



November 4, 2022

Department of Pesticide Regulation
Pesticide Registration Branch
Department of Pesticide Regulation
P. O. Box 4015
Sacramento, California 95812-4015
Registration.Comments@cdpr.ca.gov

**RE: Proposed Decision to Renew Paraquat Registrations for 2023 -
California Notice 2022-18**

Dear Mr. Macedo:

The Center for Biological Diversity and Californians for Pesticide Reform urge the California Department of Pesticide Regulation (“DPR”) to begin reevaluation, suspension, and cancellation proceedings for pesticide products containing paraquat because of the significant adverse impacts of these products. 3 Cal. Code Regs. §§ 6220, 6221; Food & Ag. Code § 12825, 12826. Despite paraquat being a restricted use pesticide, such restrictions are not sufficient to prevent significant adverse impacts to human health and the environment.

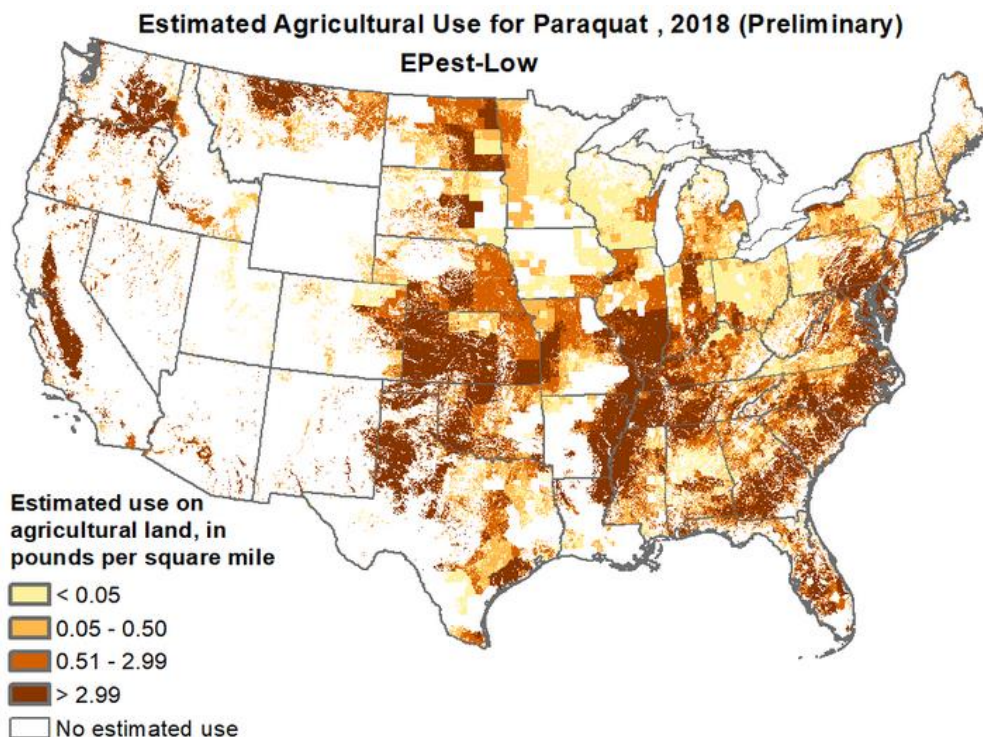
Paraquat is “one of the most acutely lethal pesticides still in use today, [and] is implicated in around 100 poisoning incidents in the USA each year, resulting in at least one death per year since 2012.”¹ The U.S. EPA even has a webpage detailing the dangers of paraquat exposure titled “Paraquat Dichloride: One Sip Can Kill”.² In 2013, paraquat caused a series of 50

¹ Donley, N. (2019). The USA lags behind other agricultural nations in banning harmful pesticides. *Environmental Health*, 18(1). Available here: doi:10.1186/s12940-019-0488-0.

² *Paraquat Dichloride: One Sip Can Kill*, U.S. EPA <https://www.epa.gov/pesticide-worker-safety/paraquat-dichloride-one-sip-can-kill> (last visited Oct. 21, 2022).

accidental deaths in the San Joaquin Valley, with 12 of these deaths due to accidental ingestion of paraquat.³ In 2014, there were 27 deaths attributed to paraquat poisoning nationwide.⁴

Due to its high toxicity, nearly 60 countries,⁵ including large agricultural producers like China, Brazil, and members of the European Union have banned paraquat.⁶ Yet, over the past decade, paraquat use in the U.S. has doubled and it is used extensively throughout the U.S.⁷ Now, paraquat use is the highest it's ever been since 1992.⁸ In California, paraquat is one of the top five herbicides in terms of pounds applied and acres treated,⁹ with over a million pounds applied and acres treated in 2018.¹⁰



³ *Paraquat Dichloride: One Sip Can Kill*, U.S. EPA, <https://www.epa.gov/pesticide-worker-safety/paraquat-dichloride-one-sip-can-kill> (last visited Oct. 21, 2022).

