NONPOINT SOURCE SUCCESS STORY

Alaska

Controlling Streamside Erosion and Urban Runoff Improves Water Quality in Chena River and Chena and Noyes Sloughs

Waterbodies Improved

Runoff from urban areas and eroding culverts contributed sediment to Alaska's Chena Slough, Chena River and Noyes Slough. Alaska Department of Environmental Conservation (ADEC) added these three waterbodies to the state's Clean Water Act (CWA) section 303(d) list of impaired waters due to sediment—Chena River in 1990 and Noyes and Chena sloughs in 1994. Numerous restoration efforts have taken place since the mid-1990s, including implementing best management practices (BMPs) to control stormwater runoff and removing and replacing eroding culverts that restricted water flow. Data collected in 2011–2012 show that sediment levels met water quality standards, prompting ADEC to propose removing all three waterbodies from the 2014/2016 list of impaired waters for sediment.

Problem

Chena Slough is a 16-mile-long perennial stream that flows into the Chena River near the city of Fairbanks, Alaska. Both Chena Slough and Chena River are popular and important fishery and recreational resources, offering grayling fishing, salmon spawning habitat, and boating (e.g., canoeing, kayaking, motor boating). Noyes Slough is a 5.5-mile long side branch of the Chena River in Fairbanks that provides wildlife habitat (Figure 1). Flood-control structures installed over the past 50 years on the Chena and Tanana rivers have altered flow conditions in the Chena River watershed.

Erosion of streamside areas and stormwater runoff from expanding urban areas around the cities of Fairbanks and North Pole contributed sediment to the Chena River and Noyes and Chena sloughs. Bank erosion occurs along most of the Chena River, and is most prevalent along the river during the two annual peaks in discharge: spring snowmelt runoff and late summer precipitation. Several upper tributaries of the Chena River have been or are currently being mined for gold, which could contribute sediment to the system.

The sediment standard requires that there be "no measurable increase in concentration of settleable solids above natural conditions, as measured by the volumetric Imhoff cone method." Because the three waterbodies failed to meet the standard, ADEC added them to the CWA section 303(d) list for sediment (Chena River: 1990, Chena and Noyes sloughs: 1994).

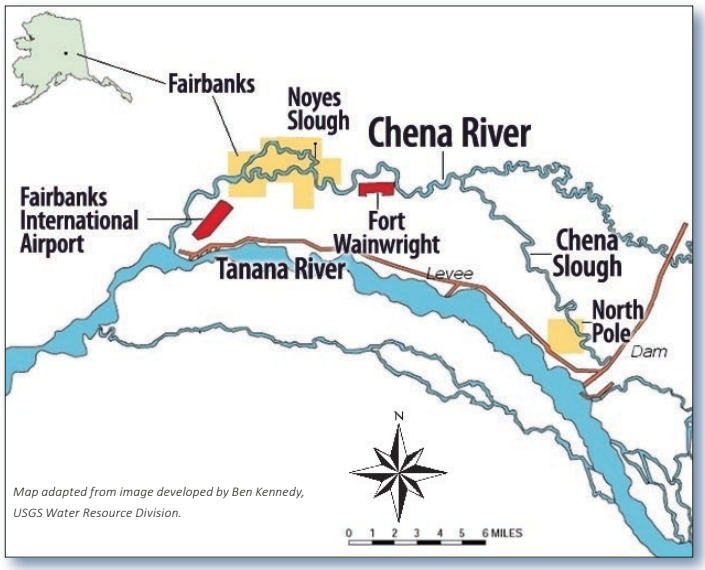

Figure 1. The Chena River and Chena Slough are in eastern Alaska's Tanana River watershed.

Story Highlights

Efforts to address sediment and other pollution sources in the Chena River and Noyes and Chena sloughs drainage basins have been underway for decades. The Noyes Slough Action Committee coordinated several volunteer clean-up events in 1999–2002 to remove log jams and other debris to restore water flow to the slough and enhance habitat. In 1999 the Army Corps of Engineers (COE) stabilized a Chena

Figure 2. Partners replaced small culvert pipes (left) along Chena Slough with a new bridge (right) that allows the water to flow freely.

River streambank that was eroding due to recreational uses (boat wakes and angler foot traffic). In 1999 the city of Fairbanks, in conjunction with the University of Alaska–Fairbanks (UAF), received a CWA section 319 grant from ADEC to support a 1999–2003 project to develop a map, inventory, and model of the city's stormwater drainage system. Additional section 319 grants allowed the city to prioritize potential sedimentation sources (2002) and assess water quality and BMP effectiveness (2004).

In 2000 the Alaska Department of Fish and Game (ADF&G) published a guidance pamphlet, *Chena River Bank Stabilization*, to help landowners restore streambanks using riprap gabions, sandbags, concrete block retaining walls, log berms, earthen berms, and bioengineered stabilization. In the early 2000s, the USFWS worked with local stakeholders to stabilize 195 feet of streambank near Fairbanks.

Stakeholders have been working for years to improve water flow in Chena Slough. Hydrological modifications in the watershed contributed to decreased water flows, which encouraged flooding and allowed upstream sediments to accumulate in the slough and then erode under high water flow conditions. Between 2001 and 2009, partners replaced four poorly functioning culverts with new bridges (Figure 2).

Since the area's municipal separate storm sewer system permit went into effect in 2005, the committee has implemented many activities that exceeded the minimum permit requirements, including encouraging rain barrel use, holding annual river-related education events, conducting an annual storm drain art event, and promoting the use of green infrastructure.

In 2009–2011, ADF&G implemented the Fairbanks Restoration Cost Share project, a financial incentive and educational outreach program that provides funding and technical project design assistance for landowners to restore streambanks to rehabilitate and sustain salmon habitat. From 2009 to 2011, the program helped fund nine projects in the Fairbanks area, almost all along the Chena River, restoring approximately 2,250 liner feet of streambank.

Results

The partners' combined efforts have reduced the amount of sediment reaching waterways. ADEC collected water samples and visually assessed the waters in 2011–2012 under various flow regimes and compared them to upstream reference sites. All sites had results consistent with the reference sites; most results for all sites were either reported as 0 milliliters per liter (ml/L) settleable solids or were below the method reporting limit (MRL). In 2011–2012 the Chena River had two samples at the MRL of 1.0 ml/L. The Chena Slough also had two measurable samples (2 and 6 ml/L). All 2011–2012 samples for Noyes Slough were below the MRL. All sample results for settleable solids, at both reference and downstream sites, were comparable. This satisfies the water quality standard, prompting ADEC to propose removing the three segments from the 2014/2016 list of impaired waters for sediment.

Partners and Funding

Numerous partners have worked to improve water quality in the area, including UAF, COE, USFWS, ADF&G, ADEC, and local groups. Funding for the 2002–2009 culvert replacement project included a $75,000 National Fish and Wildlife Foundation grant and $374,000 in state grant monies from the offices of Senator Therriault ($250,000) and Representative Coghill ($124,000), among other sources. Beginning in 1999, Fairbanks used CWA section 319 funds to (1) map, inventory, and model Fairbank's stormwater drainage system to allow better management (1999–2004: $541,500), (2) prioritize potential sedimentation sources (2002: $60,414), and (3) assess water quality and BMP effectiveness (2004: $175,000).

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