
Summary of the

DUCK CREEK WATERSHED MANAGEMENT PLAN

-----WHAT IS THE DUCK CREEK WATERSHED MANAGEMENT PLAN?-----

The plan is part of a community-based effort to restore water quality and anadromous fish habitat in Duck Creek, a stream impaired by urban runoff and development in Mendenhall Valley. A public group, the Duck Creek Advisory Group (DCAG), is looking at the problems of Duck Creek to determine what should be done to improve it. A comprehensive plan has been prepared by the group to identify specific problems and to outline potential management and restoration strategies; this plan along with public comment will be used to develop the long-range planning needed to protect and restore Duck Creek and other streams.

Public participation is important because the plan to manage and restore Duck Creek takes a stewardship approach that depends on partnerships. Stewardship is really people working together to protect the land and water resources they care for and depend on. The plan is about improving the watershed for the local community, but it is more than that--the entire project is intended to demonstrate to the community, residents of Alaska, and the nation the benefits of restoring and protecting small streams and wetlands.

-----WHY DOES DUCK CREEK NEED A PLAN?-----

Duck Creek is located in the center of Mendenhall Valley, a relatively large watershed that drains several streams into the Mendenhall Wetlands and Fritz Cove area near Juneau, Alaska (Fig. 1). The Valley and its streams have played an important role in the growth and development of Juneau. From the early dairy farms on Duck and Jordan Creeks to the discovery of gold in Nugget Creek to the Juneau International Airport, the Valley has been a focal point for Juneau and Southeast Alaska. Over one-third of Juneau's population lives in the Valley.

Duck Creek is presently listed on the State's 303(d) list of impaired waterbodies because of urban runoff from non-point source pollutants including turbidity, heavy metals, hydrocarbons, iron floc, and fecal coliform bacteria. It wasn't always this way. Historically, there were runs of nearly 10,000 chum salmon in Duck Creek. Native Alaskan Tlingits relied on salmon from Duck Creek for subsistence. A dozen fur farms in the Mendenhall Valley also used salmon from the stream to feed their animals. The coho run still numbered about 500 fish in the late 1960s.

Currently in Duck Creek, **the chum run is extinct, the coho run is less than 20, and the once excellent trout fishing is closed.** This is reason for concern, because **salmon are barometers of stream health.** The health of these fish populations--both their abundance and diversity--is a reliable indicator of the stream's health and the overall environment of the Mendenhall Valley. Salmonids are extremely sensitive to habitat degradation during the fresh water phases of their life cycle. Unfortunately the Duck Creek anadromous fish habitat has suffered significantly from an accumulation of physical habitat alteration, poor water quality, loss of riparian vegetation, and loss of estuarine wetlands as a result of water diversion,

sedimentation of pools and riffles, channelization, road building and stream crossings, airport construction, and littering. What has happened to Duck Creek in the last half century is typical of the neglect given urban streams throughout the country. As a consequence of neglect, Duck Creek has developed **MAJOR PROBLEMS:**

- ⊗ Inadequate streamflow for fish
- ⊗ Barriers to fish migration
- ⊗ High levels of dissolved iron
- ⊗ Runoff pollution (sewage, oil, heavy metals)
- ⊗ Inadequate stream crossings (e.g., culverts)
- ⊗ Channelization
- ⊗ Sedimentation
- ⊗ Excessive nutrients
- ⊗ Low levels of dissolved oxygen
- ⊗ Loss of streamside vegetation

However, despite these problems, Duck Creek contains important overwintering habitat and still produces salmon and trout for the local fisheries, is used by kids and adults for recreation, and is an important part of Juneau life.

-----WHAT IS THE DUCK CREEK ADVISORY GROUP?-----

The DCAG was formed in 1993 to coordinate planning, initiating, and carrying out activities to restore water quality and anadromous fish habitat in Duck Creek and its freshwater and estuarine wetlands. The Advisory Group provides education and facilitates work with the CBJ, State and Federal agencies, private businesses, conservation organizations, and homeowners in the design of restoration projects and pollution control throughout the watershed. Schools, youth groups, citizens and agency researchers have been involved in baseline data collection in order to help understand the problems and make decisions on how to improve and best manage Duck Creek.

Objectives of the DCAG:

- *Restore beneficial resources including water quality, flood control, and fish habitat.*
- *Provide information on the status and value of aquatic resources and options for maintenance and restoration of such resources.*
- *Evaluate the effectiveness of restoration protocols for improving water quality and fish habitat.*
- *Instill a “conservation ethic” and perspective in the community on the importance of neighborhood streams to “quality of life.”*
- *Develop Duck Creek as a local, regional, and national demonstration site for restoration.*

The DCAG does not have authority and only makes recommendations based on the technical expertise of the membership. Each member of the DCAG is responsible for keeping their organization informed of the Group's progress and for facilitating parent agency actions and approvals necessary to accomplish the Group's objectives. Membership of the DCAG consists of representatives from numerous groups:

Public Organizations

Duck Creek Homeowners
Juneau Trout Unlimited
Southeast Alaska Guidance Association (SAGA)
Mendenhall Watershed Partnership

