

**INDIVIDUAL NPDES PERMIT FOR THE
CONTROL OF BURROWING SHRIMP USING
IMIDACLOPRID ON COMMERCIAL
SHELLFISH BEDS IN WILLAP BAY AND
GRAYS HARBOR**

Addendum to the Fact Sheet

Appendix F: Response to Comments

April 8, 2015

SUMMARY OF KEY PERMIT CHANGES

This is a summary of the changes made to the Individual NPDES Permit for the Control of Burrowing Shrimp Using Imidacloprid on Commercial Shellfish Beds in Willapa Bay and Grays Harbor in response to the public comments received between October 24 and December 8, 2014. In finalizing this permit, the Washington State Department of Ecology (Ecology) considered all of the public comments received during the public comment period, and comments received during oral testimony at the public hearing held in South Bend Washington on December 2, 2014.

Due to extensive comments regarding the monitoring requirements in the draft permit Ecology has made the following changes:

- Ecology has removed the requirement to sample for porewater. Whole sediment, water, and benthic sampling will provide the information that is needed in order to evaluate the environmental effects of imidacloprid in Willapa Bay and Grays Harbor.
- Based on data collected in previous studies, sixteen core samples per monitoring plot is sufficient to meet the statistical power requirement for the majority of the monitoring metrics. Therefore, the power requirement will not be included in the final permit. Sample numbers may be adjusted in the future based on monitoring data acquired during the duration of the permit.
- The Department of Ecology included the Ocean Park boat basin and vicinity (approximately 300 acres) in the sediment impact zone for central Willapa Bay. Several commentors noted that this is an area of economic importance for the staging of seed oysters prior to the movement to other areas of the bay for fattening. As part of the SIZ this area will be included in the general monitoring requirements.

COMMENTS AND RESPONSES

Ecology published a draft Individual Permit for the Control of Burrowing Shrimp using Imidacloprid on Commercial Shellfish Beds in Willapa Bay and Grays Harbor on October 24, 2014 for public comment. The public comment period ended December 8, 2014 at 5:00 p.m. During the comment period, Ecology conducted a public workshop and hearing in South Bend. Ecology also accepted public comments via letter and email.

Ecology considered all comments in preparing the final permit. The response to comments documents Ecology's response to each commenter and any changes to the permit that resulted from the comments. Each comment has been paraphrased to clarify the concern that Ecology is responding to. Full text of all comments received by Ecology can be found at: <http://www.ecy.wa.gov/programs/wq/pesticides/imidacloprid/index.html> or by contacting Derek Rockett at: derek.rockett@ecy.wa.gov, or (360) 407-6697. Comments on the Draft Environmental Impact Statement (DEIS) are summarized in Appendix F of the Final EIS.

1. Association of Washington Business (Housekeeper)

Comment: Support of a permit to include southern Willapa Bay and limited monitoring, with an emphasis on the economic benefit of aquaculture.

Response: Currently, Southern Willapa Bay is excluded for treatment under the draft permit for the following reasons:

1. Possible persistence of the pesticide due to the presence of sediments with a high total organic content, which can increase the potential for persistence.
2. Concerns about the lower flushing rate of the tidal cycle in this portion of the bay, which could increase persistence of the pesticide.

The WGHOGA has the opportunity during the permit cycle to provide information that supports treatment in Southern Willapa Bay by providing applicable information. Southern Willapa Bay may receive treatment under the experimental use section of the permit if the treatment meets the intent of this section, which is to conduct research in order to obtain information.

Monitoring requirements for this permit are based on the Sediment Management Standards and the obligation of the Washington State Department of Ecology (Ecology) to protect water quality.

2. Association of Washington Business (Johnson)

Comment: Support of a permit to include southern Willapa Bay and limited monitoring, with an emphasis on the economic benefit of aquaculture.

Response: Refer to response #1.

3. Audubon Society (Bayard)

Comment: Concern regarding the potential effects of burrowing shrimp control and imidacloprid application on the Grays Harbor and Willapa Bay estuarine ecosystems, and uncertainties surrounding the fate of imidacloprid in the marine aquatic environment.

Response: Monitoring studies have been done to understand the fate of imidacloprid in the marine aquatic environment. These studies are discussed in FEIS 2.8.3.5. Additionally, the permit requires annual monitoring of water, sediment, and benthic invertebrates.

If any exceedances of minor adverse effects are confirmed during monitoring, Ecology will require adaptive management measures (which could include timing of imidacloprid

application, changing areas to be sprayed, changing buffer zones around application, changing concentration or improving best management practices) with the permittee to reduce adverse effects. The probable likely net impact from these adaptive management measures will be to restrict spraying in areas where exceedances of minor adverse effects have occurred.

Comment: Concern for bird species.

Response: Concentrations of imidacloprid below 150 milligrams per kilogram (mg/kg) are generally non-toxic to most birds (Gervais et al. 2010), with a low of 15 mg/kg direct application found toxic to the gray partridge (Mineau and Palmer 2013). Similarly, CSI (2013) found imidacloprid application was unlikely to adversely affect birds in Willapa Bay or Grays Harbor based on an application concentration of approximately 3.34 mg/kg²². The flowable form of imidacloprid disperses in water, and granular application dissolves in shallow water. Although crustaceans and molluscs uptake imidacloprid during exposure (Frew 2013), they do not bioaccumulate imidacloprid in their tissues, minimizing potential exposure to foraging shorebirds. Red knot and other shorebirds that feed in and around shellfish beds could come in contact with low concentrations of granular imidacloprid immediately following an application. Peak abundance for red knot and many shorebirds occurs in April and May. (FEIS 3.2.5.3)

Granular-form applications of imidacloprid on commercial shellfish beds (mudflats) could result in an opportunity for birds to be exposed to this chemical through ingestion of the solid form, but direct exposure would be limited since application techniques flush birds from the site, and imidacloprid dissolves readily in water. This limited period of potential exposure would be interrupted when the mudflats became inundated by the incoming tide. CSI (2013) found imidacloprid toxicity exposure for snowy plover to have a low likelihood of indirect effects, and concluded that it would be unlikely to have adverse effects. "Flowable"-form applications of imidacloprid would avoid exposure time for birds (Giddings et al. 2012). (FEIS 3.2.5.3)

Aerial dispersal of imidacloprid is limited by spray drift management techniques which will minimize potential exposure to non-target species. Aerial applications are permitted only when wind speeds are less than ten miles per hour. Therefore aerial applications would be unlikely to adversely affect bird populations within Willapa Bay or Grays Harbor.

Additionally, the potential for direct exposure of either pesticide to birds would be limited since application techniques by helicopter or hand-held equipment tend to flush birds from the target area (personal communication with Dr. Kim Patten). (FEIS 2.9)

Comment: Request to discuss Important Bird Areas.

Response: Important Bird Areas are now discussed in FEIS 3.2.5.

Comment: Request integration or recent advances in the published literature about both the short and long-term effects of imidacloprid into the FEIS.

Response: Ecology has relied on the best available science and has required monitoring to ensure compliance with the Sediment Management Standards (WAC 173-204) and the Water Quality Standards (WAC 173-201A).

This permit may be modified, revoked and reissued, or terminated if a determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination.

Comment: Although it appears from the evidence presented in the DEIS that imidacloprid uptake by eelgrass is minimal, there seems to be enough uncertainty about the transport and long-term accumulation of imidacloprid in the sediments of these two sites that a greater understanding of the potential uptake by zooplankton and micro and macro-algae, both within and outside of the pesticide application area should be considered.

Response: Imidacloprid would be applied on selected commercial shellfish beds in-water during out-going tides or on exposed mudflats, when densities of zooplankton would be low due to limited water depth. Imidacloprid breaks down rapidly in water and has a low volatilization potential in air, minimizing potential adverse effects on zooplankton in Willapa Bay or Grays Harbor (Gervais et al. 2010). (FEIS 3.2.5.3)

Limited information is available regarding imidacloprid impacts to marine vegetation. The results of field studies conducted during one season to evaluate uptake in eelgrass tissues showed limited uptake by eelgrass, and imidacloprid was undetectable after 14 days. In addition, imidacloprid is an acetylcholinase inhibitor and plants do not have a biochemical pathway involving acetylcholinase. Therefore, it is unlikely that imidacloprid would adversely affect eelgrass or other marine vegetation. (FEIS 3.2.4)

6.4.2 Algae

No studies were available to assess the toxicity of imidacloprid to marine algae. However, freshwater data indicate that algae are at least three orders of magnitude less sensitive to imidacloprid than many insect and crustacean species (CCME 2007). (CSI 2013, page 26)

6.4.3 Aquatic macrophytes

As discussed in Sections 6.4.2, imidacloprid is an insecticide and has low toxicity to plants. In field trials, Patten et al. (2011b) reported that eelgrass became established quickly on bare plots treated with 0.4 and 0.5 lb a.i./acre, indicating that eelgrass is capable of rapid growth when burrowing shrimp are reduced. Although no other studies of imidacloprid toxicity to aquatic macrophytes were available, it can be concluded that

imidacloprid use on shellfish beds will not have adverse effects on aquatic macrophytes. (CSI 2013, page 26)

Comment: The timing of the proposed imidacloprid application is between April 15 and December 15. Because shorebird numbers peak from mid-April through early May during spring migration, and waterfowl return to the estuaries in October, we request that if alternative 3 is approved, the timeframe for imidacloprid application be limited to May 15-September 15.

