



March 29, 2024

Office of Pesticide Programs  
Docket number EPA-HQ-OPP-2011-0855  
Environmental Protection Agency Docket Center (EPA/DC)  
(28221T)  
1200 Pennsylvania Ave. NW.  
Washington, DC 20460-0001

**Re: Comments on EPA's Preliminary Supplemental Consideration of Certain Issues in Support of its Interim Registration Review Decision for Paraquat (Docket #: EPA-HQ-OPP-2011-0855)**

Please accept the following comments on behalf of the Center for Biological Diversity (“Center”) in response to the Environmental Protection Agency’s (“EPA”) Preliminary Supplemental Consideration of Certain Issues in Support of its Interim Registration Review Decision for Paraquat under the Federal Insecticide, Fungicide, and Rodenticide Act (“FIFRA”).

The Center for Biological Diversity (“Center”) is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 1.7 million members and online activists dedicated to the protection and restoration of endangered species and wild places. The Center has worked for twenty-six years to protect imperiled plants and wildlife, open space, air and water quality, and overall quality of life. The Center’s Environmental Health Program aims to secure programmatic changes in the pesticide registration process and to stop toxic pesticides from contaminating fish and wildlife habitats. We appreciate the opportunity to provide comment.

These comments are submitted in addition to other comments in the docket that we have signed and supported. These comments concern EPA’s “Preliminary Supplemental Consideration of Certain Issues in Support of its Interim Registration Review Decision for Paraquat” (hereafter “Supplemental Consideration”)<sup>1</sup>

In registering pesticides under FIFRA, the core standard is the “unreasonable adverse effects” standard. That is, EPA applies a cost-benefit analysis “to ensure that there is no unreasonable

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<sup>1</sup> EPA's Preliminary Supplemental Consideration of Certain Issues in Support of its Interim Registration Review Decision for Paraquat. January 30, 2024. <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0318>

risk created for people or the environment from a pesticide.”<sup>2</sup> That cost-benefit analysis “is the *critical determination* that the pesticide complies with FIFRA’s safety standard.”<sup>3</sup> Congress anticipated that EPA’s balancing of costs and benefits would “take every relevant factor [the agency] can conceive into account,”<sup>4</sup> and thus defined “unreasonable adverse effects on the environment” to mean “any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide.” 7 U.S.C. § 136(bb). EPA must have substantial evidence and an objective basis to balance risks and benefits of continued registration of paraquat. Here, EPA overstates economic benefits and ignores or understates the risks.<sup>5</sup>

These supplemental comments address three areas where EPA’s FIFRA obligations have not been adequately addressed:

- 1) EPA’s consideration of non-tariff trade barriers in the economic costs associated with paraquat;
- 2) EPA’s outdated and incomplete review of incident data associated with paraquat; and
- 3) EPA’s insufficient balancing of the ecological costs and the purported benefits of paraquat’s use.

**1) EPA has not appropriately considered the economic costs associated with trade barriers of commodities containing paraquat residues**

*Thai Paraquat Maximum Residue Limit (MRL)*

EPA concludes in its Supplemental Consideration that the analysis conducted by the United States Department of Agriculture Foreign Agricultural Service (USDA FAS) was incorrect when it concluded that: “the United States’ potential market losses, if this new rule is in place, will be approximately U.S. \$0.9-1.1 billion per annum”<sup>6</sup> if Thailand’s zero tolerance rule for paraquat and chlorpyrifos were to go into effect. In fact, EPA came to the complete opposite conclusion as the USDA FAS and found that Thailand’s zero tolerance rule for paraquat would have absolutely

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<sup>2</sup> 7 U.S.C. § 136a(c)(5)(C),(D); 40 C.F.R. § 152.112(e). *See also Pollinator Stewardship Council v. EPA*, 806 F.3d 520, 522–23 (9th Cir. 2015).

<sup>3</sup> *NRDC v. EPA*, 38 F.4th 34, 53 (9th Cir. 2022) (emphasis added).

<sup>4</sup> S. Rep. 838, 92d Cong. 2d Sess., reprinted in 1972 U.S.C.C.A.N. 3993, 4032–33.

<sup>5</sup> *National Family Farm Coalition v. EPA*, 960 F.3d 1120, 1138, 1124 (9th Cir. 2020) (vacating the dicamba registration for violations of FIFRA because EPA “substantially understated three risks it acknowledged” and “also entirely failed to acknowledge three other risks.”).

<sup>6</sup> Preechajarn S. 2020. Economic Impact of the Ban on Paraquat and Chlorpyrifos on Thai Industries. United States Department of Agriculture, Foreign Agricultural Service.