⁴ *Id.*

⁵ Pesticide Action Network. PAN INTERNATIONAL CONSOLIDATED LIST OF BANNED PESTICIDES. Accessed 10/12/2022. Available here: <https://pan-international.org/pan-international-consolidated-list-of-banned-pesticides/>.

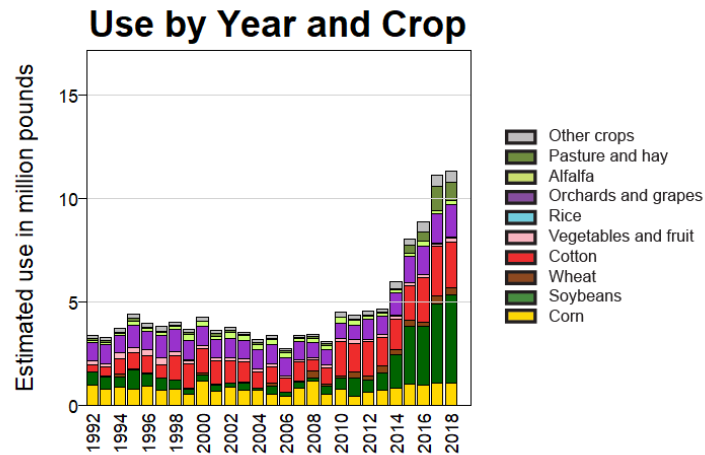
⁶ Donley, N. (2019), *supra* note 1.

⁷ USGS. National Water-Quality Assessment (NAWQA) Project. Estimated Annual Agricultural Pesticide Use Pesticide Use Maps – Paraquat. Accessed 12/13/2019. Available here: https://water.usgs.gov/nawqa/pnsp/usage/maps/show_map.php?year=2018&map=PARAQUAT&hilo=L&disp=Paraquat; *Paraquat Dichloride*, U.S. EPA, <https://www.epa.gov/ingredients-used-pesticide-products/paraquat-dichloride> (last visited Oct. 21, 2022).

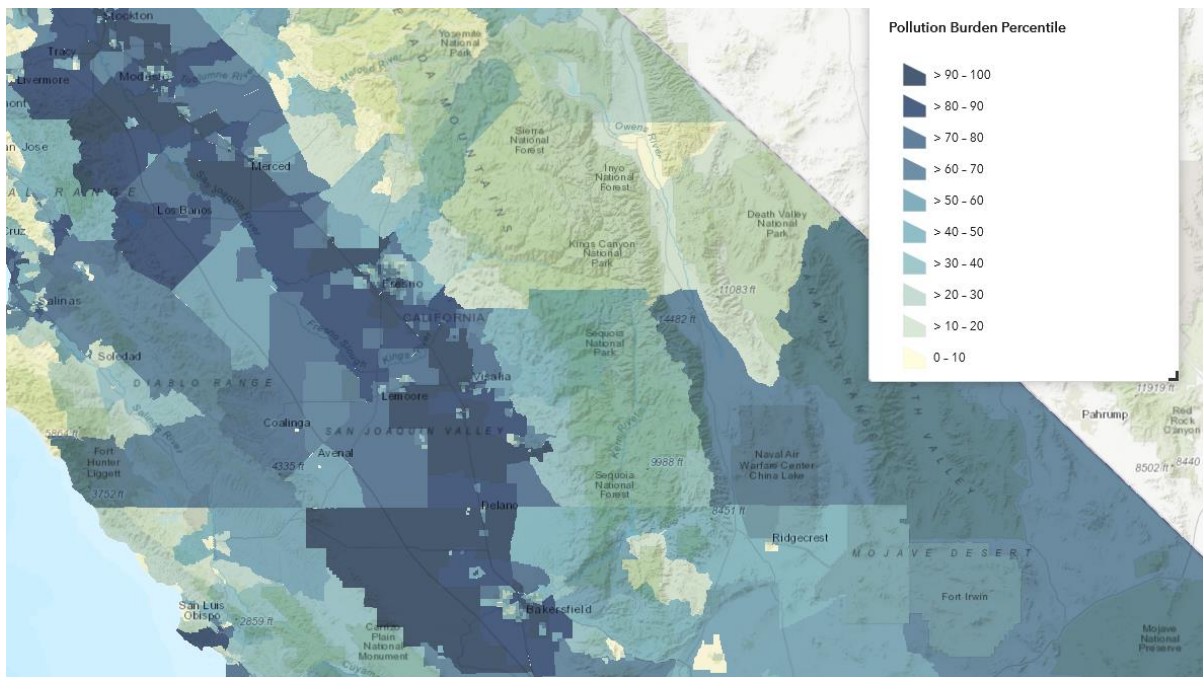
⁸ *Id.*

⁹ California Department of Pesticide Regulation, Summary of Pesticide Use Report Data 88, June 2020. Available here: https://www.cdpr.ca.gov/docs/pur/pur18rep/pur_data_summary_2018.pdf.

