

Fact Sheet: ABFC-FS-02a
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Hydrologic Assessment of Shaw Creek Watershed and Adjacent Southern Tributaries of the Tanana Basin, Alaska

Project Partners

Whitestone Farms Community

Shaw Creek Community

GW Scientific

Alaska Department of Fish and Game

Alaska Department of Natural Resources--Division of Forestry

Alaska Department of Environmental Conservation

Restoration Science and Engineering

Importance of Hydrology Data for Watershed Managers

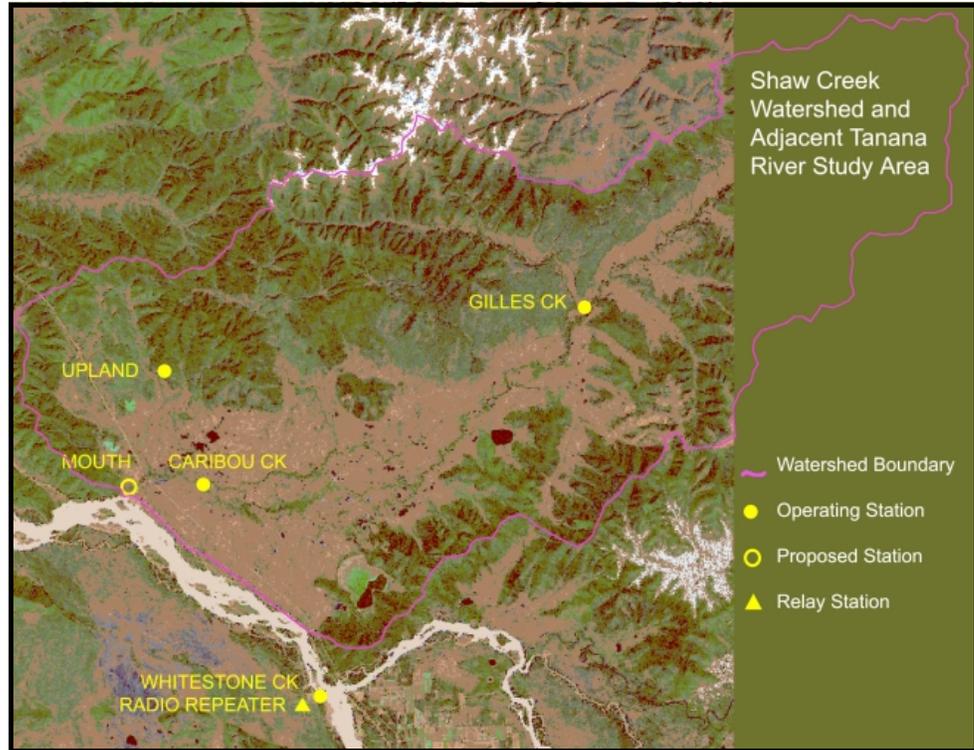


Figure 1: Shaw Creek Watershed and Monitoring Station Network

Introduction

Shaw Creek, a northern tributary of the Tanana River (Figure 1), has been identified by the Alaska Department of Fish and Game as rearing and possibly spawning habitat for chum, coho, and chinook salmon, important spawning and rearing habitat for Arctic grayling, and habitat for other resident fish species. In addition, the Shaw Creek basin serves as habitat for moose, bears, furbearers, and portions of the Fortymile caribou herd. The watershed also contains spruce and hardwood timber resources, mining resources, scientific resources (e.g. Shaw Creek Tamarack and Rosa Keystone Dunes research natural areas), a long history of trapping fur bearing animals, and recreational resources (e.g. Quartz Lake, winter trails).

Access routes to proposed timber sales and mining areas, timber harvesting activities, prescribed burns, and community development all have the potential to impact the water quality and quantity of the Shaw Creek watershed. The goal is to have both sustainable development and environmental protection in the context of current and future development. This requires knowledge of the surface and ground water processes within this watershed. The data collected in this project will provide information to land managers to better assess interactions of development activities with the watershed and its ecosystem.

The focus of this multi-year project has been to establish long-term index sites for monitoring

the hydrology of Shaw Creek watershed and nearby southern, spring-fed tributaries of the Tanana River. Last year, with the help of ADEC 319-Grant No. NP-02-01, we were able to successfully install three monitoring stations in the Shaw Creek basin (Fig. 1). The index stations provide continuous data on surface-water levels; air, soil, surface-water, and river-bed temperatures; stream conductivity; soil moisture and atmospheric relative humidity. This year we plan to install one additional site (Fig. 1), provide analysis and interpretation of the data, and create useful GIS products.