Small Businesses

Gastineau Guiding
Discovery Foundation
Hanna Construction

Local Government

City and Borough of Juneau
Southeast Conference
Juneau Public Schools

State Government

Alaska Department of Environmental Conservation
Alaska Department of Fish and Game

Alaska Department of Natural Resources
Alaska Department of Transportation and Public Facilities
Alaska Division of Governmental Coordination

Federal Government

National Marine Fisheries Service (Alaska Region and Auke Bay Laboratory)
U.S. Fish and Wildlife Service
Environmental Protection Agency
U.S. Geological Survey
Federal Highway Administration
U.S. Corps of Engineers
U.S. Forest Service
Natural Resource Conservation Service

Community and statutory concerns that are the focus of the Watershed Plan originated from public outreach and agency consultation through the DCAG forum. The public scoping process included four public scoping meetings, more than 70 monthly meetings of the Duck Creek Advisory Group, ten newsletters each distributed to nearly 150 local households, and numerous presentations to community interest, environmental, school, business, and professional groups. Consultation with public resource managers and regulatory agencies at all levels of government was done continually throughout the scoping process. More than a dozen agencies have participated in discussions of this Plan. As key concerns were identified, agency staff and community members discussed alternative solutions to the problems and raised the issues at meetings, in presentations, and in the newsletter. The Mendenhall Watershed Partnership, a citizens group working toward a healthier Mendenhall watershed, was organized in 1998 and evolved from the DCAG.

The DCAG has used a science-based approach to plan for and accomplish effective restoration of Duck Creek. That approach has four phases: 1) establish baselines of conditions; 2) implement pollution control measures; 3) implement restoration projects; and 4) evaluate effectiveness based on established baselines.

The Duck Creek Watershed Management Plan considers more than just the stream--it takes a watershed approach. Watersheds are nature's boundaries for water resources. When rain falls it either flows downhill through wetlands and ditches into streams and into the ocean or it may percolate through the soil to become ground water. As it flows, water picks up pollution, sediment and debris. As a result, physical, chemical, and biological processes--including human activities--within a watershed affect the quantity and quality of water in the stream or groundwater. Technically, a watershed is defined as: "an area of land that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel" .

-----**THE WATERSHED MANAGEMENT PLAN**-----

The Duck Creek Watershed Draft Management Plan considers more than just the stream; it takes a watershed approach. Watersheds are nature's boundaries for water resources. When rain falls or when snow melts, water flows downhill through wetlands and ditches into streams and rivers and eventually to the ocean. The water may also percolate through the soil to become ground water. As it flows, water picks up pollution, sediment and debris. As a result, physical, chemical, and biological processes--including human activities--within a watershed affect the quantity and quality of water in the stream. **A watershed approach:**

★ fosters the coordinated and more efficient implementation of programs to control pollution,

reduce runoff, enhance or restore sensitive habitats, and protect drinking water;

★ highlights opportunities for creativity in enhancing the health of the aquatic system; and

★ fosters the commitments and resources of local communities, private landowners, and citizens to clean up and maintain the streams, lakes, wetlands, and coastal areas.

Components. The plan has three basic components: (1) enforcement of existing ordinances and regulations, (2) control of runoff and pollution control using Best Management Practices (BMPs), and (3) implementation of restoration projects.

Completed Projects. Through “windows of early opportunity” several restoration and pollution control projects have already been implemented on Duck Creek.

- . ☺Replacement of Stephen Richards Drive Culverts with 17 ' Arch
- ☺Streambank Revegetation and Channel Modification at Stephen Richards Drive
- ☺Sediment Removal and Channel Reconfiguration at Taku Blvd.
- ☺Revegetation of CBJ constructed ditch near St. Brendan’s Espiscopal Church
- ☺Culvert Replacement on El Camino Drive
- ☺Culvert Replacement on Mendenhall Loop Road between Kiowa St. and El Camino Dr.
- ☺Installation of Snow Fencing at Intersections for Snow Management
- ☺Creation of Wetland in Dredge Pond at Church of the Nazarene
- ☺Replacement of Two Culverts Below Nancy Street with Bridges
- ☺Creation of Wetland and Outdoor Education Facility at Floyd Dryden School
- ☺Replacement of Cessna Drive Culvert with 17 ' Arch and Fish Trap (under way)

Future Projects. NMFS and DCAG have been working with the Corps of Engineers (COE) from Anchorage and have developed a priority plan for future restoration projects on Duck Creek. Preliminary cost estimates for eight projects exceeds \$3,000,000. The COE's 206 Program will fund most of the costs, but the CBJ will be responsible for about 35%. The CBJ expenses can be in-kind-services and/or projects already planned to improve water quality or habitat on Duck Creek. The success of this partnership with the COE could lead to additional restoration projects on other streams in the Valley such as Jordan Creek or the Mendenhall River. ***Public support of the COE proposal and CBJ involvement is needed.***

1. CONTROL OF DISSOLVED IRON - The major factor limiting the biological communities and the stream ecosystem in Duck Creek is the high concentration of dissolved iron in ground water. Alleviation of this problem is imperative to begin restoration of water quality and fish habitat.