¹⁰ California Department of Pesticide Regulation, The Top 100 Chemicals by Pounds in Total Statewide Pesticide Use in 2018. Available here: https://www.cdpr.ca.gov/docs/pur/pur18rep/top100lists/top_100_pesticides_by_pounds.pdf.



Paraquat is predominantly used in California’s Central Valley. In 2018, Kern County had the highest paraquat use, with 304,162.3 pounds applied and 250,555.2 acres treated.¹¹ Other counties with considerable paraquat use include: Fresno, with 182, 892.63 pounds applied and 185,755.67 acres treated; Kings, with 165, 588.95 pounds applied and 182,741.26 acres treated; Merced, with 87,777.58 pounds applied and 87,376.64 acres treated; and Tulare, with 88, 289.99 pounds applied and 82,158.45 acres treated. These counties also carry the highest pollution burdens in the state.¹²



¹¹ California Department of Pesticide Regulation, Total Pounds, Applications, and Acres Treated by County and Chemical: 2018. Available here:

https://www.cdpr.ca.gov/docs/pur/pur18rep/totals/county_subtotals_chemical.pdf.

¹² CalEnviroScreen 4.0 Indicator Maps, California Office of Environmental Health Hazard Assessment,

<https://experience.arcgis.com/experience/ed5953d89038431dbf4f22ab9abfe40d/page/Indicators/?views=Pollution-Burden> (last visited Nov. 1, 2022).

We urge DPR to take steps to begin cancellation proceedings because the serious uncontrollable adverse effects of paraquat. Food & Ag. Code § 12825. And in the interim, DPR should immediately suspend paraquat because the continued use of this pesticide presents immediate substantial danger to human health and the environment. Food & Ag. Code § 12826. These steps are consistent with DPR’s mandate to “eliminate from use in the state any pesticide that endangers the agricultural or nonagricultural environment.” Food & Ag. Code § 12824.

The Center for Biological Diversity is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center for Biological Diversity has over 1.7 million members and supporters throughout the United States, including 211,061 residents in California and has worked for many years to reduce the significant adverse effects of pesticides, including paraquat.

Californians for Pesticide Reform is a statewide coalition of more than 190 organizations, founded in 1996 to fundamentally shift the way pesticides are used in California. CPR has built a diverse, multi-interest coalition to challenge the powerful political and economic forces opposing change. Californians for Pesticide Reform’s member organizations include public health, children’s health, educational and environmental advocates, clean air and water organizations, health practitioners, environmental justice groups, labor organizations, farmers, and sustainable agriculture advocates.

I. DPR should promptly reevaluate paraquat

A pesticide must be reevaluated when it presents significant adverse impacts, including but not limited to hazards to public or worker health and/or fish and wildlife. 3 Cal. Code Regs §§ 6220, 6221. The health risks of paraquat exposure through the skin, ingestion, or inhalation are well documented and range from heart failure, kidney failure, liver failure, and lung scarring.¹³ Multiple scientific studies have also found links between paraquat exposure and diseases such as Parkinson’s and cancer. These health risks fall disproportionately on farmworkers and farming communities within California. There are also several state and federally protected species that are harmed by paraquat and occur in areas where there is high paraquat use. Therefore, paraquat should be reevaluated due to its significant adverse impacts on human health and protected wildlife.

a. Paraquat presents significant adverse impacts to human health

i. Paraquat exposure has been linked to Parkinson’s disease

Parkinson’s disease is a neurological condition that “stems from a loss of nerve cells in a particular region of the brain that produces dopamine, the brain chemical that helps control

¹³ *Facts About Paraquat*, CDC, <https://emergency.cdc.gov/agent/paraquat/basics/facts.asp> (last visited Nov. 1, 2022).

movements such as walking.”¹⁴ Those with Parkinson’s experience “tremors, slowness in movement, stiffness, and difficulties with balance and walking.”¹⁵ There is currently no cure for Parkinson’s.¹⁶

We urge DPR to consider the “plethora of studies [that] have shown that exposure to paraquat is correlated positively within parkinsonism in humans.”¹⁷ A 2019 meta-analysis found that “there is a statistically significant association between paraquat exposure and [Parkinson’s disease].”¹⁸ In addition to Parkinson’s disease being linked to paraquat exposure, human epidemiological studies have also found that the “incidence of the disease and the extent of paraquat exposure can sometimes strongly correlate.”¹⁹ Even animal studies “demonstrate that paraquat can elicit the hallmark symptoms of Parkinson’s in mice.”²⁰

Studies have also found that when environmental or genetic risk factors are combined with paraquat exposure, the risk of developing Parkinson’s disease is increased. For example, a 2012 study found that the risk of developing Parkinson’s disease was three times higher in those who had a traumatic brain injury in addition to being exposed to paraquat.²¹ Another study in 2009 also found that those with certain genetic markers have an increased risk of developing Parkinson’s after being exposed to paraquat.²² In this study, participants who faced high paraquat exposure and carried one “susceptibility allele” were three times more likely to develop Parkinson’s, and those who carried two “susceptibility alleles” were four times more likely to develop Parkinson’s.²³

ii. Paraquat exposure has been linked to thyroid cancer

A recent study investigating thyroid cancer in agricultural areas in Central California found that pesticide exposure, including paraquat, is associated with an increased risk of thyroid

¹⁴ Dorsey, R., Sherer, T., Okun, M., Bloem, B, Ending Parkinson’s Disease 2 (2020).

