

FISHSCAPE: Assessment of shifting seasonality on Arctic grayling migration



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Abstract

Arctic grayling (*Thymallus arcticus*) populations provide a model system for understanding the impacts of changing seasonality on circumpolar ecosystem function. Grayling serve as prey for other biota, including lake trout, birds and humans, and as top-down controls in stream ecosystems, suggesting that changes to their populations will have impacts throughout Arctic ecosystems.

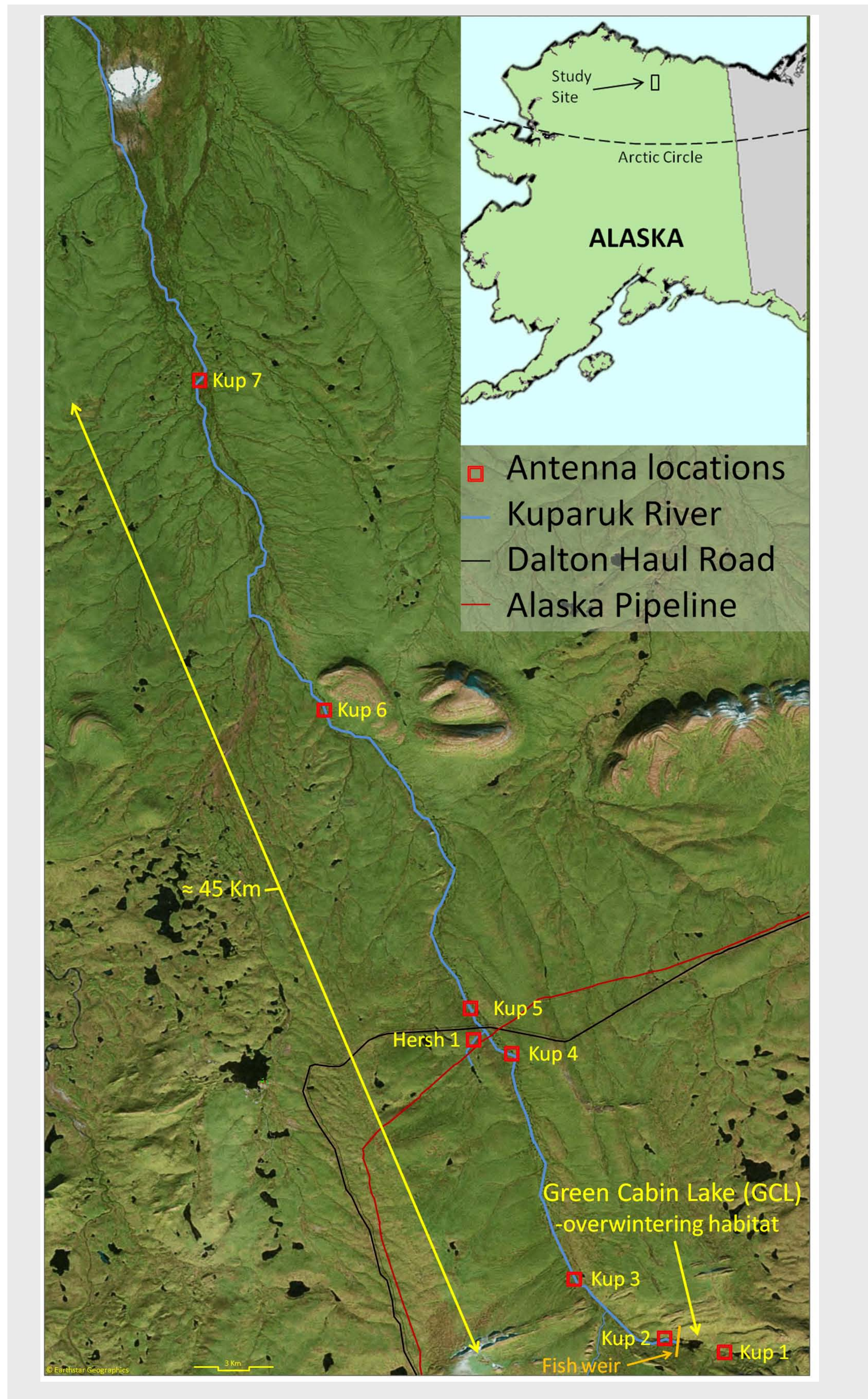
For one component of a larger study, the FISHSCAPE project is assessing how the shifting seasonality of Arctic river hydrology alters key biotic linkages within and between lake and stream components of watersheds and may alter the function of the Arctic system. To address these goals we undertook new surveys of grayling migration dynamics for a population located in the Kuparuk River on the North Slope of the Brooks Mountain Range, Alaska. In summer of 2010, we used Passive Integrated Transponder (PIT) tags, coupled with stream-side antenna units and a fish weir to monitor grayling migration timing into winter refugia.

