

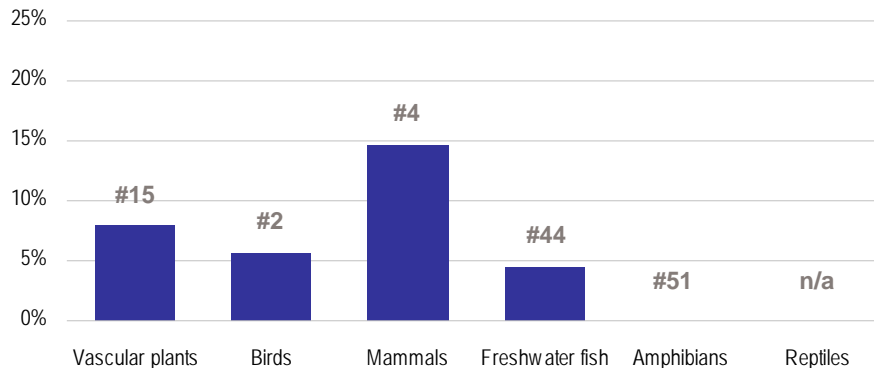
20. Biodiversity

The preservation of biological diversity is essential for environmental health, including that of humans.

Individual species and whole natural communities support subsistence, sport and commercial hunting and fishing, biomedical products, and disease control. Biological diversity also sustains forestry, tourism, wilderness values, as well as ecosystem functions.

A deep understanding and protection of Alaska's biodiversity is critical to a healthy future for Alaska.

% of species at risk (endangered and threatened) in Alaska and rank relative to 50 states and DC, 2002:



Source: NatureServe 2002

SOURCE: Matthew Carlson, PhD, Alaska Natural Heritage Program, January 2004.

Biodiversity in Alaska

Although Alaska is rich in species and ecological processes that are rare or have vanished from the lower 48, biodiversity in Alaska is naturally low relative to most other states even despite our size. This is due to short growing seasons and other biogeographical reasons.

The U.S. Fish and Wildlife Service is responsible for implementing the 1973 Endangered Species Act and produces formal rankings for species of conservation concern to protect species on public lands. Private lands are only affected in the case of listed vertebrates.

Significant populations of vertebrates (for example genetically distinct salmon runs) as well as subspecies or species of invertebrates and plants can be listed as Endangered (threatened with extinction throughout its range), or Threatened (likely to become endangered in the foreseeable future). Species can also be proposed for listing as Candidates. Alaska has the lowest number of listed species (7) in the United States in large part because human-caused threats to rare species are minimal.

Other state and federal agencies produce lists of species which are of conservation concern to each agency and managed accordingly. The Alaska Natural Heritage Program maintains a database of rare plants and vertebrates in the state that is used by NatureServe and other organizations.

While few species are listed by the U.S. Fish and Wildlife Service and wide-scale human-caused landscape disturbances—such as industrial agriculture—have not occurred, a large percentage of the state's mammals, birds, and plants are in fact rare.

Alaska ranks 2nd, 4th, and 15th in percentage of species at risk for birds, mammals, and plants, respectively. Many of these species are naturally very rare and are not threatened by immediate human factors. Others are at risk due to global warming, pollution, incidental take or natural resource-based industries.

Current status

In general terrestrial and freshwater biodiversity in Alaska is secure, although biodiversity in the marine

environment is poorly understood. Management plans are being implemented to reduce threats and increase population numbers of listed species.

Alaska 20/20 notes

The Alaska Department of Fish and Game recently completed a Comprehensive Wildlife Conservation Strategy to qualify for federal State Wildlife Grants. The stated purpose of the strategy is to “conserve the diversity of Alaska's wildlife resources, focusing on those species with the greatest conservation need.” This document may become a regular source of information about biodiversity in Alaska.

Ongoing arguments between environmentalists and resource developers over the conservation status of charismatic megafauna such as polar bears continue.

Alaska is rich in species and ecological processes that are rare or have vanished from the lower 48.