Response: The WGHOGA has requested an opportunity to apply in spring and fall to evaluate increased efficacy at times of the year other than summer. Some of the variables associated with seasonal application include vegetative cover, burrowing shrimp life stages, dissolved oxygen, and water temperature. These could all affect efficacy. If negative effects on birds is observed due to treatments, the permit allows for adaptive management through the Annual Operations Plan and windows of treatment could be incorporated. Permit timing is consistent with the FIFRA Registrations which allow applications during the period between April 15 and December 15.

Comment: The DEIS contends that burrowing shrimp are present at high densities at these sites, but no formal assessment of the burrowing shrimp population, including potential drivers for population growth, are given. If burrowing shrimp populations are indeed substantially higher than “normal,” it is important to understand if other human pressures are driving this trend, or whether high densities of burrowing shrimp are the result of natural phenomena.

Response: Studies are ongoing to increase understanding of burrowing shrimp populations. Additionally, Dr. Dumbauld’s most recent studies regarding burrowing shrimp recruitment are referenced in the Final Environmental Impact Statement and can be found in FEIS 3.1.

Comment: The DEIS contends that a reduction in burrowing shrimp will yield beneficial impacts to eelgrass and other aspects of the invertebrate biodiversity. We find this purported benefit quite puzzling, since the Willapa/Grays Harbor Oyster Growers Association (WGHOGA) recently applied for and received a permit to control non-native eelgrass using the herbicide imazamox. Is there any information available on whether the suppression of burrowing shrimp will result in new areas of non-native eelgrass (*Zostera japonica*) growth? The idea that imidacloprid use to suppress burrowing shrimp populations will result in greater biodiversity is completely at odds with the biological outcomes observed in the published literature.

Response: Increased densities of burrowing shrimp could result in decreased biodiversity and increased sedimentation (Dumbauld and Wyllie-Echeverria 1997; Colin et al. 1986). High densities of burrowing shrimp have been associated with lower numbers of Dungeness crab, oysters, and other shellfish due to competitive exclusion and habitat modification caused by the shrimp (Doty et al. 1990; Brooks 1995; Dumbauld and Wyllie- Echeverria 1997). (FEIS 3.2.5.3)

Comment: What is the current profile of fungicides, pesticides, and fertilizer contamination in Grays Harbor and Willapa Bay, and how does this vary over the course of the proposed imidacloprid application period? Have the analyses of the potential toxic effects of imidacloprid taken this information into account?

Response: Please refer to the 303d listings available at the following link <http://www.ecy.wa.gov/programs/wq/303d/index.html>.

Comment: Application of imidacloprid in the estuarine environment appears to be a fairly unusual use of the insecticide. The DEIS states that WGHOGA 2011 field trials testing the efficacy, environmental fate and transport, and biological effects of imidacloprid did not have an Ecology-approved Sampling and Analysis plan, although 2012 field trials did. Nevertheless, one year of preliminary field data combined with one year of more rigorous data should not take precedence over the peer-reviewed research. Until a rigorous assessment of imidacloprid in the estuarine environment is available, Ecology should use a precautionary approach and apply conservative estimates of imidacloprid toxic effect thresholds and transport rates, as are reported in the peer-reviewed literature. This includes recommended ecological thresholds for imidacloprid at below 0.2 µg/L for acute exposure and 0.035 µg/L for long-term chronic exposure. The imidacloprid levels reported in the 2013 Risk Assessment are considerably higher (acute 0.35 µg/L to 4,200 µg/L; chronic: 0.4 µg/L), which poses an unacceptable risk to the benthic environment of Willapa Bay and Grays Harbor.

Response: Different environments may have different variables affecting the threshold and transport rates of imidacloprid. The Draft Permit requires continued studies to continue evaluation of imidacloprid in both Willapa Bay and Grays Harbor. These studies along with best available science are being used by Ecology to apply adaptive management regarding imidacloprid applications. In 2014 monitoring studies were done at a commercial scale and the results are included in FEIS Appendix E.

Washington State currently has not promulgated any regulatory standards for imidacloprid in either surface waters or sediments. Therefore, permit monitoring utilizing direct biological observation of benthic organisms is the only means Ecology has to verify compliance with the Sediment Management Standards (WAC 173-204) and assess the health of the benthic community throughout the term of the permit. Sampling and analysis costs of biological monitoring typically greatly exceed the costs of measuring a chemical concentration. Ecology strives to maintain a balance between monitoring benefits and monitoring cost, and believes that the proposed monitoring plan is a precautionary yet feasible solution.

4. Board of Pacific County Commissioners (Rogers, Wolfe, Ayers)

Comment: Support of a permit.

Response: Comment noted.

5. Coalition of Coastal Fisheries (Fricke)

Comment: Support of a permit with emphasis on the benefits of the habitat provided by shellfish beds

Response: Comment noted.

6. Coalition to Protect Puget Sound Habitat (Laura Hendricks)

Comment: We strongly oppose the issuance of a permit and application for a SIZ due to concern for pollinators and aquatic invertebrates.

Response to concern for pollinators: Scoping comments received from local area scientific experts report that pollinators do not use the tideflats, and spray drift management techniques required by the Federal registrations for imidacloprid are sufficiently protective (personal communications received from Ed Darcher, Pacific County *Spartina* Coordinator since 1996, February 6, 2014; and Dr. Kim Patten, WSU Pacific County Extension Director, various dates). There are no flowering plants (other than eelgrass) on commercial shellfish beds as these are inundated twice daily by tides. Of the approximately 3,000 bee hives imported in June each year to pollinate cranberries at the south end of Willapa Bay, a few of these are located approximately 0.5 mile (2,640 feet) from the nearest commercial shellfish beds. The closest cranberry farm in Grays Harbor is approximately 1.5 miles from a commercial shellfish beds. The remaining 98 percent of the colonies are located 6 miles or more from the nearest shellfish beds (see FEIS Chapter 3, Section 3.2.5). The conditional FIFRA Registrations issued for the use of imidacloprid products at the proposed rate of 0.5 lb active ingredient per acre indicate that this would be below concentrations that would impact honey bees (USEPA 2013b). Further, in the professional opinion of the WSDA, Special Pesticide Registration Program Coordinator (Erik Johansen), there is no risk to bees from the application of imidacloprid (either granular or flowable formulation) to tidal flats. Implementing appropriate spray drift management techniques for the flowable formulation of imidacloprid, and maintaining an adequate buffer between the imidacloprid treatment area and blooming plants (as proposed by WGHOGA) would mitigate potential risk to bees (personal communication with Erik Johansen, WSDA, March 19, 2014). (FEIS 1.7)

Additionally, the FIFRA Registrations for the granular and flowable formulations of imidacloprid (Protector 0.5G and Protector 2F, respectively) include the following spray drift management requirements (USEPA 2013a and 2013b):

- Drift potential is lowest between wind speeds of 3 to 10 mph. Average wind speed at the time of application shall not exceed 10 mph to minimize drift to adjacent shellfish and water areas when either Protector 0.5G or 2F is applied by air. Further, aerial applications shall not occur during gusty conditions, or during temperature inversions. Temperature inversions begin to form as the sun sets and often continue into the morning.
- Applications of imidacloprid shall be made at the lowest possible height (helicopter, ground, or barge) that is safe to operate and that would reduce exposure of the granules to wind.

- When applications of Protector 0.5G (the granular formulation) are made crosswind, the applicator must compensate for displacement by adjusting the path of the application equipment upwind. Swath adjustment distance should increase with increasing drift potential.
- Helicopters used to apply Protector 2F (the flowable formulation) should be equipped to minimize spray drift. The best drift management strategy and most effective way to reduce drift potential is to apply large droplets that provide sufficient coverage and control. Droplet size can be controlled by using high flow-rate nozzles, selecting the number and type of nozzles, nozzle orientation, and controlling pressure appropriate for the nozzle type.

Response to concern for aquatic invertebrates: The Sediment Impact Zone requires that impacts to benthic invertebrates do not exceed minor adverse effects. Sampling has been done in 2011, 2012 and 2014 to study these effects. The FEIS describes the results of these studies in section 2.8.3.5.

Sampling studies indicate the minor adverse effects threshold will not be exceeded in the area designated by Ecology as a SIZ. Ecology is requiring sampling and analysis under this permit to ensure that minor adverse effects to sediments and the benthic community do not occur. If any exceedances of minor adverse effects are confirmed during monitoring, Ecology will require adaptive management measures (which could include timing of imidacloprid application, changing areas to be sprayed, changing buffer zones around application, changing concentration or improving best management practices) with the permittee to reduce adverse effects. The probable likely net impact from these adaptive management measures will be to restrict spraying in areas where exceedances of minor adverse effects have occurred.

Field studies to date demonstrate that there is limited on-site impact to non-target aquatic invertebrates, and that this impact is transient. The use of efficient and accurate application methods over treated shellfish beds will mitigate impacts beyond the targeted areas. The strict specification on the accepted labeling, of rotating applications at least a year apart, will limit any effects to temporary and transient events. (CSI 2013, 8.11)

7. Columbia River Crab Fisherman's Association (Beasley)
Comment: Support of a permit with an emphasis on the benefits of oyster beds on crab, water quality, the greater community, and the overall environment.

Response: Comment noted.

8. Ocean Park Area Chamber of Commerce (Adams)
Comment: We encourage you to expeditiously assist the shellfish industry in seeking appropriate solutions as part of their Integrated Pest Management program.

Response: Comment noted.

9. Pacific Coast Shellfish Growers Association (Barrette)

Comment: Support of a permit to include southern Willapa Bay and limited monitoring, with an emphasis on the economic benefit of aquaculture.

