Assessing Arctic Grayling Relative Abundance and Distribution Through Environmental DNA Analysis

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We acknowledge the Alaska Native nations located on the traditional lands of the Dena people of the lower Tanana River from which we collected our environmental samples from.

Grayling and eDNA
- Arctic Grayling (Thymallus arcticus) freshwater species
  - Broad distribution across Alaska
  - Opportunistic feeders; wide diet variety
  - Follow spawning salmonid to feed
  - Not an important species for subsistence harvest
  - Popular for sport fishing; various colors and sizes
- Environmental DNA analysis
  - Potential source of information of distribution, abundance, and ecology
  - qPCR (quantitative Polymerase Chain Reaction) strategy for extracted DNA to determine relative amount of species specific DNA
- Will we find an abundance of Arctic Grayling DNA in the Chena River during the salmon spawning season?

Methods
- Collected water samples with Citizen Science Sampler
  - 7 locations on 3 separate days: 3 samples each sample site
- Isolated DNA from filters
- Processed species specific assay with qPCR
- Processing samples through qPCR machine (qTOWER3 84)

Preliminary Analysis
- Tested assay specificity with tissue samples from Arctic Grayling and closely related/unrelated species (Table 1).
- High DNA concentrations of most salmonids indicate amplification during PCR (Image 5) and qPCR (Figure 1 & Table 2).
- qPCR indicates DNA concentrations of Chena River samples too low to amplify (Figure 2).

Discussion
- Latest qPCR analysis indicates eDNA sample concentrations are too low to amplify.
- Next Steps:
  - Further testing assay (Rodgers, et al) with known DNA concentrations to develop level of detection for Arctic Grayling.
  - Data configured in relation to Chum and Chinook salmon eDNA spawning periods

qPCR method may become a complementary technique in the field of assessing relative quantities of species over time and space.

Sources

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