More information

Alaska Department of Fish and Game: www.sf.adfg.state.ak.us/statewide/ngplan/

Alaska Natural Heritage Program: aknhp.uaa.alaska.edu

Threatened and Endangered Species System: ecos.fws.gov/tess_public/TESSWebpage

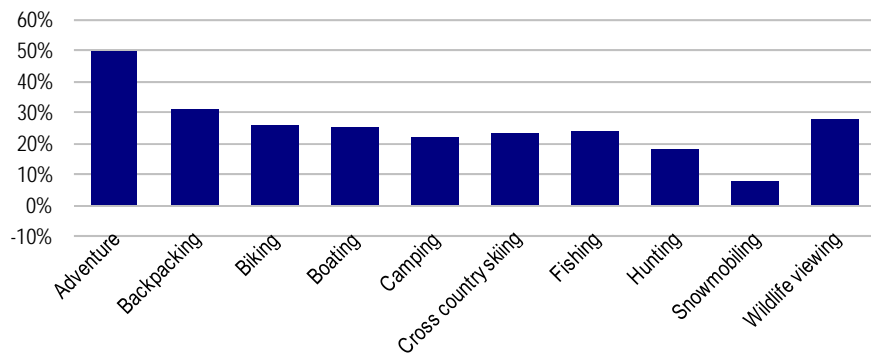
21. Wilderness

Preservation and management of wilderness areas is important for both sound ecological reasons and to support public uses.

Wilderness provides habitat for plants and animals, and the unspoiled nature of wild ecosystems serves as a valuable benchmark for developed environments.

These areas provide significant economic benefits not only through fishing, hunting, tourism and recreation but through thousands of jobs in managing wilderness areas.

Projected change in statewide outdoor recreation participation for selected activities, 2000-2020. Data is not specific to wilderness areas:



Source: Outdoor Recreation by Alaskans

The Wilderness Act of 1964

Wilderness is a legal term defined by the Wilderness Act of 1964. It refers to areas designated by Congress in which permanent structures, roads, logging and mining are prohibited to maintain an area in a natural state.

Alaska has 48 official wilderness areas that total 57 million acres or 15.8% of Alaska's total land area, both the highest figures for any state. This is 54% of all designated wilderness in the nation and includes the single largest area, 9.7 million acres in Wrangell-St. Elias. 106 million acres nationwide are designated as wilderness, 4.7% of total US lands.

Wilderness in Alaska is part of the 60% of Alaska's land owned by the federal government. The rest is owned by the state (28%), Alaska Native Corporations (12%) and other private owners (1%). Alaska also has a state wilderness program established in 1970 that manages under one million acres.

ANILCA

The Alaska National Interest Lands Conservation Act of 1980 (ANILCA) doubled the size of the nation's national park and refuge system and tripled the amount of land designated as wilderness. It also allowed permitting of many activities in Alaska that would otherwise not conform to the Wilderness Act of 1964.

These activities include motorized access for traditional uses and subsistence purposes, modification of fish habitat, establishment of fish hatchery programs, construction of a

limited number of new recreation cabins or shelters to protect public health and safety, use of trees for house logs and firewood, and commercial salvage of beach logs. Temporary facilities, such as tent platforms and shelters, may be established for hunting and fishing.

Alaska has 48 official wilderness areas that total 57 million acres, 15.8% of our total land area.

Managing wilderness

Wilderness needs to be managed to ensure that fire, pollution, pests, recreation and other activities that take place both inside and outside wilderness areas do not degrade its natural state.

Wilderness land is managed by four federal agencies: the Bureau of Land Management, the US Fish and Wildlife Service, the Forest Service and the National Park Service.

There are currently no standardized indicators of wilderness used by managing agencies. The Forest Service has taken the lead in developing core indicators of wilderness areas that can be shared across agencies and over time.

This initiative is the National Monitoring Protocol that is targeted for implementation in 2006-07. The protocol will gather data on four qualities of wilderness that measure the efficacy of stewardship efforts and management strategies.

Alaska 20/20 notes

National Park Service data show a moderate increase the last few years in the total number of visitors to parks in Alaska, but a moderate decrease in the total number of visitor days. Possible improvements include data from the National Monitoring Protocol as it becomes available.