Response: Refer to response #1.

10. Plauche & Carr LLP on behalf of the Willapa Bay Oyster Growers Association (WGHOGA)

Comment: The letter submitted provided background information on the proposal with an emphasis on the benefits that shellfish aquaculture provides to the communities of Pacific County and Grays Harbor County.

Response: Comment noted.

Comment: The SIZ letter errs in failing to authorize a SIZ in southern Willapa Bay.

Response: Refer to response #1.

Comment: The “conditional” status of the Grays Harbor and northern Willapa Bay sediment impact zone (SIZ) authorizations should be removed.

Response: The status of Grays Harbor and northern Willapa Bay will remain conditional. The Permit authorizes the SIZ and also provides a process to confirm the determination made by Ecology that for those areas the minor adverse effects threshold will not be exceeded. The additional SIZ conditions in Grays Harbor and northern Willapa Bay serve to emphasize the importance of gathering this information, to notify the oyster growers that management of this area is dependent upon collection of information to confirm the theory that application of imidacloprid does not exceed the minor adverse effects threshold outlined in the Sediment Management Standards (SMS), and to clarify the response of Ecology if the sampling results show an exceedance of the minor adverse effects threshold.

Data has not been collected on the potential effects of imidacloprid application in Grays Harbor. The data collected to date for central Willapa Bay does not exceed the minor adverse effects threshold. Ecology has determined that extrapolating this data to Grays Harbor provides sufficient foundation to justify authorization of a SIZ, but extrapolating this data to Grays Harbor without confirmation sampling is inappropriate. Therefore Ecology is issuing a conditional SIZ, so there is a requirement to collect confirmational information for Grays Harbor. To the extent that the information shows an exceedance of the minor adverse effects threshold, it is clearly understood that Ecology may modify or rescind the permit and SIZ authorization.

A similar approach is being required for the northern Willapa Bay (Cedar River) area. Benthic tests conducted on experimental application of imidacloprid in 2011 in the Cedar River area exhibited more than a minor adverse effect based on Department of Ecology review. The specific reason(s) why the test exhibited more than a minor adverse effect is not known, and several variables could have affected the results. Since tests in northern Willapa Bay showed exceedances of minor adverse effect, the conditional status will remain and additional studies are required to begin in 2015. Based on the results, the conditional status may be lifted/changed/modified.

Comment: The Draft Permit monitoring requirements are unreasonable and must be revised.

Response: Regarding the sediment monitoring schedule.

- a. Is required to verify imidacloprid application will not result in exceedances of the minor adverse effect threshold that ongoing monitoring for the entire span of the five year permit be required for both Grays Harbor and Willapa Bay. Although experimental trials have been conducted in Willapa Bay, ongoing full scale commercial application of 2000 acres per year over a five year period (as proposed in the permit) has not been conducted.
- b. Requires sediment sampling for persistence beyond 28 days if results from the previous sampling event indicate it is necessary.
- c. The Monitoring information supports adaptive management and changes to the spraying plan if necessary.

Response: Regarding the sediment benthic invertebrate monitoring.

Ecology has reviewed alternative proposals for sediment and benthic invertebrate monitoring. Ecology has found efficiencies which have reduced the estimated overall cost from over \$1 million to approximately \$500,000.

Comment: The maximum biological effects criteria in the Draft Permit are inappropriate and must be revised.

Response: Ecology recognizes WGHOGA's concerns about the use of the Puget Sound invertebrate maximum biological effects criteria. The Puget Sound Marine Criterion in the SMS is not directly applicable to Willapa Bay and Grays Harbor as these embayments are not located in Puget Sound. Ecology acknowledged that distinction, and determined that it was appropriate and justified for the agency to use the Puget Sound Marine Criterion, along with scientific literature, to develop an approach to interpret the non-Puget Sound marine narrative criteria in Willapa Bay (and by extension Grays Harbor). This approach combined recent scientific thinking and the Puget Sound criterion.

There is not adequate basis or rationale provided by WGHOGA to support Ecology deviating from the approach which the agency determined would best evaluate the health

of the benthic community. In addition, adopting a different criteria at this stage would make results of the required future studies difficult to compare or interpret to previous data collected.

Comment: Propose that the Annual Operations Plan be submitted at least 14 days prior to the first treatment of the year instead of March 1st each year. This is because some of the growers may not know which beds they intend to treat by March 1st.

Response: The Annual Operations Plan may be revised/updated with justification.

Comment: The Willapa/Grays Harbor Oyster Growers Association request that GPS coordinates provided in the Annual Operations Plan be of the treated beds, not the precise area to be treated. This is because the precise area to be treated will depend on site specific conditions of the bed at the time of treatment.

Response: The Annual Operations Plan may be revised/updated with justification. It is understood that locations of acreage planned for treatment may change.

Comment: Provided appendices with the Integrated Pest Management Memorandum of Agreement, The Economic Impact of Shellfish Aquaculture in Washington, Oregon and California, and support from Hart Crowser, Inc. in support of previous comments.

Response: Information provided was informative.

11. Washington Farm Bureau (Stuhlmiller)

Comment: Support of a permit to include southern Willapa Bay and limited monitoring, with an emphasis on the economic benefit of aquaculture.

Response: Refer to response #1.

12. World Temperate Rainforest Network (Rasmussen)

Comment: The World Temperate Rainforest Network would like to sign onto the attached comments submitted by the Xerces Society for Invertebrate Conservation.

Response: Refer to response #13.

Comment: The use of neonicotinoids is irresponsible given what we know about their tragic effect on honeybees.

Response: Refer to response #6.

Comment: Your proposal to use a pesticide that will impact invertebrates and reduce salmon that are eaten by orcas will mean more stress put on the orca population.

Response: Imidacloprid would be unlikely to adversely affect salmonids or their critical habitat. (CSI 2013)

6.4.4 Fish

Eight laboratory toxicity studies of technical grade and formulations of imidacloprid on five species of marine/estuarine fish were identified by the search strategy described previously (Table 6.1). The studies ranged in length from 96 hours to 32 days. Imidacloprid has low toxicity to fish regardless of test species or duration. Toxicity studies on species that are resident in Willapa Bay and Grays Harbor indicate relatively low sensitivity to this product and reflect the results found with surrogate test organisms. (CSI 2013, page 26)

Additionally, with site specific information on spawning areas, it is possible to adjust treatment areas and timing through the Annual Operations Plan.

13. Xerces Society (Mazzacano)

Comment: The draft permit fails to confirm appropriate economic thresholds for burrowing shrimp.

Response: The economic threshold for burrowing shrimp has been included in the FEIS. Please refer to FEIS 1.4.

Comment: The draft permit fails to determine a method to accurately measure shrimp population density.

Response: Ecology is working with the WGHOGA in order to establish an appropriate method to ensure that shrimp burrows are accurately identified. However, burrow counts are used to determine the stability of the substrate and not the number of shrimp. Burrows are an indicator of shrimp density, related to effects on shellfish aquaculture.

Comment: The draft permit fails to institute integrated management methodologies in order to diminish reliance on a single control method.

Response: The draft permit will incorporate integrated pest management. Ecology is working with the WGHOGA and other agencies in order to revise and adapt IPM techniques.

Comment: Reference to “Worldwide Integrated Assessment on Systemic Pesticides” published in *Environmental Science and Pollution Research* with concern for non-target species and persistence.

Response regarding concern for non-target species: Balancing beneficial uses, Ecology recognizes that there could be limited impacts to non-target species and the permit conditions mitigate those potential impacts to the extent possible while still allowing for the beneficial use of shellfish aquaculture.

Ecology is requiring the best available testing and monitoring requirements from the SMS regulation to provide information about risks and potential effect to non-target benthic invertebrate species. To date experimental trials of imidacloprid have not shown significant impacts to non-target organisms. Sampling results have not exceeded the “minor adverse impacts” level in all but one sampling event. Testing data has shown that significant impacts have not been observed on the treated beds, and therefore won’t be seen on or around the treated beds. (FEIS 2.8.3.5)

If any exceedances of minor adverse effects are confirmed during monitoring, Ecology will require adaptive management measures (which could include timing of imidacloprid application, changing areas to be sprayed, changing buffer zones around application, changing concentration or improving best management practices) with the permittee to reduce adverse effects. The probable likely net impact from these adaptive management measures will be to restrict spraying in areas where exceedances of minor adverse effects have occurred.

