United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

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D. Rockett, Permit Writer
Washington State Department of Ecology
Water Quality Program
P.O. Box 47775
Olympia, Washington 98504-7775

Dear Mr. Rockett,

On September 18, 2017, the Washington State Department of Ecology's (Ecology) Water Quality Program, Aquatic Pesticide Permits Program, announced the availability of a Supplemental Environmental Impact Statement (EIS) addressing four alternatives for control of native burrowing shrimp (ghost shrimp, *Neotrypaea californiensis*, and mud shrimp, *Upogebia pugettensis*) on commercial shellfish beds in Willapa Bay and Grays Harbor, Washington. The Supplemental EIS was prepared pursuant to the requirements of the State Environmental Policy Act (SEPA), and provides and assesses new sources of information that were not available when Ecology published and took comment on the 2014 Draft EIS (Ecology 2014), the 2014 proposal to issue a National Pollutant Discharge Elimination System (NPDES) Individual Permit/State Waste Discharge Permit to the Willapa-Grays Harbor Oyster Growers Association (WGHOGA) for use of the aquatic pesticide imidacloprid, and the 2015 Final EIS (Ecology 2015). The public comment period closes on November 1, 2017.

Background Information

WGHOGA has submitted to Ecology an application and request for a NPDES Individual Permit. WGHOGA has made changes to their earlier 2014-2015 application and request for a NPDES Permit. Whereas the permit issued by Ecology to WGHOGA on April 16, 2015 (Permit No. WA0039781), and subsequently withdrawn on May 3, 2015, permitted a proposed use of the neonicotinoid pesticide imidacloprid to treat commercial shellfish beds on up to 2,000 acres per year (total) in Willapa Bay and Grays Harbor, WGHOGA's current application and request seeks a permit for treatment of 500 acres per year (total) in Willapa Bay and Grays Harbor.

WGHOGA's 2017 request for a NPDES Permit also proposes a change for the methods of pesticide application. Aerial spraying (i.e., from helicopters) was previously a proposed method of application, but is no longer being requested by WGHOGA. WGHOGA's 2017 request for a NPDES Permit instead seeks approval for application of imidacloprid (flowable liquid and granular solid formulations) to commercial shellfish beds at low tide using only boats and/or ground-based equipment.

The Supplemental EIS describes and assesses four alternatives: 1) No Action – No Permit for Pesticide Applications (Alternative 1); 2) Continue Historical Management Practices – Carbaryl Applications with Integrated Pest Management (IPM) (Alternative 2); 3) Imidacloprid Applications with IPM on up to 2,000 acres per year in Willapa Bay and Grays Harbor, with aerial applications by helicopter (Alternative 3; i.e., the Preferred Alternative from the 2015 Final EIS); and, 4) Imidacloprid Applications with IPM on up to 500 acres per year in Willapa Bay and Grays Harbor, with no aerial applications (Alternative 4) (Ecology 2017). According to the Supplemental EIS, Ecology is currently not proposing an action, making a decision whether to issue a NPDES Waste Discharge Permit and Sediment Impact Zone (SIZ) authorization to WGHOGA, or identifying a preferred alternative. We understand that "Alternative 2 is no longer being considered as an alternative, since Ecology denied the application for extension of … permit No. WA0040975 in May 2015." (Ecology 2017, p. iii)

The U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office (USFWS), issued a letter during the public comment period for the 2014 Draft EIS (USFWS 2014; Letter to Rich Doenges and Heather Bartlett, December 8, 2014). Our letter expressed concern about the proposed use of imidacloprid to control burrowing shrimp in Willapa Bay and Grays Harbor, and voiced support for the continuation of limited field trials under an Experimental Use Permit.

Since 2015, Ecology has obtained and reviewed additional information about the impact(s) of imidacloprid on aquatic and terrestrial species and their habitats, and has analyzed the data from additional field trials completed in Willapa Bay and Grays Harbor. The Supplemental EIS presents and assesses these new sources of information (Ecology 2017), including the information provided by three recent comprehensive literature surveys; two completed by the U.S. Environmental Protection Agency (EPA) during 2015 and 2017, and a third completed by Health Canada during 2016. These new sources of information identify known adverse impacts and additional significant uncertainties and concerns regarding fate, transport, and toxicity of imidacloprid in the environment.

