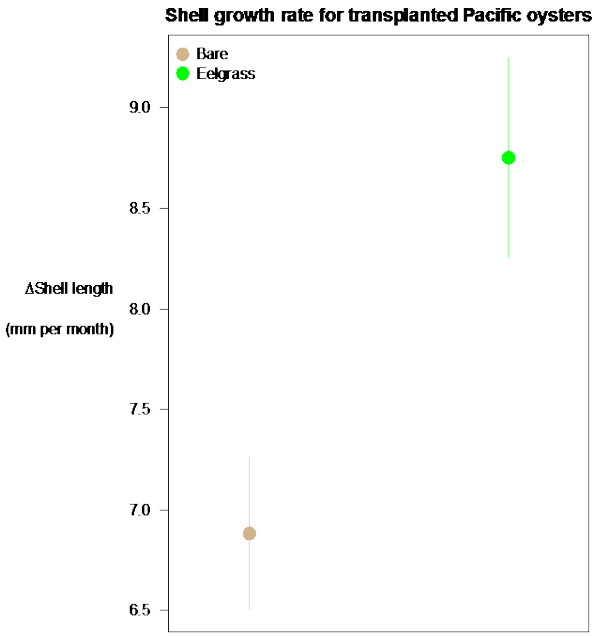
WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

Shellfish stress under environmental change

Hatchery shellfish transplanted into the wild alongside environmental sensors.



Pacific oysters and Olympia oysters grew 20% faster in eelgrass, while geoducks showed no difference.

Can eelgrass enhance shellfish growth and reduce stress from the environment?

Shellfish farmers most often plant their crops by moving juvenile shellfish from a hatchery into the nearshore environment. Over time, farmers are being forced to contend with warmer waters and more acidic conditions as carbon dioxide dissolves into the ocean. In 2016, WDNR worked with the University of Washington to test whether eelgrass can protect juvenile shellfish from environmental change and to develop a technique to measure stress in wild and farmed shellfish.

In partnership with commercial shellfish farmers, we transplanted juvenile Pacific oysters, Olympia oysters, and geoducks from a hatchery into the wild in flow-thru predator protection enclosures. At Fidalgo Bay, Port Gamble Bay, the Skokomish River Delta, Case Inlet, and Willapa Bay, we left juvenile shellfish for a one-month exposure period inside and outside of eelgrass.

We measured growth by comparing shell lengths before and after the one-month exposure period. To gauge stress, we took tissue samples to see whether stress proteins were activated in the juvenile shellfish DNA and to test if this was in response to the environment. We used sensors to keep a record of water quality at each site to cross-reference with shellfish growth and stress data.

We found preliminary evidence that juvenile Pacific oysters and Olympia oysters grew 20% faster in eelgrass, while geoducks showed no difference. Decreased acidity, increased oxygen, better food availability, or other factors might explain this enhanced growth. The analysis of juvenile shellfish DNA is ongoing.