More information

Alaska National Interest Lands Conservation Act: npca.org/media_center/factsheets/anilca.asp
 US Forest Service Alaska Region: www.fs.fed.us/r10
 Wilderness.net: wilderness.net

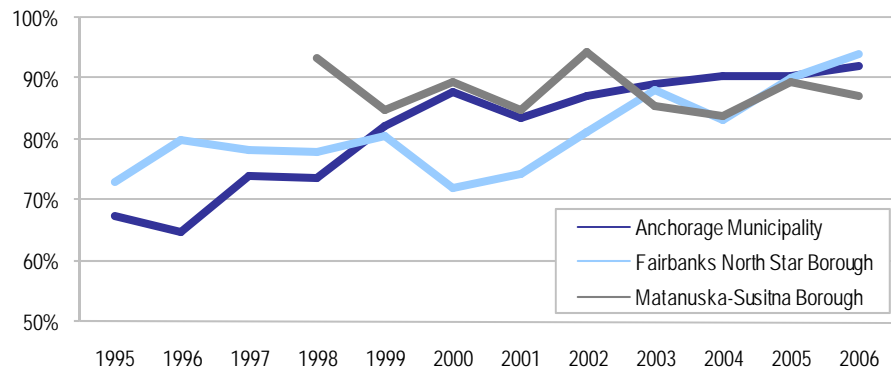
22. Air Quality

Air pollution affects health, the economy and the environment. It leads to respiratory problems and heart and lung disease, which in turn lead to missed days at work and at school.

Children, the elderly and those with sensitive conditions such as asthma are at higher risk. Air pollution can significantly affect ecosystems and water bodies.

Poor air quality can compromise Alaska's reputation for a pristine environment that attracts outside visitors.

Percentage of monitored days rated "good" on the EPA Air Quality Index:



Source: US Environmental Protection Agency

Abridged from "Alaska's SLAMS/NAMS Monitoring Network Assessment 2001 Annual Report," Alaska Department of Environmental Conservation.

Measuring air quality in Alaska

Alaska is a huge state with a small population. It is not possible to monitor the air in every community so the Department of Environmental Conservation has taken a three-pronged approach: (1) monitoring larger communities to cover the largest possible population exposure, (2) monitoring designated smaller towns that are representative of multiple communities in a region, and (3) monitoring in response to complaints.

Air pollutants

The State of Alaska monitoring network has sites for CO (carbon monoxide), two sites for PM10 (particulate matter such as dust from unpaved roads) and seven sites for PM2.5 (smaller particulate matter such as wood smoke).

CO is monitored in winter months (October through March) in Anchorage and Fairbanks.

There are only two PM10 sites operating in Alaska: one in Juneau in the Mendenhall Valley non-attainment area and one in the Eagle River non-attainment area.

There are numerous PM2.5 sites in Alaska, including three in Anchorage and one in the Matanuska-Susitna Borough, that serves to assess the wind-blown dust events that occur occasionally in the spring and fall.

Monitoring in rural Alaska

Summer season fugitive dust in rural Alaskan communities has led to several complaints. Virtually all rural roads are unpaved. Once break-up occurs, large dust clouds are generated by off-road vehicles and vehicular traffic.

Local governments are concerned about the high cost to effect compliance with the PM10 standard, and the long-term effect of any control measures.

As the State completes the investigation of fine particulate impacts in the major cities, the focus will switch to looking at more rural areas and small communities such as Sitka, Skagway, Bethel, and Nome.

Summer season fugitive dust in rural Alaskan communities has led to several complaints. Virtually all rural roads are unpaved.

Alaska 20/20 notes

The Alaska Department of Environmental Conservation Division of Air Quality does a poor job of communicating air quality status and progress to the public.

The six principal air pollutants tracked nationally are nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), particulate matter (PM₁₀ and PM_{2.5}), carbon monoxide (CO) and lead (Pb). 2004 monitoring sites number seven for CO, six for PM₁₀, four for PM_{2.5} and one for O₃.

Related indicators include *asthma*, the leading cause of chronic illness and school absenteeism for children in the United States. The number of Americans diagnosed with asthma continues to increase, as do the related deaths, illnesses and health care costs.