Control of Native Burrowing Shrimp with Imidacloprid

WGHOGA has submitted an application for a 5-year NPDES Permit to chemically control burrowing shrimp on commercial shellfish (*e.g.*, clam and oyster) beds in Willapa Bay and Grays Harbor using the pesticide imidacloprid. Often used in agriculture, imidacloprid is the most widely used pesticide belonging to the class of systemic pesticides known as neonicotinoids. Imidacloprid acts as a neurotoxin in arthropod invertebrates (insects, crustaceans, zooplankton, etc.), by interfering with the transmission of stimuli in the nervous system, and causing blockages in neuronal pathways resulting, over time, in tetany, paralysis, or death (Health

Canada 2016; EPA 2017). Imidacloprid binds irreversibly to receptors, increasing the likelihood that exposed individuals may suffer sub-lethal effects, or chronic effects, with consequences for survival.

The EPA has approved several Section 3 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) labels for products containing the active ingredient imidacloprid. For each of these products, excluding only the flowable liquid and granular solid formulations proposed for use by WGHOGA (Protector 2F and Protector 0.5G), the EPA includes an explicit label warning that imidacloprid must not be applied directly to water or where surface waters are present (i.e. intertidal areas). Many of the EPA approved labels and formulations contain the same percentage of the active ingredient.

Ghost shrimp and mud shrimp – the two varieties of burrowing shrimp found in Willapa Bay and Grays Harbor – are native to these waters and tidelands. Burrowing shrimp play a significant ecological role in these systems. Their normal behaviors, including burrowing and deposit-feeding, affect and regulate benthic properties and processes (grain size, nutrient exchange, organic deposition), and influence benthic community composition and trophic pathways. Burrowing shrimp create unique habitat types that support additional native species. It is believed that mud shrimp are in decline throughout significant portions of their range (Feldman *et al.*, 2000; Chapman *pers. comm.*, 2017).

WGHOGA has tested and applied a number of physical and chemical methods of control for burrowing shrimp. While historically some shellfish growers and farm operators in Willapa Bay and Grays Harbor have used carbaryl (1-naphthol n-methyl carbamate) to chemically control burrowing shrimp on commercial shellfish bed (Labenia *et al.*, 2007; NMFS 2009), there is no current, valid permit for the application of carbaryl, and Alternative 2 (Carbaryl Applications with IPM) is no longer being considered by Ecology (Ecology 2017, p. iii).

WGHOGA and their research partners obtained an Experimental Use Permit to test and conduct field trials using imidacloprid to control burrowing shrimp on shellfish beds in Willapa Bay and Grays Harbor. Since 2008, WGHOGA and their research partners have been conducting limited field trials (including larger acreages during 2014) to evaluate fate and transport, persistence in sediment and water, and effects to target and non-target invertebrate species (Ecology 2017).

General Comments

As was stated in our previous comment letter addressing imidacloprid and these specific proposed practices (USFWS 2014), there is substantial scientific evidence documenting the persistence of neonicotinoids in natural systems (marine, freshwater, and terrestrial environments), and documenting direct and indirect adverse impacts on non-target invertebrate species, vertebrate species, and overall ecosystem functions (Chagnon *et al.*, 2015; Gibbons *et al.*, 2015; Morrissey *et al.*, 2015; Health Canada 2016; EPA 2017). New scientific evidence compiled and reviewed by Ecology, including the findings from field trials conducted during 2012 and 2014, establishes with certainty that these proposed practices would have acute adverse impacts to sediments and sediment quality, the benthic community, and free-swimming

crustaceans and zooplankton, both on and off of (i.e.. adjacent to) the treated shellfish beds (Ecology 2017). This scientific evidence also points to significant information gaps and uncertainties regarding a number of important issues and potential consequences (e.g., efficacy, persistence, sub-lethal effects, indirect and chronic effects (Health Canada 2016; EPA 2017)), some of which are not adequately described or addressed in the Supplemental EIS.

Considering the best available scientific information regarding imidacloprid, and these specific proposed practices, the USFWS does not agree that all of the potentially significant adverse impacts and effects are adequately known and understood. We do not agree that all of the potential adverse effects (Health Canada 2016; EPA 2017) will be "short-lived" or limited in duration.

The USFWS does not support either Alternative 3 or Alternative 4 (Imidacloprid Applications with IPM). We do not support issuance of a NPDES Permit or SIZ authorization to WGHOGA at this time. The USFWS supports Alternative 1 (No Action), and we suggest that limited field trials using boats and/or ground-based equipment should continue under the Experimental Use Permit.

