**DEPARTMENT OF ECOLOGY**
*Toxics Cleanup Program*

April 18, 2017

TO: Rich Doenges
Water Quality Program, Southwest Regional Office (SWRO)

FROM: Barry Rogowski, Section Manager
Toxics Cleanup Program (TCP), Headquarters

SUBJECT: Willapa-Grays Harbor Oyster Growers Association (WGHOGA) Sediment Impact Zone Application (SIZ) for Grays Harbor, complete determination.

Thank you for the opportunity to review the WGHOGA Sediment Impact Zone (SIZ) application (February 13, revised submission March 21, 2017 which included the draft monitoring plan) for the use of imidacloprid to control burrowing shrimp in Grays Harbor. It is our understanding that TCP has been requested to review the permit application only to make a determination as to whether the application is complete as required by the Sediment Management Standards (SMS) in WAC 173-204. Finding an application to be complete means that TCP has the information necessary to begin processing the SIZ application. If while processing the application, TCP discovers deficiencies, TCP may request additional information from WGHOGA to clarify, modify, or supplement the information in the application. *See* WAC 173-204-415(2)(c). Furthermore, if TCP determines that the discharge as detailed in the application will not comply with applicable SMS requirements, the SIZ authorization may be denied.

Ecology has reviewed the most recent SIZ application submittal and has determined it is complete. Please note, a determination that the application is complete means TCP can begin reviewing the SIZ application to determine whether a sediment impact zone may be authorized. A complete SIZ application does not constitute Ecology agreement of the applicant's statements within the application.

Ecology required two applications for SIZ authorizations under WAC 173-204-415(2)(a): One for Willapa Bay and one for Grays Harbor. This memo is in reference to the Grays Harbor SIZ application. It is the opinion of Ecology that, as a result of the proposed effluent discharge (i.e., the pesticide application), the permit applicant will violate or create a substantial potential to violate the sediment quality standards of WAC 173-204-320 through -340 in Grays Harbor. Ecology's opinion is based on factors detailed in WAC 173-204-400(6), including the experimental trials conducted with imidacloprid on sediments and the benthic community of Willapa Bay by the WGHOGA and WSU. Currently, no experimental or commercial application of imidacloprid has occurred in Grays Harbor which have been reported to Ecology.

We have compared the information requested in previous Ecology letters to the revised and most current version of the SIZ application. We have noted a number of areas where the SIZ application has been adequately updated, and is now complete.

IMPORTANT NOTES:

- Appendix B (landowners adjacent to proposed pesticide application area) is the same for both applications. This is especially misleading with Grays Harbor, as they only identify 15 acres per year, but then go on to say that they want flexibility to location. This runs counter with the SIZ application because we cannot accurately review where the spraying will occur, where the impacts might be, and how to quantify. If they are only proposing one area in Southern Grays Harbor, they should be able to identify the specific locations of beds of interest. This has been clarified and is now complete.

- General comment – It appears that the Willapa Bay SIZ application has been used as a template for construction of the Grays Harbor SIZ application. While this provides appreciated consistency in reviewing the documents, it appears that not all the necessary global changes have been made. That is, in numerous areas, Willapa Bay information has not been updated to include Grays Harbor specific documentation (e.g. Exhibits F & G and specific comments below). Exhibits F & G have been updated. TEXT REVIEW WILL SHOW IF OTHER AREAS COVERED. This has been clarified and is now complete.

Responses to Ecology's April 15, 2016 memo:

1. **SIZ monitoring must be conducted by the discharger to evaluate compliance with Ecology's SIZ authorization and the standards of WAC 173-204-400 through -420. To review and determine the adequacy of the SIZ application, Ecology is requiring a general description of the discharger's proposed sediment monitoring and reporting. As an example, the draft NPDES permit from 2014 has a good description of the sediment monitoring and reporting requirement on pages 8-17. Sections of the text from the draft permit could be used to expedite completion of this requirement in the SIZ application.** Ecology is pleased to hear that WGHOGA believes constructive meetings have been held with WGHOGA and its representatives. These meetings have highlighted Ecology's need for a robust, consistent monitoring plan which is a critical component in making a SIZ authorization decision. Ecology has clearly stated the need for monitoring that is consistent in concept to the monitoring agreement agreed to for NPDES permit # WA0039781, at a minimum. Ecology must have a detailed description which concludes that the applicants will invest in proper maintenance of a SIZ Authorization (WAC 173-204-415).