[https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Economic%20Impact%20of%20the%20Ban%20on%20Paraquat%20and%20Chlorpyrifos%20on%20Thai%20Industries%20Bangkok%20Thailand\\_05-27-2020](https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Economic%20Impact%20of%20the%20Ban%20on%20Paraquat%20and%20Chlorpyrifos%20on%20Thai%20Industries%20Bangkok%20Thailand_05-27-2020)

no measurable effect on the U.S. economy whatsoever.<sup>7</sup> We do not share EPA’s optimism in this particular case.

- I. First, EPA’s assumption that Thai importers will bear all the costs to secure a paraquat-free supply line<sup>8</sup> is unsupported by data and in direct contradiction to expert agencies within the U.S. government.<sup>9</sup>

In fact, USDA FAS found that “Many suppliers in the United States, accounting for around 40 percent of total wheat and soybean imports, can issue these non-detectable certificates,”<sup>10</sup> indicating that the cost of testing and certification will be on suppliers in the U.S. The U.S. will now be competing for the Thai soybean market with major soybean suppliers like Brazil (which has banned paraquat, and will have no trade barrier). A Thai importer would likely just import soybeans from Brazil rather than incur the expense of testing a U.S. product. This expense will fall directly to U.S. suppliers if they want to maintain this export market and those costs will likely be passed on to U.S. soybean growers.

This is not just our opinion, it is the position of the United States International Trade Commission. The federal agency found that:

“To avoid the costs and consequences of an MRL violation, many exporters test their products for MRL compliance prior to shipping them to their market destinations. These compliance checks are conducted either before export or at the point of import, often as a condition of contracts between the seller and the buyer. Although such testing can prevent the larger losses triggered by MRL violations, these programs are costly, and the cost is often borne by the processor/exporter.”<sup>11</sup>

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<sup>7</sup> EPA's Preliminary Supplemental Consideration of Certain Issues in Support of its Interim Registration Review Decision for Paraquat. January 30, 2024. <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0318>

<sup>8</sup> *Id.* at C-5. “While there may be costs to certifying that a commodity is untreated, BEAD expects that Thai purchasers bear these costs, not U.S. growers.”

<sup>9</sup> United States International Trade Commission. Global Economic Impact of Missing and Low Pesticide Maximum Residue Levels, Vol. 1. June 2020 Publication Number: 5071 Investigation Number: 332-573. Page 202. Found here: <https://www.usitc.gov/publications/332/pub5071.pdf>

<sup>10</sup> Prasertsri P & Chanikornpradit M. 2020. Thai FDA Announced Ban of Paraquat and Chlorpyrifos on Imported Food Products. United States Department of Agriculture, Foreign Agricultural Service. [https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Thai%20FDA%20Announced%20Ban%20of%20Paraquat%20and%20Chlorpyrifos%20on%20Imported%20Food%20Products\\_Bangkok\\_Thailand\\_11-03-2020](https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Thai%20FDA%20Announced%20Ban%20of%20Paraquat%20and%20Chlorpyrifos%20on%20Imported%20Food%20Products_Bangkok_Thailand_11-03-2020)

<sup>11</sup> United States International Trade Commission. Global Economic Impact of Missing and Low Pesticide Maximum Residue Levels, Vol. 1. June 2020 Publication Number: 5071 Investigation Number: 332-573. Page 202. Found here: <https://www.usitc.gov/publications/332/pub5071.pdf>

The ITC's report is filled with numbers on how much U.S. companies spend to test their commodity before export. Before Thailand's ban on paraquat residues, the U.S. did not have to test for paraquat before export because the MRL's aligned. Now it does have to test for paraquat residues because the Thai MRL is essentially zero. That is now a cost to U.S. producers and exporters that must be accounted for. To claim that Thailand will bear all of these costs is inconsistent with the expert agency in the U.S. government and must be rectified before taking a final agency action on paraquat.

- II. Second, EPA claims that only 6-21% of soybeans are treated with paraquat;<sup>12</sup> and therefore untreated soybeans in the U.S. could easily fill the Thai export market. But there is no infrastructure in place to do that. Commodity crops are often combined in large silos. There is an infrastructure in place to separate organic from non-organic crops, but that is not the case for subsets of non-organic crops. And to put that infrastructure in place would come at a significant cost. EPA acknowledges that most soybean treatments in the U.S. are for desiccant purposes, particularly in the mid-South.<sup>13</sup> Desiccant use also happens to be the use resulting in the highest residues on harvested crops because it happens immediately prior to harvesting. There is simply no mechanism in place to separate paraquat-contaminated soybeans with soybeans that are free of paraquat. To do so would be cost-prohibitive. Also, paraquat use on soybeans has increased considerably in the last 10 years<sup>14</sup> and it is reasonable to assume that this increase will continue during the timeframe of EPA's action (at least the next 15 years until next registration review). Therefore, the difficulties of separating treated soybeans from non-treated soybeans will continue to increase.

