Subsistence Advisory Committee

Hydraulics & Hydrology

January 5th, 2023

Fairbanks, Alaska

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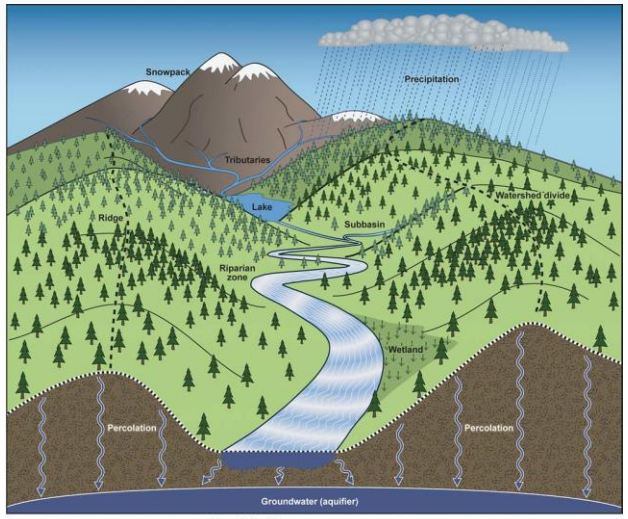
Hydraulics & Hydrology

Key Example Question – How high do we need to build the bridge?

