Identifying thermal refugia and their use by a species of conservation concern, Chinook salmon (*Oncorhynchus tshawytscha*) in a drought prone stream.

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Endangered Chinook salmon (*Oncorhynchus tshawytscha*) in the Deadman River return to their natal stream in early summer yet hold for over 2 months before spawning in the fall. Semi-arid watershed conditions exacerbated by land use for agriculture and forestry expose adults to stream temperatures that frequently approach or exceed their upper thermal limits. This cold-water salmon may rely on finding and selecting cooler stream habitat features to maintain homeostasis. The availability, accessibility, and connectivity of cool water refuges and their use by chinook during elevated and stressful stream temperatures is not well understood. We propose to evaluate instream migration patterns and the thermal history of chinook using a novel combination of thermal radiotelemetry, archival temperature loggers on adult chinook, and characterizing river temperatures with thermal infrared radiation technology and archival temperature monitoring. Specific hypotheses include:

a. At stressful stream temperatures at or above 17 °C, tagged chinook select cooler river sections (or habitats) to hold in.

b. At stressful stream temperatures at or above 17 °C, tagged chinook accumulate fewer thermal units than accumulated, ambient stream thermal units.

c. Female chinook will accumulate fewer thermal units than males.

As this species-at-risk has only one chance to pass on its fitness to the next generation, mortality caused by temperature can further reduce the productivity of this population. Documenting the location, use and the importance of these critical habitats is essential for their protection and restoration, especially when resources for mitigation are finite and as the frequency of drought and stressful stream temperatures are expected to increase.