



# CHESAPEAKE BAY FOUNDATION

*Environmental Protection and Restoration  
Environmental Education*

## **Senate Bill 300**

Pesticides – Use of Chlorpyrifos - Prohibition

**DATE: FEBRUARY 11, 2020**

**POSITION: SUPPORT**

### **POSITION**

Chesapeake Bay Foundation urges a favorable report from the Senate Education Health and Environmental Affairs Committee on SB 300.

### **COMMENTS**

It has been known since at least the early 1990s that, in general, aquatic and terrestrial microorganisms and plants are tolerant to chlorpyrifos exposure. Chlorpyrifos binds strongly to soils, is relatively immobile, and has low water solubility. In contrast, its degradate TCP adsorbs weakly to soil particles and is moderately mobile and persistent in soils<sup>1</sup>. Aquatic invertebrates, particularly crustaceans and insect larvae, are quite sensitive to exposure. Lethal Concentrations for 50 percent of the population, or LC50s, are generally less than 1 microgram/L and No-observed-effect concentrations (NOECs) may be below 0.1 microgram/L in laboratory studies.<sup>2</sup> Numerous studies on chlorpyrifos describe effects to the central nervous system of crustaceans impairing their physiology, behavior, survival and reproduction, leading to further ecosystem effects changing the balance of predators and prey. Chlorpyrifos physically sorbs to particles and can be transported by dust in agricultural areas to deposit during rainfall runoff events at concentrations beyond what would be expected from the most recent application rate<sup>3</sup>.

There is potential for chlorpyrifos to bioaccumulate in the tissues of aquatic species<sup>4</sup> Residues of chlorpyrifos found in fish tissue included the metabolites TCP and two glucuronide conjugates of TCP. Researchers exposed various fish species to chlorpyrifos continuously during early development, and calculated bioconcentration values ranging from 58 to 5100<sup>5</sup>.

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<sup>1</sup> Reregistration Eligibility Science Chapter for Chlorpyrifos Fate and Environmental Risk Assessment Chapter; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, Environmental Fate and Effects Division, U.S. Government Printing Office: Washington, DC, 1999.

<sup>2</sup> Reviews of Environmental Contamination and Toxicology 1995, 144-1-93 Ecotoxicology of chlorpyrifos, Barron M.G. and Woodburn K.B.

<sup>3</sup> Diazinon and Chlorpyrifos Loads in Precipitation and Urban and Agricultural Storm Runoff during January and February 2001 in the San Joaquin River Basin, California, Celia Zamora, Charles R. Kratzer, Michael S. Majewski, and Donna L. Knifong

<sup>4</sup> Reregistration Eligibility Decision (RED) for Chlorpyrifos; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, U.S. Government Printing Office: Washington, DC: 200

Kamrin, M. A. Pesticide Profiles Toxicity, Environmental Impact, and Fate; Lewis Publishers: Boca Raton, FL, 1997; pp 147- 152.

Racke, K. D. Environmental Fate of Chlorpyrifos. Rev. Environ. Contam. Toxicol. 1993, 131, 1-150

<sup>5</sup> Ibid

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As part of a re-registration review, National Marine Fisheries Service, produced a biological opinion that finds Chlorpyrifos will reduce the abundance and productivity of Atlantic sturgeon. Anticipated levels from ongoing mosquito control in Chesapeake Bay are sufficient to kill fish and invertebrates throughout the sturgeon's critical habitat<sup>6</sup>.

The potential for ongoing harm to Maryland's iconic blue crab fishery as well as the myriad insect larvae and other crustacean species that support the base of our aquatic and estuarine food web of the Chesapeake Bay is too great to allow continued use of this known toxic chemical, especially when alternatives exist.

## **CONCLUSION**

For these reasons, CBF urges a favorable report on SB 300. If you have any questions, please feel free to contact Doug Myers, Maryland Senior Scientist, at 443-482-2168 or [dmyers@cbf.org](mailto:dmyers@cbf.org)

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<sup>6</sup> National Marine fisheries Service, Endangered Species Act Section 7 Biological Opinion, The Environmental Protection Agency's Registration of Pesticides containing Chlorpyrifos, Diazanone and Malthion, FPR 2017-9241, December 29, 2017



CHESAPEAKE BAY FOUNDATION  
*Saving a National Treasure*

July 23, 2018

Submitted via regulations.gov and U.S. Mail

Mr. Andrew Wheeler, Acting Administrator  
Environmental Protection Agency  
1200 Pennsylvania Ave., NW  
Washington, DC 20460