More information

Alaska Department of Environmental Conservation Division of Air Quality: www.state.ak.us/dec/air/
 Environmental Protection Agency Air Trends: www.epa.gov/airtrends/
 Scorecard.org air quality data: www.scorecard.org

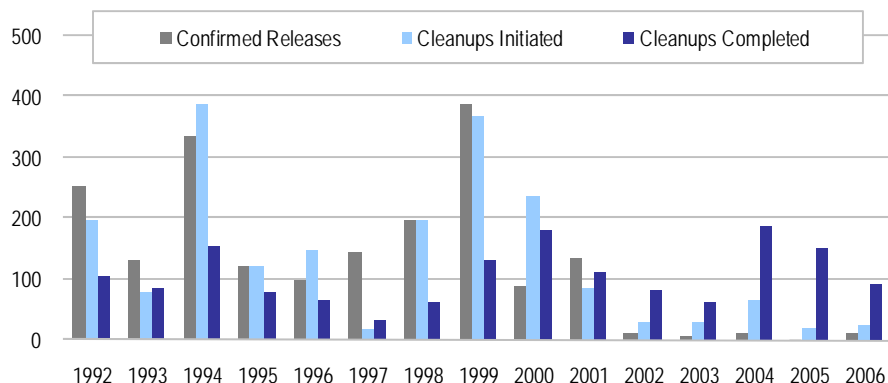
23. Land Quality

Alaska's resource economy and strategic importance have given us a legacy of industrial and defense related installations and activity.

Much of this activity occurred before there was wide knowledge of the nature and severity of the contaminants that go along with them, resulting in contaminated sites.

It is important to identify and remediate situations that threaten public health or the environment and result in economic hardship for people and communities.

Annual contaminant releases and cleanups from leaking underground storage tanks in Alaska:



Source: Environmental Protection Agency

Superfund and RCRA sites

Congress established the Superfund Program in 1980 to clean up abandoned hazardous waste sites throughout the US. The most seriously contaminated sites are on the National Priorities List (NPL). As of November 2005 there were 1,239 sites on the NPL. Alaska has 99 active Superfund sites including eight on the NPL, two of which have been de-listed due to meeting remediation requirements.

Under the Resource Conservation and Recovery Act of 1976 the EPA and authorized states have identified 1,714 hazardous waste management facilities that are the most seriously contaminated and may pose significant threats to humans or the environment. Some RCRA Corrective Action Sites are also identified by the Superfund Program as NPL sites.

Brownfields

Brownfield properties are defined by U.S Environmental Protection Agency (EPA) as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contamination." Nearly a decade ago, EPA initiated a program to clean up brownfields properties.

The Alaska Department of Environmental Conservation is developing resources to assist eligible entities in Alaska in applying for EPA brownfields grants. The program also will provide technical assistance, perform some site assessments, and develop a site inventory and public database of brownfields properties in Alaska.

Underground storage tanks

Leaking underground storage tanks have impacted a number of public drinking water systems in Alaska. Benzene, a petroleum component and known carcinogen, poses a significant threat to human health and the environment. Over 50 percent of all pre-1998 underground storage tanks systems in Alaska leaked over time, impacting soils and groundwater.

In the period 1990-2004 the state expended over \$42 million in total program costs for tank tightness testing, site assessment, cleanup, upgrade or closure of tanks in Alaska. Of the over 2,000 applications originally received, 1,107 have been funded.

Over 50% of all pre-1998 underground storage tanks in Alaska leaked over time, impacting soils and groundwater.

North Slope

The Charter for Development of Alaska's North Slope was signed in 2000 as a prerequisite to state support of the merger between BP and ARCO. It includes significant environmental provisions to advance environmental protection, improve environmental performance, increase on-site safety, develop improved technology, remedy existing environmental challenges and address emerging ones.

Alaska 20/20 notes

Alaska is not one of the 35 states that have received EPA approval of the state program for regulating underground storage tanks.

Possible improvements include data on toxics release inventory, brownfields and charting progress on the 2000 Charter for Development of Alaska's North Slope.