The potential effects of imidacloprid use for the control of burrowing shrimp in Willapa Bay and Grays Harbor have been studied extensively over the past six years. Studies have included investigations of chemical residues, laboratory and field toxicity using surrogate and local species, and biological field sampling under commercial use conditions. The overriding weight of evidence indicates that imidacloprid treatment will not significantly impact the endemic species or the ecology of these waters, and will not significantly impact human health. The use of imidacloprid in Willapa Bay and Grays Harbor will be limited in both timing and spatial scope. To reduce the impact of the burrowing shrimp species on shellfish production, these products will be used to treat targeted beds approximately once every 3 - 4 years on a rotating basis (although applications in consecutive years are allowed). Not all shellfish beds require treatment, dependent on the resident population of burrowing shrimp. There are approximately 45,000 acres of tidelands in Willapa Bay, with only 20% used for commercial shellfish (largely oysters and clams). In Grays Harbor, shellfish are grown commercially on only 3% of the 9,000 acres of tideland. These facts indicate that exposure will be significantly limited within the two water bodies. The Willapa Bay and Grays Harbor systems both experience significant flushing associated with daily tidal patterns, with major daily tidal fluctuations ranging between six and ten feet. This extensive water exchange is necessary for commercial shellfish production and provides several critical inputs into these environments. Tidal flows provide water dilution and movement, increasing opportunities for rapid dissipation of imidacloprid. Tidal changes also bring in water that is rich in nutrients and microorganisms, supporting more rapid metabolic breakdown of chemicals such as imidacloprid. This rapid breakdown and subsequent decline in concentrations is supported in multiple residue studies involving water and sediments associated with treated beds and adjacent channels. Based on these observations, exposures of non-target organisms to biologically active concentrations of imidacloprid would be significantly limited and brief. Numerous studies have been conducted on the effects of imidacloprid on estuarine and marine organisms. Results indicate that the majority of surrogate and endemic species are not sensitive to environmentally relevant concentrations of imidacloprid. This includes fish, mollusks, polychaetes and some crustaceans. Although there are some indications of toxicity to specific crustaceans, the impact is expected to be

minor because of limited exposures and rapid re-colonization. Biological field trials were conducted on commercially treated oyster beds in Willapa Bay and Grays Harbor. Imidacloprid was found to have a limited impact on certain crustaceans on treated beds, although ecological indices showed minor, transient changes in the fauna on commercial oyster plots. Researchers believe that these data suggest a short-lived toxic effect on the most sensitive macro-invertebrates (primarily crustaceans) followed by a rapid recovery through product dissipation and re-colonization with tidal flushing. The proposed use of imidacloprid to treat burrowing shrimp in shellfish beds located in Willapa Bay and Grays Harbor is expected to have little or no impact on the local estuarine and marine species. (CSI 2013, page 7)

Response regarding concern for persistence: Persistence monitoring is an annual requirement in the permit.

Comment: The draft EIS has not provided sufficient information regarding the possible risks of imidacloprid. Therefore, Ecology has not justified the use of imidacloprid, especially on such an expanded acreage.

Response: A Risk Assessment was prepared for EPA prior to the registration of imidacloprid for use in Willapa Bay and Grays Harbor in order to control burrowing shrimp. Additionally, Ecology has developed an Environmental Impact Statement assessing potential impacts associated with imidacloprid applications in Willapa Bay and Grays Harbor, and the permit requires extensive monitoring.

This permit may be modified, revoked and reissued, or terminated if a determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination.

Comment: Larger studies should be done and included in the FEIS.

Response: Monitoring studies were done at a commercial rate in 2014 and showed that commercial applications in Willapa Bay did not violate that Sediment Management Standards. The final monitoring report is referenced in FEIS 2.8.3.5 and is in appendix E of the FEIS. Additionally, ongoing monitoring is a permit requirement.

Comment: Expresses the need to include specific elements in the Integrated Pest Management Program (IPM).

Response: Your suggestions are noted.

14. Gary Anderson

Comment: Has any effort been made to find a method of compaction to mechanically control burrowing shrimp?

Response: Various mechanical and non-chemical control methods have been tried as methods for controlling burrowing shrimp. These methods have either failed to control burrowing shrimp, are too impractical to implement on a commercial scale, or they significantly harm the shellfish crop and/or non-target species. Examples of these include sediment compaction, sediment alteration, and physical barriers. Therefore, IPM studies have shifted to a search for less toxic chemicals that are still effective at controlling burrowing shrimp. Imidacloprid has been identified through years of study and experimentation as a possible substitute for carbaryl.

A preliminary imidacloprid IPM Plan will be submitted to Ecology concurrent with issuance of the final NPDES permit. Growers propose to refine the imidacloprid IPM Plan over time based on what they learn from investigation and evidence gathered each year that applications are made (personal communication with WGHOGA, June 17, 2014). (FEIS 2.8.3.3)

Refer to FEIS Section 2.8.4 *Alternatives Considered and Eliminated from Detailed Evaluation*.

15. Bay Center Mariculture Co. (Wilson)

Comment: Informative comments on Dr. Wilson's background working within Willapa Bay, burrowing shrimp history, eelgrass, and their impacts to the environment. Dr. Wilson emphasized a need to maintain a healthy environment through an informed process.

Response: Comment noted.

Comment: Overall I think the serious damage to the nearshore habitat where the ghost shrimp take over, needs to be understood and proper actions taken to maintained at levels which do not eliminate valuable members of the biota. It seems regulations should be promulgated on the premise of helping maintain environmental productivity and not on how to keep control methods minimum or even eliminated because of perceived problems.

Response: Comment noted.

16. Ross Barkhurst

Comment: Concern for lack of WDFW and DNR input.

Response: WDFW and DNR both submitted comments. See comments and responses #46 and #47.

Comment: Concern for potential cumulative effects with imazamox.

Response: There are currently no known studies that address additive or synergistic effects of imidacloprid and imazamox. Imidacloprid and imazamox have completely different toxic modes of action; imidacloprid is a neonicotinoid insecticide that affects neural transmission in animals, and imazamox is an acetolactate synthesis (ALS) inhibitor which acts on a biochemical pathway that occurs in plants but not in animals. (FEIS 2.10.1)

Comment: Concern for salmon.

Response: Imidacloprid would be unlikely to adversely affect salmonids or their critical habitat. (CSI 2013)

6.4.4 Fish

Eight laboratory toxicity studies of technical grade and formulations of imidacloprid on five species of marine/estuarine fish were identified by the search strategy described previously (Table 6.1). The studies ranged in length from 96 hours to 32 days. Imidacloprid has low toxicity to fish regardless of test species or duration. Toxicity studies on species that are resident in Willapa Bay and Grays Harbor indicate relatively low sensitivity to this product and reflect the results found with surrogate test organisms. (CSI 2013, page 26)

Additionally, with site specific information on spawning areas, it is possible to adjust treatment areas and timing through the Annual Operations Plan.

Comment: Concern for avian species.

Response: Refer to response #3.

Comment: Concern for invertebrates.

Response: Refer to response #38.

Comment: Analysis and monitoring is prudent.

Response: Washington State currently has not promulgated any regulatory standards for Imidacloprid in either surface waters or sediments. Therefore, permit monitoring utilizing direct biological observation of benthic organisms is the only means Ecology has to verify compliance with the Sediment Management Standards (WAC 173-204) and assess the health of the benthic community throughout the term of the permit. Sampling and analysis costs of biological monitoring typically greatly exceed the costs of measuring a chemical concentration. Ecology strives to maintain a balance between monitoring benefits and monitoring cost, and believes that the proposed monitoring plan is a precautionary yet feasible solution.

Previous monitoring was done and is described in FEIS section 2.8.3.5.

Comment: Concern for Green Sturgeon.

Response: Refer to response #39.

17. Frank Bedell

Comment: Opposed to any application of pesticides/chemicals to Grays Harbor.

Response: Comment noted.

18. Jen-Jay, Inc. (Chris Betcher)

Comment: There needs to be other methods of mitigating for the detrimental effects of the native burrowing shrimp on the aquaculture of the non-native oysters and clams.

Response: The draft permit will incorporate integrated pest management. Ecology is working with the WGHOGA and other agencies in order to revise and adapt IPM techniques.

Comment: Opposed to the permit with concerns for pollinators.

Response: Refer to response #6.

Comment: Physical, not chemical, solutions to the problem need to be investigated.

Response: Refer to FEIS Section 2.8.4 *Alternatives Considered and Eliminated from Detailed Evaluation*.

19. Nancy Bischoff

Comment: As an owner of Willapa Bay land I do not want pesticides put into intertidal areas, the bay or onto the sediment lands.

Response: Comment noted.

20. Fritzi Cohen

Comment: I am totally opposed to this permit application and am in agreement with those critics who find the permit and sediment impact zone unsupported by scientific evidence.

Response: The Risk Assessment and Environmental Impact Statement both discuss the scientific literature and studies that were used to evaluate the proposal for the use of imidacloprid treatment to control burrowing shrimp. Additional monitoring will be required in the permit to further evaluate environmental impacts of imidacloprid applications.

This permit may be modified, revoked and reissued, or terminated if a determination that the permitted activity endangers human health or the environment, or contributes to water

quality standards violations and can only be regulated to acceptable levels by permit modification or termination.

Comment: Request the information regarding the costs of past permits granted to the aquaculture industry and what the growers have paid. If an exemption regarding paying actual cost was determined I am asking that that information be provided, i.e. as to any legislation or policy that was developed to subsidize this permitting process.

Response: The Department of Ecology is proposing to provide approximately \$200,000 from the State Toxics Control Account (STCA) to assist Washington State University with monitoring. The STCA is a fund established (RCW 70.105 D and RCW 82.21.030) from a thirty-three hundredths of one percent tax on hazard substances imported into Washington State. Monies from this account are commonly used to help fund important environmental projects or research.

Ecology is proposing to provide funding because we are interested in additional information about the effects of imidacloprid application in an estuary environment to be able to manage this practice.

Permits are not subsidized and the permittee is required to pay all statutory/regulatory fees associated with the permit.

Comment: Provided information on neonicotinoids from EARTH FOCUS and a link for additional information www.linktv.org/earthfocus or www.kcet.org/earth_focus.

Response: Comment noted.

21. Michael Goldberg

Comment: I am concerned about unmonitored potentially detrimental use of imidacloprid to oyster beds in Willapa Bay. This chemical can drift into other areas and may be harmful to human health.

