Large commercial oyster bed application of imidacloprid: Impacts on benthic and epibenthic organisms

Early morning on Willapa Bay on July 27, 2014.

Objective: Facilitate the permitting of imidacloprid as an alternative to carbaryl to control burrowing shrimp in Washington's Willapa Bay and Grays Harbor. This research specifically assesses the impact of large scale applications of imidacloprid. Prior to 2014, all experimental field trials to address impacts on benthic invertebrates featured plot sizes of 10 acres (ac) or less. Accordingly, the Washington Department of Ecology (Ecology) has indicated that the maximum plot size for commercial applications allowed in the eventual NPDES permit could be limited to 10 ac unless studies on larger plots are conducted.

Methods: General methods are similar to those of previous years: 20 samples from a plot treated with imidacloprid and 20 samples from an untreated control plot at 1 day before treatment and at 14, 28 and potentially 56 days after treatment. Sampled animals are sorted from debris, identified and counted, and assessed by comparison of abundance, richness, and diversity of polychaetes, mollusks, and crustaceans at treated and control plots at each sample date. Additional studies to address the off-bed transport of imidacloprid by the flood tide immediately post treatment, and its persistence in estuarine sediments are being conducted by Washington State University (WSU). Ecology's request to conduct studies in areas of very high silt content and low flushing could not be conducted this year as a suitable study site could not be identified.

Progress: What was thought to be a suitable large (35 ac) plot in the Stoney Point growing area was identified during early season field surveys. The plot and a suitable control near Bay Center were submitted to Ecology in the final Sample and Analysis Plan, which was approved during a group discussion between Ecology, PSI, WSU and Hart Crowser. However, while laying out the plot at 2 weeks pre-treatment, it became apparent that the plot was far from uniform due to recent dredging, thick eelgrass in standing water, and large piles of shell. Using the plot would therefore produce a highly variable, unrepresentative, and inconclusive data set.

A neighboring plot was identified as a better, more uniform plot and was proposed to Ecology as a substitute. Ecology refused the request in light of insufficient notification, so the sampling array was established on the eelgrass section. The array extends to the northern border of the plot by ~100 meters (m) to centralize the array within a larger (~45 ac) plot.

At the suggestion of Willapa Bay Grays Harbor Oyster Growers Association (WGHOGA), we expanded the boundaries of the adjacent plot and had that treated as well. PSI is therefore now sampling and sorting two treated plots and two control plots. Preliminary results from the pre-treatment samples should be available in September. Post-treatment processing and analysis will continue through the fall.

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