Acknowledgements

Bruce Peterson, Heidi Golden, Gretchen Murphey, Elissa Schuett, Richard McHorney, Christina Maki

Study site

Upper Kuparuk River Watershed



Results

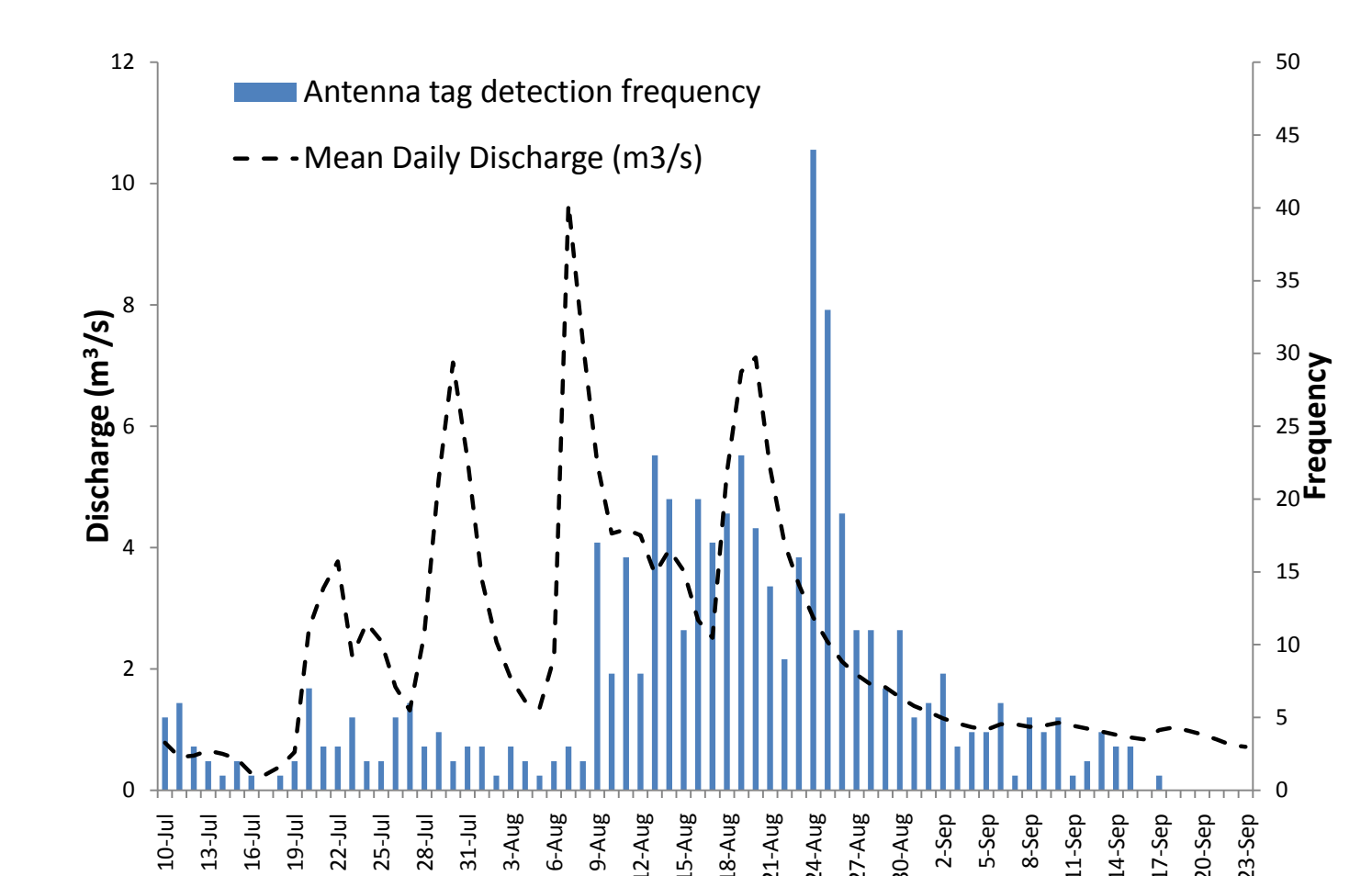
PIT antenna setup on Kuparuk River



1. Antenna efficiency

- Antennas were effective at detecting PIT tagged fish.
- 99% of re-captured fish at the headwater lake weir in the fall were detected at the antenna set up downstream.
- 57,000 tag detections were observed across the study site.