Response: The proposed use of imidacloprid is not likely to result in adverse human health effects. Imidacloprid is not considered toxic to humans via dermal or inhalation exposure routes. It is designated an acute oral toxicant, but residues in fish and shellfish are below the detection limit and pose no threat even under conservative aggregate exposure scenarios. The subpopulations most vulnerable to dietary exposure— infants and children—are the least likely to consume high levels of fish and shellfish. This assessment also considered scenarios including population subgroups that are prone to higher levels of fish/shellfish consumption, but these did not alter the conclusions reached in this risk assessment. Applicators inherently face the possibility of acute exposure, particularly in the event of an accidental dose. The label instructions require that applicators wear protective equipment beyond US EPA Human Effects Division's (HED's) more conservative expectations (e.g. applicators of the granular formulation must wear dust masks during application). All of HED's applicator scenarios resulted in Margins of Exposure (MOEs) "not of concern," when applicators wore gloves. As the

formulation labels restrict usage to a single application per year, there is no risk of chronic or subchronic exposure to handlers or other groups. (CSI 2013, page 8)

Under current labels, effects on human health as a result of residential, dietary, or occupational exposure appear to be low as a result of the low application rates relative to the toxicity of imidacloprid and to the rates and exposures generated from other registered uses. There is sufficient data on the chemistry, fate, toxicity, and exposure to conclude that adverse effects to human health due to imidacloprid are not expected if label directives are followed. (CSI 2013, page 76)

Additionally, the permit has monitoring requirements to further evaluate environmental impacts of imidacloprid applications, and Ecology staff will be monitoring applications to ensure permit compliance.

22. Daniel Graf

Comment: Opposed to the permit with concern for pollinators.

Response: Refer to response #6.

Comment: Opposed to the permit with concern for salmon.

Response: Imidacloprid would be unlikely to adversely affect salmonids or their critical habitat. (CSI 2013)

6.4.4 Fish

Eight laboratory toxicity studies of technical grade and formulations of imidacloprid on five species of marine/estuarine fish were identified by the search strategy described previously (Table 6.1). The studies ranged in length from 96 hours to 32 days. Imidacloprid has low toxicity to fish regardless of test species or duration. Toxicity studies on species that are resident in Willapa Bay and Grays Harbor indicate relatively low sensitivity to this product and reflect the results found with surrogate test organisms. (CSI 2013, page 26)

Additionally, with site specific information on spawning areas, it is possible to adjust treatment areas and timing through the Annual Operations Plan.

Comment: It's time we look at more sustainable practices, or we'll pay the consequences in food supply, and with our health, later.

Response: Comment noted.

23. Warren Huntsinger

Comment: Concern for long term effects.

Response: The Sediment Impact Zone requires that impacts to benthic invertebrates do not exceed minor effects. Sampling has been done in 2011, 2012 and 2014 to study these effects. The FEIS describes the results of these studies in section 2.8.3.5.

Sampling studies indicate the minor adverse effects threshold will not be exceeded in the area designated by Ecology as a SIZ. Ecology is requiring sampling and analysis under this permit to ensure that minor adverse effects to sediments and the benthic community do not occur. If any exceedances of minor adverse effects are confirmed during monitoring, Ecology will require adaptive management measures (which could include timing of imidacloprid application, changing areas to be sprayed, changing buffer zones around application, changing concentration or improving best management practices) with the permittee to reduce adverse effects. The probable likely net impact from these adaptive management measures will be to restrict spraying in areas where exceedances of minor adverse effects have occurred.

Field studies to date demonstrate that there is limited on-site impact to non-target aquatic invertebrates, and that this impact is transient. The use of efficient and accurate application methods over treated shellfish beds will mitigate impacts beyond the targeted areas. The strict specification on the accepted labeling, of rotating applications at least a year apart, will limit any effects to temporary and transient events. (CSI 2013, 8.11)

Comment: Concern for pollinators.

Response: Refer to response #6.

Comment: Suggest the stake culture instead of chemicals.

Response: Refer to response #26.

24. Jane Lindley

Comment: Opposed to the permit.

Response: Comment noted.

Comment: Concern for pollinators.

Response: Refer to response #6.

Comment: Concern for non-targeted marine life.

Response: Refer to response #13.

25. Kristen Long

Comment: Opposed to the permit with concern for non-target species.

Response: Refer to response #13.

26. Brent Naylor

Comment: Concern for long term effects.

Response: Refer to response #23.

Comment: Concern for breakdown products.

Response: Eight imidacloprid degradation products have been identified as a result of imidacloprid hydrolysis, photolysis, and soil and microbial degradation. Two of these degradation compounds, imidacloprid olefin, and 5-hydroxy imidacloprid were identified by EPA as being of interest due to potential toxicity. One of these degradates, imidacloprid-olefin, was analyzed during 2012 research efforts (Grue & Grassley 2013; Hart Crowser 2013). Of the samples analyzed for imidacloprid olefin concentrations, less than 20 percent resulted in detectable concentrations of imidacloprid-olefin and these ranged from 0.08 to 3.6 ppb. Imidacloprid-olefin was found in surface water, sediments, and sediment porewater; it was undetectable in eelgrass tissue. Despite numerous attempts, the necessary laboratory standards to test for 5-hydroxy imidacloprid could not be found or synthesized. Subsequent analysis suggests that this degradation product is likely unstable and has a very short half-life in the environment (Hart Crowser 2012). (FEIS 2.8.3.6)

Studies have shown that imidacloprid has eight degradation products as a result of hydrolysis, photolysis, and soil and microbial degradation. These degradation products include: imidacloprid-olefin, 5-hydroxyimidacloprid, imidacloprid-nitrosimine, imidacloprid-guanidine, imidacloprid-urea, 6-chloronicotinic acid, imidacloprid-guanidine-olefin, and acyclic derivative. The toxicity levels of all the degradation products are equal to or lower than the toxicity of the parent compound (SERA 2005). (FEIS 3.2.3.2)

Comment: Concern for pollinators.

Response: Refer to response #6.

Comment: There are alternatives such as stake culture.

Response: Commercial shellfish growers have been investigating alternative methods for burrowing shrimp control since the 1950s. These have included mechanical means, alternative shellfish culture methods, a variety of chemical applications, and biological controls, none of which has proven to be as effective, reliable, economical, or more

species-specific than carbaryl or imidacloprid applications administered with adaptive management principles.

Some of the methods tried can be found in *An Updated Plan for Integrated Pest Management of Burrowing Shrimp on Commercial Shellfish Beds* (Booth 2010). Additionally, the FEIS discusses alternatives considered in section 2.8.4.

27. Kate O'Neal

Comment: Opposed to the permit.

Response: Comment noted.

28. Michael Parker

Comment: Support of a permit to include southern Willapa Bay, with an emphasis on the economic benefit of aquaculture.

Response: Refer to response #1.

29. Brian Sheldon

Comment: Support of a permit to include southern Willapa Bay and limited monitoring, with an emphasis on the economic benefit of aquaculture.

Response: Refer to response #1.

Comment: Clarification of the submittal of the Sediment and Analysis Plan and the Sediment Data Report.

Response: The permit states that the SAP will be submitted in the Annual Operations Plan (S4.D.) and that the Sediment Data Report will be submitted in the Annual Report (S4.E.).

30. Katherine Smith

Comment: Support of a permit to include southern Willapa Bay and limited monitoring, with an emphasis on the economic benefit of aquaculture.

Response: Refer to response #1.

Comment: Shellfish farmers put significant resources toward protecting habitat and these actions should be considered an ecological public service.

Response: Comment noted.

31. Keith Stavrum

Comment: Opposed to the permit.

Response: Comment noted.

32. Max Ventura

Comment: Please feel free to use my personal account after carbaryl exposure.

Response: Comment noted.

33. Larry Warnberg

Comment: The use of an aquatic pesticide to kill native shrimp to protect non-native oyster culture should not be permitted.

Response: Comment noted.

Comment: There is currently no reliable measure of shrimp density.

Response: Ecology is working with the WGHOGA in order to establish an appropriate method to ensure that shrimp burrows are accurately identified. Burrow count are used to determine the stability of the substrate and not the number of shrimp.

Comment: There are proven effective non-chemical alternatives available to shellfish growers.

Response: Commercial shellfish growers have been investigating alternative methods for burrowing shrimp control since the 1950s. These have included mechanical means, alternative shellfish culture methods, a variety of chemical applications, and biological controls, none of which has proven to be as effective, reliable, economical, or more species-specific than carbaryl or imidacloprid applications administered with adaptive management principles.

Comment: No published evidence supports the claim that shrimp populations have increased.

Response: Dr. Dumbauld's most recent studies are referenced in the Final Environmental Impact Statement and can be found in FEIS 3.1.

Some of the methods tried can be found in *An Updated Plan for Integrated Pest Management of Burrowing Shrimp on Commercial Shellfish Beds* (Booth 2010). Additionally, the FEIS discusses alternatives considered in section 2.8.4.

Comment: The time restriction is too wide. Spraying could occur right up to the moment the tide floods over a treated area, greatly increasing the risk of off-site drift with the current.

Response: Monitoring studies have been done to understand the fate of imidacloprid in the marine aquatic environment. These studies are discussed in FEIS 2.8.3.5.

Additionally, the permit requires annual monitoring of water, sediment, and benthic invertebrates.

If any exceedances of minor adverse effects are confirmed during monitoring, Ecology will require adaptive management measures (which could include timing of imidacloprid application, changing areas to be sprayed, changing buffer zones around application, changing concentration or improving best management practices) with the permittee to reduce adverse effects. The probable likely net impact from these adaptive management measures will be to restrict spraying in areas where exceedances of minor adverse effects have occurred.

