Project Report
PSMFC Subaward 23-084G for the period **April 1st through June 30**

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 processing RNA-seq data and preparing samples for epigenetic analyses. This includes completion of the first stage of RNA-seq analysis that demonstrates an indication how physiological processes are impacted by temperature. This involves expression analysis at the gene and isoform level. Liver samples were assessed for integrity with respect to epigenetics analysis and it was decided to proceed with blood samples. About 75% of samples for epigenetic analysis have been extracted with the remainder to be extracted during the next reporting period.

Challenges

None to report.