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Derek Rockett, Permit Writer  
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RE: Imidacloprid Draft SEIS | WA0039781 | ECY RE WQ Burrowing Shrimp Permit | *Proposed Use of Imidacloprid for Burrowing Shrimp Control on Commercial Oyster and Clam Beds in Willapa Bay and Grays Harbor, Washington*

*Dear Derek Rockett,*

On behalf of Orca Conservancy, we are providing comments on the Willapa-Grays Harbor Oyster Growers Association request for a permit to use the pesticide *imidacloprid* to control burrowing shrimp in Willapa Bay and Grays Harbor.

Orca Conservancy is an all-volunteer 501(c)(3) Washington State non-profit organization, established in 1996, with the mission of working on behalf of *Orcinus orca*, the killer whale, and protecting the wild places on which it depends. Orca Conservancy currently represents over 20,000+ members and supporters, and collaborates with some of the world's top research institutions and environmental groups to address the most critical issues now facing wild orcas. The organization's urgent attention is on the population of endangered Southern Resident killer whales (SRKW).

On November 18, 2005, after evaluating the five listing factors of the Endangered Species Act, 16 U.S.C. §§ 1531-1544, the National Marine Fisheries Service (NMFS) issued a final ruling listing the Southern Resident Killer Whales (SRKWs), as endangered under the Act. The southern resident population is comprised of three pods (identified as J-, K-, and L-pods) and is arguably the most familiar killer whale population to the general public. It

occurs primarily in the Georgia Basin and Puget Sound from late spring to fall, when it typically comprises the majority of killer whales found in Washington. The population travels more extensively during other times of the year to sites as far north as the Queen Charlotte Islands in British Columbia and as far south as Monterey Bay in California.<sup>1</sup> As NMFS recently acknowledged, “new information ... confirms that ... [S]outhern [R]esidents spend substantial time in coastal areas of Washington, Oregon and California and utilize salmon returns to these areas.”<sup>2</sup> These coastal waters are recognized as an essential foraging area for this critically endangered population in the winter and spring, and are currently under consideration to be designated as critical habitat for the SRKW.<sup>3</sup>

While it is known that imidacloprid breaks down rapidly in water in the presence of light, it still remains persistent in water in the absence of light. It has a water solubility of .61 g/L, which is relatively high.<sup>4</sup> In the dark, at pH between 5 and 7, it breaks down very slowly, and at pH 9, the half-life is about 1 year. In soil under aerobic conditions, imidacloprid is persistent with a half-life of the order of 1–3 years. On the soil surface the half-life is 39 days.<sup>5</sup> Major soil metabolites include imidacloprid nitrosamine, imidacloprid desnitro and imidacloprid urea, which ultimately degrade to 6-chloronicotinic acid, CO<sub>2</sub>, and bound residues.<sup>6, 7, 8</sup> Chloronicotinic acid is recently shown to be mineralized via a nicotinic acid (vitamin B3) pathway in a soil bacterium.<sup>9</sup>

A 2012 water monitoring study by the state of California, performed by collecting agricultural runoff during the growing seasons of 2010 and 2011, found imidacloprid in 89% of samples, with levels ranging from 0.1-3.2 µg/L. 19% of the samples exceeded the EPA threshold for chronic toxicity for aquatic invertebrates of 1.05 µg/L. The authors also point out that Canadian and European guidelines are much lower (0.23 µg/L and 0.067 µg/L, respectively) and were exceeded in 73% and 88% of the samples, respectively.

It is important to note that both varieties of burrowing shrimp found in Willapa Bay and Grays Harbor, Washington are *native* to these waters and thus play a role in the natural ecosystem. However, the Willapa Grays Harbor Oyster Growers Association (WHGOGA), grows *non-native* clams and oysters. Control of burrowing shrimp is also likely to reduce the

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<sup>1</sup> Wiles, G. J. 2004. Washington State status report for the killer whale. Washington Department Fish and Wildlife, Olympia. 106 pp.

<sup>2</sup> Michael J. Ford, Nat'l Marine Fisheries Serv., Status Review Update of Southern Resident Killer Whales 26 (2013). In fact, evidence indicates that Southern Residents spend the majority of time in coastal and offshore waters. Cf. M. Bradley Hanson, et al., Assessing the Coastal Occurrence of Endangered Killer Whales Using Autonomous Passive Acoustic Recorders, 134 J. OF THE ACOUSTICAL SOC'Y OF AMERICA 3486, 3486 (2013) [hereinafter Coastal Occurrence] (explaining that “on average the whales occur in inland waters less than half of the days each year”)

<sup>3</sup> 12-Month Finding on a Petition to Revise the Critical Habitat Designation for the Southern Resident Killer Whale Distinct Population Segment, 80 FR 9682, published 2/24/2015.

<sup>4</sup> Flores-Céspedes, Francisco; Figueredo-Flores, Cristina Isabel; Daza-Fernández, Isabel; Vidal-Peña, Fernando; Villafranca-Sánchez, Matilde; Fernández-Pérez, Manuel (January 18, 2012). "Preparation and Characterization of Imidacloprid Lignin–Polyethylene Glycol Matrices Coated with Ethylcellulose". *Journal of Agricultural and Food Chemistry*. **60** (4): 1042–1051. PMID 22224401. doi:10.1021/jf2037483.

<sup>5</sup> Matthew Fossen (2006). "[Environmental Fate of Imidacloprid](#)" (PDF). Retrieved April 16, 2016.