This permit may be modified, revoked and reissued, or terminated if a determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination.

Comment: Who will pay for the permit, how much, and will the Growers again be exempted from paying the actual cost of developing and issuing the proposed permit?

Response: Permit coverage fees are set by rule and can be found in WAC 173-224-040.

Comment: I strongly support the restriction in the south half of Willapa Bay.

Response: Comment noted.

34. Carole Wiegardt

Comment: Support of the permit with emphasis on economic, historical, and environmental reasons.

Response: Comment noted.

35. Cris Wiegardt

Comment: Support of the permit.

Response: Comment noted.

36. Michael Williams

Comment: Against the spraying of chemicals in Willapa Bay.

Response: Comment noted.

37. Steve and Vicki Wilson

Comment: Support of a permit to include southern Willapa Bay and limited monitoring, with an emphasis on the economic benefit of aquaculture.

Response: Refer to response #1.

38. Elise Wright

Comment: Opposed to the permit.

Response: Comment noted.

Comment: Concern for consumers.

Response: Refer to response #21.

Comment: Concern for avian species.

Response: Refer to response #3.

Comment: Concern for invertebrates.

Response: The Sediment Impact Zone requires that impacts to benthic invertebrates do not exceed minor effects. Sampling has been done in 2011, 2012 and 2014 to study these effects. The FEIS describes the results of these studies in section 2.8.3.5.

Sampling studies indicate the minor adverse effects threshold will not be exceeded in the area designated by Ecology as a SIZ. Ecology is requiring sampling and analysis under this permit to ensure that minor adverse effects to sediments and the benthic community do not occur. If any exceedances of minor adverse effects are confirmed during monitoring, Ecology will require adaptive management measures (which could include timing of imidacloprid application, changing areas to be sprayed, changing buffer zones around application, changing concentration or improving best management practices) with the permittee to reduce adverse effects. The probable likely net impact from these adaptive management measures will be to restrict spraying in areas where exceedances of minor adverse effects have occurred.

Field studies to date demonstrate that there is limited on-site impact to non-target aquatic invertebrates, and that this impact is transient. The use of efficient and accurate application methods over treated shellfish beds will mitigate impacts beyond the targeted areas. The strict specification on the accepted labeling, of rotating applications at least a year apart, will limit any effects to temporary and transient events. (CSI 2013, 8.11)

39. National Oceanic and Atmospheric Administration (Hooper)

Comment: Believe that we should reduce the proposed acreage to 800 acres total because there are too many unknowns regarding impact to other aquatic and terrestrial biota.

Response: Comment noted.

Comment: Request that the 2014 data report be available for public review and comment prior to permit issuance. Additionally, believe that the data from the report could have altered the subsequent FEIS and Fact Sheet and would result in sufficiently protected public aquatic resources.

Response: Ecology's evaluation and the report are in FEIS Appendix E.

Comment: Request data regarding recent burrowing shrimp recruitment from Dr. Dumbauld.

Response: Dr. Dumbauld's most recent studies are referenced in the Final Environmental Impact Statement in FEIS 3.1.

Comment: Request previous water quality monitoring reports.

Response: These reports have been sent to National Oceanic and Atmospheric Administration employee Thomas Hooper.

Comment: State that the burrowing shrimp are native to these waters and play an important role in the natural ecosystem.

Response: Refer to FEIS 3.1.

Comment: Concern for the green sturgeon.

Response: Toxicity studies on species that are resident in Willapa Bay and Grays Harbor indicate relatively low sensitivity to imidacloprid and reflect the results found with surrogate test organisms such as the white sturgeon.

6.4.4 Fish

Eight laboratory toxicity studies of technical grade and formulations of imidacloprid on five species of marine/estuarine fish were identified by the search strategy described previously (Table 6.1). The studies ranged in length from 96 hours to 32 days. Imidacloprid has low toxicity to fish regardless of test species or duration. Toxicity studies on species that are resident in Willapa Bay and Grays Harbor indicate relatively low sensitivity to this product and reflect the results found with surrogate test organisms. (CSI 2013, page 26)

Additionally, with site specific information on spawning areas, it is possible to adjust treatment areas and timing through the Annual Operations Plan.

This is listed as an uncertainty in the FEIS. (FEIS 1.7) Imidacloprid has a limited effect on large vertebrates, and only when high concentrations are ingested directly.

Imidacloprid applications would occur in shallow water or on exposed mudflats, when sturgeon are unlikely to be present over commercial shellfish beds. (FEIS 3.2.5.3)

Comment: Concern for impacts to a prey resource in the designated critical habitat for green sturgeon.

Response: Imidacloprid applications would be unlikely to adversely affect green sturgeon foraging habitat due to the limited area where imidacloprid would be applied relative to the size of Willapa Bay and Grays Harbor. (FEIS 3.2.5.3)

Comment: Concern zooplankton.

Response: Imidacloprid would be applied on selected commercial shellfish beds in-water during out-going tides or on exposed mudflats, when densities of zooplankton would be low due to limited water depth. Imidacloprid breaks down rapidly in water and has a low volatilization potential in air, minimizing potential adverse effects on zooplankton in Willapa Bay or Grays Harbor (Gervais et al. 2010). (FEIS 3.2.5.3)

Comment: Concern for salmon and forage fish.

Response to concern for salmon: Imidacloprid would be unlikely to adversely affect salmonids or their critical habitat. (CSI 2013)

6.4.4 Fish

Eight laboratory toxicity studies of technical grade and formulations of imidacloprid on five species of marine/estuarine fish were identified by the search strategy described previously (Table 6.1). The studies ranged in length from 96 hours to 32 days. Imidacloprid has low toxicity to fish regardless of test species or duration. Toxicity studies on species that are resident in Willapa Bay and Grays Harbor indicate relatively low sensitivity to this product and reflect the results found with surrogate test organisms. (CSI 2013, page 26)

Additionally, with site specific information on spawning areas, it is possible to adjust treatment areas and timing through the Annual Operations Plan.

Response to concern for forage fish: It is unlikely that there would be adverse effects to forage fish or groundfish from imidacloprid in water (CSI 2013) due to dilution, adsorption onto sediment, and application during low tide conditions. Additionally, imidacloprid would be unlikely to have a significant adverse effect on forage fish or groundfish in Willapa Bay and Grays Harbor due to the relatively small proportion of tidelands within each estuary that would be treated for the control of burrowing shrimp.

Comment: Concern for persistence in sediments.

Response: Sediment monitoring will be required annually to identify any areas of persistence.

Comment: Concern that the Puget Sound regulations are sufficient.

Response: The Puget Sound Marine Criterion in the Sediment Management Standards (SMS) is not directly applicable to Willapa Bay and Gray's Harbor as these embayments are not located in Puget Sound. However, the criterion was considered, along with recent scientific literature, in developing the approach for interpreting the non-Puget Sound marine narrative criteria in Willapa Bay.

The SMS and the research and rationale developed and used that provide the basis for the SMS are the primary wealth of institutional knowledge and the best known, developed and utilized criteria for this type of proposal. There is not adequate basis or rationale provided to deviate from the protocols that have been used for many years, and in fact to do so may set a poor precedent and make results difficult to compare or interpret to previous data collected.

Comment: Gave opportunity for grants to encourage alternative practices.

Response: Ecology welcomes grant opportunities and will incorporate consideration of alternative practices during IPM.

40. Nisqually Tribe (Shotwell)

Comment: Support of a permit that allows for shrimp control for the entirety of Willapa and Grays Harbor.

Response: Comment noted. Refer to response #1.

41. Pacific County Commissioners (Rogers, Wolfe, Ayers)

Comment: Support of a permit.

Response: Comment noted.

42. Shoalwater Bay Tribe (Davis)

Comment: Concern for monitoring water quality away from the application site.

Response: There is required water quality monitoring away from the application site in order to monitor fate and transport. Refer to permit condition S4.A.

Comment: Concern for additive effects from multiple treatment areas.

Response: The permit requires persistence sampling every year. Refer to permit condition S4.F.

Comment: Concern for impact on marine fauna.

Response: Refer to response #13.

Comment: Concern for green sturgeon.

Response: Refer to response #39.

Comment: Concern for lack of information in a marine environment.

Response: The Risk Assessment and Environmental Impact Statement both discuss the scientific literature and studies that were used to evaluate the proposal for the use of imidacloprid treatment to control burrowing shrimp. Additional monitoring will be required in the permit to further evaluate environmental impacts of imidacloprid applications.

This permit may be modified, revoked and reissued, or terminated if a determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination.

43. United States Fish and Wildlife Service (USFWS) (Quackenbush on behalf of McReynolds)

Comment: There is not a current permit for the application of carbaryl to commercial shellfish beds in Willapa Bay and Grays Harbor.

Response: The individual permit for the control of burrowing shrimp using carbaryl on oyster beds in Willapa Bay and Grays Harbor remains in effect.

Comment: Support of the no action alternative.

Response: Comment noted.

Comment: Opposed to imidacloprid permit due to lack of scientific information regarding fate and transport, efficacy, persistence, and effects to non-target organisms. Believe that the research findings indicate that effects and damages will not be limited to the treatment sites.

Response: Refer to response #13.

Comment: Alternative methods should be given fair and equal consideration.

Response: The draft permit will incorporate integrated pest management. Ecology is working with the WGHOGA and other agencies in order to revise and adapt IPM techniques.

Comment: Question regarding recent recruitment.