¹⁵ *Id.*

¹⁶ *Id.* at 3.

¹⁷ Anselmi, L., Bove, C., Coleman, F. H., Le, K., Subramanian, M. P., Venkiteswaran, K., Subramanian, T., & Travagli, R. A. (2018). Ingestion of subthreshold doses of environmental toxins induces ascending Parkinsonism in the rat. *NPJ Parkinson's disease*, 4, 30. Available here: <https://doi.org/10.1038/s41531-018-0066-0>.

¹⁸ Tangamornsuksan, W., Lohitnavy, O., Sruamsiri, R., Chaiyakunapruk, N., Norman Scholfield, C., Reisfeld, B., & Lohitnavy, M. (2019). Paraquat exposure and Parkinson's disease: A systematic review and meta-analysis. *Archives of environmental & occupational health*, 74(5), 225–238. Available here: <https://doi.org/10.1080/19338244.2018.1492894>.

¹⁹ Nandipati, S., & Litvan, I. (2016). Environmental Exposures and Parkinson's Disease. *International journal of environmental research and public health*, 13(9), 881. Available here: <https://doi.org/10.3390/ijerph13090881>.

²⁰ Brief for Timothy Greenamyre et al. as Amici Curiae Supporting Petitioners, *California Rural Legal Assistance et al. v. U.S. Environmental Protection Agency*, (2021) (No. 21-71287).

²¹ Lee, P. C., Bordelon, Y., Bronstein, J., & Ritz, B. (2012). Traumatic brain injury, paraquat exposure, and their relationship to Parkinson disease. *Neurology*, 79(20), 2061–2066. Available here: <https://doi.org/10.1212/WNL.0b013e3182749f28>.

²² Ritz, B. R., Manthripragada, A. D., Costello, S., Lincoln, S. J., Farrer, M. J., Cockburn, M., & Bronstein, J. (2009). Dopamine transporter genetic variants and pesticides in Parkinson's disease. *Environmental health perspectives*, 117(6), 964–969. Available here: <https://doi.org/10.1289/ehp.0800277>.

²³ *Id.*

cancer.²⁴ The study documented “consistent positive associations” between paraquat exposure and thyroid cancer.²⁵ In light of this recent study, DPR should reevaluate paraquat to further investigate its carcinogenic effects.

iii. Agricultural workers and those living in agricultural areas are most at risk for paraquat exposure

Given the high use of paraquat in much of California’s Central Valley, agricultural workers and residents living in these high exposure areas are at greater risk of developing Parkinson’s disease and other illnesses caused by this extremely toxic herbicide. Thus, it is imperative that DPR consider the disproportionate impact that paraquat exposure has on farming communities in the state.

In 2019 EPA identified risks of concern for agricultural workers who engaged in mixing, loading, and application of paraquat.²⁶ EPA also identified risks of concern for bystanders who were not engaged in agricultural work but would otherwise be exposed to paraquat due to spray drift occurring at the field edge.²⁷ In performing its risk assessment, EPA also assumed workers would be wearing the required level of personal protective equipment (PPE).²⁸ Still, for mixers and loaders EPA found inhalation risks of concern for 13 out of 26 exposure scenarios.²⁹ For applicators, there were inhalation risks of concern for 19 out of 26 exposure scenarios.³⁰ For mixers, loaders, and applicators, there were dermal risks of concern for 6 out of 8 exposure scenarios.³¹

However, data gathered through 2014 by SENSOR-Pesticides showed that most paraquat-related illness and/or injury cases were occupational, with “many cases involve[ing] PPE issues, including spray/splash getting into eyes although wearing safety glasses.”³² The data also showed that many cases also involved application equipment failures and inadequate paraquat application training.³³ Thus, the lack of PPE compliance, equipment failures, and

²⁴ Omidakhsh, N., Heck, J., Cockburn, M., Ling, C., Hershman, J., & Harari, A. (2022). Thyroid Cancer and Pesticide Use in a Central California Agricultural Area: A Case Control Study. *The Journal of Clinical Endocrinology & Metabolism*, 107(9), e3574–e3582. Available here: <https://doi.org/10.1210/clinem/dgac413>.

²⁵ Cox, J, *Study links use of paraquat, other pesticides to thyroid cancer in southern, central valley*, Bakersfield.com (Sept. 19, 2022), https://www.bakersfield.com/news/study-links-use-of-paraquat-other-pesticides-to-thyroid-cancer-in-southern-central-valley/article_cd6d8eea-3838-11ed-ae09-b7fea4f12e80.html (last visited Nov. 1, 2022).