The U.S. International Trade Commission finds that: "In order to comply with various MRLs, growers report that they often must choose to either segregate their crops or to produce all of their crops to suit their export market with the lowest MRL."<sup>15</sup> The ITC ultimately concluded that either choice increases production costs:

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<sup>12</sup> EPA's Preliminary Supplemental Consideration of Certain Issues in Support of its Interim Registration Review Decision for Paraquat. January 30, 2024. <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0318> at C-4 to C-5.

<sup>13</sup> *Id.*

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[https://water.usgs.gov/nawqa/pnsp/usage/maps/show\\_map.php?year=2018&map=PARAQUAT&hilo=L&disp=Paraquat](https://water.usgs.gov/nawqa/pnsp/usage/maps/show_map.php?year=2018&map=PARAQUAT&hilo=L&disp=Paraquat)

<sup>15</sup> United States International Trade Commission. Global Economic Impact of Missing and Low Pesticide Maximum Residue Levels, Vol. 1. June 2020 Publication Number: 5071 Investigation Number: 332-573. Pages 199-200. Found here: <https://www.usitc.gov/publications/332/pub5071.pdf>

“The choice to segregate or standardize production affects the entire supply chain, from the growing and harvest process to processing, packing, and shipping, and either decision can increase costs throughout.”<sup>16</sup>

In order to separate paraquat-contaminated from paraquat-free commodities an infrastructure will need to be established. Without an infrastructure, there is no separation that can take place. There will either be a cost to develop that infrastructure or the export market will go away. Either scenario results in costs to the U.S. economy that must be accounted for in EPA’s registration review decision.

- III. Third, now that we have established that the Thai soybean export market cannot be maintained without significant U.S. infrastructure investment, it’s important to analyze whether the export loss would – or could – be made up elsewhere. Unfortunately, EPA takes a siloed view of the costs of non-tariff trade barriers, assessing whether individual farmers will feel the pinch when they sell their produce to commodity traders who have lost the Thai export market.<sup>17</sup> However there is no consideration of whether the U.S. economy as a whole will be impacted by a potential export loss. Even assuming EPA is correct that there will be little impact to individual farmers, small impacts across the entirety of a population can be a significant total hit on the U.S. economy. There is no consideration in EPA’s analysis of the total cost to the U.S. economy.

There is an assumption by EPA that the loss of the Thai export market will just result in funneling of exports elsewhere, but there are absolutely no data to support that claim. In fact, that runs counter to simple supply and demand principles. And to say that this can just happen without a cost to the U.S. economy is inconsistent with the findings of the U.S. International Trade Commission. For growers having to change export markets due to MRL changes, the ITC finds it “can be difficult and costly for producers” and “growers who cannot find alternative markets have to switch products or stop production altogether.”<sup>18</sup> This is because “potential alternate export markets may offer lower prices or have insufficient demand, especially if other producers are also seeking to ship to that market.”<sup>19</sup>

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<sup>16</sup> *Id.*

<sup>17</sup> EPA’s Preliminary Supplemental Consideration of Certain Issues in Support of its Interim Registration Review Decision for Paraquat. January 30, 2024. <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0318> at C-7.

<sup>18</sup> United States International Trade Commission. Global Economic Impact of Missing and Low Pesticide Maximum Residue Levels, Vol. 1. June 2020 Publication Number: 5071 Investigation Number: 332-573. Page 194. Found here: <https://www.usitc.gov/publications/332/pub5071.pdf>

<sup>19</sup> *Id.*

The \$1 billion in revenue loss from the inability to export soybeans to Thailand must be made up elsewhere in order for this to not negatively impact the U.S. economy. You can't just conjure up an export market or increase demand in the domestic market out of thin air, you have to compete with other soybean producers to secure it. How would the U.S. do that? There is no consideration of how this could happen in EPA's analysis, just blind trust that it would. Furthermore, with lower MRLs in many other importing countries, switching export markets is not easy or straightforward (see below section).

We conclude that EPA's analysis makes faulty assumptions that 1) Thailand would bear the economic burden of ensuring that U.S. exports met Thailand's zero-tolerance MRLs; 2) the U.S. could easily separate out paraquat-contaminated soybeans from those free from paraquat, and 3) losing a \$1 billion export market would, in direct contradiction of USDA FAS's findings, have absolutely no effect on the U.S. economy. There will be trade costs to keeping paraquat on the market in the U.S. Those must be accounted for in EPA's cost-benefit balancing.