Response: Dr. Dumbauld's most recent studies are referenced in the Final Environmental Impact Statement in FEIS 3.1.

Comment: Question regarding the burrowing shrimp threshold.

Response: The economic threshold for burrowing shrimp has been included in the FEIS. Please refer to FEIS 1.4.

Comment: Request results for 2014 field trials.

Response: Ecology's evaluation and the report are in FEIS Appendix E.

Comment: Concern regarding native predators of shrimp with specific concern for sturgeon.

Response: Refer to response #39.

Comment: USFW Service disagrees with the claim that shrimp control improves biodiversity.

Response: Increased densities of burrowing shrimp could result in decreased biodiversity and increased sedimentation (Dumbauld and Wyllie-Echeverria 1997; Colin et al. 1986). High densities of burrowing shrimp have been associated with lower numbers of Dungeness crab, oysters, and other shellfish due to competitive exclusion and habitat modification caused by the shrimp (Doty et al. 1990; Brooks 1995; Dumbauld and Wyllie- Echeverria 1997). (FEIS 3.2.5.3)

Comment: Do not support control of mixed beds of native and non-native eel grass.

Response: Imidacloprid is an acetylcholinase inhibitor and plants do not have a biochemical pathway involving acetylcholinase. Therefore, it is unlikely that

imidacloprid would adversely affect eelgrass or other marine vegetation (FEIS Chapter 3, Section 3.2.4). (FEIS 1.7)

Imidacloprid applications are not intended to control eelgrass.

Comment: Do not agree that significant alterations to the bay wide ecosystem would occur without burrowing shrimp control. Chemical control methods represent an intrusive alteration and may have unintended consequences. Additionally, USFW Service disagrees that no significant adverse impacts would be expected with proposed alternative 2 or 3.

Response: Comment noted.

Comment: USFW Service believes that the proposed permit and SIZ cannot be implemented without significant adverse impacts.

Response: Comment noted.

Comment: USFW Service disagrees that a finding of no significant and adverse impact can be justified for plants.

Response: Limited information is available regarding imidacloprid impacts to marine vegetation. The results of field studies conducted during one season to evaluate uptake in eelgrass tissues showed limited uptake by eelgrass, and imidacloprid was undetectable after 14 days. In addition, imidacloprid is an acetylcholinase inhibitor and plants do not have a biochemical pathway involving acetylcholinase. Therefore, it is unlikely that imidacloprid would adversely affect eelgrass or other marine vegetation (FEIS Chapter 3, Section 3.2.4). (FEIS 1.7)

Comment: Disagrees with our description of bull trout presence in Willapa Bay and Grays Harbor.

Response: Comment noted.

Comment: Disagrees with our description of snowy plover distribution and habitat use.

Response: Comment noted.

Comment: Concern regarding ESA listed species and their critical area habitats.

Response: Issuance of this permit is not a Federal agency action subject to the ESA's consultation provisions.

Issuance of a NPDES permit by Ecology is not subject to ESA consultation with the National Marine Fisheries Service or the U.S. Fish and Wildlife Service. However, obtaining coverage under an NPDES Individual Permit does not exempt a permit holder from the “take” provisions of the ESA. “Take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in such conduct with respect to a species listed under ESA (16 U.S. C. Section 1532 [19]). Potential impacts to species listed under the ESA are addressed in FEIS Chapter 3, Section 3.2.5.

Comment: The draft permit proposes inadequate treatment buffers.

Response: Permit buffers are consistent with criteria from EPA’s registration.

Comment: Without a valid current incidental take permit or statement addressing the effects of this practice on listed species parties engaging in aquatic application of imidacloprid lack ESA coverage.

Response: Refer to the previous response regarding the Endangered Species Act.

Comment: Attachment B fails to identify the U.S. Department of the Interior U.S. Fish and Wildlife Service as a landowner.

Response: The referenced appendix was part of the application submitted by WGHOGA. Ecology recognizes the U.S. Department of the Interior U.S. Fish and Wildlife Service as a landowner.

Comment: Eelgrass represents a potentially significant exposure pathway for a variety of wildlife species.

Response: Limited information is available regarding imidacloprid impacts to marine vegetation. The results of field studies conducted during one season to evaluate uptake in eelgrass tissues showed limited uptake by eelgrass, and imidacloprid was undetectable after 14 days. In addition, imidacloprid is an acetylcholinase inhibitor and plants do not have a biochemical pathway involving acetylcholinase. Therefore, it is unlikely that imidacloprid would adversely affect eelgrass or other marine vegetation (FEIS Chapter 3, Section 3.2.4). (FEIS 1.7)

Comment: Concern for sub-lethal impacts

Response: There are approximately 45,000 acres of tidelands in Willapa Bay, with only 20% used for commercial shellfish (largely oysters and clams). In Grays Harbor, shellfish

are grown commercially on only 3% of the 9,000 acres of tideland. Imidacloprid applications would only be on a small percentage of the water bodies, limiting exposure.

The permit would require annual monitoring and closure of the SIZ's to ensure recovery of the sediment and benthic organisms.

Comment: Concern for birds.

Response: Refer to response #3.

Comment: Without a valid, current incidental take permit or statement addressing the effects of this practice on listed species, parties engaging in aquatic application of imidacloprid lack ESA coverage.

Response: Refer to previous response regarding ESA coverage.

Comment: A decision to issue the permit and authorize SIZs while relevant and important data remain unavailable would be premature. We recommend that Ecology should continue limited field trials under the Experimental Use Permit. We do not support the issuance of an individual NPDES permit at this time and we oppose the authorization of SIZs in Willapa Bay and Grays Harbor.

Response: Commercial size monitoring studies conducted in 2014 support previous field trials and are referenced in FEIS section 2.8.3.5, and included in FEIS appendix E.

44. United States Department of Agriculture – Agriculture Research Service (Dumbauld)

Comment: DEIS reference on page 1-8 should be Dumbauld et al 2006 not Dumbauld et al 2001.

Response: This change was made in the FEIS.

Comment: Unclear why there is a difference between the description measures for Alternative 2- carbaryl and Alternative 3 –imidacloprid for NPDES permit requirements.

Response: Because this is a new use pattern for imidacloprid and less is known regarding its effects in this type of environment.

Comment: DEIS reference on page 2-29 should be Dumbauld et al 2001 not Dumbauld et al 1997.

Response: This change was made in the FEIS.

Comment: The McCauley et al reference is not in the literature cited.

Response: It is now cited in the FEIS.

Comment: Disagrees with the statement in the DEIS on page 2-29 that burrowing shrimp can be slow to recolonize.

Response: This has been removed from the FEIS.

Comment: Need to update statements about salmonid exposure to carbaryl.

Response: Waiting for studies.

Comment: DEIS page 2-55 should state red rock crabs instead of red crabs.

Response: This has been changed in the FEIS.

Comment: We now think that ghost shrimp can live up to 13 years.

Response: The FEIS states that ghost shrimp can live up to 13 years.

Comment: The statement citing McCrow about multiple broods (three to four) is unlikely.

Response: This has been deleted from the FEIS.

Comment: Mud shrimp do not necessarily delay reproduction until their third year.

Response: This has been deleted from the FEIS.

Comment: Post-larvae settle to the bottom in spring to early summer.

Response: The language in the FEIS has been changed to reflect this.

Comment: The last paragraph on page 3-4 cites Hosack et al 2006 for burrowing shrimp effects on eelgrass should be deleted.

Response: This has been deleted from the FEIS.

Comment: The depth range on page 3-27 is not accurate for Willapa Bay.

Response: This has been deleted from the FEIS.

Comment: The statement that “these population cycles have not been correlated to specific environmental or biological factors” is not true.

Response: This has been deleted from the FEIS.

Comment: What is the purpose of repeatedly monitoring the effects of imidacloprid applications?

Response: Ecology has developed a monitoring plan over the five year span of the permit to provide cost-effective monitoring. Ecology developed the first year of monitoring to provide the most information possible to be used to design the subsequent years of monitoring. Additional benthic analysis is being conducted every other year to provide a better time span for information collection. We agree that collecting the same information every year may be redundant. Hence the every other year approach. Water Quality data is being collected every year of the permit. Monitoring the effects of pesticide application needs to be completed on a regular basis.

45. Washington State Department of Agriculture (McLain)

Comment: Multiple changes in language in the Fact Sheet and DEIS in order to provide clarity.

Response: We agree with these changes in language. The Fact Sheet cannot be modified and the changes regarding the DEIS will be incorporated in the FEIS. Please refer to the comments from the Washington State Department of Agriculture for specifics, as the list of changes is numerous. Their comments can be found at <http://www.ecy.wa.gov/programs/wq/pesticides/imidacloprid/commentsDec2014.html>.

46. Washington State Department of Fish and Wildlife (Culver)

Comment: Would like to see a sustainable ecologically base IPM plan.

Response: The draft permit will incorporate integrated pest management. Ecology is working with the WGHOGA and other agencies to develop an IPM strategy.

Comment: Concern for sublethal effects, trophic impacts, and bioaccumulation effects.

Response: Limited information in marine environments is available regarding the possible sub-lethal effects of imidacloprid on non-target aquatic organisms. Ultimately,

burrowing shrimp are controlled through sublethal effects. Review of future studies will be conducted to further determine the potential long-term sublethal effects of imidacloprid on animals in the aquatic environment.