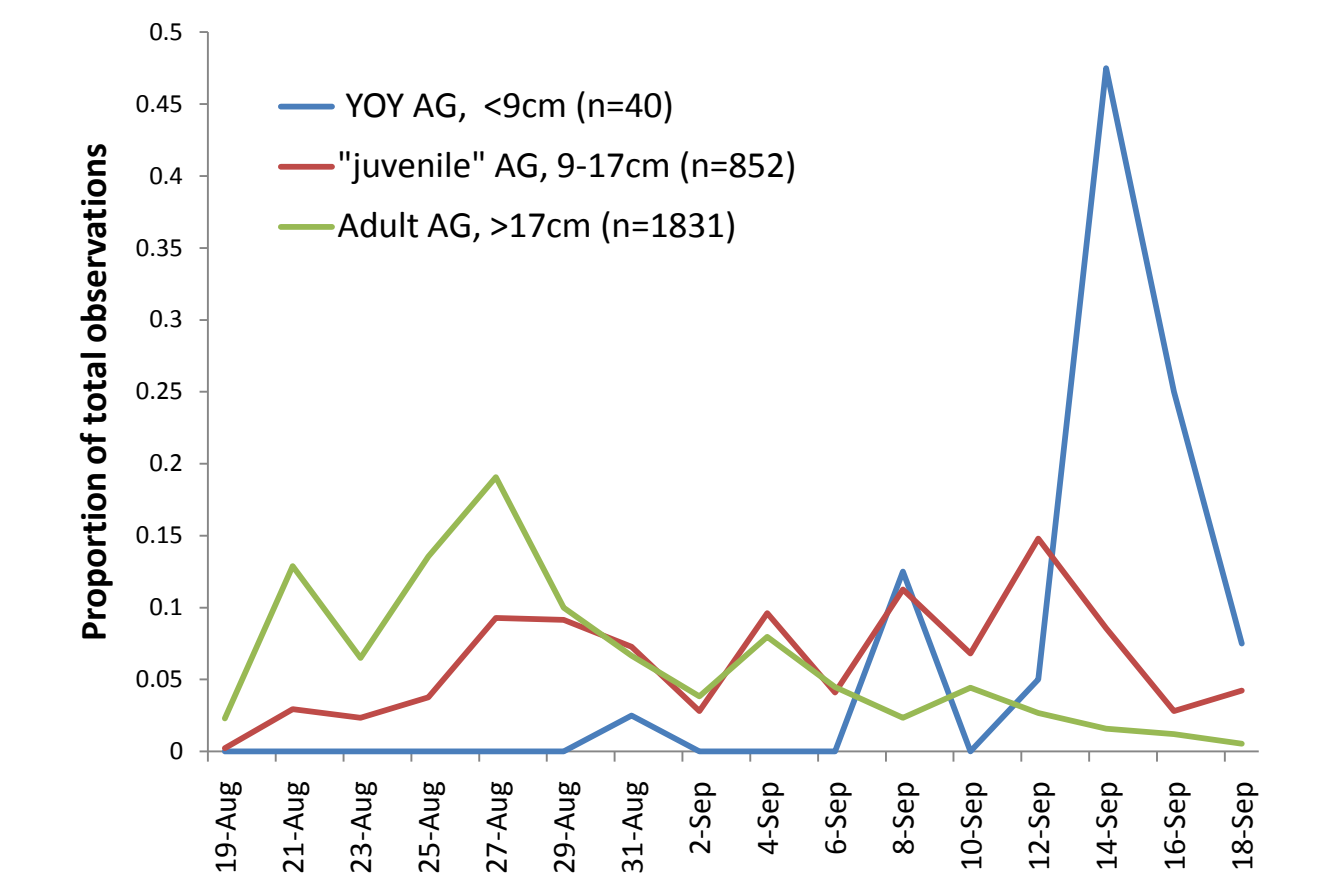
Migration timing and discharge in Kuparuk River



