

## Project Report

Title: Development of Genomic Markers for Environmental Resilience in Mussels

Reporting Period: May, 2021

### (A) Project Summary

Our project seeks to support the sustainable expansion of the shellfish aquaculture industry by investigating the downstream impact of ocean acidification (OA) and ocean warming (OW) on the survival and successful cultivation of marine bivalves. Our research *objective* is to describe the response of commercially relevant species of marine mussels to current and near-future OA and OW, utilizing cutting-edge molecular technologies to identify genetic markers that confer resilience to environmental change. In collaboration with our industry partner, Penn Cove Shellfish LLC, the measure of success for this proposal will be the identification of genetic markers that, when used as selection criteria for mussel broodstock, will produce adults with robust attachment to aquaculture lines under near-future OA and OW. By defining these gene-environment interactions, our results stand to support commercial growers in the development of selective breeding programs to ensure the efficient, sustainable, and profitable production of mussels within the United States.

### (B) Summary of Progress and Results

During the May 2021 reporting period, a majority of our effort has been allocated to planning the mesocosm experiments required to complete the study objectives. Planning has taken place during multiple virtual and in-person meetings between the project's PI (Dr. Emily Carrington, UW), the project post-doc (Dr. Matthew George, UW), and our project collaborator and industry partner (Mr. Ian Jefferds, Penn Cove Shellfish). During these strategy meetings, the size and scope of experiments have been agreed upon, as well treatment levels to be employed (ocean acidification, ocean warming, and hypoxia). Discussion also included the pros and cons of performing experiments during the summer versus winter months, with the consensus being that avoiding the confounding variables of gonad maturation, high-temperature exposure, and poor physiological conditions experienced by mussels during the spring and summer would be ideal when identifying differentially expressed genes that influence attachment.

### (C) Challenges

No challenges have yet been encountered.