On March 21, 2017, WGHOGA provided Ecology with a draft monitoring plan as part of a revised SIZ application submission. Based upon a cursory review of the monitoring plan, Ecology has determined the have provided enough information to be considered a "general description of the discharger's proposed sediment monitoring and reporting." The March 21, 2017 submission is considered complete for purpose of the SIZ application. However, Ecology does not approve of the monitoring plan as a final plan that is ready for implementation. Ecology will review the monitoring plan in detail and expects further cooperative discussions with the grower's representatives.

2. **Information on the areas where pesticide will be applied in Southern Grays Harbor is incomplete. A map showing those parcels would be ideal, or at a minimum a list with the GPS coordinates. The applicant is also required to provide the legal location and landowner(s) of property proposed for use as, or potentially affected by, a SIZ. Ecology also requires the name and contact information for all lessees of land proposed for use as, or potentially affected by, the SIZ.** Ecology appreciates the inclusion of Exhibit A representing oyster beds in Grays Harbor. However, it does not appear that the promised table denoting information on Grays Harbor plots to be sprayed is included. In addition, the application states that WGHOGA has received, "incomplete information from a few, small growers." This information will need to be clarified prior to SIZ authorization. The applicants propose spraying a maximum of 15 acres per year, and the current map (Exhibit A) appears only to identify one general location for pesticide application in the southern portion of Grays Harbor east of Westport. If so, then unlike the Willapa Bay application, WGHOGA can provide more than a "general discharge location for the SIZ". Ecology believes that a GPS centroid of the polygon, in addition to the promised table, would be appropriate to meet SMS requirements.

   Appendix B identifies two aquatic and four upland landowners adjacent to Grays Harbor shellfish beds. Ecology appreciates the applicant's updating of these records to identify the correct landowners.

   In this section, the applicants also relate the acreage proposed for pesticide application to the entire Gray Harbor estuary. As the application appears only to propose spraying in the southern portion of Grays Harbor, the applicants should identify the percentage of acreage ranging from -2 to +4' MLLW in this area proposed for spraying during the life of the permit. The applicants have only partially addressed Ecology's comments in previous letters. As the applicants have provided landowner information and a map, Ecology declares the application complete. However, a SIZ authorization will not be issued until concerns identified in this section are addressed.

3. **On page 12 of the SIZ application, the statement is made that "research conducted by WGHOGA, WSU, UW, and PSI over the past eight years demonstrates conclusively that imidacloprid is not persistent, does not migrate off-plot, and has no detectable long term impacts to epibenthic or benthic invertebrate communities or mega fauna". This conclusory statement does not provide enough specificity for Ecology to determine the adequacy of the SIZ application. Ecology requests a summary and copy of the research papers of the last eight years by WGHOGA, WSU, UW, and PSI which support such a statement. If such a statement cannot be supported with documentation, then Ecology requests the statement be removed.** Revisions to the document adequately address this comment. This is now complete.

4. WAC 173-204-415(3) identifies a minimum of eleven locational considerations which must be included in any SIZ application. The Willapa application has failed to identify and appropriately catalogue several important criteria to be analyzed. An important component of each of the eleven locational considerations is knowing the exact areas where pesticide will be applied. As requested previously, a map showing those parcels would be ideal or, at a minimum, a list with the GPS coordinates. Other missing information includes:

   a. **Identification of shellfish harvest areas. Although it is clear that the applicants are applying for authorization to apply pesticides to *privately owned* shellfish beds, the SIZ application fails to identify public shellfish harvesting areas and their proximity to proposed spray locations as required in WAC 173-204-415(3)(d).** The recently updated map (Exhibit F) identifies shellfish beaches near Grays Harbor. However, the text on page 17-18 does not appear to match. For example, distances measured to three bulleted locations, Twin Harbors, Westport, and Copalis, all exceed 1.91 miles; while the paragraph below identified "other public shellfish areas range from 1.9 miles to 0.07 miles (approx. 400 feet)" from potential imidacloprid application sites. Exhibit G identifies state land directly to the south. Clarification will be required during SIZ review. For the purposes of a SIZ completeness determination, Ecology has determined that enough information has been provided for the application to be deemed complete.

   b. **Any identification of recreationally and commercially important species such as Dungeness crab. As required in WAC 173-204-415(3)(e), areas used by species of economic importance must be identified. Dungeness crab is an economic resource to the state averaging nearly $40 million (at the dock, i.e. pre-processing), however no mention or description of this resource was made in Section 15 of the SIZ application.**

For the purposes of a SIZ completeness determination, Ecology has determined that enough information has been provided for the application to be deemed complete. However, Ecology does not agree with the applicants conclusions regarding potential impacts to Dungeness crab.