#### *Other Existing MRLs*

EPA also concludes that lower paraquat MRLs in other countries are not having an effect on U.S. growers who use paraquat.<sup>20</sup> We are skeptical this that is the case. In fact EPA's only support for this conclusion comes from an uncited statement that "EPA observed no difference in price received for commodities treated with paraquat compared to other conventionally produced commodities that were not treated with paraquat."<sup>21</sup> However, this stated analysis – assuming it was conducted<sup>22</sup> – is not really the correct analysis to fulfill EPA's FIFRA obligations. The question is not whether there are differences in the sale price between paraquat-contaminated and paraquat-free produce, the issue is whether the EU's reduced MRL resulted in reduced exports to the EU and a resulting hit to the U.S. economy. The more likely scenario once the EU lowered its MRL was not that a price differential was established between paraquat-contaminated and paraquat-free produce, but that the export market decreased or was lost completely and the U.S. simply adjusted to the lower export revenue (see above for explanation of why the U.S. cannot simply create two separate supply lines, and would simply have to give up on the export market). Therefore, EPA's analysis concluded that no price differential exists between paraquat-contaminated and paraquat-free produce, however the only relevant analysis is whether use of paraquat here is costing the U.S. a lucrative export partner. EPA's current analysis does not

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<sup>20</sup> EPA's Preliminary Supplemental Consideration of Certain Issues in Support of its Interim Registration Review Decision for Paraquat. January 30, 2024. <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0318> at C-9 to C-10.

<sup>21</sup> *Id.* at C-10.

<sup>22</sup> We have read through all of BEAD's materials on the paraquat docket and have not found any evidence of this analysis being conducted by the agency. In fact, there is not even a single mention in all of these documents that this analysis was even conducted. We urge the EPA to make this analysis available to the public to see.

answer this question that is vital to an accurate accounting of the costs associated with this action.

The U.S. International Trade Commission found that US producers and exporters face a significant cost by testing commodities being exported to countries where the MRL is significantly lower than exporter's country.<sup>23</sup> If testing is not conducted, violations are more likely to happen. If a violation occurs, then that company will be subject to more frequent inspections, higher compliance costs and reputational damage. Researchers have found that more stringent MRLs can significantly reduce trade.<sup>24</sup>

Furthermore, EPA analyzes the Thai MRL and other countries' MRL issues separately when they really should be analyzed concordantly. When EPA proposed that there were other countries that the U.S. could export paraquat-contaminated produce to when the Thai zero tolerance for paraquat went into effect, the agency pointed to the EU and China as potentially absorbing the \$1 billion of extra soybeans that were left without a home.<sup>25</sup> However, the EU and China both have lower paraquat MRLs for soybeans and wheat than the U.S.,<sup>26</sup> putting in place a major barrier to trade for those commodities. In fact, the European Union's MRL for paraquat on soybeans is 3% what it is in the U.S. (0.02 ppm compared to 0.7 ppm) and for wheat is 2% of the U.S. (0.02 ppm compared to 1.1 ppm). With a crop like soybeans, where most of the paraquat use is for desiccant purposes, meeting a reduced MRL is not easy. Therefore, trade of paraquat-contaminated goods with these partners is necessarily difficult. The entirety of this economic picture must be analyzed together, not piecemeal. The fact is that the world is an increasingly unfriendly place for the trade of paraquat-contaminated produce – and for good reason. The economic consequences of this must be accounted for in EPA's decision. EPA's failure to properly account for the true economic "costs and benefits" runs afoul of FIFRA's mandate to determine whether there are unreasonable adverse effects from pesticide registrations.<sup>27</sup> EPA's approach of relying

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<sup>23</sup> United States International Trade Commission. Global Economic Impact of Missing and Low Pesticide Maximum Residue Levels, Vol. 1. June 2020 Publication Number: 5071 Investigation Number: 332-573. Pages 195-207. Found here: <https://www.usitc.gov/publications/332/pub5071.pdf>

<sup>24</sup> Center for Agricultural Trade. Hidden Trade Costs? Maximum Residue Limits and U.S. Exports of Fresh Fruits and Vegetables. July 2018. Available here: <https://vtechworks.lib.vt.edu/items/ce35c340-e810-4df7-96ac-fa22d8bc2b24>.

<sup>25</sup> EPA's Preliminary Supplemental Consideration at page C-7.

<sup>26</sup> BCGlobal. 2023. International MRLs – U.S. ViewPoint Database.

