

RESTORATION OF SLOUGHS IN THE FAIRBANKS NORTH STAR BOROUGH (TANANA RIVER WATERSHED)

by Nancy J. Ihlenfeldt



April 2006

Alaska Department of Natural Resources
Office of Habitat Management and Permitting

The Alaska Department of Natural Resources administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADNR, 1300 College Road, Fairbanks, Alaska 99701; U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300, Webb, Arlington, VA 22203; or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-269-8549 or (TDD) 907-269-8411.

RESTORATION OF SLOUGHS IN THE FAIRBANKS NORTH STAR BOROUGH
(TANANA RIVER WATERSHED)

By

Nancy J. Ihlenfeldt

Kerry M. Howard
Executive Director
Office of Habitat Management and Permitting
Alaska Department of Natural Resources

Introduction:

Sloughs in the Fairbanks North Star Borough (FNSB) are important to Arctic grayling (*Thymallus arcticus*) as they provide spawning and rearing habitat. Arctic grayling are an important species for sport fishing in Interior Alaska. Due to the increase in urbanization and development along the sloughs, degradation of fish spawning and rearing habitat has occurred. Chena Slough, Beaver Springs Slough, Piledriver Slough, Twentythree Mile Slough and Noyes Slough are the most prominent sloughs in the FNSB. Chena Slough (between Chena River and Nordale Road crossing), Twentythree Mile Slough, Piledriver Slough and Noyes Slough are listed in the *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* as they support Chinook (*Oncorhynchus tshawytscha*) and chum (*O. keta*) salmon spawning and rearing. Many species of resident fish other than Arctic grayling [e.g., round whitefish (*Prosopium cylindraceum*), northern pike (*Esox lucius*), longnose suckers (*Catostomus catostomus*), slimy sculpin (*Cottus cognatus*), Alaska blackfish (*Dallia pectoralis*) and arctic lamprey (*Lampetra japonica*)] also are found in these waterbodies.

State and Federal agencies, University of Alaska-Fairbanks researchers, Lower Chena River Watershed Management Planning Team (1995-1998), U.S. Army Corp of Engineers (COE) and community-based groups have been working for many years conducting studies, generating alternative restoration plans, identifying goals and searching for funding to restore sloughs in the FNSB.

This document highlights the achievements and goals of the Chena Slough Technical Committee (CSTC), a multi-agency group (see Figure 1) formed in 2000 due to the pressing concern for the declining condition of Chena Slough. The CSTC has been working on replacing culverted crossings with bridges at all non-maintained Alaska Department of Transportation and Public Facilities (ADOT/PF) road crossings of Chena Slough. The CSTC recently implemented a three phase restoration plan. Phase I includes the continued replacement of existing culverts with bridges (or larger, properly installed culverts) at the remaining ADOT/PF maintained road crossings.

History:

Prior to 1945 and before construction of the various control projects, these sloughs were side channels of the Tanana River. Piledriver Slough and Chena Slough were one continuous channel called “Chena Slough” that flowed northwest through the town of Fairbanks and then back into the Tanana River at the west end of Fairbanks. The Chena River flowed into “Chena Slough” about 18 miles northeast of Fairbanks. “Chena Slough” carried a high discharge and sediment load that created a wide channel with high banks. Twentythree Mile Slough and Beaver Springs Slough were side channels of “Chena Slough”. The construction of Moose Creek Dike (1945) split “Chena Slough” into two waterbodies now known as Chena Slough (north of the dike) and Piledriver Slough (south of the dike).

Flooding in Fairbanks during the 1930’s encouraged the construction of an earthen dam adjacent to the Tanana River south of town at Moose Creek Bluff in 1945. The intent of this dam was to block the flow of Tanana River water into Chena Slough.

In August 1967, the Chena River crested 19 feet above its banks (7 feet above flood stage) and flooded Fairbanks. In addition to the severe destruction in Fairbanks, this event washed out most of the existing crossings (culverts and bridges) on Chena Slough. ADOT/PF and some subdivision developers installed temporary culverts of varying diameter, length and texture in an emergency manner to provide access. Most of these “temporary” culverts exist today.

The Chena River Flood Control Project (dam, levee, floodway and additional dikes) was constructed in the 1970’s and became fully operational by 1978. The project includes the Moose Creek Dam across the Chena River, a levee that keeps the Tanana River from reaching Fairbanks, and a floodway that takes backed-up Chena River flood water from the dam south to the Tanana River. This project resulted in sloughs that are mostly groundwater-fed systems with low discharge and low sediment loads that would naturally have narrow channels and low banks. For example, the Chena Slough summer flows went from ~1000 cubic feet per second (cfs) to ~70 cfs, with winter flows as low as 40 cfs (see Figure 2).

Meanwhile, land along the Old Richardson Highway (Piledriver Slough) and the Old Valdez Trail (Twentythree Mile Slough) was being developed for subdivisions, private homes, and agriculture. Much of this property required slough crossings for

access. Many of the property owners installed undersized culverts (requiring many cubic feet of gravel fill material) in the sloughs to gain access to their homes or agricultural fields.