Juvenile crab are an important contingent of commercial and recreational crab fisheries as juveniles recruit to recreational and commercial fisheries. Considering the economic importance of Dungeness crab to the state, and the significant proportional mortality identified in previous Field Investigation reports, Ecology considers review of potential crab impacts as a critical part of meeting application requirements (WAC 173-204-415 (3e)). This will be further discussed during SIZ review process.

c. **Other public recreation areas must be identified as required in WAC 173-204-415(3)(i), which includes state recreation areas as well as national areas.** The recently submitted map (Exhibit G) now includes Grays Harbor. This is now complete although clarification of 4a will be required prior to SIZ authorization.

**Although waterfowl are identified in the SIZ applications, the information presented appears to conflict itself as is not sufficient meet the requirements of WAC 173-204-415(3)(c). For example, in the Grays Harbor SIZ application the applicants highlight a limited high intertidal feeding area, then identify numerous species which feed on mudflats lower in the intertidal area. The applicants should include the latter, remove the former, and the applicants should provide a more thorough review of the full range of shorebirds that use the area. The applications should not artificially limit feeding to only a limited portion of the tidal range and use only one citation, especially as this citation itself is tailored towards one specific area for which it is promoting a restoration activity. The applicant's should examine a broader range of published literature, including but not limited to, WDFW's Management Recommendations for Washington's Priority Species – Volume IV: Birds (www. http://wdfw.wa.gov/publications/00026/wdfw00026.pdf). For example, in the Management Recommendations, WDFW identifies specific species presence during the application's proposed spraying times (page 158) and associated habitat. A minimum of 18 species are identified using habitat potentially targeted for spraying and within the proposed SIZ. The applications discussion of waterfowl feeding areas must be updated to reconcile information from WWDFW's Management Recommendations and WGHOGA's own publication noting shorebirds feeding on tetanied invertebrates in field studies.** This section is deemed complete for the purposes of a complete SIZ application.

The applicants have addressed several concerns identified in Ecology's last letter (January 3, 2017). However, there are several areas in which Ecology believes statements remain missing or cannot be factually supported with the information present.

WDFW identifies fall migration as occurring from June to late October, occasionally to November. Exhibit E references imidacloprid concentrations of 150 mg/kg, without referencing lower values, as low as 3 mg/kg exposure identified in the risk assessment and Audubon letter. These inconsistencies will need to be addressed through the SIZ review process.

d. The Grays Harbor SIZ application correctly identifies Eulachon, listed under the Endangered Species Act as threatened, spawning in the Grays Harbor watershed. However, Ecology believes that it is inaccurate to only state that, "they are found only infrequently (USACE 2013)" when more up to date information consistently identifies active spawning (Gustafson 2016; http://www.westcoast.fisheries.noaa.gov/publications/status_reviews/other_species/eulachon/eulachon_2016_status_review_update.pdf). For instance, WDFW estimates 11.2 metric tons, or 272,000 adult spawners, for Grays Harbor. Please update the application to include a reference citation as USACE is not identified in the References section. This comment has not been addressed. However, Ecology will provide a complete determination on this point for the goal of moving the application process forward. This information still needs to be corrected.

5) **The 2014 efficacy information presented in the SIZ application states a range of efficacy from 65% to 84% reduction in shrimp burrows. This information appears to contradict the efficacy information presented in the Final 2014 Field Investigation Report (1/8/16). The Final 2014 report indicates an efficacy range of a reduction of 91.4% to an increase of 67.3% in shrimp burrows for those sites monitored in 2014. For the sites monitored in 2015, the efficacy range appears to even greater with one location reported an increase of 478% in shrimp borrows and second an increase of 16.7 %. This information must be corrected and/or explained prior to the SIZ application being considered complete.** The efficacy information section has been improved as the applicants have attempted to address Ecology's comments in previous incompleteness letters. Ecology's conclusion is that efficacy is highly variable based on a number of factors. For the purposes of determining a complete application, Ecology has concluded that enough information has been provided to begin processing the application.