H&H -

Hydraulics – How water moves in a stream

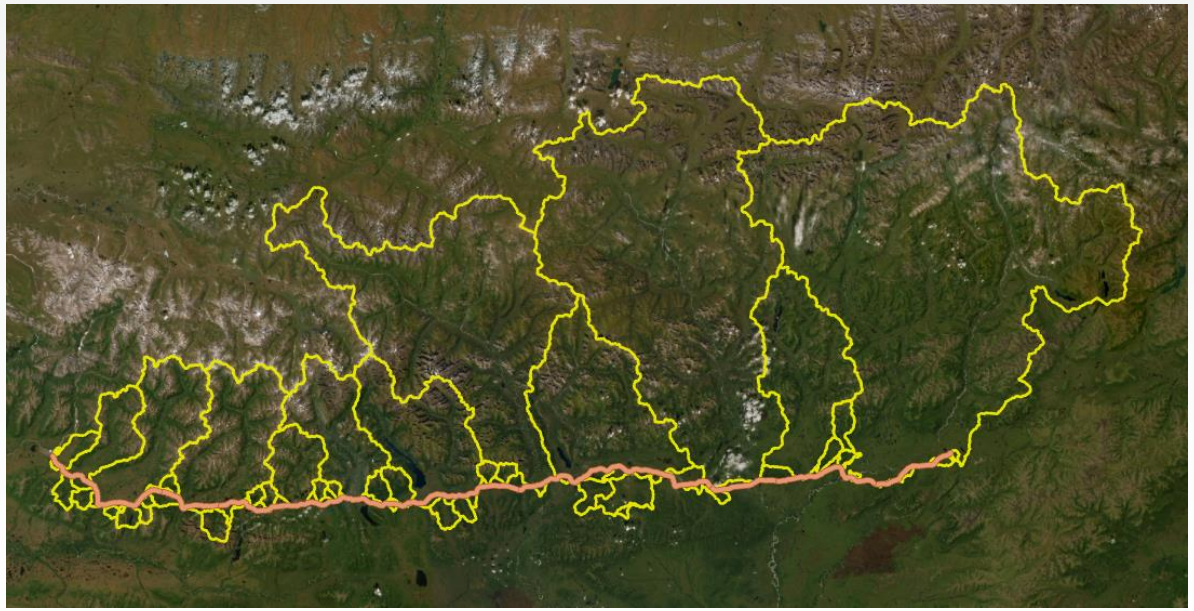
Hydrology – How water gets to a stream



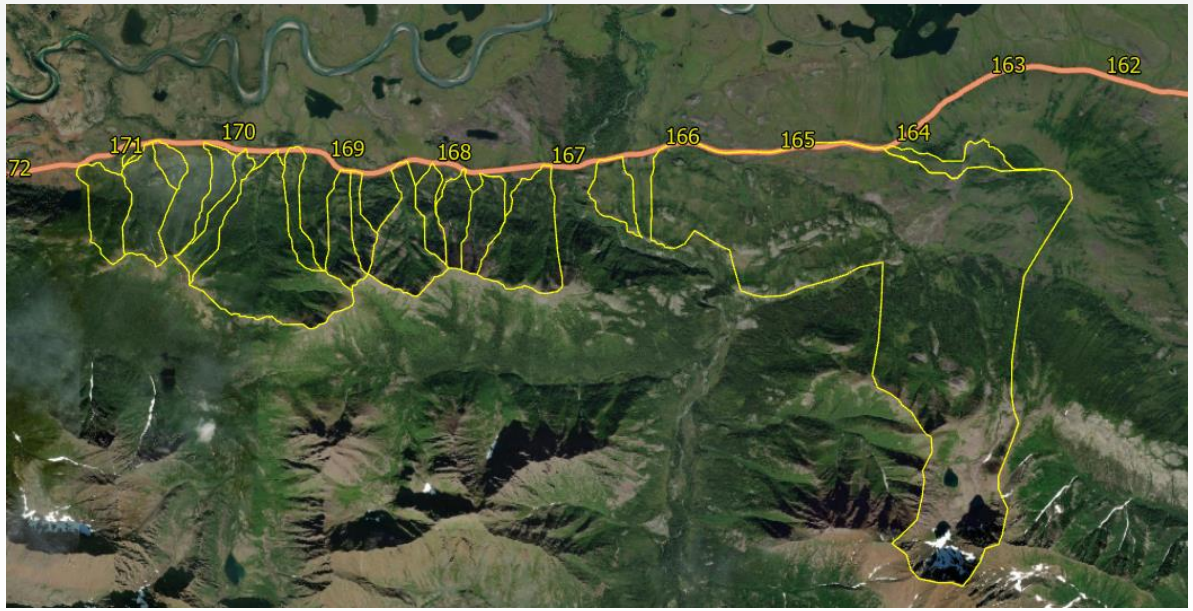
General Hydrology – Drainage Basins

Larger drainage basins feed rivers with bridge crossings

Smaller drainage basins feed streams with culvert crossings



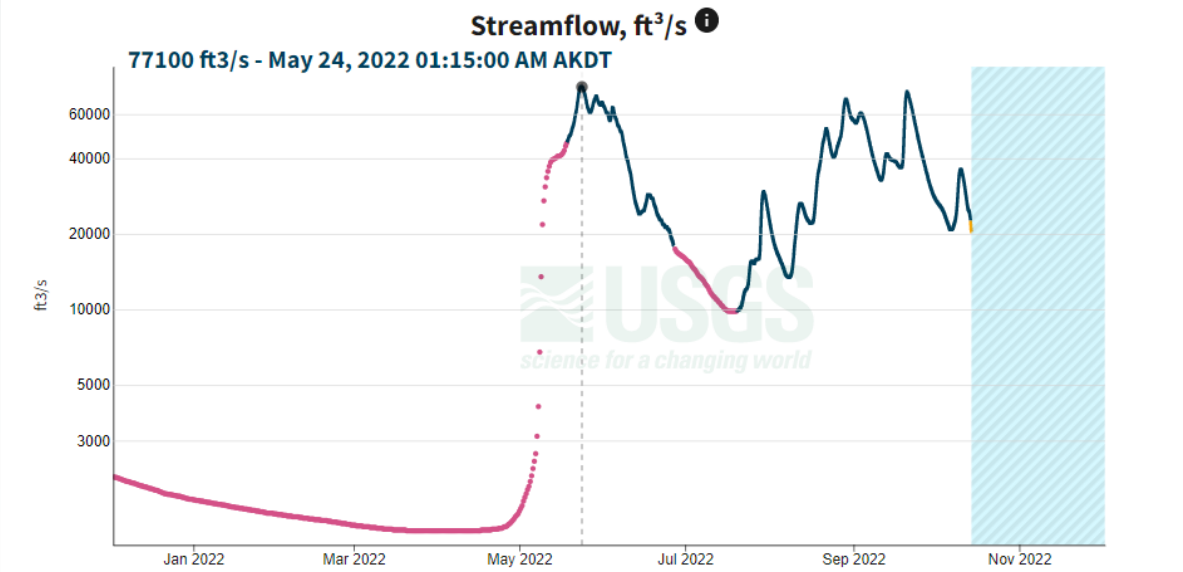
Large drainage basins, up to 3,500 square miles