In 2001, the Alaska Department of Fish and Game (ADF&G), Habitat and Restoration Division (now the Alaska Department of Natural Resources [ADNR], Office of Habitat Management and Permitting[OHMP]) conducted a culvert survey on nine road crossings of Chena Slough. Results showed that, with the exception of Nordale Road, fish passage was blocked at all of the culverts when discharges were less than the design fish passage flow (70 cfs). The most common fish passage problems observed included: culverts undersized for the design discharge; grade breaks within the culvert barrel creating hydraulic jumps; culvert slopes not matching the channel gradient; excessive water surface restriction (flow contraction) at the inlet; culverts blocked by debris and/or grates; or the culverts set above the channel thalweg (perched).

Adoptive Restoration Plan for Chena Slough Recommended by the CSTC:

To improve and/or maintain existing fish habitat (mostly Arctic grayling spawning and rearing habitat), maintain recreational use (swimming, fishing, canoeing) and prevent high water problems (septic, yard, or basement flooding) the CSTC developed a three phase restoration plan: (1) assessment and reestablishment of fish passage, (2) major stream channel restoration work and fish monitoring programs, and (3) evaluation of restoration success. Specifically, the plan recommends:

1. Replace culverted crossings with bridges or much larger, correctly placed, depressed culverts that meet proposed width/depth ratio.

[To create and maintain free flowing water (year round) for the movement of ice, vegetation and unwanted nutrients and the free passage of fish both upstream and downstream.]

2. Construct a channel (within the existing channel/floodway) with a width/depth ratio of 20'-30' wide by 2'-3' deep, sinuous with intermittent pools, runs, riffles and slack water ponds.

[To further enhance the free flowing water; change the water temperature regime to prevent the depletion of dissolved oxygen (DO) and the increase of unwanted

- algae and aquatic macrophytes; and to create a “healthy” stream by constructing a width/depth ratio that “fits” the proposed stream flows while creating fish habitat use areas.]*
3. Create a beaver management program and reduce beaver dams.
[To further enhance and ensure the continuous, free flowing water.]
 4. Divert water from Moose Creek to Chena Slough to double the existing discharge (existing summer flows = 70-90 cfs, winter flows = 40 cfs) to a proposed 140-180 cfs.
[To further enhance the free flowing water that will help flush out the ice, vegetation and unwanted nutrients.]
 5. Conduct fish habitat use studies along the length of the slough.
*[To ensure that the “new” channel created within the “old” channel contains the habitat types (e.g., spawning, rearing, feeding, resting, eating, predator avoidance areas) that are important for **all** life stages of fish, but concentrating on the spawning and rearing habitat for Arctic grayling.]*
 6. Continue the recreational and educational use of the slough.
[The schools, local residents, and summer visitors have enjoyed this slough in the past, are doing so now, and need that opportunity to continue into the future. Chena Slough travels thru North Pole and is a valuable resource to the community.]

Phase I Completed Projects:

The following is a summary (with before and after photos) of the sites that have been “restored” along Chena Slough and Beaver Springs Slough. Funding for each project is acknowledged. U.S. Fish and Wildlife Service (USFWS) monies are from the federal grant programs “Partners for Fish and Wildlife” and/or “Fish Passage”; the National Fish and Wildlife Foundation (NFWF) Grant was applied for and received in spring of 2001 (\$75,000); State Grant monies were from the offices of Senator Gene Therriault (\$250,000) and Representative John Coghill (\$124,000).

In October 2001, 3-36” diameter culverts were removed from Airway Road crossing of Chena Slough and replaced with a free-span 40’ long steel bridge (originally used to access a timber sale on Montague Island) purchased and installed with a combination of funding and in-kind services from the NFWF Grant, Fairbanks Soil and Water Conservation District (FSWCD), ADNR-OHMP, ADOT/PF, USFWS, City of North Pole, and Airway Road Service District.



Before



After

In July 2001, a 25' section of an earth dam was breached to allow for fish passage. The dam was located just downstream from the Mission Road crossing of Chena Slough. Money from the NFWF Grant was used to hire the contractor.



Before



After

In October 2001, to increase fish passage a causeway across Beaver Springs Slough that connected the elementary school to 5th Avenue Park was removed and replaced with a pedestrian footbridge. USFWS grant monies and the City of North Pole funded this project.



Before



After

In August 2003, one-5' diameter (extremely damaged) culvert was removed from the Doughchee Road crossing of Beaver Springs Slough and replaced with a free-span 40' long steel bridge (originally used to access a timber sale on Montague Island). Funding was generated from the USFWS grant program, City of North Pole, State grant monies, and NFWF Grant.



Before



After

In September 2004, 3-36" diameter culverts were removed at the Outside Hurst Road crossing of Chena Slough and replaced with a free-span 40' long steel bridge (originally used as a temporary bridge on the Pogo Mine Road). Funding was from USFWS grants and State grant monies.



Before



After