<sup>6</sup> Federoff, N.E.; Vaughan, Allen; Barrett, M.R. (13 November 2008). "[Environmental Fate and Effects Division Problem Formulation for the Registration Review of Imidacloprid](#)". *US EPA*. Retrieved 18 April 2012.

<sup>7</sup> Canadian Council of Ministers of the Environment (2007). *Canadian water quality guidelines: imidacloprid: scientific supporting document* (PDF). Winnipeg, Man.: Canadian Council of Ministers of the Environment. ISBN 978-1-896997-71-1.

<sup>8</sup> [European Draft Assessment Report: Imidacloprid. Annex B, B.7. February 2006]

<sup>9</sup> Madhura Shettigar, Stephen Pearce, Rinku Pandey, Fazlurrahman Khan, Susan J. Dorrian, Sahil Balotra, Robyn J. Russell, John G. Oakeshott, Gunjan Pandey. Cloning of a Novel 6-Chloronicotinic Acid Chlorohydrolase from the Newly Isolated 6-Chloronicotinic Acid Mineralizing Bradyrhizobium Strain SG-6C. DOI: 10.1371/journal.pone.0051162 <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0051162>

quality of essential fish habitat for federally managed fish species, including Pacific salmon, groundfish, and coastal pelagic species, by reducing prey availability. Based on conversations that Washington State Department of Ecology had with National Marine Fisheries Service (NMFS) prior to 2015, Ecology is clearly aware that imidacloprid is a persistent broad spectrum pesticide that will kill nearly all benthic organisms on the acreage directly treated. NMFS believes impacts to benthic prey species would be affected beyond the area to be treated, including areas where the spray has drifted, or carried off-site by tidal currents. These benthic organisms are prey for many species of fishes that are listed under the ESA, managed under the MSA, and others, including Pacific salmon, groundfish, coastal pelagic species, herring, sand lance, and smelt. The ESA-listed Pacific salmon from the Columbia River use the coastal estuaries to rear. Activities reducing available prey directly affect their growth, and hence their survival (NMFS 2009). Salmon and forage fish are intrinsically important, and also are important economic resources. Millions of dollars are spent each year on salmon recovery efforts.<sup>10</sup>

Southern Resident killer whales are dietary fish-specialists and depend on abundant populations of Chinook salmon for their survival, social cohesion and reproductive success.<sup>11</sup> Experts anticipate that climate change and ocean acidification will contribute to further significant declines in regional salmon abundance during the coming decades, thus impeding Southern Resident recovery.<sup>12</sup> After over a decade of federal protection, the population has yet to show signs of significant recovery, with 76 members total as of October 2017 — this is TWELVE members fewer than when they were initially listed. The 77th SRKW member is Lolita, who currently resides in Miami Seaquarium<sup>13</sup>. This critically endangered populations' survival remains in question and is far from guaranteed.<sup>14</sup>

Based on the natural history and behavior of the endangered SRKWs it is imperative that prey species, specifically Chinook salmon, of sufficient quality and quantity are available to support not only individual growth, reproduction, and development, but to further encourage the overall growth of this population. Prey depletion is recognized as one of the major threats to the survival and recovery of the SRKW community, and rebuilding depleted salmon stocks is listed as a top priority for the population.<sup>15</sup>

Spraying *Imidacloprid* directly into any natural body of water that supports other life forms other than the one being targeted by the poison is at best, reckless. If the Department of Ecology allows this permit, it will set a precedence that the industry will continuously reference. There are many others growing shellfish with non-chemical methods, including the two

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<sup>10</sup> NMFS comment letter on draft NPDES Permit and DEIS on use of Imidacloprid, December 8, 2014.

<sup>11</sup> Center for Biological Diversity, Petition to Revise the Critical Habitat Designation for the Southern Resident Killer Whale (*Orcinus orca*) under the Endangered Species Act 5 (Jan. 16, 2014).

<sup>12</sup> See, e.g. Lisa G. Crozier et al., Predicting Differential Effects of Climate Change at the Population Level with Life-Cycle Models of Spring Chinook Salmon, 14 GLOBAL CHANGE BIOLOGY 236, 237, 247 (2008) (predicting that global warming and changing ocean conditions will lower survival and fertility among all populations of Pacific salmon (*Oncorhynchus* spp.))

<sup>13</sup> Amendment to the Endangered Species Act Listing of the Southern Resident Killer Whale Distinct Population Segment, 80 FR 7380, published 2/10/2015.

<sup>14</sup> Olesiuk, P. F., M. A. Bigg and G. M. Ellis. 1990. Life history and population dynamics of resident killer whales (*Orcinus orca*) in the coastal waters of British Columbia and Washington State. Report of the International Whaling Commission (Special Issue 12):209-243. Estimates neonate mortality between 37-50%.

<sup>15</sup> National Marine Fisheries Service. 2008. Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*). National Marine Fisheries Service, Northwest Region, Seattle, Washington.

largest companies operating in both estuaries, Coast and Taylor, which opted out of the current permit application. Only a few small Growers on the entire West Coast persist with efforts to obtain a pesticide permit.

In closing, instead of allowing this dangerous pesticide to be sprayed, we urge the Department of Ecology to work with growers to find creative alternatives that will not threaten important ecosystems.

Thank you for your thoughtful consideration of these comments.

Sincerely,



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