More information

Alaska DEC Contaminated Sites Program: www.state.ak.us/dec/spar/csp

Charter for Development of Alaska's North Slope: www.state.ak.us/dec/spar/ipp/nscharter/nshome.htm

Environmental Protection Agency Superfund Program: www.epa.gov/superfund

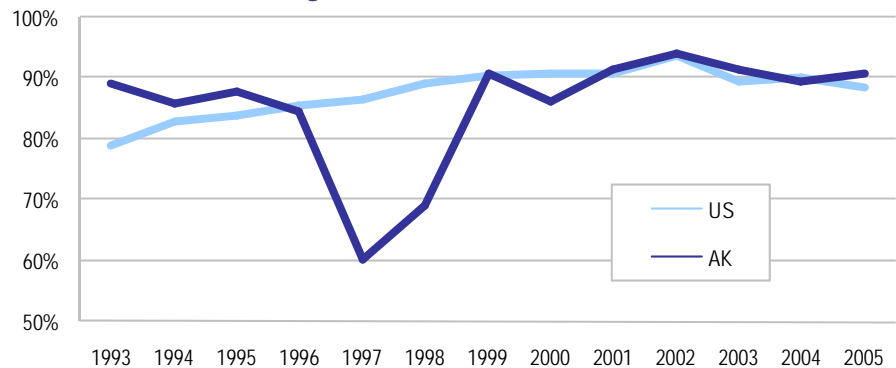
24. Water Quality

Surface freshwater supplies three quarter's of the state's water needs for industry, agriculture, mining, fish processing, and public water use, and is used for about half of Alaska's domestic water supply.

Alaska's surface waters include over 15,000 salmon streams, an important resource to Alaskans and the world.

Alaska has the greatest groundwater resources of any state and the primary use of groundwater is for domestic needs.

Percentage of population served by community water systems that meet all Safe Drinking Water Act health-based standards:



Source: Environmental Protection Agency

SOURCE: Abridged from "Alaska's Final 2006 Integrated Water Quality Monitoring and Assessment Report," Alaska Dept. of Environmental Conservation, December 2006.

Background

Alaska is rich in water quantity, water quality and aquatic resources. Almost half of the total surface waters of the United States are located in Alaska. Because of Alaska's size, sparse population and its remote character the vast majority of Alaska's water resources are in pristine condition.

Alaska is sparsely populated by approximately 635,000 residents. The 1990-2000 US Census showed an Alaskan increase of 14% and a national average increase of 1.2%. As Alaska's population grows and Alaska's natural resource base economy expands an increasing number of Alaska's waters, especially in urban areas, face the threat of degradation.

Sources of pollutants

In specific localized parts of Alaska surface water quality has been impaired. Historically and for this 2006 report in urban settings waters are predominantly impaired from sediment, turbidity, and fecal coliform bacteria contamination from urban and stormwater runoff.

Other sources of impairment are sediment and turbidity from mining activities in Interior Alaska, residues from seafood processing facilities in the coastal zone, contaminated military sites in southcentral and southwestern Alaska, and bark and wood residues from timber processing and trans-

fer facilities in coastal southeast Alaska. Petroleum products, such as oil spills or fuel leaks, are also a source of impairment within the state.

Designated uses

The Alaska Water Quality Standards designate specific uses for which water quality must be protected, and specifies the pollutant limits, or criteria, necessary to protect designated uses. There are seven designated uses for fresh waters, and seven designated uses for marine waters specified in state standards.

By default water bodies in Alaska are protected for all designated uses. The few water bodies that have had some uses removed are listed in the water quality standards.

Almost half of the total surface waters of the United States are located in Alaska.

The seven freshwater uses are: drinking water; agriculture; aquaculture; industrial; contact recreation; non-contact recreation; and growth and propagation of fish, shellfish, other aquatic life, and wildlife. The seven marine water uses are: aquaculture; seafood processing; industrial; contact recreation; non-contact recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life.

For each of the 14 uses the state standards specify criteria for a variety of parameters or pollutants.

Alaska 20/20 notes

In 2006 Alaska had 34 water bodies identified as impaired under the Clean Water Act section 303(d) list. Four water bodies were removed from the list.