<https://bcglobal.bryanchristie.com/db#/pesticides/query?q=eyJmaWx0ZXJzIjp7ImZEZWZhdWx0IjowLCJmVVNTZWNoaW9uMThSZWdpb25hbCI6MCwiZlVTSW5kaXJlY3QiOjAsImZFTVJMcy16MCwiZkZhY2lsaXR5VXNlIj0yLCJmSW1wb3J0VG9sZXJhbmNlIjowLCJmT3RoZXJNUkxzIjowLCJ0eXB1U29ydE9yZGVyIjpbMTUsMiwXSwicGVyc3BIY3RpdmVNYXJrZXRJRCI6MjEsInJlcXVpcmVQZXJzcGVjdG12ZVZhbHVlIjpbMTUsMiwXSwicGVyc3BIY3RpdmVNYXJrZXRJRCI6MTUsImxpc3QiOls1MTA1LDUyMDldfSx7Iml0ZW1UeXB1SUQiOjIsImxpc3QiOlszMTFdfSx7Iml0ZW1UeXB1SUQiOjEsImxpc3QiOls5MSw1LDIxXX1dfQ%3D%3D&isSimpleViewProp=true>

<sup>27</sup> 7 U.S.C. § 136(bb).

on inconsistent information does not provide the substantial evidence necessary for continued registration of paraquat.<sup>28</sup>

(NRDC v. United States EPA (9th Cir. 2022) 38 F.4th 34, 40.) As it stands now it is not, and without a proper accounting of these costs EPA cannot come to a defensible “no unreasonable adverse effects” conclusion.

## **2) EPA’s review of incident data associated with paraquat is outdated and incomplete**

### *Human Incidents*

EPA’s last review of human incidents associated with paraquat occurred nearly six years ago in July of 2018.<sup>29</sup> In that analysis, EPA found that from January 1, 2012 to February 6, 2018, there were 63 cases reported that involve the active ingredient paraquat. Of those 63, 53 occurred in the U.S. and encompassed four deaths, four major severity incidents and 43 moderate severity incidents.<sup>30</sup> In addition to the 53 main Incident Data System (“IDS”) incidents, there were an additional 61 incidents reported in the aggregate IDS.<sup>31</sup>

Since EPA’s last review of human incidents in July of 2018, the number of incident entries in the main IDS has nearly doubled – an extra 48 entries have been added, which comprise at least 120 separate incidents to people.<sup>32</sup> This includes six reported human deaths, with at least three confirmed as being accidental. The extra 48 entries include six deaths, 12 major incident entries, 24 moderate incident entries, four minor incident entries and two unspecified. These 120 separate incidents associated with paraquat must be accounted for before EPA can make an interim or final registration review decision on paraquat. As of 2011, EPA stated that a “moderately large number of paraquat incidents were identified.”<sup>33</sup> That number has ballooned to what can conservatively be called “a very large” number of paraquat incidents. Most of these incidents are high severity.

We also take issue with EPA’s practice of counting incidents by the number of listed entries in the IDS. It is abundantly clear from the data that many incident entries compile multiple incidents. For instance, on 9/20/2018, there is one incident entry for paraquat that compiled 10 moderate-severity incident reports. To count that as one incident is incorrect. In order to correctly classify the harm associated with any active ingredient, EPA must correctly count the

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<sup>28</sup> NRDC v. EPA, 38 F.4th 34, 44 (9th Cir. 2022).

<sup>29</sup> EPA. Paraquat: Tier II Human Incidents Report. July 25, 2018. Found here: <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0122>.

<sup>30</sup> *Id.* at pages 5-6.

<sup>31</sup> *Id.* at page 6.

<sup>32</sup> See attached spreadsheet submitted with comments. Paraquat human incidents.

<sup>33</sup> EPA. Paraquat: Tier II Human Incidents Report. July 25, 2018. Page 1. Found here: <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0122>



number of individual incidents associated with the pesticide – not just the number of entries in the database. EPA’s failure to account for relevant information does not provide the substantial evidence for pesticide registrations required under FIFRA.<sup>34</sup>

### *Plant/Animal Incidents*

EPA’s last review of plant and animal incidents associated with paraquat occurred nearly six years ago in June of 2018.<sup>35</sup> Since then there have been at least seven additional entries encompassing at least 45 separate incidents, such as bee kills, harm to farm animals and off-target plant damage.<sup>36</sup> These data are needed to accurately characterize the ecological risk posed by paraquat.

### **3) EPA has insufficiently balanced the ecological costs and the purported benefits of paraquat’s use**

#### *Data deficiencies must be addressed*

The EPA must have substantial evidence to re-register this pesticide. To do so, the EPA must require all necessary data and studies, including, but not limited to any previously identified data or study gaps, additional studies to evaluate effects on pollinators in accordance with the *Guidance for Assessing Pesticide Risks to Bees*,<sup>37</sup> information concerning estrogen or other endocrine disruption effects,<sup>38</sup> and any information that this pesticide or products containing this pesticide may have synergistic effects.