²⁶ U.S. EPA, Paraquat Dichloride: Draft Human Health Risk Assessment in Support of Registration Review. June 26, 2019. Pg. 11. Available here: <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0121>.

²⁷ *Id.*

²⁸ *Id.* at 52.

²⁹ *Id.*

³⁰ *Id.*

³¹ *Id.*

³² Paraquat Dichloride: Draft Human Health Risk Assessment in Support of Registration Review, *supra* note 26, at 55.

³³ *Id.*

inadequate training adds further risk to agricultural workers who handle this extremely dangerous pesticide.

EPA also identified a risk of concern to bystanders who are indirectly affected by paraquat drift up to 150 feet from the field edge.³⁴ Therefore, agricultural workers who wear required PPE and bystanders who wear no PPE remain at risk for exposure, and therefore at risk for lung and skin damage,³⁵ kidney harm,³⁶ and other illnesses such as Parkinson's disease and cancer.³⁷

Furthermore, a 2018 study investigating premature deaths from Parkinson's in highly agricultural areas found "sizeable clustering of premature deaths" within 1,000 meters of paraquat application.³⁸ A study looking at paraquat exposure in the Central Valley found those exposed to both paraquat and maneb, had a greater risk of developing Parkinson's, especially if exposure occurred during teenage years or young adulthood.³⁹

iv. Industry has suppressed data and analyses on the causal link between paraquat exposure and Parkinson's disease

A pesticide must also be evaluated if there is a "discovery that data upon which a registration was issued is false, misleading, or incomplete." 3 Cal. Code Regs. §6221(l). Paraquat should be reevaluated due to the recent discovery of evidence that Syngenta, a paraquat manufacturer and registrant, propounded misleading information about the harmful effects of paraquat.⁴⁰ Litigation between farmworkers, Syngenta, and Chevron Chemical has revealed internal documents dating back to the 1960s and 70s showing that Syngenta's predecessor and Chevron Chemical knew that paraquat "could impair the central nervous system (CNS), triggering tremors and other symptoms in experimental animals similar to those suffered by people with Parkinson's."⁴¹ In 1985, an internal Chevron Chemical memorandum revealed that corporate officials took special note of a study that found an "extraordinarily high correlation" between Parkinson's and paraquat exposure.⁴² The memorandum also expressed concern over future legal liability, similar to the liability that asbestos companies faced when it was revealed

³⁴ *Id.* at 47.

³⁵ *Id.* at 6-5.

³⁶ *Id.*

³⁷ *See supra*, Section I(a)(i)-(ii).

³⁸ Caballero, M., Amiri, S., Denney, J. T., Monsivais, P., Hystad, P., & Amram, O. (2018). Estimated Residential Exposure to Agricultural Chemicals and Premature Mortality by Parkinson's Disease in Washington State. *International journal of environmental research and public health*, 15(12), 2885. Available here: <https://doi.org/10.3390/ijerph15122885>.

³⁹ Costello, S., Cockburn, M., Bronstein, J., Zhang, X., & Ritz, B. (2009). Parkinson's disease and residential exposure to maneb and paraquat from agricultural applications in the central valley of California. *American journal of epidemiology*, 169(8), 919-926. Available here: <https://doi.org/10.1093/aje/kwp006>.

⁴⁰ C. Gillam and A. Uteuova, *Secret files suggest chemical giant feared weedkiller's link to Parkinson's disease*, The Guardian (Oct. 20, 2022), <https://www.theguardian.com/us-news/2022/oct/20/syngenta-weedkiller-pesticide-parkinsons-disease-paraquat-documents> (last visited Nov. 1, 2022).

⁴¹ *Id.*

⁴² *Id.*

that asbestos caused cancer.⁴³ The memorandum stated that “the bankruptcy of [an asbestos manufacturer] ... has highlighted the especially severe financial risks involved in selling a product which contributes to a chronic disease. Parkinson’s can go on for decades.”⁴⁴

Memorandum
Chevron's Paraquat and
Parkinson's Disease

October 8, 1985

Attached are an article from the July 19 issue of *Science*, discussing recent evidence of environmental causes of Parkinson's and portions of an article from *Chevron World's* summer 1985 edition focused on the important economic and ecological advantages of conservation tillage using the herbicide, Paraquat. Chevron holds sole U.S. marketing rights for the product which is produced by ICI. Conservation tillage is expected to become the major tillage method in the country.

The article raises concern that Paraquat may be implicated because:

Paraquat is chemically very similar to the by-product of synthetic heroin manufacture, MPTP, which produces almost instant Parkinson's, by killing dopaminergic neurons in the brain, and

Paraquat is among the agricultural chemicals used in the area of Canada in which an extraordinarily high correlation of .967 was found between levels of pesticide use and Parkinson's cases. The incidence of the disease in the area was about 7 times the rate in areas where use was low.