**RE: Chesapeake Bay Foundation Comments, *Chlorpyrifos, Diazinon, and Malathion*; National Marine Fisheries Service Biological Opinion Issued Under the Endangered Species Act; Notice of Availability**  
**Docket ID. No. EPA-HQ-OPP-2018-0141; FRL-9975-59**

Dear Acting Administrator Wheeler:

The Chesapeake Bay Foundation, Inc. (CBF) respectfully submits these comments in response to the above-referenced Notice of Availability, *Chlorpyrifos, Diazinon, and Malathion*; National Marine Fisheries Service Biological Opinion Issued Under the Endangered Species Act.<sup>1</sup> CBF is a 501(c)(3) non-profit organization, founded in 1967. The organization's mission – carried out from offices in Maryland, Virginia, Pennsylvania and the District of Columbia – is to restore and protect the ecological health of the Chesapeake Bay, one of the nation's most vital estuaries. As such, and on behalf of our over 275,000 members across the United States, we are very interested in matters that impact the health of the aquatic life in the Chesapeake Bay and the waters that feed into it.

In its Notice, EPA seeks comment on the final Biological Opinion issued by the National Marine Fisheries Service (NMFS) regarding the potential effects of chlorpyrifos, malathion, and diazinon on federally listed or endangered species and their designated critical habitats (BiOp).<sup>2</sup> This BiOp was generated by NMFS, as required by the Endangered Species Act and in response to a court-ordered deadline.<sup>3</sup>

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<sup>1</sup> 83 FR 12754, March 23, 2018.

<sup>2</sup> National Marine Fisheries Service, Endangered Species Act, Section 7, Biological Opinion, *The Environmental Protection Agency's Registration of Pesticides Containing Chlorpyrifos, Diazinon, and Malathion*, FPR-2017-9241, December 29, 2017, <https://doi.org/10.7289/V5CJ8BQM>.

<sup>3</sup> See EPA, *Chlorpyrifos, Diazinon, and Malathion*; National Marine Fisheries Service Biological Opinion Issued Under the Endangered Species Act; Notice of Availability, 83 FR 12754, 12755, March 23, 2018, citing, *Nw. Coal. For Alternatives to Pesticides, et al. v. NMFS*, Stipulation and Order, Dkt. 50, No. 07-1791-RSL (D. Wash. May 21, 2014).

EPA seeks stakeholder input prior to its decision to either reinitiate consultation on the BiOp or implement the measures of the BiOp. Our comments focus on the impacts of chlorpyrifos to the Chesapeake Bay, and particularly to the Atlantic Sturgeon. The consideration of banning chlorpyrifos has been going on for far too long. CBF therefore strongly urges EPA to implement the measures of the BiOp and recommends that the BiOp acknowledge the potentially higher risk for exposure to chlorpyrifos in the Distinct Population Segment (DPS) for the Chesapeake Bay.

## **I. Background**

Chlorpyrifos is an insecticide commonly used in agriculture and, as the BiOp finds, it is “highly toxic to mammals, fish and aquatic invertebrates.”<sup>4</sup> Indoor use of the chemical was banned in 2000 and EPA proposed a complete ban on the substance in 2015. On March 29, 2017, EPA reversed course and denied a petition asking it to revoke all pesticide tolerances and cancel all chlorpyrifos registrations, announcing that it would allow chlorpyrifos to remain on the market until 2022, pending further study.<sup>5</sup> As noted above, the BiOp was prepared by the NMFS in response to a court-ordered deadline and the EPA now seeks comment on the findings of that opinion.

## **II. Chlorpyrifos Poses a Particular Threat to the Chesapeake Bay.**

Chlorpyrifos, used on golf courses and widely used on row crops in the Bay region, makes its way into the Chesapeake Bay and its rivers and streams.<sup>6</sup> Chlorpyrifos physically adsorbs to particles and can be transported by dust in agricultural areas during rainfall runoff events. USGS research on this dynamic suggests that the early parts of storms, after long dry spells, can deliver chlorpyrifos at concentrations beyond what would be expected from the most recent application rate.<sup>7</sup>

Indeed, of the thousands of chemicals found in sediments, fish and water in the Chesapeake Bay, chlorpyrifos ranks **third** on the most recent “Toxics of Concern” list.<sup>8</sup> The ranking reflects those chemicals of greatest concern based on estimates of loads, presence in the Bay, and toxicity to aquatic species.