Specific Comments Relating to Alternative 3 and Alternative 4

- Alternatives 3 and 4 (Imidacloprid Applications with IPM) would have acute adverse impacts to sediments and sediment quality, the benthic community, and free-swimming crustaceans and zooplankton, both on ("on-plot") and off ("off-plot") the treated shellfish beds:

    - According to an internal memorandum, Ecology's Toxics Cleanup Program evaluated the findings from field trials conducted during 2012 and 2014 and concluded that they represent threshold exceedances of the State's Sediment Management Standards (SMS). "Monitoring results show that acute endpoints have been exceeded both on-plot (in 2012 and 2014) and off-plot (2012)." (Toxics Cleanup Program 2017) There were, "...unavoidable adverse impacts in high total organic carbon (TOC) areas ... Ecology and WGHOGA did not see adequate recovery of the benthic invertebrate population." (Toxics Cleanup Program 2017) Ecology's Toxics Cleanup Program has stated that these practices are likely to cause exceedances of the SMS where TOC is high (North Willapa Bay, Cedar River vicinity; South Willapa Bay), and that such exceedances should not be allowed under a SIZ authorization issued pursuant to the State's sediment management regulations.

    - The best available scientific information demonstrates that imidacloprid is highly toxic to freshwater invertebrates. There is also a growing body of scientific evidence to suggest that imidacloprid has, or is likely to have, a similar high toxicity in marine and estuarine invertebrates (Morrissey *et al.*, 2015). Where the product is applied directly to water, or where surface waters are present (as per Alternatives 3 and 4), estimated on-plot and off-plot environmental concentrations

will be dramatically higher (even orders of magnitude higher) than the acute biological endpoint criteria identified by the EPA and Health Canada (Health Canada 2016; EPA 2017).

- Information included in the Supplemental EIS clearly demonstrates Alternatives 3 and 4 will cause mortality and tetany (or indirect mortality) in Dungeness crab (*Cancer magister*). However, the field trials and studies likely underestimate the total numbers of acutely and adversely affected crab (on-plot and off-plot), and do little to evaluate the likely scale or size of acute and adverse effects to other members of the benthic community, other free-swimming crustaceans, or zooplankton.

- Alternatives 3 and 4 (Imidacloprid Applications with IPM) would have uncertain and unquantified impacts and effects, including some that we recommend must be more sufficiently analyzed and described in the Final Supplemental EIS:

  - WGHOGA's proposed aquatic use of imidacloprid is unique. Other than the limited field trials completed to date in Willapa Bay and Grays Harbor, there have been few studies that have evaluated the impacts of direct application of imidacloprid to marine waters or tidelands. Additional, limited field trials may be warranted. These field trials should further investigate efficacy, persistence in and long-term impacts to sediments, sub-lethal but biologically significant effects to target and non-target species, potential indirect chronic effects to target and non-target species, and potential indirect effects to food webs (predator-prey dynamics) and ecosystem functions.

  - There is no well-defined methodology for determining the treatment threshold. Efficacy has been highly variable and the target species may frequently and rapidly rebound in numbers or density. It is also unclear whether or not the target species may become resistant to the application of imidacloprid over time.

  - The Supplemental EIS acknowledges, but does not adequately address, persistence in, and long-term impacts to, sediments and sediment quality. The results of multi-year studies in the aquatic environment are not yet available to describe how imidacloprid and its primary metabolites accumulate in sediments, or to assess the potential for chronic, long-term sediment toxicity effects on benthic invertebrate communities. Neonicotinoids, including imidacloprid, operate with a mode of action that suggests a significant potential for additive, synergistic, and cumulative effects. We are concerned even comparatively low concentrations may contribute to significant adverse biological effects over lengthened or repeated, chronic exposures.

  - The Supplemental EIS acknowledges, but does not adequately address, sub-lethal effects to target and non-target species. Much of the available scientific information addresses lethal biological endpoints only. When combined with

other sources of sub-lethal effects and stress, these exposures may result in unforeseen adverse impacts to the survival, growth, or reproductive success of target and non-target species (benthic invertebrate community, free-swimming crustaceans, or zooplankton) (Chagnon *et al.*, 2015; Morrissey *et al.*, 2015).

- The Supplemental EIS acknowledges, but does not adequately address, potential indirect effects to food webs (predator-prey dynamics) and ecosystem functions. The Supplemental EIS does not speak definitively to the likely scale of foreseeable impacts to the target species, the non-target benthic invertebrate community, free-swimming crustaceans, or zooplankton. Because of these limitations, the Supplemental EIS makes no compelling argument regarding potential indirect effects to food webs (predator-prey dynamics). The best available scientific information demonstrates that ubiquitous use of neonicotinoids in the terrestrial environment has resulted in instances of reduced prey availability, with consequences for growth and survival (e.g., in birds) (Chagnon *et al.*, 2015). Alternatives 3 and 4 may have this same or a similar potential.

