

Testimony of Dr. Gil Sylvia and Dr. Robert Cowen on H.B. 2209
Creating an Oregon Shellfish Initiative
March 24, 2015

Introduction

Our names are Gil Sylvia and Robert Cowen. We are respectively the Directors of Oregon State University's Coastal Oregon Marine Experiment Station (COMES) and Hatfield Marine Science Center. Our organizations, located in Newport and Astoria, are responsible for supporting a diverse array of applied and basic marine science important to the state of Oregon. Much of this research focuses on improving the utilization and conservation of fisheries and aquaculture resources. We are here to speak on behalf of HB 2209 as research scientists with more than 50 years of combined experience in marine science issues.

The Oregon and West Coast Shellfish Industry

The shellfish commercial and recreational industry is an important component of the history and economy of Oregon's coastal communities as well as an intrinsic part of the "coastal experience". Oyster production has been a particularly important part of this industry, with an estimated farm-gate value in Oregon of approximately \$12 million.¹ The Whiskey Creek Shellfish Hatchery is the largest independent seed-producer on the West coast supplying more than 75% of West coast farmers. Total oyster production on the West coast has a farm-gate value of about \$70 million and the regional economic impact exceeds \$150 million, with the majority of production originating from Washington State.

Oregon State University Shellfish History

Oregon State University has supported the west coast oyster industry for over 50 years through research, education, and extension. Research at the pilot-scale hatchery at the Hatfield Marine Science Center, Newport, was instrumental in developing hatchery technologies in the 1970's and transferring them to industry. OSU research continues today with a major focus on developing oyster breeds, improving the safety and nutritional value of oyster products, and addressing the challenges of ocean acidification. Oregon Sea Grant activities have supported additional research efforts and promoted extension activities, leading to expanded approved shellfish growing areas, discussions on permitting new shellfish species for culture, and engaging farmers and the public with the issue of ocean acidification.

Today's Challenge – Oyster Seed Production and Ocean Acidification

In mid-summer 2007, the Whiskey Creek Shellfish Hatchery began to experience very severe problems in raising oyster larvae. Similar problems were reported by researchers at the Hatfield Marine Science Center, by private hatcheries in Washington State, and for

¹ The exact amount of Oregon oyster value and production is unknown due to inadequate data collection. Official statistics by the Oregon Department of Agriculture list value at only \$3 million but industry experts believe the value is between \$10-20 million.

wild populations of oysters in Willapa Bay, Washington. This problem, known as the “seed crisis”, persisted for several years until it was realized that poor larval production was correlated with upwelling of acidified seawater from offshore waters. Fortunately, OSU has two of the world’s leading experts on ocean acidification, Professors Burke Hales and George Waldbusser in the College of Earth, Ocean and Atmospheric Sciences. In 2009, Dr. Hales installed sophisticated equipment at Whiskey Creek that allowed hatchery operators to monitor the carbonate chemistry (and hence acidity) of seawater pumped into the hatchery. In collaborations involving Hales, Waldbusser, and Whiskey Creek personnel, the link between carbonate chemistry on oyster spawning and larval performance was determined. This finding and continued monitoring has allowed hatchery managers to take advantage of the best water-quality conditions, and to improve seawater quality for oyster larvae by addition of sodium carbonate. This technology has now been adopted by other West coast hatcheries impacted by the effects of ocean acidification.

Parallel research was also being conducted to determine the biological response of oysters as part of a long-term oyster breeding program – the Molluscan Broodstock Program housed at Hatfield Marine Science Center and directed by Professor Chris Langdon. The Broodstock Program was established in 1996 with Congressionally appropriated funds. After the elimination of Special Projects (earmarks) from the Federal budget in 2011, the Broodstock Program has been maintained by “cobbling together” several short-term grants, through funding from the state of Oregon, and support from the West coast oyster industry.

These broodstock are used to produce most of the diploid larvae from the Whiskey Creek Hatchery and two of the other three major West coast hatcheries. The seed is distributed to farmers in all West coast states, resulting in an estimated increase of \$1.8 million in production per year. Although the initial focus of the Molluscan Broodstock Program was on improvement of yields of oysters planted on farms, selection for more resistant larvae to ocean acidification probably occurred “inadvertently” during the initial years of the program. Whiskey Creek reported that larvae from the Molluscan Broodstock Program perform better than those from wild stocks during upwelling periods. In response to the seed crisis and problems in rearing larvae at commercial hatcheries, the Broodstock Program is now including larval performance as a selected trait in its program.

Tomorrows Challenge -- Need for Long Term Research and Monitoring

Oregon’s oyster farmers and hatchery operators are experiencing ocean acidification conditions that have worsened since 2007, due in part to upwelling of acidified water from hypoxic zones off the Oregon coast as well as due to the gradual increase in global concentrations of atmospheric carbon dioxide. Unfortunately, Oregon’s oyster farmers are getting a foretaste of conditions that are predicted to occur globally by the end of the century. The Whiskey Creek Hatchery program and Oregon State University researchers are recognized as global leaders in developing adaptive strategies to cope with the effects of ocean acidification on the shellfish industry. Their technology and approaches are being widely adopted by shellfish producers both nationally and internationally.

Avoidance of the worst ocean conditions, via monitoring of estuarine carbonate chemistry, hatchery modifications of seawater chemistry, and use of MBP selected broodstock have alleviated about 70% of the decrease in larval hatchery production caused by ocean acidification. However, if global trends in ocean acidification continue to worsen, more resistant oyster stocks will need to be developed to sustain both hatchery and farm production. Funding from HB2209 will be critical for 1) continuing to support monitoring and control of seawater chemistry at Whiskey Creek, and advising other monitoring efforts in the northwest region in order to alleviate the effects of ocean acidification on larval production, and 2) to continue selection of oyster stocks that are more resistant to the effects of ocean acidification and other environmental problems due to changing oceanographic conditions.

Oregon State University's *Marine Studies Initiative* and the *Oregon Shellfish Initiative*

The efforts to establish an *Oregon Shellfish Initiative* is occurring at the same time that Oregon State University is developing a major new investment in marine education, research, and engagement, known as the *Marine Studies Initiative*. This interdisciplinary and experiential-based program will bring up to 500 new students to Oregon State University and the Hatfield Marine Science Center. Aquaculture, and specifically shellfish aquaculture, as well as ocean acidification, are expected to be major focus areas of the new program. The Marine Studies Initiative provides a timely and unique opportunity to support the *Oregon Shellfish Initiative* through research, education, extension, and work force development. Working in tandem, these two *Initiatives* create an opportunity to develop a "Center of Excellence" on the central West Coast for shellfish research and education. Working with Oregon Sea Grant and other organizations, the Center could also function as a convener including federal, state, industry, and university partners to coordinate strategies to support shellfish industry development, restoration and management, and leverage partnerships for the mutual advantage of the coast, state, and region.

Summary

The Oregon and West coast shellfish industry confront opportunities as well as major challenges. While the industry is positioned to take advantage of rapidly growing markets in the U.S. and Asia, Oregon's oyster farmers and hatchery operators face major challenges due to ocean acidification, food safety issues, and regulation. The *Oregon Shellfish Initiative* is a timely and critical strategy to address these challenges through research, education, and engagement. This initiative can work in conjunction with other efforts including Oregon State University's *Marine Studies Initiative* to maximize creative and collaborative potential and bring greater value to the state of Oregon from improved use, restoration, and conservation of Oregon's valuable shellfish resources.