

Harvest Management Tools to Control the Levels of *Vibrio parahaemolyticus* in Oysters and Other Bivalve Shellfish

Project Summary: *Vibrio parahaemolyticus* (Vp) is a common bacterial contaminant of bivalve shellfish, primarily oysters, and a major source of seafood-related food poisoning. Vp illnesses associated with consumption of raw or poorly cooked shellfish in the U.S. and elsewhere cause seasonal harvest closures and product recalls. The closures reduce farm and harvester revenue, payrolls, and lost opportunity for tribal and recreational harvest. The overall long-term goal of our project was to develop a suite of tools to allow the harvest and sale of shellfish for raw or fresh consumption during warm summer to fall months when *Vibrio* levels are typically elevated.



*Jackson Cove in north Hood Canal, where oysters were collected for relay to reduce *Vibrio* levels.*

We completed a series of experiments which focused on methods to relay oysters to locations with lower ambient Vp levels and/or different temperature and salinity conditions, addressed shellfish handling and storage procedures, and applied alternative depuration methods. After a big lab-analysis hiccup the first year, a limited set of experiments in 2011 and 2012 indicated when total Vp levels in oysters were moderate prior to intertidal exposure, placing the oysters in open seawater for 24+ hours typically resulted in a 1 to 2 log average reduction in Vp. In 2013 we assessed the effect of relaying moderately contaminated oysters from Jackson Cove in Hood Canal to Port Hadlock. In general there was good to acceptable reduction of Vp among most treatments (re-immersion in harvest bags versus grow-out bags, duration of immersion) and trials (2 relays). We concluded this research provided preliminary evidence that elevated Vp levels in intertidally cultivated and harvested shellfish can be mitigated by exposure to ambient water conditions. That the same Vp reductions often fail to occur during depuration in closed or artificial systems indicated these treatments disrupt the natural feeding and physiological processes of the animals.

Throughout the project PSI maintained ongoing communication at various levels with Washington Department of Health (WDOH) staff, NOAA and USFDA personnel, and shellfish growers. Experiments were coordinated with WDOH to ensure field trials coincided with their Vp observations from routine sampling.

PSI staff presented the project results to shellfish growers at regional meetings held in 2012 and 2013, and participated in the West Coast *Vibrio* Management workshop. The workshop reviewed existing and future strategies for Vp control, and gaps in our current understanding of environmental influences on these bacteria.

This research highlighted additional studies to continue collaboration and share results with emphasis on the following: 1) additional field trials to evaluate contained and open-water depuration; 2) evaluate the benefits of relaying prior to Vp closure; 3) examine effects of holding oysters in tubs, grow bags, etc.; 4) assess sample collection timing versus tidal exposure; and 5) evaluate alternate Vp assay methods.

Science Team: Leaders for this research were Dan Cheney and Carolyn Friedman, and most of the work was carried out by Robyn Estes Strenge (UW), Andy Suhrbier, Rohinee Paranjpye (NOAA), Terrence Lee, Steve Booth and Bobbi Hudson. Funding was a grant (#NA09NMF4270089) from the NOAA Saltonstall Kennedy (SK) program and generous assistance and support from WDOH, the Hama Hama Oyster Co, and D.D. DeNotta Oyster.



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