Specific Comments on Various Concerns and Current Topics for Consideration

- WGHOGA claims, in the absence of an approved chemical method of control for burrowing shrimp, significant tideland acreages historically used to farm oysters and clams will no longer be economically viable. However, content included in the Supplemental EIS suggests that alternate shellfish culturing methods and practices, including placement of gravel and oyster shell ("frosting"), could be used economically on the affected tidelands (Ecology 2017, pp. 1-4, 2-8, 2-9, 2-11, 2-12). Ecology should clarify the economic viability of using one method over the other.

- Ecology is unable to quantify the total acreage of commercial shellfish beds that would be treated with imidacloprid under any future permit. Growers might conceivably re-apply the pesticide to the same acreage several times over the term of the permit. The Final Supplemental EIS should provide a more accurate and reliable estimate of the total affected acreage, both on-plot (treated commercial shellfish beds) and off-plot (adjacent affected tidelands). If reapplication to the same acreage is possible and likely over the term of the permit, Ecology in the Final Supplemental EIS should better assess and describe what implications this may have for persistence, indirect effects, and chronic effects.

- The Natural Resources Defense Council recently sued the EPA over the registration and use of products that contain neonicotinoids, including imidacloprid, acetamiprid, and dinotefuran. According to the complaint, neonicotinoid pesticides pose risks to numerous species listed under the Endangered Species Act (ESA), including pollinators (bees, butterflies), birds, and fish. At least five of the federally-listed species specifically mentioned by the Natural Resources Defense Council occur in western Washington.

- In a suit and complaint brought by the Center for Food Safety against the U.S. Army Corps of Engineers (Corps), the plaintiffs argue that the Corps has failed to properly administer its authorities, and has improperly permitted commercial shellfish aquaculture, in violation of the National Environmental Policy Act, Administrative Procedure Act,

  Clean Water Act, and ESA. The complaint filed by the Center for Food Safety specifically mentions and addresses pesticide use in shellfish aquaculture.

- Content included in the Supplemental EIS suggests that there would be no direct adverse effects to birds or fish, including those listed under the ESA. However, the Supplemental EIS does acknowledge that potential indirect effects to food webs and prey availability are a significant uncertainty, sources of prey could be reduced for shorebirds that feed exclusively on invertebrates, and granular imidacloprid pellets could be consumed and lead to toxicity or sub-lethal effects (including reduced reproductive fitness) in birds. The indirect effects to food webs potentially caused by neonicotinoids is of particular concern to the USFWS because of the numerous migratory bird species that depend on habitats of Willapa Bay and Grays Harbor as part of their migratory pathway (Chagnon *et al.*, 2015). Grays Harbor supports migratory bird habitats of hemispheric importance as classified by the Western Hemisphere Shorebird Reserve Network (WHSRN). Over half a million shorebirds stage in Grays Harbor annually as they migrate along the Pacific Flyway. WHSRN has also recently designated Willapa Bay and the Long Beach Peninsula a place of international importance because these habitats support over 10 percent of the Pacific Coast populations of dunlin (*Calidris alpina*), red knot (*Calidris canutus*), and short-billed dowitcher (*Limnodromus griseus*).

In closing, the USFWS remains unconvinced, even with the new scientific evidence included in the Supplemental EIS, that Alternative 3 and Alternative 4 can be implemented in a manner that ensures minimal adverse impacts to aquatic and terrestrial species and their habitats. In fact, the best available scientific information indicates that neonicotinoids present significant acute and chronic risks to non-target organisms, and have known adverse environmental impacts. USFWS acknowledges that additional field trials may be warranted and will be necessary to adequately address the outstanding issues and concerns highlighted in this letter, and to improve our knowledge regarding applications of imidacloprid, especially in the estuarine and marine environments.

We appreciate the opportunity to comment and express our concerns regarding Alternatives 3 and 4 (Imidacloprid Applications with IPM). If you or your staff have any questions, if our comments require further explanation, or you would like to discuss these matters, please contact Ryan McReynolds (ryan_mcreynolds@fws.gov; 360.753.6047), or Jay Davis (jay_davis@fws.gov; 360.753.9568).