This is information that the EPA must require from the applicant in the first instance pursuant to 40 C.F.R. § 159.195(a), which require registrants to submit information that they reasonably should know that EPA might regard as raising concerns about the appropriate terms and conditions of registration of a product. Failure to require any of the above information will result in the EPA underestimating adverse effects and lacking substantial evidence to support registration.

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<sup>34</sup> 40 C.F.R. § 152.112(b)-(c); *see also* 7 U.S.C. § 136a(c)(5); *Pollinator Stewardship Council v. EPA*, 806 F.3d 520, 523 (9th Cir. 2015) (“Unconditional registration necessarily requires sufficient data to evaluate the environmental risks.”).

<sup>35</sup> EPA. Paraquat: Preliminary Ecological Risk Assessment for Registration Review. June 26, 2019. Page 25. Found here: <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0128>.

<sup>36</sup> See attached spreadsheet. Paraquat eco incidents

<sup>37</sup> EPA 2014. Guidance for Assessing Pesticide Risks to Bees. Available at [https://www.epa.gov/sites/production/files/2014-06/documents/pollinator\\_risk\\_assessment\\_guidance\\_06\\_19\\_14.pdf](https://www.epa.gov/sites/production/files/2014-06/documents/pollinator_risk_assessment_guidance_06_19_14.pdf)

<sup>38</sup> *See* 21 U.S.C. §§ 346a(d)(2)(A)(x) and 346a(p).

EPA seriously underestimates risk and costs to terrestrial invertebrates because “[d]ata are not available on the chronic toxicity to adult honey bees or acute and chronic toxicity to larval honey bees. These data are needed to fully assess potential risks to bees.”<sup>39</sup> These data, at a minimum, include Tier 1 acute and chronic toxicity testing to honey bees and possibly higher tier testing as well.<sup>40</sup> Without chronic contact or oral toxicity EPA continues to ignore the impact of long-term soil contact to terrestrial invertebrates. EPA’s failure to include and analyze information on pollinators renders the registration deficient.<sup>41</sup> This is especially egregious given the persistence of paraquat in soil and is reason to require long-term contact toxicity studies.

There is additional uncertainty regarding the presence of paraquat in nectar and pollen. EPA considers paraquat to be “locosystemic”<sup>42</sup> likely because paraquat is so toxic to plants that the plants die before the chemical has time to spread throughout the entire plant. But EPA has no idea whether trace amounts could end up in nectar and pollen and therefore be toxic to terrestrial invertebrates. It is possible that low levels of paraquat, that are not enough to kill a plant, could be taken up and expressed in the nectar and pollen. Paraquat-resistant weed populations may also be able to have greater amounts of paraquat in their tissues, concentrations great enough to harm terrestrial invertebrates that feed on nectar, pollen, or leaf tissue. When there is uncertainty about exactly where in a plant a potentially systemic pesticide could be, EPA should be conservative and assume that paraquat can be found in all parts of the plant.

#### *Exposure via dust or soil-adsorbed particles*

EPA did not attempt to characterize risk from dust exposure despite finding that 1) Paraquat rapidly and almost completely adsorbs to soil and/or sediment; and 2) Laboratory fate studies did not detect degradation of paraquat, indicating that it is very persistent in soil/sediment and accumulates in the environment in an adsorbed state.<sup>43</sup> Failure to account for these risks and their costs does not provide the substantial evidence necessary for this unconditional registration. This almost guarantees paraquat will move offsite adhered to soil and organic matter particles and that exposure to some environmental receptors will continue for an extended period of time.

Contaminated dust can drift into communities and into ecologically sensitive areas. Dust is inevitably produced during planting and tilling, but happens at other times when soil is uncovered and dry. Climate is also an important factor in creating conditions for dust. Heavily agricultural, but arid, areas such as the San Joaquin Vally of California is an example of an area

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<sup>39</sup> EPA. Paraquat: Preliminary Ecological Risk Assessment for Registration Review. June 26, 2019. Page 8. Found here: <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0128>.

<sup>40</sup> *Id* at pages 8-9.

<sup>41</sup> *Migrant Clinicians Network v. United States EPA*, 88 F.4th 830, 842-45 (9th Cir. 2023)

<sup>42</sup> *Id* at 73.