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<sup>4</sup> National Marine Fisheries Service, Endangered Species Act, Section 7, Biological Opinion, *The Environmental Protection Agency's Registration of Pesticides Containing Chlorpyrifos, Diazinon, and Malathion*, FPR-2017-9241, December 29, 2017, p. 5, <https://doiorg/10.7289/V5CJ8BQM>.

<sup>5</sup> See EPA, Chlorpyrifos, EPA Actions and Regulatory History, found at:

<https://www.epa.gov/ingredients-used-pesticide-products/chlorpyrifos#actions>.

<sup>6</sup> National Marine Fisheries Service, Endangered Species Act, Section 7, Biological Opinion, *The Environmental Protection Agency's Registration of Pesticides Containing Chlorpyrifos, Diazinon, and Malathion*, FPR-2017-9241, December 29, 2017, pp. 1081-1089,

<https://doiorg/10.7289/V5CJ8BQM>; See also: <https://www.epa.gov/ingredients-used-pesticide-products/chlorpyrifos>.

<sup>7</sup> *Diazinon and Chlorpyrifos Loads in Precipitation and Urban and Agricultural Storm Runoff During January and February 2001 in the San Joaquin River Basin, California*, Celia Zamora, Charles R. Krataer, Michael S. Majewski, and Donna L. Knifong.

<sup>8</sup> [https://www.chesapeakebay.net/documents/Prioritized\\_Chesapeake\\_Bay\\_Organic\\_Toxics\\_of\\_Concern\\_Method\\_and\\_Assessment\\_2006.pdf](https://www.chesapeakebay.net/documents/Prioritized_Chesapeake_Bay_Organic_Toxics_of_Concern_Method_and_Assessment_2006.pdf).

It was found in more than 90% of water samples that were analyzed for this chemical, and 40% of those had concentrations that exceeded thresholds indicating possible ecological effects.<sup>9</sup> In addition, aquatic invertebrates, particularly crustaceans and insect larvae, are very sensitive to exposure. Lethal concentrations for 50 percent of the population, or LC50s, are generally less than 1 microgram/L and No-observed-effect concentrations (NOECs) may be below 0.1 microgram/L in laboratory studies.<sup>10</sup> Numerous studies on chlorpyrifos describe effects to the central nervous system of crustaceans impairing their physiology, behavior, survival and reproduction leading to further ecosystem effects changing the balance of predators and prey.<sup>11</sup>

Chlorpyrifos is an obvious threat to the Bay – and particularly to the blue crab fishery as well as the myriad insect larvae and other crustacean species that support the base of the aquatic and estuarine food web. As the BiOp finds, it is also a threat to the Atlantic Sturgeon and should be regulated accordingly. CBF supports the conclusions of the BiOp and offers the following additional consideration to the DPS for the Chesapeake Bay.

### **III. CBF Supports the Findings of the BiOp in General and Recommends that the BiOp Acknowledge the Potentially Higher Risk to the Atlantic Sturgeon in the Nanticoke Watershed.**

The BiOp acknowledges that “[c]urrent application rates and application methods are expected to produce aquatic concentrations of all three pesticides that are likely to harm aquatic species as well as contaminate their designated critical habitats.”<sup>12</sup> CBF agrees with this statement and while the BiOp is thorough in its review of potential risks to listed species through typical pathways of exposure on a nationwide basis, it seems less protective of Atlantic Sturgeon in the Chesapeake Bay if the landscape context is considered.

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<sup>9</sup> *Id.*

<sup>10</sup> Reviews of Environmental Contamination and Toxicology 1995, *Ecotoxicology of Chlorpyrifos*, Barron M.G. and Woodburn K.B, pp. 144-1-93.

<sup>11</sup> See Ecotoxicology and Environmental Safety, *Embryo-toxic effects of environmental concentrations of chlorpyrifos on the crustacean Daphnia magna*, P. Palma, et. al., Volume 72, Issue 6, September 2009, pp. 1714-1718, <https://www.sciencedirect.com/science/article/pii/S0147651309001006>; Journal of Experimental Marine Biology and Ecology, *Cellular energy allocation and scope for growth in the estuarine mysid Neomysis integer (Crustacea: Mysidacea) following chlorpyrifos exposure: a method comparison*, Tim Verslycke et. al., Vol. 306, Issue 1, July 28, 2004, pp. 1-16, <https://www.sciencedirect.com/science/article/pii/S0022098104000243>; Environmental Toxicology and Chemistry, *Effects of chlorpyrifos on individuals and populations of Daphnia pulex in the laboratory and field*, Nelly van der Hoeven, Anton A. M. Gerritsen, October 25, 2009, <https://setac.onlinelibrary.wiley.com/doi/abs/10.1002/etc.5620161202>.