Inconsistencies exist in the Final 2014 Field Investigation Report. Efficacy estimates are based upon the potentially faulty assumption that edge-of-plot counts accurately represent on-plot pre-application burrow estimates.

Proper pre- and post-treatment burrow counts will need to be incorporated into monitoring if a SIZ is authorized. Ecology cautions against broad sweeping statements being made by the applicants based only upon compiled tables in Dr. Patten's review. Presenting only summary tables does not show the variability of individual studies and would therefore also mask any gradients in efficacy that would inform BMP development and SIZ review in general. Dr. Patten, in the appendix to the 2 September 2016 letter states, "Field efficacy of imidacloprid applied by the shellfish industry, however, has been variable and not consistent." As the applicants own supporting research identifies inconsistent efficacy, the SIZ application should not gloss over this. Further, Ecology does not agree with the applicant's contention that although the only a portion of entire 2014 spray area was surveyed, crab mortality estimated from only this subsection could be averaged across the entire area.

Results of Field Trails are wholly dependent upon only experimental imidacloprid application in Willapa Bay, and not Grays Harbor. A statement such as, "Experimental application of Imidacloprid in liquid or granular form has only been conducted and reported for Willapa Bay. No information is available for Grays Harbor," should be included in the first paragraph of section 14. The section needs to clearly identify that all efficacy information is being extrapolated from another watershed. This section should also clarify as to how specific locational information at proposed plots in Grays Harbor, such as studies of TOC, grain size, and residence times, compare to Willapa Bay application plots so that review of the SIZ application, when complete can determine the limitations of extrapolating data from Willapa Bay to Grays Harbor. The above comments in this paragraph, from Ecology's January 3, 2017 memo have not been addressed by the applicants. Ecology believes these comments remain valid.

6) **The SIZ application indicates that applicants will be using a granular/pellet form of imidacloprid in addition to the liquid form. However, there is limited information on the effectiveness of the granular/pellet form and this information is necessary as part of the design requirements under WAC 173-204-415(4) and so determinations can be made about the possible on and off plot effects of granular/pellet application. Data about how well the granular/pellet form of the pesticide controls ghost shrimp or burrowing shrimp should be included in the application, so a determination about whether the application of this form of pesticide will have an effect to control shrimp populations. It should also be noted that sediment monitoring and reporting will be tailored to ensure that any unanticipated negative environmental effects of using this form of imidacloprid do not occur.** This section is complete. Ecology would like additional work to be conducted on the BMPs and efficacy of the granular form of the pesticide during implementation of the NPDES permit, if issued.