<sup>43</sup> EPA. Paraquat: Preliminary Ecological Risk Assessment for Registration Review. June 26, 2019. Page 5. Found here: <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0128>.

with large pesticide use, but also high propensity for off-field movement. California recognizes that agricultural soils in the San Joaquin Valley that have been contaminated with paraquat, and other pesticides, present risk of blowing while still in production and for years after land is fallowed.<sup>44</sup> The San Joaquin Valley must take areas out of production to reign in groundwater over-pumping and this will result in fallowed fields with considerable potential to blow contaminated dust. The environmental movement of contaminated dust is complex to model, but EPA does not even attempt it, missing a serious route of exposure.

*Paraquat's potential for ecological harm is high*

Paraquat is expected to result in severe ecological harm. EPA's risk assessment – despite not assessing risk from all exposure routes like dust – found birds, mammals, benthic and terrestrial invertebrates, and aquatic and terrestrial plants all face concerning risks from paraquat exposure.<sup>45</sup> Risk quotient exceedances were extraordinarily high for all these taxa, indicating that harm is almost certain to occur without substantial mitigation.

All of these risks that EPA found to birds, bees and mammals are supported by recent incident reports. Even more bee kills have been reported since EPA's incident review in 2018.<sup>46</sup> In the last 10 years, at least 13 domestic pets have died from paraquat exposure, further supporting that paraquat poses an unreasonable acute risk to mammals.<sup>47</sup> The extremely high toxicity of paraquat to birds was reproduced in three different test species.<sup>48</sup>

Non-apis bees,<sup>49</sup> especially ground-nesting bees, and other beneficial soil-dwelling insects are at potentially higher risk from paraquat than EPA admits because of lack of data and knowledge of their life history. Ground-nesting bees and beneficial soil-dwelling insects have exposure pathways that are very different than honeybees primarily in their increased contact with soil, social structure, and differences in feeding habits. The vast majority of native bees and other insects are solitary and ground-nesting<sup>50</sup> and need loose, bare soil for their nests. This consistent contact with contaminated soil is not considered in EPA's bee risk assessment even though most

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<sup>44</sup> Ayres A, Kwon J, Collins J, Morales ZJ. 2022. Land Transitions and Dust in the San Joaquin Valley. Public Policy Institute of California. Available from [https://www.researchgate.net/profile/Jaymin-Kwon/publication/374923937\\_Land\\_Transitions\\_and\\_Dust\\_in\\_the\\_San\\_Joaquin\\_Valley\\_-\\_How\\_Proactive\\_Management\\_Can\\_Support\\_Air\\_Quality\\_Improvements/links/65373aec24bbe32d9a657eba/Land-Transitions-and-Dust-in-the-San-Joaquin-Valley-How-Proactive-Management-Can-Support-Air-Quality-Improvements.pdf](https://www.researchgate.net/profile/Jaymin-Kwon/publication/374923937_Land_Transitions_and_Dust_in_the_San_Joaquin_Valley_-_How_Proactive_Management_Can_Support_Air_Quality_Improvements/links/65373aec24bbe32d9a657eba/Land-Transitions-and-Dust-in-the-San-Joaquin-Valley-How-Proactive-Management-Can-Support-Air-Quality-Improvements.pdf).

<sup>45</sup> *Id.* at Table 1-1.

<sup>46</sup> See attached spreadsheet. Paraquat eco incidents

<sup>47</sup> See attached spreadsheet. Aggregate paraquat incidents

<sup>48</sup> EPA. Paraquat: Preliminary Ecological Risk Assessment for Registration Review. June 26, 2019. Page 21. Found here: <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0128>.

<sup>49</sup> “Non-apis bee” refers to any bee other than a honey bee.

<sup>50</sup> David Fischer and Thomas Moriarty, eds., *Pesticide Risk Assessment for Pollinators*, 1st ed. (John Wiley & Sons, Ltd, 2014), 10–11, <https://doi.org/10.1002/9781118852408>.

native bees spend a great deal of their lives in contact with the soil. While independent, peer-reviewed study of paraquat to bees is limited, one study found impacts to larval honey bees at a cellular level at very low concentrations  $<0.01\mu\text{g}/\text{kg}$ .<sup>51</sup> Because non-apis bees are largely solitary, whereby one female provisions her own nest, EPA underestimates risk to these native bees because the acute and chronic effects to individual honeybees are buffered at the colony level – so even if one bee is highly exposed, the colony can still be at lower risk. Non-apis bees tend to be smaller, and therefore can be harmed at a lower concentration.<sup>52</sup> If one solitary bee is exposed and dies that means that her colony will stop growing and thereby reduce the effective population size. Non-apis, solitary bees forage differently than honeybees which are extreme generalists. Non-apis bees often forage on a restricted range of plants<sup>53</sup> and on more marginal floral resources than honeybees that are likely to be found in field margins.