7.4 Bioconcentration and bioaccumulation

Concentrations of imidacloprid in aquatic invertebrates and fish can be estimated assuming that tissue concentrations are in equilibrium with water concentrations. Imidacloprid has a low octanol-water partition coefficient ($\log K_{ow} = 0.57$), indicating a low potential for bioaccumulation. Indeed, because of the low $\log K_{ow}$, EPA has not required a bioconcentration study for imidacloprid. The $\log K_{ow}$ is below the minimum value required for EPA's Kabam bioaccumulation model. Assuming that imidacloprid is taken up from the water column or interstitial water rapidly, an estimate of residue concentrations in fish and invertebrate tissues would be the same as the maximum concentration in the on-bed treated water, 470 $\mu\text{g/L}$ (Table 7.5). (CSI 2013)

Comment: Concern for Dungeness crab and finfish.

Response: Imidacloprid applications at the permitted concentration of 0.5 lb active ingredient per acre would not cause direct mortality in Dungeness crab, fish, or birds (CSI 2013).

Comment: Concern for aerial drift with a preference for granular application because it is more strategic.

Response: FIFRA Registration spray drift management techniques would become conditions of the NPDES permit for the use of imidacloprid:

- Average wind speed at the time of application shall not exceed 10 mph when either Protector 0.5G or 2F is applied by air. Further, aerial applications shall not occur during gusty conditions, or during temperature inversions. Temperature inversions begin to form as the sun sets and often continue into the morning.
- Applications of imidacloprid shall be made at the lowest possible height (helicopter, ground or barge) that is safe to operate and that would reduce exposure of the granules to wind.
- When applications of Protector 0.5G (the granular formulation) are made crosswind, the applicator must compensate for displacement by adjusting the path of the application equipment upwind. Swath adjustment distance should increase with increasing drift potential.
- Helicopters used to apply Protector 2F should be equipped to minimize spray drift. The best drift management strategy and most effective way to reduce drift potential is to apply large droplets that provide sufficient coverage and control. Droplet size can be controlled by using high flow-rate nozzles, selecting the number and type of nozzles, nozzle orientation, and controlling pressure appropriate for the nozzle type.

Comment: They are not opposed although would like their concerns noted for the record.

Response: Comment noted.

47. Washington Department of Natural Resources (Niles)

Comment: DNR recognizes the need for the shellfish industry to control burrowing shrimp and supports their effort to do so in a responsible manner.

Response: Comment noted.

Comment: Burrowing shrimp are a food source for green and white sturgeon and gray whales.

Response: Comment noted.

Comment: We believe that the DEIS has not adequately addressed important considerations regarding the use of imidacloprid.

Response: The DEIS was written based on the best available science and the results of monitoring activities. Additionally, annual monitoring is required in the permit.

48. Washington State Long Beach Research and Extension Unit (Patten)

Comment: Provided information on tidal residence time in Willapa Bay.

Response: Ecology has reviewed Dr. Patten's comment and believes that tidal dilution and tidal residence time may be less of a factor on pesticide effect than total organic carbon content of sediments. Poor circulation is still a greater factor in southern Willapa Bay than in central and northern Willapa Bay and Grays Harbor. Ecology's position is that a combination of factors including potentially poorer dilution and higher TOC warrant a more conservative approach be taken toward pesticide application in southern Willapa Bay. This, coupled with limited data on southern Willapa Bay, all contribute to Ecology's decision to take a conservative approach towards managing this area.

Public Hearing Comments Transcribed in order presented.

49. Keith Stavrom

Comment: Concern for Willapa Bay and for the characterization that it is a chemical soup.

Response: Comment noted.

Comment: Concern for green sturgeon.

Response: Refer to response #39.

50. Terry Larson

Comment: Against pesticides being sprayed in the water to control burrowing shrimp.

Response: Comment noted.

Comment: Would like us to be aware of elevated cancer in Grays Harbor and Pacific Counties and a potential connection to carbaryl.

Response: Comment noted.

51. Larry Warnberg

Comment: Has farmed oysters using off-bottom culture and believes that it is unnecessary and unwise for the growers to pursue this permit.

Response: Comment noted.

52. Jacob Moore

Comment: Concerned for the conditional zone in the northern part of Willapa Bay due to some really productive oyster beds bordered by some really intense ghost shrimp infestations. Additionally, emphasized his observations of beds with high shrimp populations having a reduction in biodiversity.

Response: Refer to response #10.

53. Ross Barkhurst

Comment: Does not feel that Ecology workshops serve their purpose.

Response: Comment noted.

Comment: Is concerned for fish and waterfowl.

Response concerning fish: It is unlikely that there would be adverse effects to forage fish or groundfish from imidacloprid in water (CSI 2013) due to dilution, adsorption onto sediment, and application during low tide conditions. Additionally, imidacloprid would be unlikely to have a significant adverse effect on forage fish or groundfish in Willapa Bay and Grays Harbor due to the relatively small proportion of

tidelands within each estuary that would be treated for the control of burrowing shrimp.

Response concerning waterfowl: Refer to response #3.

Comment: Believes that the monitoring is weak.

Response: Washington State currently has not promulgated any regulatory standards for Imidacloprid in either surface waters or sediments. Therefore, permit monitoring utilizing direct biological observation of benthic organisms is the only means Ecology has to verify compliance with the Sediment Management Standards (WAC 173-204) and assess the health of the benthic community throughout the term of the permit. Sampling and analysis costs of biological monitoring typically greatly exceed the costs of measuring a chemical concentration. Ecology strives to maintain a balance between monitoring benefits and monitoring cost, and believes that the proposed monitoring plan is a precautionary yet feasible solution.

54. Eric Hall

Comment: Support of issuing the permit to control burrowing shrimp in Willapa Bay and Grays Harbor. Emphasis on the economic input from the shellfish industry and the employment provided. Believes that it is highly critical to our farming operations, our business, and our employees, to have the ability to control burrowing shrimp on our shellfish beds.

Response: Comment noted.

55. Kim Patten

Comment: Does not think that it is acceptable to have exclusion or conditional zones because of high organic sediments and/or low flows within some parts of those areas.

Response: Refer to responses #1 and #10.

Comment: There needs to be a dialog with Ecology to look at the monitoring and what is needed to satisfy the Washington Administrative Codes yet still be practical, feasible, and technically cost effective.

Response: Washington State currently has not promulgated any regulatory standards for Imidacloprid in either surface waters or sediments. Therefore, permit monitoring utilizing direct biological observation of benthic organisms is the only means Ecology has to verify compliance with the Sediment Management Standards (WAC 173-204) and assess

the health of the benthic community throughout the term of the permit. Sampling and analysis costs of biological monitoring typically greatly exceed the costs of measuring a chemical concentration. Ecology strives to maintain a balance between monitoring benefits and monitoring cost, and believes that the proposed monitoring plan is a precautionary yet feasible solution.

Monitoring requirements for this permit are based on the Sediment Management Standards and the obligation of the Washington State Department of Ecology (Ecology) to protect water quality.

Comment: Suggest that it may be better to look at benthic monitoring in 24 or 28 days as opposed to 14 days.

Response: Ecology has selected the 14 day time period to measure benthic communities as an appropriately conservative measurement time period based on the tidal patterns and sampling logistics.

56. Dick Sheldon

Comment: Provides history and states that the growers have dumped millions of dollars satisfying Department of Ecology demands and that the required studies have changed nothing.

Response: Comment noted.

57. Don Gillies

Comment: Commented in support of the permit. Thinks the no-control option did not address the impact of not controlling the shrimp fully and should be elaborated on.

Response: Comment noted.

Comment: Thinks that the monitoring seems too aggressive and could reproduce the same results year after year.

Response: Ecology has developed a monitoring plan over the five year span of the permit to provide cost-effective monitoring. Ecology developed the first year of monitoring to provide the most information possible to be used to design the subsequent years of monitoring. Additional benthic analysis is being conducted every other year to provide a better time span for information collection. We agree that collecting the same information every year may be redundant. Hence the every other year approach. Water Quality data is being collected every year of the permit. Monitoring the effects of pesticide application needs to be completed on a regular basis.

Comment: Believes that there should be further investigation regarding the theory that the sediments in southern Willapa Bay are true.

Response: Ecology agrees.

Comment: Would like everyone to be aware of the economic impact the shellfish industry has in Pacific County and Grays Harbor and that this is taken into account when decisions are made regarding the permit and the sediment impact zone evaluations.

Response: Comment noted. Refer to FEIS 2.6.

58. Kathleen Nisbet Moncy

Comment: Urges people to take a look at the economic impact that the loss of shellfish farming would have on Pacific County and the people that exist in it.

Response: Comment noted. Refer to FEIS 2.6.

Comment: Support of the issuance of the permit for shellfish farmers to be a viable part of a sustainable community, the environment, and the ecosystem in which they farm.

Response: Comment noted.

59. Westin Taylor

Comment: Discusses the economic value of shellfish farmers and the jobs that they provide.

Response: Comment noted.

60. Eric Petit

Comment: Discusses the need to have a chemical to control burrowing shrimp in order to sustain his farm and the people that work there. States that without a chemical to control burrowing shrimp what he has seen built up will go away.

Response: Comment noted.

61. Fritzi Cohen

Comment: Concern for the water in Willapa Bay, the oysters, and the people who consume these oysters, due to chemicals within Willapa Bay.

Response: Comment noted.

62. Brady Ingvall

Comment: Provides a history of the Burrowing Shrimp Committee, some of the methods tried to control burrowing shrimp, and the decision to use carbaryl.

Response: Comment noted.

Comment: Issuance of the permit would be a net positive, and not a negative.

Response: Comment noted.