Why is Hydrology Information Important ?

Hydrology information collected at Shaw Creek and nearby spring-fed streams can be useful to land managers and the public for a number of purposes. Some examples of how the data can be used are listed below:

- Water is an important mechanism for transport of energy, nutrients and chemicals, and sediments. Thus, defining the hydrologic cycle of a watershed is an important step in understanding erosion processes, water nutrient dynamics, contaminant transport, thermal processes (e.g. permafrost degradation).
- Water quality and quantity data can allow for more precise delineation of anadromous (e.g. salmon) and high value resident fish habitat
- Over-wintering conditions (e.g. freezing depth of water, icing) can allow for better permitting decisions for all-season and winter

roads including access to timber harvest and mining activities

- Soil moisture, surface weather conditions, and water quality provide valuable baseline data for use in prescribed burning programs to maintain wildlife habitat
- Relative roles of groundwater and surface water components in the basin allow natural resource managers to better evaluate effects of proposed surface-disturbing activities on fish habitat and water quality.
- Shaw Creek has important timber resources. Development of all season and winter roads for access to these resources requires baseline hydrologic data. These data are valuable for designing culverts, bridges, and ice-bridges, and in monitoring long-term effects on water resources.

— Johnny Mendez



Figure 2: Rachel, a Junior High student at Whitestone Farms Training Center, collects soil moisture data for their study on how water availability affects birch-sap production. Photo provided by John Donaldson

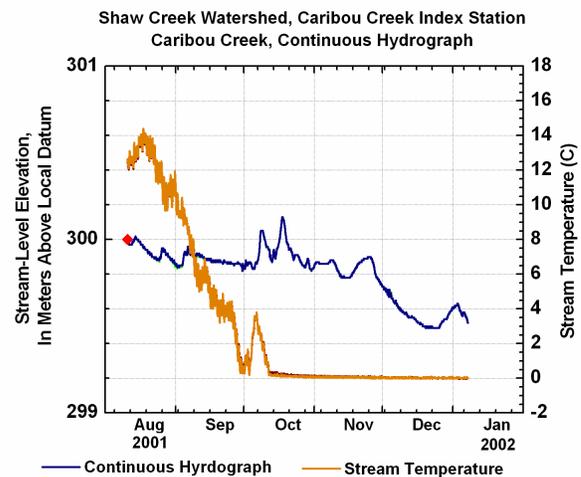


Figure 3: Hydrograph of Shaw Creek (blue line) shows changes in water level throughout the year. Notice how in winter water levels drop. Most of the water at this time is base-flow provided by the local groundwater system. The orange line shows the water temperature.

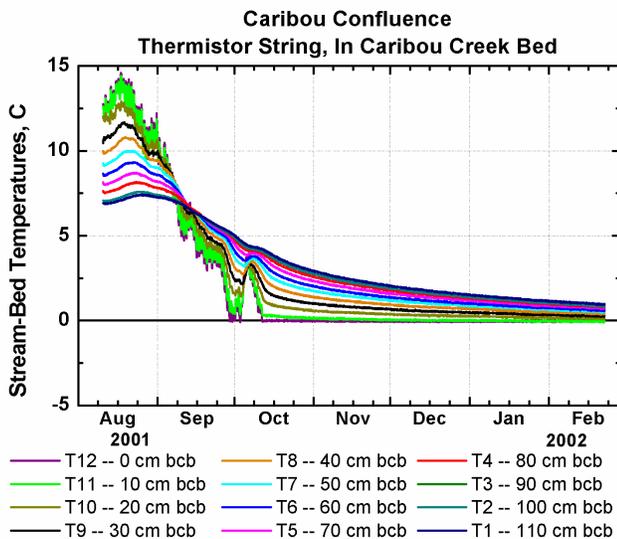


Figure 4: Stream-bed temperature profile of Caribou Creek (a Shaw Creek tributary). Notice how in the winter the stream-bed temperature increases with depth. This type of data can help identify fish incubation timing, since fish egg development depends on accumulated water-temperature.

For More Information:

If you would like to get involved or find out more about this project, visit the following website:
<http://www.tanana-watershed.org>

Or contact:

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