



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Alaska

Remediation Efforts Reduces Pollution Seeping into Waterbodies

Waterbody Improved

Petroleum and chemical seeps from contaminated soil, contaminated groundwater and leaking storage tanks polluted several waterbodies flowing through Alaska's King Salmon Air Station (KSAS), including Red Fox Creek, King Salmon Creek, Eskimo Creek and Naknek River. Alaska placed these waterbodies on the Clean Water Act section 303(d) list in 1994 (Red Fox Creek) and 1996 (King Salmon Creek, Eskimo Creek and the Naknek River) for impairments by petroleum hydrocarbons and oil and grease. To address the problem, the U.S. Air Force implemented various remedial actions, including removing leaking storage tanks, closing dry wells, removing or capping contaminated soil, and installing treatment systems. Water quality monitoring data indicate that these actions are successfully preventing petroleum products from seeping into the waterbodies, allowing them to meet water quality standards. Alaska removed the waterbodies from the impaired waters list in 2003 (King Salmon and Eskimo creeks) and 2004 (Red Fox Creek and Naknek River).

Problem

Red Fox Creek, King Salmon Creek, Eskimo Creek and the Naknek River flow through KSAS property on the Alaska Peninsula. KSAS is approximately 280 miles southwest of Anchorage (Figure 1). KSAS is on the poorly drained lowlands northwest of the Aleutian Range. Ground elevations range from 30 to 68 feet above mean sea level. The Air Force built an air station at the beginning of World War II to serve as a fuel and support base for the Aleutian Islands. Alaska acquired the airfield in 1959, which now serves as a commercial airport. KSAS still supports some military activities of the Air Force, Army, Marines and Coast Guard.

During the 1940s and 1950s, activities at KSAS released petroleum products and chemicals into the environment. In the 1980s and 1990s, seeps from this historically contaminated soil, contaminated groundwater and leaking storage tanks entered several waterbodies flowing through KSAS—Red Fox Creek, King Salmon Creek, Eskimo Creek and the Naknek River. The pollutants created visible hydrocarbon sheens on the waterbodies, which violated Alaska's water quality standards. The Alaska Department of Environmental Conservation (ADEC) placed these waterbodies on the Clean Water Act section 303(d) list in 1994 (Red Fox Creek) and 1996 (King Salmon Creek, Eskimo Creek, and Naknek River) for petroleum hydrocarbons and oil and grease. The Air Force is responsible for cleaning up the contamination on KSAS.

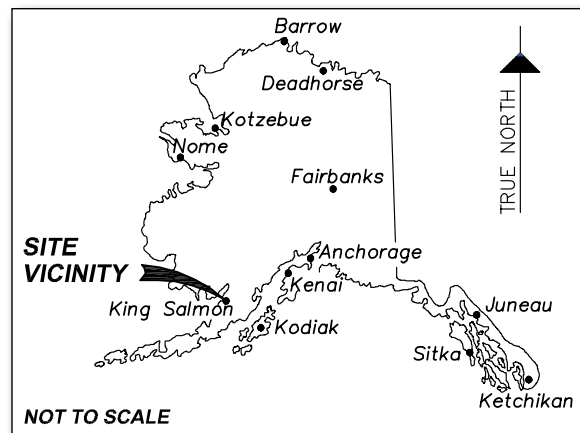


Figure 1. Contaminated soil and groundwater on King Salmon Air Station polluted several waterbodies in the Alaska Peninsula's lower Naknek River watershed.

Project Highlights

Since 1987 the Air Force has been engaged in cleanup operations at KSAS under the Installation Restoration Program (IRP)—the Air Force equivalent of the U.S. Environmental Protection Agency's Comprehensive Environmental Response, Compensation, and Liability Act program. The IRP provides guidelines and funding to investigate and remediate potentially contaminated sites at Air Force installations. The Air Force delineated KSAS into seven groundwater zones for cleanup on the basis of similarities in groundwater and surface water movement, contaminants of concern, geology, and location.

Although the impaired waterbodies are in different areas of KSAS, similar pollution sources caused their impairments. For example, data show that Eskimo Creek was contaminated by petroleum and trichloroethylene (TCE) products seeping into the creek from a former tank farm, two former dry wells, and various individual sites. In 1997 TCE levels in Eskimo Creek reached 0.015 milligrams per liter (mg/L). In response, the Air Force signed a Record of Decision for Final Remedial Action, which established a 0.005 mg/L Remedial Action Objective (RAO/cleanup level) for TCE in the groundwater zone. To address the pollution source, the Air Force installed a bioventing curtain and groundwater treatment system to remove the chemicals from the soil and groundwater and prevent them from reaching Eskimo Creek.

Similarly, groundwater carried petroleum and TCE contamination from former training areas into Red Fox Creek. The Air Force launched numerous clean-up efforts, including removing and treating contaminated soil and installing a bioventing system.

Buried and partially exposed storage drums leaked petroleum hydrocarbons and oil and grease into soil and groundwater, allowing free product to move into King Salmon Creek and its adjacent wetlands. In response, the Air Force removed the exposed drums and then recontoured and capped the area to prevent movement of remaining contaminants. The Air Force also installed a groundwater treatment system to prevent the polluted groundwater from flowing into the creek.

Petroleum-contaminated groundwater from a former tank farm seeped into the wetlands near the Naknek River and then into the Naknek River itself. The Air Force removed 1,100 cubic yards of contaminated soil and remediated the majority of the petroleum-contaminated groundwater. The removed soil was treated in facility bioremediation cells, and the treated soil was reused as landfill capping material at the facility. The Air Force installed a passive remediation system that continues to treat residual contamination before it enters the wetlands and Naknek River.

The Air Force has an extensive monitoring network in place and will continue to monitor petroleum levels in groundwater, surface water, upland sediments and creek sediments to evaluate remedial efforts and attenuation processes.

Results

Monitoring data indicate that the Air Force's remediation efforts removed historical petroleum sources and are successfully treating remaining contaminated groundwater before it can enter the waterbodies. For example, data from Eskimo Creek show that TCE levels have decreased from a high of 0.015 mg/L before project implementation to levels predominantly below the RAO of 0.005 mg/L in recent years. Similarly, monitoring data collected after project implementation along King Salmon Creek (Figure 2), Red Fox Creek and the Naknek River indicate that pollutant levels have declined or were non-detectable. All four waterbodies met Alaska's surface water quality standards, prompting ADEC to remove the waterbodies from the state's impaired waters list in 2003 (King Salmon and Eskimo creeks) and 2004 (Red Fox Creek and Naknek River).

Although the Air Force's cleanup efforts have restored the surface waters, some soil and groundwater contamination remains on KSAS. Therefore, restoration efforts at KSAS will continue beyond 2015. Because remaining pollution in the groundwater could seep into adjacent surface waters, the Air Force will continue monitoring indefinitely until groundwater levels fall below the cleanup criteria outlined in the KSAS IRP.

Partners and Funding

To facilitate public involvement, the Air Force helped to form the King Salmon Restoration Advisory Board, which is made up of interested stakeholders, including members of the King Salmon Tribe, and serves as a communication link between the community, local government, the Air Force and regulatory agencies. ADEC has worked collaboratively with the Air Force; the King Salmon Tribe; local companies such as Paug-Vik, an Alaska native-owned corporation; local residents; the advisory board; and the U.S. Environmental Protection Agency to improve the conditions at KSAS. The Air Force is funding all remediation efforts at KSAS. ADEC provides oversight of the cleanup programs through a Defense State Memorandum of Agreement.



Figure 2. Remediation efforts removed petroleum seeps and restored Alaska's King Salmon Creek.



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