¹.

Groundwater withdrawals in Alaska during 2003



Distribution of community & nontransient/noncommunity public water systems in Alaska using groundwater



Groundwater Availability: Groundwater is available in most areas of Alaska, except where permafrost is very deep in the northern part of the state. Southcentral and interior Alaska have the greatest dependence on groundwater. Arctic, western, and southeastern Alaska make more frequent use of streams, rivers, lakes, and rainwater catchments. The largest groundwater withdrawals occur in the Anchorage and Fairbanks areas, and to a lesser extent, the Matanuska-Susitna and Kenai Peninsula Boroughs in the southcentral portion of the state.

Most of Alaska’s aquifers consist of unconsolidated materials derived from glaciers, rivers, and streams. Producing aquifers are typically unconfined (i.e., not protected by a layer of clay or silt), and the depth to groundwater ranges from a few feet to over 400 feet statewide.

Water Quality: Although water quality data is sparse, most of the state’s groundwater is suitable for domestic, agriculture, aquaculture, commercial, and industrial uses with moderate or minimal treatment. Naturally occurring iron, manganese, and arsenic are the most common treatment problems in groundwater systems. Storage and spills of fuel, along with wastewater disposal, primarily from onsite (septic) systems, are common threats to groundwater quality statewide. Additionally, a range of other activities either have potentially or actually affected groundwater quality (e.g., nonpoint pollution in urban areas, natural resource extraction activities in remote locations, and a wide range of potential point sources of pollution). Prevention of human exposure to contaminated groundwater is a main focus of the department’s program to remedy new and historic contamination, where leaking underground fuel tanks and other releases of oil and

¹ Based on an estimate provided by the Alaska Department of Natural Resources

hazardous substances may have occurred. Efforts have been on-going since the late 1980s. Groundwater is known to be contaminated at 1,330 sites. Cleanup of groundwater is a lengthy process and is the biggest constraint to complete closure of contaminated sites. During the cleanup, primary efforts are to prevent use of the water for drinking and to monitor the status of contamination. Alaska's contaminated sites include seven Superfund sites where cleanups have been under way for a number of years.

Cost of Contamination: The cost to clean up (remediate) contaminated groundwater can be staggering. Costs can run into millions depending on site conditions. Installing and operating groundwater remediation equipment and long-term groundwater monitoring are common expenses during remediation.

Efforts to Protect Groundwater: Protection of Alaska's groundwater is largely accomplished through the regulation of contaminated sites, storage tanks, spill response, and specific waste disposal activities under state and federal programs at this time. The Alaska Department of Environmental Conservation (ADEC) manages several programs that contribute to the protection of groundwater, including ADEC's Contaminated Sites, Storage Tank, Prevention & Emergency Response, Industry Preparedness & Pipeline, Solid Waste, Pesticides, Drinking Water, Wastewater, Watershed Development, Water Quality Protection, and Community Assistance & Information programs. US EPA's Underground Injection Control Program, and a number of other important EPA programs, can also have a significant impact on groundwater quality in Alaska.

Division of Water: The Division of Water's, Water Quality Programs are focused primarily on surface water pollution although they are also protective of groundwater since surface water quality can have an impact on groundwater quality through infiltration and percolation. Division activities which protect groundwater quality include the industrial, domestic, and on-site domestic wastewater permitting programs; water quality protection, stewardship, and restoration projects implemented by the Division or funded through the Alaska Clean Water Actions's grant program; and development of waterbody recovery plans and Total Maximum Daily Loads (TMDLs) assessments.

The Division of Water's Facilities Section funds the Village Safe Water Program which provides grants and engineering assistance to small communities for water and sewer projects. The Section administers the Alaska Clean Water Fund and the Alaska Drinking Water Fund which provide loans and engineering support for drinking water, wastewater (sewer), solid waste, and non-point source pollution projects, such as waterbody restoration and recovery. These loan programs are designed for cities, boroughs and qualified private utilities. The Alaska Municipal Water, Sewerage, and Solid Waste Matching Grant Program primarily assist the larger communities and boroughs in the State.

Drinking Water Program: There are 1,775 sources of drinking water that serve 1,546 public drinking water systems (PWS) in the State of Alaska. Of these PWS, 618 are "Class A" systems (community and non-transient, non-community), and 931 "Class B" systems (transient, non-community). In July, 2004, the Drinking Water Program completed Source Water Assessments (SWAs) for each source of drinking water used by Alaska PWS. The SWAs established drinking water protection areas and vulnerability assessments of the risk to PWS from existing and potential sources of contamination. They serve as a foundation or "stepping stone" to comprehensive management and protection of Alaska's groundwater resources and have led to the development of the Alaska Wellhead Protection Program, a voluntary program which provides tools, resources and assistance to PWS owners and operators in developing individual or community-based Wellhead Protection Management Plans (WPMP). A WPMP identifies protection activities directed at existing or potential contaminant risks using the SWAs, establishes a strategy for implementing protection activities, and sets up an implementation schedule.

The SWAs will also be a crucial tool that the State will use to comply with the new (EPA) Ground Water Rule, expected to be promulgated in June, 2005. This Rule requires the State to conduct hydrogeologic sensitivity assessments to identify PWS using a groundwater source that are sensitive to contamination. The basics for these assessments were completed as part of Alaska's PWS SWAs vulnerability assessment.