

The Yukon River Basin Water Quality Monitoring Program: a partnership between stewards and governments

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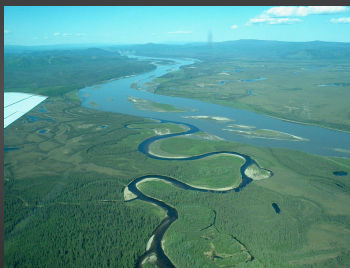
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Introduction

In September, 2005, the U.S. Geological Survey (USGS) completed a comprehensive 5-year water quality study of the Yukon River basin (YRB). The YRB is the 4th largest drainage basin in North America covering 330,000 square miles in Alaska and Canada. The Yukon River Intertribal Watershed Council (YRITWC) recognized the importance of this work and began working with the USGS in an effort "to pass the torch". Through a strong partnership, the YRITWC has developed a water quality monitoring program that mimics the USGS sampling and monitoring protocols (USGS, TWRI, Book 9). The YRITWC trains local volunteers as water-quality technicians to collect baseline data measurements of pH, conductance, temperature, and dissolved oxygen, and water samples for lab analyses. As an extension of this research effort, the USGS National Research Program laboratories analyzes the samples for major ions, alkalinity, dissolved organic carbon, selected trace metals, greenhouse gases, and stable isotopes. The YRITWC technicians and staff completed more than 90 water quality samplings at 20 sites throughout the YRB. The laboratory analyses are within expected ranges based on the USGS 5-year YRB database, demonstrating that techniques and protocols were properly executed. By successfully completing a 6th year of water quality data collection we begin to add to the knowledge of how the YRB is affected by global climate change. It is our mutual goal to develop a long-term monitoring program, (10 or more years) to track water quality trends throughout the YRB.

What is the Challenge?

A warming climate is causing large expanses of permafrost are melting in the arctic and subarctic regions, the soil active layer is deepening, upland soils are drying, the growing season is lengthening, and, as a result, fire frequency is increasing. Along with these changes, as permafrost melts, the frozen soil is transformed into biogeochemically active zones.



Confluence of the Charley and Yukon Rivers

A critical question is how a warming climate will affect the water quality of the Yukon River Basin?

Answering this question requires cooperation unlike any other in the human history of the Yukon River Basin.

People of all kinds will need to come together
From the Tribes to the First Nations
From scientist to technician
From federal to local government
From grass roots to the citizen
From the American to the Canadian



American Creek near Eagle, Alaska
The brown color is dissolved organic carbon (DOC)

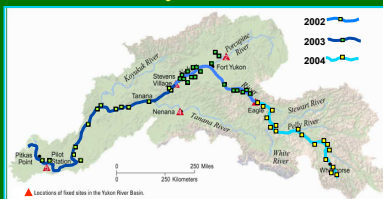
The USGS Yukon River Basin Study

Baseline data (2001-2005)

- 5 fixed sampling stations
- Yukon River @ Eagle
- Yukon River @ Stevens Village
- Yukon River @ Pilot Station
- Porcupine River
- Tanana River @ Nenana

Process-based studies (2002-2005)

- 7 Synoptics
- 43 major tributaries sampled
- Additional mainstem sites sampled

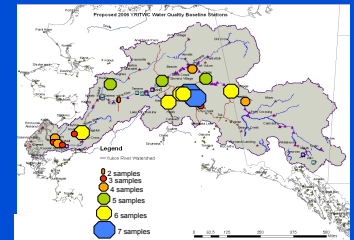


Each field season:
~70 samplings @ ~25 sites
Over 90 constituents measured

The YRITWC Water Quality Monitoring Program

2006: first field season
90 samplings @ 20 sites
~40 constituents measured

More than 47 volunteer
water technicians
and 4 YRITWC science
staff participated



Starting in April, 2005, at the 4th Biannual Summit in Kotlik, Alaska, the USGS and YRITWC began a series of seminars and workshops to educate and train any and all persons with a genuine interest and concern for the future health of the Yukon River Basin



First workshop, Fairbanks, Oct 2005

Passing the Torch



Laura Phillips and Le'ona DeWilde, YRITWC
Under ice wq sampling, Tanana River, Above
Fairbanks, March, 2006

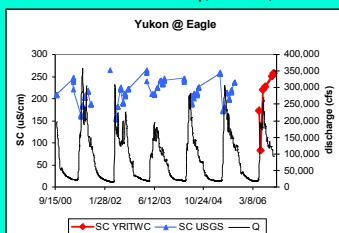


Geoff Dates, River Network, Bioassessment
Lecture at Moosehide Summit, Aug. 2005

Using the knowledge gained by the 5-year USGS study and following the same water quality sampling protocols, The YRITWC developed a comprehensive and successful water quality monitoring program



Bryan Maracle, YRITWC, and Mark Dornblaser,
USGS, training in sampling techniques at the
USGS Boulder labs, Jan 2007



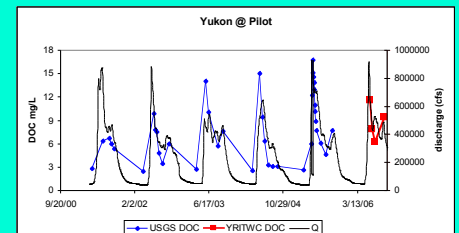
Six years of specific conductance data for the
Yukon River at Eagle, Alaska



Paul Schuster, USGS, equipment demo at
Moosehide Summit, Aug 2005



Workshop class the USGS personnel assisting
with under ice discharge measurement and
collecting water quality samples, Tanana River
at Nenana, March 2006



Six years of dissolved organic carbon data for the Yukon River
at Pilot Station, Alaska

With the guidance of the YRITWC and the USGS, the volunteer water technicians (the Stewards of the Yukon River basin) have successfully added a 6th year of water quality data to a 5-year database, building toward an invaluable long-term database.

The 2007 season is under way!