The bankruptcy of the asbestos manufacturer, The Manville Corporation, has highlighted the especially severe financial risks involved in selling a product which contributes to a chronic disease. Parkinson's can go on for decades.

For the present, we can hope that another chemical or cause will explain the correlation found in the Barbeau study, but I trust that Chevron is watching this closely, and, perhaps, doing a little testing, for the sake of its customers and stockholders.

In 2003, Syngenta conducted an internal study to evaluate the effects of paraquat exposure on animal brains but used certain methods which led to a finding that the impacts of paraquat were not statistically significant, which Syngenta publicized.⁴⁵ Notably, when Syngenta used the same, more accurate methods as independent scientists, it found that “paraquat actually did result in statistically significant loss of the relevant brain cells – just as the outside scientists had found.”⁴⁶ However, Syngenta did not disclose these additional findings.⁴⁷ Given Syngenta’s campaign to mislead the public about the harmful impacts of paraquat, we urge DPR to conduct its own investigation through the reevaluation process.

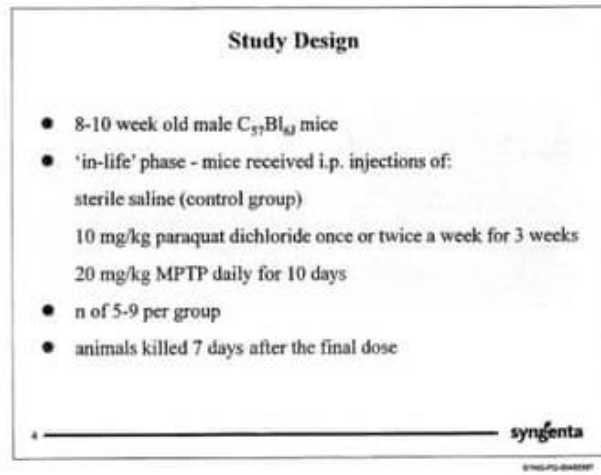
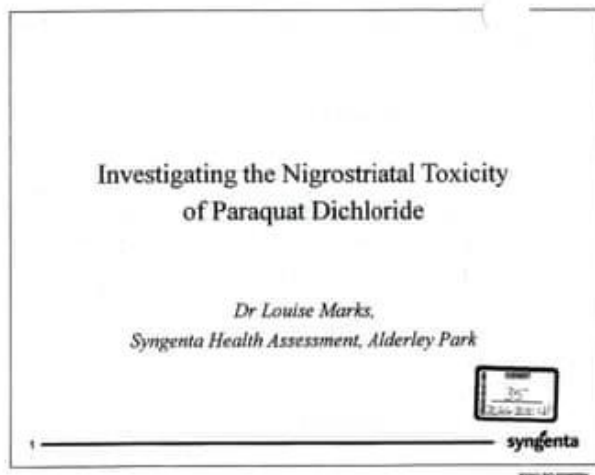
⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *Id.*



b. Paraquat presents significant adverse impacts to protected wildlife

Reevaluation must occur when a pesticide poses a hazard to fish and wildlife. 3 Cal. Code Regs § 6221(h). Furthermore, under the California Endangered Species Act (CESA) and the federal Endangered Species Act (ESA), it is the duty of state and federal agencies to “seek to conserve endangered species and threatened species.” Cal. Fish & Game Code § 2055; 16 U.S.C. § 1531(c)(1). Endangered, rare, or threatened species including those listed under CESA and/or the ESA. In California, there are additional regulatory protections for certain fully protected species, which prohibit the “take” or possession of “fully protected” fish, mammals, amphibians, reptiles, and birds. Cal. Fish & Game Code §§ 3511, 4700, 5050, 5515.

In EPA’s Preliminary Ecological Risk Assessment for paraquat, EPA found paraquat to be harmful to mammals, fish, amphibians, birds, and invertebrates.⁴⁸ Additionally, there are several state and federally protected species whose ranges overlap with the tremendous amount of paraquat used in the Central Valley. Thus, reevaluation is necessary for DPR to comply with the reevaluation criteria as well as CESA and the ESA. A partial list of the rare, sensitive, threatened, or endangered species significantly and adversely affected is below. DPR’s reevaluation process must assess the hazards to all rare, sensitive, threatened, or endangered species affected by paraquat.

i. Mammals

EPA found that paraquat causes acute and chronic harm to mammals and such harm exceeded EPA’s level of concern.⁴⁹ Therefore, DPR should investigate the harm that paraquat may cause to state and federally protected mammals such as the San Joaquin kit fox (*Vulpes*

⁴⁸ U.S. EPA, Paraquat: Preliminary Ecological Risk Assessment for Registration Review. Oct. 14, 2019. Pg. 4-6. Available here: <https://www.regulations.gov/document/EPA-HQ-OPP-2011-0855-0128>.