Beyond impacts to bees, impacts to soil arthropod, bacterial, and fungal communities are not assessed. Soil is a complex ecosystem and nearly all terrestrial invertebrates spend all or part of their life cycle in contact with the soil or decaying vegetation on the soil surface. Pesticides of all kinds generally have negative impacts to soil-dwelling animals,<sup>54</sup> but EPA's pesticide risk analysis completely ignores the impact to soil health. Paraquat clearly has the potential to harm beneficial predatory insects that keep insect pests in check and negatively impact detritivores who consume dead vegetation. Detritivores are essential to the efficient breakdown of crop residue so that the next crop can be planted. And for future crops, paraquat in the soil has been shown to reduce the activity of nitrogen fixing rhizobia bacteria.<sup>55</sup> Several other studies have also shown impacts to soil fungi and other bacteria such as *E. coli*.<sup>56</sup> If using paraquat can decrease the productivity of nitrogen fixing bacterial and beneficial fungi that then hinders the growth of crops, this pesticide use is not in compliance with the tenants of integrated pest management. Continuing to approve paraquat will result in soil contamination lasting for decades that can potentially poison the wild pollinator community, soil-dwelling beneficial invertebrates, bacterial, and fungal communities.

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<sup>51</sup> Cousin M, Silva-Zacarin E, Kretzschmar A, Maataoui ME, Brunet J-L, Belzunces LP.. Size Changes in Honey Bee Larvae Oenocytes Induced by Exposure to Paraquat at Very Low Concentrations. 2013. PLOS ONE 8:e65693.

<sup>52</sup> Fischer and Moriarty, *Pesticide Risk Assessment for Pollinators*, 53–54.

<sup>53</sup> Fischer and Moriarty, 53.

<sup>54</sup> Gunstone T, Cornelisse T, Klein K, Dubey A, Donley N. 2021. Pesticides and Soil Invertebrates: A Hazard Assessment. *Frontiers in Environmental Science* 9. Available from <http://www.frontiersin.org/articles/10.3389/fenvs.2021.643847/full>.

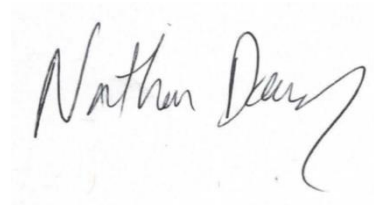
<sup>55</sup> Mohamed M, Aliyat FZ, Ben Messaoud B, Simone C, Marina M, Filippo G, Laila N, Jamal I. 2021. Effects of Pesticides Use (Glyphosate & Paraquat) on Biological Nitrogen Fixation. *Water, Air, & Soil Pollution* **232**:419.

<sup>56</sup> Eisler R. 1990, 12. Paraquat Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. U.S. Fish and Wildlife Service Patuxent Wildlife Research Center. Available from [https://scholar.google.com/scholar\\_url?url=https://citeseerx.ist.psu.edu/document%3Frepid%3Drep1%26type%3Dpdf%26doi%3Dc704e5e73f232158e7314774bb5398a3f65be2e2&hl=en&sa=T&oi=gsb-gga&ct=res&cd=0&d=15870655831853363740&ei=BH7zZb-nC8-Z6rQPzOugyAk&scisig=AFWwaeYm8IA0Bo0UnWQ2O28Y5-8m](https://scholar.google.com/scholar_url?url=https://citeseerx.ist.psu.edu/document%3Frepid%3Drep1%26type%3Dpdf%26doi%3Dc704e5e73f232158e7314774bb5398a3f65be2e2&hl=en&sa=T&oi=gsb-gga&ct=res&cd=0&d=15870655831853363740&ei=BH7zZb-nC8-Z6rQPzOugyAk&scisig=AFWwaeYm8IA0Bo0UnWQ2O28Y5-8m).

Paraquat's ecological harms are high and likely to climb higher. Paraquat is increasingly being used in areas where wildlife risks are likely and expected. For instance, in 2018 over 13,000 lbs of pesticides containing paraquat were used in 8,000 acres of National Wildlife Refuges in the Southeast region.<sup>57</sup> This represented a 100% increase in use from just two years prior in 2016.

EPA must update its cost-benefit balancing to accurately represent the high environmental costs from paraquat use.

Respectfully submitted,

A handwritten signature in black ink that reads "Nathan Donley". The signature is written in a cursive style and is positioned above a faint, illegible stamp.

Nathan Donley, Ph.D.  
Senior Scientist  
Environmental Health Program  
Center for Biological Diversity

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<sup>57</sup> [https://www.biologicaldiversity.org/campaigns/pesticides\\_reduction/pdfs/No-Refuge-Report-2020.pdf](https://www.biologicaldiversity.org/campaigns/pesticides_reduction/pdfs/No-Refuge-Report-2020.pdf)