<sup>12</sup> National Marine Fisheries Service, Endangered Species Act, Section 7, Biological Opinion, *The Environmental Protection Agency's Registration of Pesticides Containing Chlorpyrifos, Diazinon, and Malathion*, FPR-2017-9241, December 29, 2017, p. I; <https://doiorg/10.7289/V5CJ8BQM>.

The BiOp states as follows:

**Effects analysis summary:**

Adult and juvenile Atlantic sturgeon, Chesapeake Bay DPS are anticipated to experience reduced abundance and productivity (spawning adults) from exposure to chlorpyrifos. Reduced cholinesterase activity, reduced productivity, reduced prey abundance, and impaired behaviors including ability to swim are anticipated to occur in areas where chlorpyrifos achieves predicted levels. Where formulated products and tank mixtures containing chlorpyrifos occur in aquatic habitats, sturgeon will likely experience more toxicity. The overall risk to Atlantic sturgeon, Chesapeake Bay DPS from the effects of the action is high and the confidence associated with that risk is high.<sup>13</sup>

**Water Quality Risk Hypothesis; Atlantic Sturgeon, Chesapeake Bay DPS, Designated Critical Habitat**

Comprised water quality occurs when anticipated concentrations of the stressors for the action achieve toxic levels in designated critical habitat. Authorized uses of chlorpyrifos-containing products occur within the designated critical habitat of Atlantic Sturgeon, Chesapeake Bay DPS. Sixteen use site categories, totaling more than 968,635 acres (over 51% of acres) are currently present. In addition, proposed labels for chlorpyrifos allow for mosquito control and wide area use, both of which can be applied to 100% of the species designated critical habitat. The anticipated chlorpyrifos levels in designated critical habitat are sufficient to kill fish and aquatic invertebrates, and for the animals that survive, impaired swimming, reduced reproduction, and reduced growth are anticipated. Multiple (*perhaps all*) habitat types will experience levels that degrade water quality. The likelihood of attaining these concentrations increases with frequency of application, use of the maximum rates, and the proximity to designated critical habitats. Other chemicals within formulations or added to tank mixes increase the extent of water quality degradation.<sup>14</sup>

**Designated Critical Habitat Effects Analysis Summary**

We anticipate a high likelihood that the stressors of the action will negatively affect physical or biological features (PBFs). Both reductions in prey and degradation of water quality are likely throughout designated critical habitat of Atlantic Sturgeon, Chesapeake Bay DPS. The likelihood and magnitude of toxic effects may reduce overall conservation value of designated critical habitat. We find that the overall risk is high and the confidence associated with that risk is high over the 15-year duration of the action.<sup>15</sup>

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<sup>13</sup> *Id.* at 12-453, 454.

<sup>14</sup> *Id.* at 15-154.

<sup>15</sup> *Id.* at 15-155.

Review of the Atlantic Sturgeon proposed critical habitat in the BiOp differs slightly from the final habitat designations and these should be updated accordingly, especially to acknowledge potential populations in the Marshyhope Creek and Nanticoke River. This is the site of a fragile recovering population, but significant enough for NMFS to designate. The Delmarva Peninsula is a region of heavy agricultural use, especially for grain row cropping which is done in very close proximity to tidal waters. In addition, there are several golf courses located on the Eastern Shore, especially along the Choptank River.<sup>16</sup> Thus, the BiOp should acknowledge the potential for higher risk in this DPS for the Chesapeake Bay and devise special conditions on use.

EPA action regarding its proposed ban of chlorpyrifos is long overdue. CBF therefore urges EPA to implement the measures recommended in the BiOp and consider the additional protections to the Nanticoke watershed mentioned above.

Thank you for the opportunity to comment on the NMFS Biological Opinion Issued under the ESA on Chlorpyrifos, Diazinon and Malathion. Please let us know if we can provide additional information.

Sincerely,

A handwritten signature in dark ink, appearing to read "Lisa Feldt". The signature is fluid and cursive, with the first name "Lisa" and last name "Feldt" clearly distinguishable.

Lisa Feldt  
Vice President of Environmental Protection and Restoration

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<sup>16</sup> See Maryland Golf Course Map and Guide, <https://marylandgolf.com/maps/state.cfm>.