More information

Alaska Department of Environmental Conservation Division of Water: www.dec.state.ak.us/water
Anchorage Waterways Council: www.anchwaterwayscouncil.org
Environmental Protection Agency: www.epa.gov/water

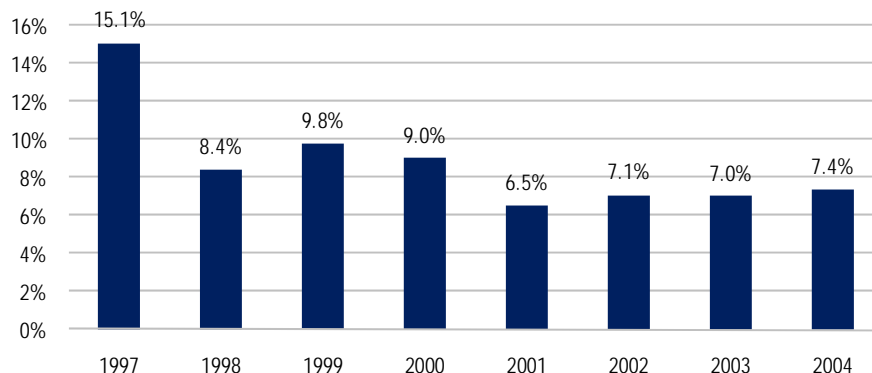
25. Fisheries

The health of Alaskan fisheries reflects the underlying health of marine ecosystems and the soundness of fisheries management practices.

The Alaska fishing industry leads the state in providing 47% of the private sector jobs, and is second only to the oil industry in providing revenue to the state.

Alaska fisheries also are an important source of food for the U.S. and the rest of the world: half of the total yearly U.S. fish catch comes from Alaska.

Alaska groundfish discard rates:



Source: North Pacific Fishery Management Council

SOURCE: Abridged from "Responsible Fisheries Management into the 21st Century," North Pacific Fishery Management Council, August 2002.

North Pacific Fishery Management Council

The North Pacific Fishery Management Council is one of eight regional councils established by the 1976 Magnuson-Stevens Fishery Conservation and Management Act.

The Council primarily manages groundfish in the Gulf of Alaska, Bering Sea, and Aleutian Islands, including cod, pollock, flatfish, mackerel, sablefish, and rockfish species harvested by trawl, longline, jig, and pot gear. The Council makes allocation decisions for halibut in concert with the International Pacific Halibut Commission. Other large Alaska fisheries such as salmon, crab, and herring are managed jointly with the State of Alaska.

Catch limits & overfishing

Annual catch limits for every target fishery ensure that annual quotas are set at conservative, sustainable levels. No groundfish stocks are considered overfished. Two crab stocks are considered overfished (though climatic factors are the likely reason, rather than fishing) and are currently subject to aggressive rebuilding plans including zero fishing allowance.

Habitat protection

Ocean habitat is essential for maintaining productivity of fishery resources and is a key component of an ecosystem-oriented management approach. Structural habitat (including boulders, corals, anemones, kelp, and other living

organisms attached to the ocean bottom) on an otherwise featureless bottom can be particularly important to fish for food, reproduction, and shelter from predators.

Bycatch & discards

Bycatch are fish that are caught incidentally while fishing for other species. Discards are fish that are caught but thrown back either due to regulations (prohibited species) or because they are not economically profitable to be retained (not a preferred species or size for the markets).

When bycatch limits are reached for prohibited species (crab, herring, halibut, and salmon) fisheries responsible for the bycatch are closed for the rest of the season or are prohibited from fishing in areas with high bycatch rates.

In 1993 over 17% of the groundfish caught off Alaska were discarded. By 2001, less than 7% of the catch

was discarded. This reduction was due in part to implementation of full retention requirements – you catch it, you keep it – for pollock and cod. The fishing industry has also worked to reduce bycatch by sharing catch information and modifying gear to allow unwanted fish to escape.

Alaska 20/20 notes

In a 2005 study Alaska's bycatch rate of 12% was the lowest in the nation, well below the average of 28%. Specific species raise concerns: rockfish, coral and sponges are particularly vulnerable to bottom trawling due to their slow reproductive cycle and sensitivity to habitat conditions. For an alternative view visit the Alaska Marine Conservation Council web site listed below.

In a 2005 study Alaska's bycatch rate of 12% was the lowest in the nation.

