

Arctic Landscape Conservation Cooperative

Linking Climate, Stream Flow, and Fish Migration

The Big Picture

Fish on the North Slope rely on seasonal migrations to access spawning, summer feeding, and overwintering areas. To complete their annual cycle, fish migrate between main stem rivers, small headwater streams, deep lakes, and shallow ponds. Maintaining surface water connectivity between these habitats is essential for successful migration. These ephemeral waterways are sensitive to changes in precipitation. This work will help managers identify fish populations whose seasonal migrations may be impacted by a warmer, drier Arctic.

Project ID: ARCT2010-06

Year Funded – 2010

Start – July 2010

End – June 2012

Budget – \$100,244

Research Partners:

UAF, Water and Environmental Research Center

Understanding how changing climate could influence fish migration on the North Slope

Project Description

Researchers from the University of Alaska Fairbanks (UAF) will develop a model that examines the relationship between measured stream flow and surface water connectivity between summer feeding and overwintering habitats for fish on the North Slope. Work initiated in 2010 will focus on the Upper Kuparuk River (Figure 1).

Why We Are Interested

Recent observations suggest that portions of some North Slope stream-beds become dry during brief periods in later summer and early fall. This is cause for concern because climate models forecast even drier summers in the future. This could pose a problem for migrating fish, which must be able to move back and forth from breeding and summer feeding areas to scarce overwintering sites.



Upper Kuparuk River during the drought of 2005. Note the dry streambed. Photo courtesy of Doug Kane/UAF.



What Will Be Done

This work uses the best available long-term stream gaging data set for the North Slope (the upper Kuparuk River watershed) to develop a model to assess the vulnerability of stream systems to periodic drought, and the vulnerability of migrating fish to a temporary loss of stream flow. The project complements studies of fish migration and ecology conducted by US Fish and Wildlife Service and Woods Hole Marine Biological Laboratory.

Expected Outcomes

This project will establish a relationship between streamflow and water depth within the portions of the Kuparuk River that are prone to drying. Using these data, researchers will develop a hindcast model to explore the frequency, timing, and duration of low flow events over the years for which we have steamflow data.

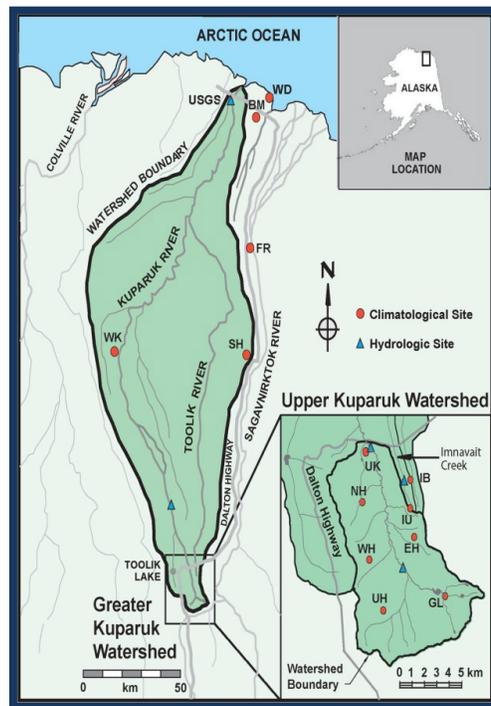


Figure 1. Location of stream gages, meteorological stations, and project locations on the North Slope of Alaska

Timeline

July 2010 – May 2012: Field work and model development

June 2012: Report of manuscript summarizing results of data analysis and models.



The mission of the Arctic LCC is to identify and provide information needed to conserve natural and cultural resources in the face of landscape scale stressors, focusing on climate change, through a multidisciplinary program that supports coordinated actions among management agencies, conservation organizations, communities, and other stakeholders.

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This project represents the necessary first step towards quantifying the importance of low water conditions and fish migration on the North Slope of Alaska.

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To learn more about this project and other Arctic LCC projects visit: arcticlcc.org
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