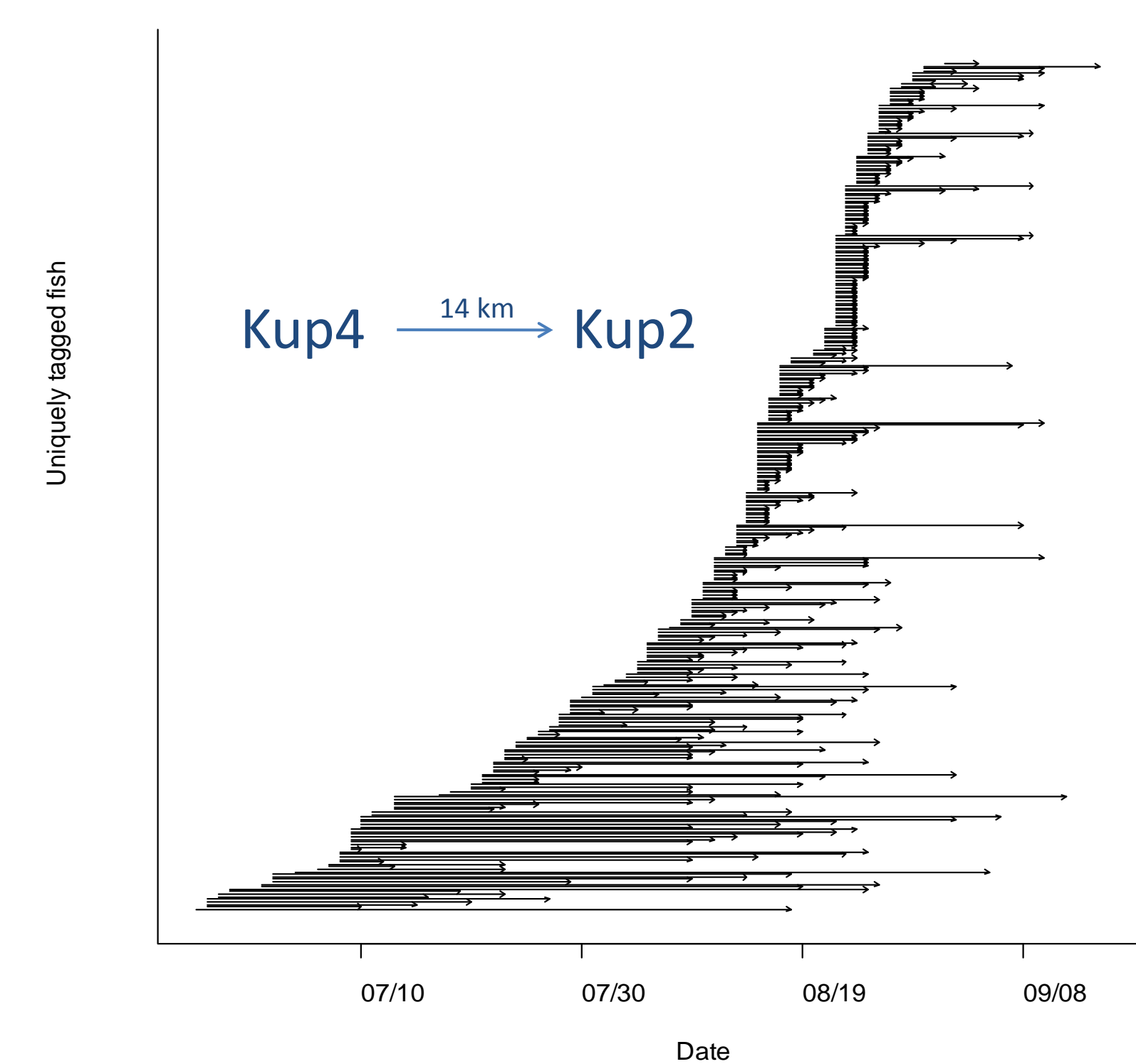
2. Migration Timing

- Late Season flooding events may have a strong influence on the timing of Arctic grayling migration into overwintering lakes.
- Timing of migration into overwintering lakes was related to size, with larger fish moving first.

Migration timing by size class into overwintering lakes



Migration duration into overwintering lakes



3. Migration Duration

- Once migration is initiated, median travel time from major summer feeding habitat to overwintering lakes is 4 days
- Many grayling linger in upper reaches prior to entering overwintering lakes