

Project Report

PSMFC Subaward 23-084G for the period **August 1st through January 31st**

Project Title: Gene activity and genetic selection in Pacific cod reared under thermal stress

Objective: Predict organismal and population outcomes of Pacific cod exposed to elevated temperature

Summary: Recent heat wave stress in the Gulf of Alaska has resulted in significant declines of Pacific cod, *Gadus macrocephalus*, in that region. The physiological and transcriptional responses of Pacific cod and whether selective mortality is present under thermal stress are unknown. The proposed project will address these questions critical to their survival under climate change by identifying regions of the genome and epigenome that respond to thermal stress. Juvenile Pacific cod will be reared in several temperatures then an integrated genomic approach will identify genes, gene variants, and epigenetic markers that respond to thermal stress and confer resilience. To complement the genomic approaches and further investigate temperature influences on energy resources, we will perform lipid analyses. This work will inform predictions of genetic selection and molecular response of Pacific cod in the Gulf of Alaska under climate change.

Progress and results

For this reporting period effort was primarily dedicated to sample processing primary tissue samples for analyses. This included entering metadata into a specific repository and splitting most liver samples for RNA extraction and DNA extraction. Further a limited number of spleen, gill and blood samples were identified. RNA extractions were successful with sufficient yield for all samples selected. Samples for RNA-seq analyses were sent for library construction and high-throughput sequencing with data expected be analyzed in the next reporting period. Samples identified for DNA methylation analyses were subsampled from the repository and the corresponding DNA extraction processing initiated.

Challenges

None to report.