

# How Does Urban Development Impact the Duck Creek Watershed? Juneau, Alaska

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## Introduction

The Duck Creek watershed has undergone number of changes in the past 100 years. What was at one time a spawning run for close to 10,000 chum salmon, is now a slow moving (sometimes stagnant) creek with many urban footprints along its path. This study was conducted to see what kind of impact urban development has had on the Duck Creek watershed.



Fig. 2. Screen culvert near airport clogged with debris.

Fig. 1. Ogilvie 1893 photo with Duck Creek at far left, similar size to the Mendenhall River



## Materials and methods

For this project, I used a Silva compass, a Garmin eTrex GPS receiver, a Nikon CoolPix L10 digital camera, notebook, and a Toyota 4-Runner.

Back in the classroom, I used my GPS waypoints and ArcMap 9.1 to create two maps detailing urban influences on the flow of Duck Creek.



Fig. 3 (Below) One of 23 culverts along the Duck Creek watershed.



Fig. 4 (Above) Duck Creek exiting the last culvert by the Airport wetlands.

## Data analysis

A total of 23 culverts were plotted along the Duck Creek flow path. A total of 5 bridges were discovered without metal culverts, but two were relatively close in proximity, so only 4 were plotted. While plotting these waypoints, some parts of the creek displayed decent flow to the naked eye, while other portions were blocked and constricted with both natural and urban debris. A stream-flow improvement portion is noted.



Fig. 5 (Above) A Culvert blocked with debris.

Fig. 6 (Left) Stream-flow improvements along Duck Creek



Fig. 7 & 8 Natural and urban debris disrupting water flow



## Results

The numerous culverts and bridges along Duck Creek are inadequate and can contribute to backwater flow, or become blocked with debris and contribute to flooding. The comprehensive plan for Juneau Borough acknowledges this as well. Numerous points along the creek were also marked with trash, discarded urban materials, and fallen natural debris (such as trees) contributing to changes in water flow, water quality, and stagnate water. The second map shows 1608 meter span of the creek where 10 culverts are marked. However, the 8 culverts in between span a distance of just 635 meters, with a mean span of 79.4 meters. It is just upstream from here that improved stream flow modifications were made.

## Conclusions

A careful study of water quality, and discharge should follow this project. It would be of interest to compare previous studies on Duck Creek going as far back as 1993 when a Duck Creek Advisory Group was formed due to being listed as an impaired water body by the Alaska Department of Environmental Conservation. While some portions of the creek show signs of improvement, the dangers of pollution from urban runoff, poor water quality, altered flow regimes and degraded habitat still exist. Since it is a source of important overwintering habitat for juvenile coho salmon, which migrate into the stream each fall, these dangers should be monitored. Lastly, it is also an important storm drainage and flood control creek. However, if portions are prone to constrained water flow and clog with debris, then backflow and flooding will occur.

## Literature cited

Owen Mason, et al, 1997, *Living with the Coast of Alaska*, Duke University Press, Durham and London, pp 239

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## For further information

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