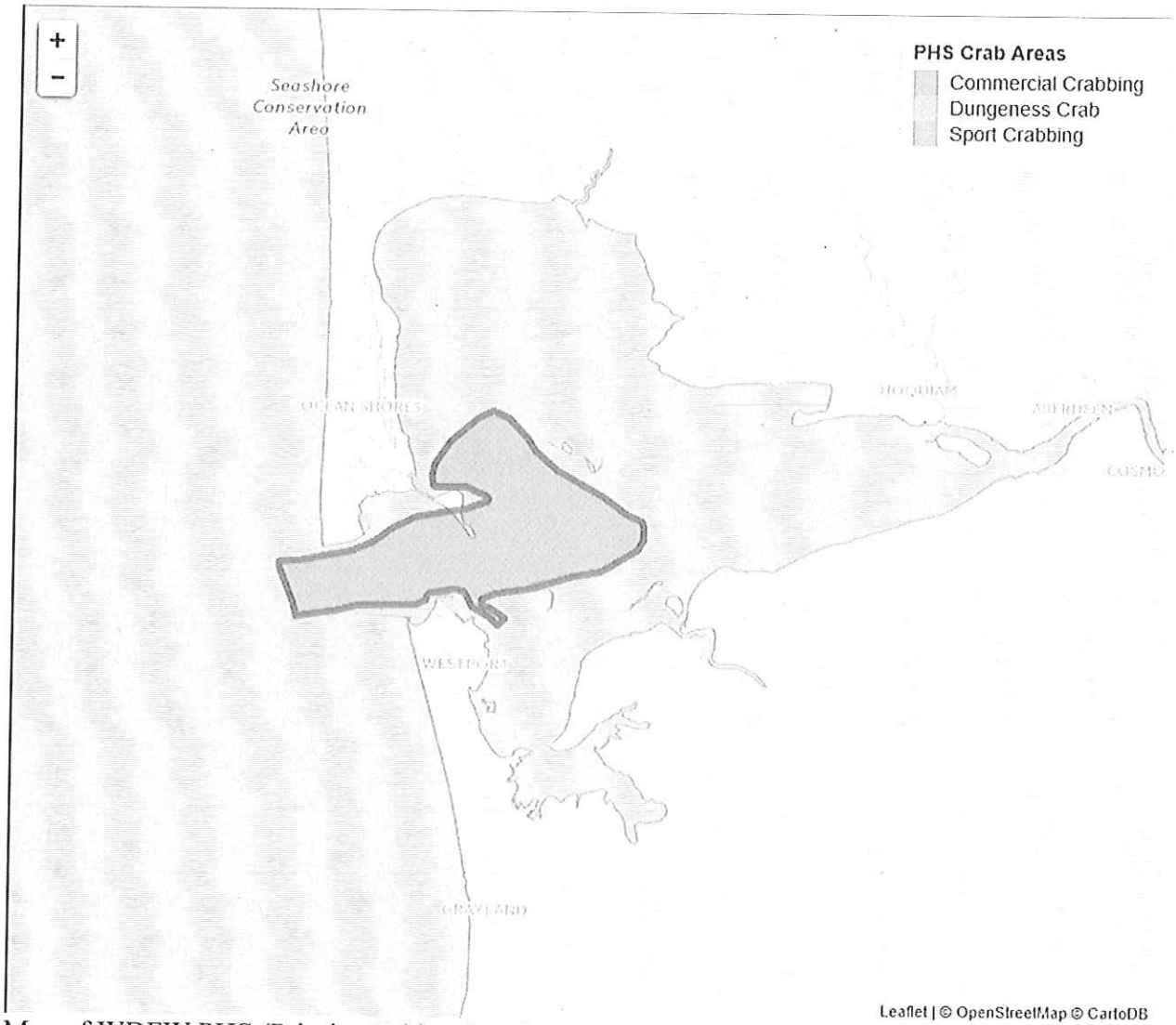
7) **Whether WGHOGA is applying for experimental or commercial use, the incomplete application did not provide any information regarding sub-surface injectors.** This section is complete. WGHOGA has confirmed that subsurface injectors will be a component of the permit application.

8) **New comment - page 13, section D, Integrated Pest Management Plan:** Ecology endorses and supports the applicant's March 21, 2017 statements on page 14 that IPM will be used and that a customized approach (per plot) will be used to reduce pesticide application. The stated goal and policy of Ecology under WAC 173-204-410(a) is to manage source control activities to reduce and ultimately eliminate adverse effects on the biological resources. WAC 173-204-410(b) only authorizes SIZ to be used by Ecology with the intent to eliminate the existence of such zones.

   Please note that some of the non-chemical IPMs recently presented by WGHOGA appear to be as effective as the pesticide treatment, so an apparent conclusion would be to use more of these IPMs. Inclusion and documentation of IPM criteria will be codified into the SIZ authorization, if approved. This section is complete.

9) **New Comment - page 9, Section 12:** The applicants list a series of screening values, citing references over 25+ years old. The latest SIZ application acknowledges this. Updated regulatory information for the recent Preliminary Aquatic Risk Assessment to Support the Registration Review of Imidacloprid[1] revised acute and chronic thresholds the have been published. Screening values are currently under evaluation. This section is complete.

[1] USEPA. (2016, December). *Preliminary Aquatic Risk Assessment to Support the Registration Review of Imidacloprid* (Publication No. 129099). Washington, D.C.: US Environmental Protection Agency, Office of Pesticide Programs




Map of WDFW PHS (Priority Habitat Species) GIS polygons of commercial crabbing locations in sections of Grays Harbor. Not imaged are recreational crab locations identified in the SIZ application.