⁴⁹ *Id.*

macrotis mutica), giant kangaroo rat (*Dipodomys ingens*), and Fresno kangaroo rat (*Dipodomys nitratoides exilis*).

The San Joaquin kit fox is state and federally listed as endangered. 50 C.F.R. § 17.11; 14 Cal. Code Regs. § 670.5. The kit fox’s range overlaps with agricultural areas in California, such as the “western portion of the San Joaquin Valley south of San Luis Reservoir to the Buena Vista Valley, in the Panoche and Cuyama Valleys, and Carrizo Plain . . . portion of the Valley around Kern NWR and Semitropic Ecological Reserve, in Bakersfield, and in the southeastern portion of the Valley north to Porterville.”⁵⁰

The giant kangaroo rat and Fresno kangaroo rat are both state and federally listed as endangered. 50 C.F.R. § 17.11; 14 Cal. Code Regs. § 670.5. Like the kit fox, the giant and Fresno kangaroo rats’ habitat overlaps with agricultural areas in the Central Valley where paraquat is used.⁵¹

ii. Birds

EPA also found that paraquat causes acute and chronic harm to birds, with both types of harm exceeding EPA’s level of concern.⁵² The yellow-billed cuckoo (*Coccyzus americanus*) is federally listed as threatened and state listed as endangered. 50 C.F.R. § 17.11; 14 Cal. Code Regs. § 670.5. The yellow-billed cuckoo is known to or believed to occur in Kern and Tulare County.⁵³

The Swainson’s hawk (*Buteo swainsoni*) and Tricolored blackbird (*Agelaius tricolor*) are state listed as threatened. 14 Cal. Code Regs. § 670.5. The Swainson’s hawk and tricolored blackbird occur in the Central Valley where paraquat is frequently used.⁵⁴

The greater sandhill crane is one of California’s “fully protected” birds. Cal. Fish & Game Code § 3511(b). This state protected bird is known to winter in the Central Valley where paraquat is used.⁵⁵

⁵⁰ U.S. Fish and Wildlife Service, San Joaquin kit fox (*Vulpes macrotis mutica*) 5-Year Review (Sept. 2020) pp. 2. Available here: https://ecos.fws.gov/docs/tess/species_nonpublish/3127.pdf.

⁵¹ *Specie Profile for Giant kangaroo rat (Dipodomys ingens)*, USFWS, <https://ecos.fws.gov/ecp/species/6051> (last visited Oct. 27, 2022); *Species Profile for Fresno kangaroo rat (Dipodomys nitratoides exilis)*, USFWS <https://ecos.fws.gov/ecp/species/5150> (last visited Oct. 27, 2022).

⁵² Paraquat: Preliminary Ecological Risk Assessment for Registration Review, *supra* note 48.

⁵³ *Species Profile for Yellow-billed Cuckoo (Coccyzus americanus)*, USFWS, <https://ecos.fws.gov/ecp/species/3911> (last visited Oct. 27, 2022).

⁵⁴ Cornell Lab of Ornithology, Tricolored Blackbird - Range Map, https://www.allaboutbirds.org/guide/Tricolored_Blackbird/maps-range (last visited Nov. 2, 2022); Cornell Lab of Ornithology, Swainson’s hawk - Range Map, https://www.allaboutbirds.org/guide/Swainsons_Hawk/maps-range (last visited Nov. 2, 2022):

⁵⁵ California Department of Fish and Game, 5-Year Status Review: GREATER SANDHILL CRANE (*Grus canadensis tabida*) (1994), https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiC1Kjc6e_6AhVuATQIH_YqXDPIQFnoECA0QAQ&url=https%3A%2F%2Fnm.dfg.ca.gov%2FFileHandler.ashx%3FDocumentID%3D3521&usg=AOvVaw2pT2RjikXaf8Cx4xCZ0-0Z (last visited Oct. 27, 2022).

iii. Invertebrates

EPA found that paraquat causes acute and chronic harm exceeding its level of concern for invertebrates,⁵⁶ like the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). The valley elderberry longhorn beetle is federally listed as threatened. 50 C.F.R. § 17.11. This beetle's range overlaps with several counties in the Central Valley, including San Joaquin, Fresno, and Merced County.⁵⁷

The vernal pool fairy shrimp (*Branchinecta lynchi*), another invertebrate, is federally listed as threatened. 50 C.F.R. § 17.11. Vernal pool fairy shrimp are known to occur throughout the Central Valley.⁵⁸

iv. Fish

A study conducted in 2020 found that paraquat “exposure affects the histology of gills, liver, and kidney, [in freshwater fish] thus impairing the vital functions like respiration, excretion, and metabolic regulation which in turn will affect the fish health and is a serious threat.”⁵⁹ Paraquat would negatively impact a range of protected fish species including, but not limited to, Chinook salmon (*Oncorhynchus* (= *Salmo*) *tshawytscha*), coho salmon (*Oncorhynchus* (= *Salmo*) *kisutch*), and steelhead trout (*Oncorhynchus* (= *Salmo*) *mykiss*).