More information

Alaska Marine Conservation Council: akmarine.org/publications/bycatchreports.shtml

Center for SeaChange: seachange.org

North Pacific Fishery Management Council: www.fakr.noaa.gov/npfmc

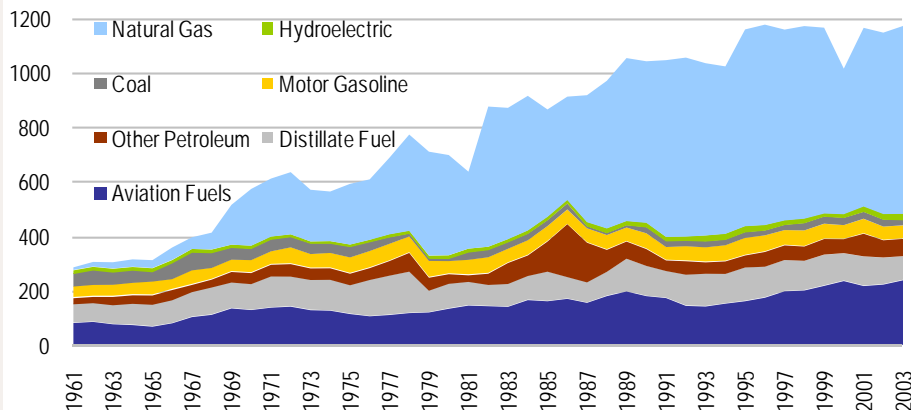
26. Energy

The quantity and quality of the energy we use has important consequences.

Energy efficiency makes our products less expensive and reduces the total cost of service delivery.

Alaska's raw energy consumption rate is relatively low, however on a per capita basis Alaskans use almost 1.2 million Btus per year. That ranks Alaska number one in the nation in per capita energy consumption, at more than three times the national average.

Per capita consumption of energy in Alaska (millions of BTUs):



Source: US Energy Information Administration

SOURCE: Abridged from "Statewide Energy Issues, an Overview," Alaska Energy Authority, 2003.

Railbelt

Anchorage, Fairbanks, Matanuska-Susitna, and the Kenai Peninsula cover 75% of Alaska's population and account for over 85% of the state's electricity.

The 7 Railbelt utilities are fueled by natural gas (67%), coal (5%), hydro (15%), and fuel oil (13%). Concerns include heavy reliance on Cook Inlet natural gas which supplies power and heat to 80% of Anchorage households. The supply is declining and subject to fluctuating prices. Opportunities include using state royalty oil and development of alternative energies.

Four dam pool

Juneau, Ketchikan, Sitka, Kodiak, Valdez, Glennallen and others are primarily served by hydroelectric power, are not connected by a grid system and are larger and more developed than the typical rural community.

90% of the total annual electricity generated in this region is hydroelectric with diesel and oil-fired turbine as a costly backup generation source. Concerns include the lack and expense of transmission interties to export surplus hydroelectric to communities that need it, high electric rates (20% higher than the Railbelt) and using costly fuel oil to provide 70% of heating requirements and 20% of electric heat. Opportunities include Congressional authorization of a \$435 million Southeast Alaska interties project.

Rural Alaska

90 utilities service 187 rural communities ranging in size from Stony Creek with 35 people to Bethel with 5,471 people. Generation and transmission systems have been proposed for two rural regions to support mining developments.

Access is mostly by air or water making energy costs extremely high, 5 times the national average. Over 50% of

powerhouse structures need replacing. Over 65% of electrical distribution requires major repairs or replacement. 50% of fuel storage facilities are in poor condition. The Power Cost Equalization program is not being fully funded. Over 66% of Rural Alaska households use fuel oil as their heating source, priced at 2-4 times the national average.

The average electric rate in rural Alaska is about 5 times the national average.

Renewable energy resources

Wind power is being studied as a potential renewable generation resource for the Railbelt. The technology is the beneficiary of more than 20 years of intense research and development. Large-scale wind projects are being installed across the country and around the world. These projects use large turbines and are installed on a scale that allows for the power to be priced competitively. Smaller turbines have been used for rural generation applications in the state and have been shown to be rugged and reliable.

For Railbelt applications larger turbines and projects would be required to achieve economies of scale and subsequently competitive pricing. Chugach Electric Association and Anchorage Municipal Light and Power are studying a large wind project on Fire Island.