Restoration Approach:

- a. Cap sources of iron with organic fill
- b. Plant riparian/aquatic plants capable of oxidizing iron
- c. Mechanically aerate the water at the sources of dissolved iron
- d. Increase the volume of flow to dilute the dissolved iron

2. STREAMFLOW RESTORATION - Ditching, groundwater pumping, channel diversions, etc. have reduced streamflow in Duck Creek as well as in Jordan Creek. Also, the highly permeable streambed in the lower Duck Creek permits the stream to lose surface flow during low precipitation.

Restoration Approach:

- a. Convey water from Nugget Cr. To both Duck and Jordan Creeks
- b. Siphon water from Dredge Lakes
- c. Pump groundwater from Thunder mountain aquifer
- d. Tap groundwater sources adjacent to upper Duck Creek near Aspen St.
- e. Divert Jordan Creek into Duck Creek at Nancy Street area

3. STREAM CROSSING IMPROVEMENTS - Improper sizing and installation of culverts has created a major problem on Duck Creek because of the stream's low flow and the damming affect created at each crossing. The stream channel is seriously degraded because the stream no longer properly flushes sediments or passes water efficiently.

Restoration Approach:

- a. Removal of two unused driveway crossings (Glacier View Mobile Home Park and Kodzoff Acres)
- b. Replace culverts downstream from Egan Expressway: Berners Avenue, Mendenhall Plaza Road, Valley Paint Road, FAA Road, Glacier Highway, and Del Rae
- c. Replace culverts upstream from Egan Expressway: Egan Expressway Culverts, Aspen Drive, and Mendenhall Boulevard

4. WETLAND CREATION - Over 60% of the original wetlands in the Duck Creek basin were eliminated by 1989, and more have been eliminated since. Many of those wetlands functioned as filters for dissolved iron and also attenuated flows, thereby improving water quality and stabilizing streamflow.

Restoration Approach:

- a. Create freshwater marsh wetlands in 10-12 acres of existing dredge ponds
- b. Create wetlands in several smaller "residential" ponds along Duck Creek

5. LINING OR SEALING OF STREAMBED - Several reaches of stream "dry up" during the salmon smolt migration each year, killing on average 50% of the smolt. "Drying up" occurs in very permeable reaches which allow the surface water to flow directly into the ground. The permeable conditions may be attributed to an old residual glacial outwash channel, but are probably due to physical alteration of the streambed.

Restoration Approach:

- a. Line about 2000 ft of channel with an impervious geotextile
- b. Pump bentonite into streambed in areas known to be highly permeable

6. FINE SEDIMENT REMOVAL - Research on spawning habitat capability by scientists at NMFS-ABL in 1995-96 confirmed that salmon reproduction is not occurring in Duck Creek because of the high proportion of fine sediment and low dissolved oxygen levels in the spawning gravel. As a consequence, the adult salmon that return to spawn each year in Duck Creek are not producing fry because of these poor incubation conditions.

Restoration Approach:

- a. Remove sediment from about 3,000 ft. of channel using a modified gold dredge

7. STORMWATER TREATMENT - Because of Juneau's relatively small population (30,000), State or Federal Regulations do not require that stormwater runoff be treated to remove pollutants before it enters streams or estuarine areas. Duck Creek's location in the heart of the Mendenhall Valley residential and business area makes it particularly vulnerable to urban runoff. As a consequence, high levels of heavy metals and hydrocarbons occur in the stream.

Restoration Approach:

- a. Create pocket wetlands at outlet of ditches draining into Duck Creek
- b. Install water treatment facilities in existing and proposed stormwater catch basins

8. REVEGETATION OF RIPARIAN AREAS - Loss of riparian vegetation has contributed significantly to Duck Creek degradation. Encroachment of residences, businesses, and roads have often left little or no buffer between the development and the stream. As a consequence, streambank erosion and loss of streamside trees have resulted in impaired fish habitat and degraded water quality.

Restoration Approach:

- a. Acquire additional greenbelt areas along stream
- b. Thin some dense stands of vegetation in existing greenbelts
- c. Plant vegetation at intersections and along reaches exposed to traffic

d. Construct snow fences using vegetation

-----HOW CAN YOU GET INVOLVED?-----

Developing a personal conservation ethic that addresses everyone's daily activities in how they treat water use, runoff from yards and parking lots, potential pollutants, streamside vegetation, instream habitat, etc. is essential for the plan to work. The plan is not final, but is an evolving draft, and comments concerning content and how to make it more useable are encouraged. You can make comments, get involved in projects, or get additional information on Duck Creek from the following individuals:

K Koski - NMFS Auke Bay Laboratory - 789-6024

Mitch Lorenz - NMFS Auke Bay Laboratory - 789-6035

Bob Triplehorn - Southeast Conference - 463-3445

Jan Caulfield - Sheinberg Associates - 586-3141

Ben Kirkpatrick - Alaska Department of Fish and Game - 465-4290

Mark Anderson - Alaska Department of Environmental Conservation 465-5087

Sue Walker - U.S. Fish and Wildlife Service - 586-7240

Margaret Beilharz - U.S. Forest Service - 586-7865