October 31, 2017

To Whom It May Concern:

As a science teacher, I understand the importance of estuaries and marine waters such as Willapa Bay and Grays Harbor, and I enjoy going out to visit these sites for recreation and bird-watching. However, these waters hold more than birds: they are a complex food web of many different creatures, all with their unique niche. Mud shrimp, ghost shrimp and Dungeness crab are native species, while Pacific oysters and Manila clams are not. I am concerned about the effect of spraying to decrease these native species in order to aid the commercial growing of clams and oysters. The poster of new literature reviewed stated that in 2014, the last time spraying was allowed, nearly 100% of crabs in the area were paralyzed and killed. How can that be considered anything but a significant negative impact, especially if this chemical does not stay within the spray zone, but moves throughout the bay? Wouldn't crabs farther off site also be killed? Ecology should not allow native species, crab and burrowing shrimp, to be impacted for a non-native species, Pacific oysters.

Additionally, consideration of the negative cascade of effects on other species, if the burrowing shrimp die, must be factored in to this decision. Which organisms have evolved to live in shrimp burrows and how would the depletion of burrowing shrimp affect these organisms? A biologic report by the U.S. Fish and Wildlife Service stated: "By aerating the subsurface sediment and digging burrows protected from most predators, ghost shrimp and blue mud shrimp provide an environment attractive to commensals. Commensal and parasitic species associated with these shrimp include a blind goby, three species of pea crabs, two species of clams, a copepod, a shrimp, polynoid worms, and isopods." (Found online) If 90% of burrows are removed from these areas, are not 90% of the organisms that inhabit these burrows also removed?

Without a better understanding of the community interactions and complex food web issues in these ecosystems, how can it be said that impacts are only localized? If imidacloprid moves off site at high levels, which will have both lethal and sub-lethal effects, what are the impacts to the broader food web? Will birds have enough to eat if the invertebrates they feed on during their fall migration are killed? Will salmon and other fish have enough to sustain them? What about those that don't die: can they still reproduce? Without this information, how can Ecology determine that spraying a pesticide known to target invertebrates won't have negative impacts throughout the bay? While I want shellfish farmers to be able to farm their lands, they cannot do so by inflicting such negative impacts on everything else in the bay. Therefore, I cannot support this request to spray pesticides directly into marine waters.

Restoring these aquatic ecosystems to their natural equilibrium would provide a sustainable solution. Mud shrimp and ghost shrimp are considered pioneering species. Though they will be among the first colonizers of a disrupted habitat, over time, they would give way to other species, including healthy oyster reefs. These reefs existed before overharvesting, dredging and other destructive practices began to occur. When growers continually harvest all the oysters, they return the habitat to the exact condition that attracts more shrimp colonizers, so the

problem reoccurs and this chemical, lethal solution is sought. If healthy reefs were restored, shell habitat would build up, making it difficult for shrimp to burrow, thus allowing structure for young oysters to grow to harvestable size, and creating durable habitat for other species, such as crab and fish.

Oyster reefs are important habitat in Willapa Bay and Grays Harbor, but their use is greatly diminished through destructive harvesting practices and through spraying a pesticide on them. Ecology should not support a pesticide application to protect oyster and clam farming when they acknowledge this solution kills most other aquatic invertebrates in and adjacent to the areas sprayed. This issue is caused by growers using practices which exacerbate this problem and will require continual pesticide application. Ecology should work with growers to promote other culturing practices that will promote sustainable farming of shellfish and have a positive impact on the bay and harbor.

Respectfully,

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