More information

Alaska Energy Authority: www.aidea.org/aea.htm

Energy Information Administration: eia.doe.gov

Institute of Social and Economic Research rural utilities: iser.uaa.alaska.edu/Home/ResearchAreas/RuralUtilities.htm

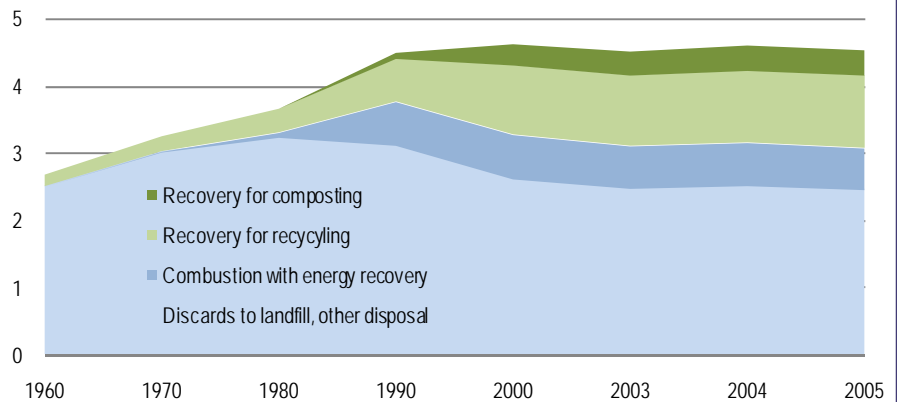
27. Waste

Waste management is critical to avoid serious health and environmental problems.

Alaska faces many unique challenges in this area, starting with the fact that so many rural communities have no road or rail access making it necessary for them to maintain a costly local landfill.

Alaskans generate 50% more waste per person than the national average. Reduction, reuse and recycling will all be necessary to meet our future waste management needs.

Municipal solid waste in the U.S., pounds per person per day, 1960-2005:



Source: EPA

SOURCE: Roland Shanks, Rural Community Assistance Program, 2004.

The need for management

Solid waste sites serve as sources of disease, an attractant for disease carrying animals and a source of water pollution in rivers and lakes. Methane production from solid waste adversely affects air quality.

Alaska has 282 known active landfills, far more than other states due to the fact that so many Alaskan communities are located off the road and rail network.

There are over 150 unpermitted landfills in the state, and over 186 landfills permitted as class 3 landfills by the federal Environmental Protection Agency. A class 3 landfill permit is unique to Alaska, and requires only minimal siting and operation standards.

Landfills in rural Alaska contain many materials not found in class 1 and 2 sites, like hazardous waste, human waste from honey buckets, animal carcasses, dog carcasses, snow machines and 4 wheelers, and petroleum products.

Approximately 2% of registered cars are junked each year. This tonnage is not included in the 695,325 tons of Municipal Solid Waste generated annually.

The use of burn barrels due to lack of convenient waste programs is an additional ongoing health hazard.

Reduction, reuse & recycling

Alaska lags far behind the rest of the nation in recycling. Nationally about 28% of the waste stream is recycled, while in Alaska the two most populous areas (Anchorage and the Mat-Su) recycle 14% and 8% respectively.

Recycling in rural Alaska is difficult because of distances, lack of transportation and the small quantity of materials,

but many villages are initiating recycling programs as a way of decreasing the material going into the landfill and to reuse items. Composting can also reduce the amount of material going into the landfills.

There are over 150 unpermitted landfills in the state.

In rural Alaska permafrost and weather issues also make siting and operating a landfill prohibitively expensive and difficult. The cost benefits of recycling therefore have increased.

Southcentral and Southeast Alaska have seen renewed interest in waste diversion through recycling. In Southeast land suitable for waste disposal is at a premium and the permit requirements for the available landfill properties are expensive. Many southeast communities have chosen to barge their waste to other states for disposal.

Alaska 20/20 notes

Related measures include [number of landfills](#) and [landfill inspection scores](#). In 2000 only 91 of 271 (33%) active landfills had a current permit or equivalent.

Possible improvements include data on per capita and total solid waste generation for Alaska over time.

More information

EPA Municipal Solid Waste: www.epa.gov/epaoswer/non-hw/muncpl/facts.htm

Solid Waste Alaska Network: www.ccthita-swan.org/main/index.cfm

State of Alaska Solid Waste Program: www.state.ak.us/dec/eh/sw/index.htm