



Section 319 NONPOINT SOURCE PROGRAM SUCCESS STORY *Alaska*

Reducing Animal Sources of Bacteria Restores Water Quality

Waterbody Improved

Excrement from large congregations of Canada geese and other waterfowl contributed fecal coliform (FC) bacteria to Alaska's Jewel Lake. Water quality monitoring data collected in the early- to mid-1990s showed that the lake violated the state's FC bacteria standard, prompting Alaska's Department of Environmental Conservation (ADEC) to add the waterbody to its 1996 Clean Water Act (CWA) section 303(d) list of impaired waters. In the late 1990s, stakeholders implemented several projects to reduce the number of Canada geese congregating around Jewel Lake and other Anchorage-area waters. Goose numbers declined, along with FC levels. Monitoring data collected in 2008, 2009 and 2010 show that Jewel Lake now meets water quality standards. As a result, ADEC removed Jewel Lake from the CWA section 303(d) list for FC in 2010.

Problem

Jewel Lake is a small lake in Anchorage, Alaska (Figure 1). Residential housing surrounds the eastern and western shores of the lake. A public park and beach area is on the northern end of the lake. A parking lot on the southern end of the lake provides parking and access for fishing. The lake covers approximately 26 acres and has a mean depth of 6.5 feet and a maximum depth of 14.5 feet. Jewel Lake is fed by shallow groundwater and surface water runoff from a small watershed. The lake drains into a large scrub wetland complex that feeds two other nearby lakes (Sand and Sundi lakes).

In the late 1980s and early 1990s, the Municipality of Anchorage (MOA) conducted water quality monitoring on many Anchorage-area waters. Data showed that Jewel Lake exceeded the 30-day, 20 FC units per 100 milliliters (mL) geometric mean standard for FC bacteria. Limited monitoring results from the mid-1990s continued to show elevated levels of fecal coliform bacteria. Therefore, ADEC added the waterbody to its 1996 CWA section 303(d) list of impaired waters for FC bacteria.

In 1997 ADEC developed a total maximum daily load (TMDL) for FC for Jewel Lake. Approximately half the land surrounding Jewel Lake was in public ownership, and private residences in the area had been on city sewer since 1984, which ruled out failing septic systems as a potential source of FC. Beginning in the late 1980s Anchorage's Canada



Figure 1. Jewel Lake in Anchorage, Alaska

goose population surged as more natural areas were converted to grass. ADEC believed the high FC bacteria counts seen in Jewel Lake were a result of the increased number of waterfowl using the lake as summer habitat and as a holding area during their fall migration. Although not identified as a primary source, pet waste from the park and lawns surrounding the lake could have also contributed FC to Jewel Lake.

Project Highlights

In the mid-1990s MOA reseeded Jewel Lake Park with a finer grass that appealed less to geese. In 2010 MOA expanded the park's swim beach, which had the unintentional side effect of further reducing goose numbers by removing some of the turf grass leading to the water's edge. During construction, observers noted that temporary erosion control barriers placed at the top of the beach discouraged geese from nearing the lake; as a result, MOA intends to plant a vegetative brush hedge in the same place.

In the late 1990s MOA participated in a city-wide effort to reduce the overall number of Canada geese in Anchorage. In 1995 an aircraft collided with a flock of geese near Anchorage, killing 24 people. Shortly thereafter, a taskforce began working to reduce wild goose populations throughout the city. MOA worked with the U.S. Fish and Wildlife Service, the Alaska Department of Fish and Game, and the Alaska Native and American Indian Elders to reduce the number of eggs available for hatching. The Migratory Bird Treaty Act ordinarily prohibits people from collecting wild bird eggs; however, the U.S. Fish and Wildlife Service granted special permits to volunteers from the Elders Program of the Southcentral Foundation. The volunteers collected and donated the eggs to Alaska Natives so they could eat them as their ancestors once did. Other methods included relocating goslings, harassing adults geese, altering habitat and, when necessary, killing the geese (i.e., around the airport).

To help address problems with unmanaged pet waste throughout the city, MOA worked with the Anchorage Waterways Council and several other partners to implement a *Scoop the Poop* program in 2003. The campaign educated pet owners about simple ways to reduce the amount of FC that enter local waters by picking up after pets and properly disposing of the waste. Program elements included developing posters featuring local celebrities, creating public service announcements for the local television stations and installing more than 56 pet waste stations throughout Anchorage's park system, trail heads and neighborhoods, including one in the public park by Jewel Lake.

Results

FC levels in Jewel Lake have declined. Beginning in July 2008, ADEC collected weekly summer-time water quality samples at nine randomly chosen Jewel Lake locations (plus one duplicate).

Monitoring data show that Jewel Lake now meets the water quality standard, which requires that in a 30-day period the geometric mean may not exceed 20 FC/100 ml (Table 1). On the basis of the data, ADEC removed Jewel Lake from the CWA section 303(d) list of impaired waters for FC in 2010.

Table 1. Jewel Lake fecal coliform bacteria data (2008 to 2010)

Date	30-day window	Geometric mean (FC/100 mL)
July 2008	1st	1.04
August 2008	2nd	1.22
September 2008	3rd	2.41
October 2008	4th	1.30
May 2009	5th	1.32
June 2009	6th	1.13
July 2009	7th	3.51
August 2009	8th	1.72
September 2009	9th	0.82
October 2009	10th	1.79
May 2010	11th	0.77
June 2010	12th	1.35

Partners and Funding

MOA altered habitat at Jewel Lake Park to reduce goose numbers. MOA also worked with the U.S. Fish and Wildlife Service and the Elders Program of the Southcentral Foundation to reduce Anchorage's Canada goose population. In 2006 the Anchorage Waterways Council received \$23,953 from the Alaska Clean Water Actions Program (which includes CWA section 319 funds) to support developing the *Scoop the Poop* campaign. Numerous partners participated in the campaign, including ADEC; University of Alaska, Fairbanks Cooperative Extension Service; U.S. Bureau of Land Management; Anchorage Animal Care and Control; Alaska Department of Fish and Game; Anchorage Unleashed; and MOA's Watershed Services and Parks and Recreation departments. ADEC used \$57,936 in Alaska Clean Water Actions Program grants obtained through the Anchorage Waterways Council to support intensive FC bacteria monitoring of Jewel Lake from 2008 through 2010.

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