Sincerely,

Eric V. Rickerson, State Supervisor
Washington Fish and Wildlife Office

cc:
Willapa NWR, Ilwaco, WA (J. Ferrier)
Grays Harbor NWR, Hoquiam, WA (G. Nakai)
USFWS, Regional Office, Portland, OR (R. White)
NMFS, Lacey, WA (S. Anderson)
NMFS, Lacey, WA (T. Hooper)

Sources Cited

Center for Food Safety v. U.S. Army Corps of Engineers. Case 2:17-cv-01209. U.S. District Court for the Western District of Washington. August 2017. Print.

Chagnon, M., Kreutzweiser, D., Mitchell, E. A. D., Morrissey, C. A., Noome, D. A., and J. P. Van der Sluijs. 2015. Risks of large-scale use of systemic insecticides to ecosystem functioning and services. Environmental Science and Pollution Research 22(**1**):119-134.

Chapman, J. 2017. Pacific west coast mud shrimp declines. As Reported By Cassandra Profita for Oregon Public Broadcasting: Native shrimp once killed with pesticides now at risk from invasive parasite. July 28, 2017. Available On-Line <http://www.opb.org/news/article/native-shrimp-once-killed-with-pesticides-now-at-risk-from-invasive-parasite/> Accessed October 30, 2017.

Feldman, K. L., Dumbauld, B. R, DeWitt, T. H., and D. C. Doty. 2000. Oysters, crabs, and burrowing shrimp: review of an environmental conflict over aquatic resources and pesticide use in Washington State's (USA) coastal estuaries. *Estuaries* 23(**2**):141-178.

Gibbons, D., Morrissey, C., and P. Mineau. 2015. A review of direct and indirect effects of neonicotinoids and fipronil on vertebrate wildlife. Environmental Science and Pollution Research 22:103-118.

Health Canada. 2016. Proposed re-evaluation decision, imidacloprid. Document PRVD2016-20. Health Canada Pest Management Regulatory Agency. Ottawa, ON. Canada.

Labenia, J.S., Baldwin, D.H., French, B.L., Davis, J.W. and Scholz, N.L. 2007. Behavioral impairment and increased predation mortality in cutthroat trout exposed to carbaryl. Marine Ecology Progress Series 329:1-11.

Morrissey, C. A., Mineau, P., Devries, J. H., Devries, Sanchez-Bayo, F., Liess, M., Cavallaro, M.C., and K. Liber. 2015. Neonicotinoid contamination of global surface waters and associated risk to aquatic invertebrates: a review. Environmental International 74:291-303.

(NMFS) National Marine Fisheries Service. 2009. Endangered Species Act Section 7 Consultation, Biological Opinion, Protection Agency Registration of pesticides containing carbaryl, carbofuran, and methomyl. April 2009. 609 pp.

Natural Resources Defense Council v. E. Scott Pruitt and the United States Environmental Protection Agency. No. 17-cv-2034. U.S. District Court. October 2017. Print.

(Toxics Cleanup Program) Toxics Cleanup Program, Department of Ecology. 2017. Letter to Rich Doenges, Washington State Department of Ecology, dated August 9, 2017. 12 pp.

(EPA) U.S. Environmental Protection Agency. 2017. Preliminary aquatic risk assessment to support the registration review of imidacloprid. PC Code 129099. DP Barcode 429937. USEPA, Office of Chemical Safety and Pollution Prevention, Washington D.C. Prepared by USEPA Office of Pesticide Programs, Environmental Fate, and Effects Division. Washington D.C.

(USFWS) U.S. Fish and Wildlife Service. 2014. Letter to Rich Doenges and Heather Bartlett, Washington State Department of Ecology, dated December 8, 2017. 14 pp.

(Ecology) Washington State Department of Ecology. 2017. Supplemental Environmental Impact Statement for control of burrowing shrimp using imidacloprid on commercial oyster and clam beds in Willapa Bay and Grays Harbor, Washington. Water Quality Program, Olympia, Washington. September 2017. 155 pp.

(Ecology) Washington State Department of Ecology. 2015. Final Environmental Impact Statement: Control of burrowing shrimp using imidacloprid on commercial oyster and clam beds in Willapa Bay and Grays Harbor, Washington. Water Quality Program, Olympia, Washington. April 2015. 389 pp.

(Ecology) Washington State Department of Ecology. 2014. Draft Environmental Impact Statement: Control of burrowing shrimp using imidacloprid on commercial oyster and clam beds in Willapa Bay and Grays Harbor, Washington. Water Quality Program, Olympia, Washington. October 2014. 246 pp.