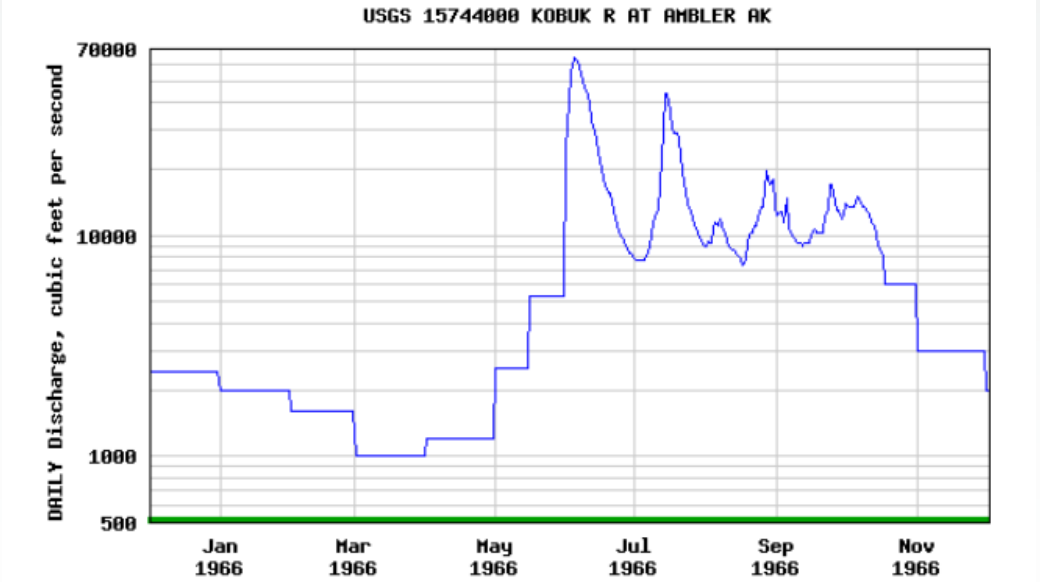
Smaller drainage basins, mileposts for clarity

General Hydrology – Seasonal Flow

- **Highest flows after spring breakup (May-July)**
- **Heavy rain events in fall (July-October)**



1-Year Koyukuk River Discharge at Hughes, AK
12/2021-12/2022
Source: USGS, 2022



1-Year Historic Kobuk River Discharge at Ambler, AK
12/1965-12/1966
Source: USGS, 2022

Hydraulics - Data Collection

High Quality Measurements = Low Impact Design

- How wide are the streams?
- How high will the water reach?
- How stable is the stream?

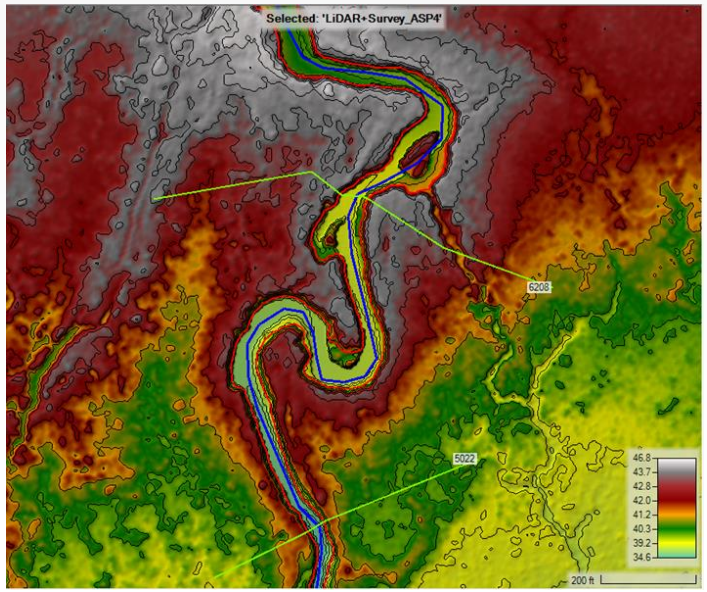
Environmentally sensitive bridge and culvert designs REQUIRE the best information and measurements

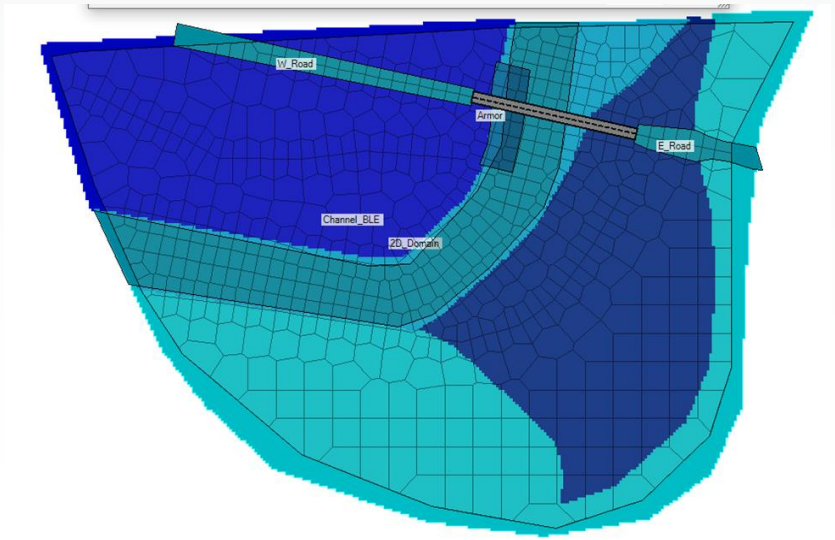
Surface Water Modeling

Key inputs – stream and floodplain geometry (above/below water mapping), and flow (hydrology)

Computer hydraulic modeling allows us to make sure that:

- **Bridges & culverts can handle large floods**
- **Bridges are high enough for ice, debris, and navigation**

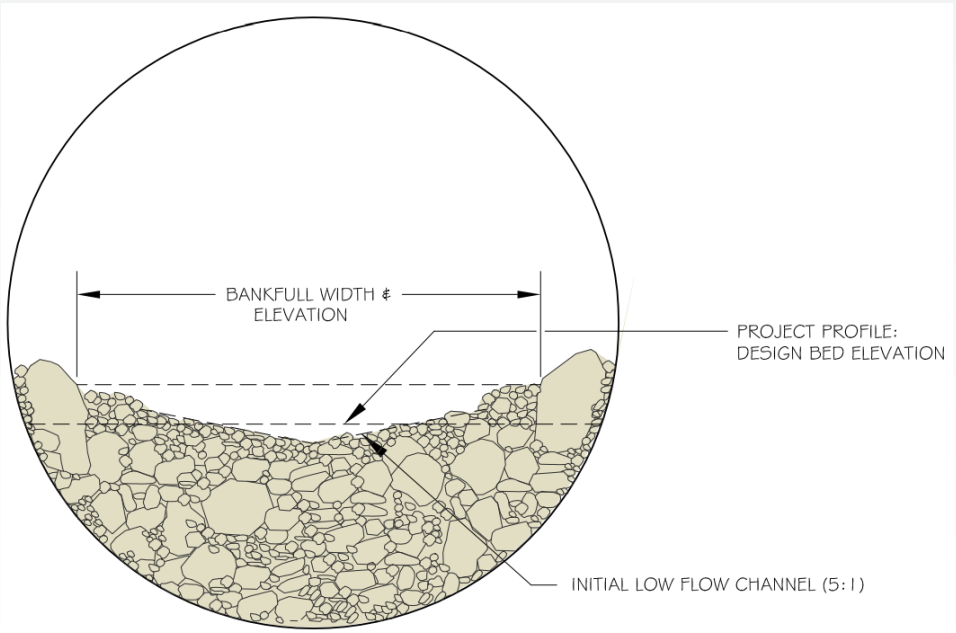




Fish Passage Structures

Fish passage will be supported by bridges or fish passage culverts.

Fish passage culvert
Source: USFS, 2008



Example fish passage culvert cross-section
Source: USFS, 2008

Data Collection – Fish Habitat

Alaska Department of Fish & Game (ADG&F) fish presence sampling in progress.

- **144 total locations**
- **Sampling on eastern 50 miles completed**

ADF&G proposed sampling locations

Summary

We look forward to collecting H&H field data in 2023 to progress design.

Questions?