Chinook salmon is both state and federally listed as endangered with a spring run through the Central Valley.⁶⁰ 50 C.F.R. § 17.11; 14 Cal. Code Regs. § 670.5. Coho salmon is federally listed as endangered, and state listed as threatened. *Id.* Central California Coast coho salmon are a unique population of coho salmon with critical habitat designated along the central coast.⁶¹ Steelhead trout is federally listed as endangered, with a distinct population in the Central Valley.⁶² *Id.* Use of paraquat in California adversely affects salmonid species and their habitat.

v. Amphibians

EPA found acute and chronic harm exceeding its level of concern for terrestrial-phase amphibians,⁶³ like the California tiger salamander (*Ambystoma californiense*) and the California red-legged frog (*Rana draytonii*). The California tiger salamander is federally listed as

⁵⁶ Paraquat: Preliminary Ecological Risk Assessment for Registration Review, *supra* note 48.

⁵⁷ *Species Profile for Valley elderberry longhorn beetle (Desmocerus californicus dimorphus)*, USFWS, <https://ecos.fws.gov/ecp/species/7850> (last visited Oct. 27, 2022).

⁵⁸ *Species Profile for Vernal pool fairy shrimp (Branchinecta lynchi)*, USFWS, <https://ecos.fws.gov/ecp/species/498> (last visited Oct. 27, 2022).

⁵⁹ Badroo, I. A., Nandurkar, H. P., & Khanday, A. H. (2020). Toxicological impacts of herbicide paraquat dichloride on histological profile (gills, liver, and kidney) of freshwater fish *Channa punctatus* (Bloch). *Environmental science and pollution research international*, 27(31), 39054–39067. Available here: <https://doi.org/10.1007/s11356-020-09931-6>.

⁶⁰ *Species Profile for Chinook salmon (Oncorhynchus (=Salmo) tshawytscha)*, USFWS, <https://ecos.fws.gov/ecp/species/E06D> (last visited Oct. 27, 2022).

⁶¹ *Species Directory: Coho Salmon (Protected)*, NOAA Fisheries, <https://www.fisheries.noaa.gov/species/coho-salmon-protected#spotlight> (last visited Oct. 27, 2022).

⁶² *California Central Valley Steelhead*, NOAA Fisheries, <https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/california-central-valley-steelhead> (last visited Oct. 27, 2022).

⁶³ Paraquat: Preliminary Ecological Risk Assessment for Registration Review, *supra* note 48.

endangered, and state listed as threatened. 50 C.F.R. § 17.11; 14 Cal. Code Regs. § 670.5. The California tiger salamander’s range overlaps with a substantial portion of the Central Valley, with critical habitat designated in Merced, San Joaquin, and Fresno County.⁶⁴

The California red-legged frog is federally listed as threatened and is found in the coastal drainages of central California.⁶⁵ 50 C.F.R. § 17.11. In 2009, EPA found that paraquat was likely to adversely affect the California red-legged frog.⁶⁶ A report on this federally protected amphibian also found paraquat to reduce larval survival and growth rates.⁶⁷

Given EPA’s ecological risk assessment and other scientific studies that documented harm to wildlife, DPR should further analyze these impacts through the reevaluation process.

c. EPA decided to reconsider its Interim Registration Decision of paraquat

In addition to the significant adverse health and wildlife impacts paraquat poses, we also urge DPR to reevaluate paraquat because EPA has sought to reevaluate the federal registration of paraquat.⁶⁸ In 2021, EPA issued its Interim Registration Decision, approving paraquat use for another 15 years. However, more recently, EPA has decided to reconsider its decision.⁶⁹

In May 2022, California Rural Legal Assistance (“CRLA”), the Center for Biological Diversity, and other groups sued EPA, challenging EPA’s interim decision.⁷⁰ CRLA argued that EPA’s risk-benefit analysis failed to address risks to farmworkers, surrounding communities, and the environment.⁷¹ CRLA argued that EPA’s risk-benefit analysis was conclusory and failed to explain why the risk of concerns it had identified to farmworkers, bystanders, and the environment were outweighed by the benefits of paraquat.⁷² CLRA also pointed out that EPA failed to fully investigate paraquat’s potential to volatilize, which is necessary to determine harm to bystanders that may be exposed to paraquat through spray drift.⁷³

⁶⁴ *Species Profile for California Tiger Salamander (Ambystoma californiense)*, USFWS, <https://ecos.fws.gov/ecp/species/2076> (last visited Oct. 27, 2022). Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California tiger salamander, Central Population: Final Rule, 70 Fed. Reg. 49,380 (Aug. 2005). Available here: <https://www.govinfo.gov/content/pkg/FR-2005-08-23/pdf/05-16234.pdf#page=2>.

⁶⁵ *Species Profile for California red-legged frog (Rana draytonii)*, USFWS, <https://ecos.fws.gov/ecp/species/2891> (last visited Oct. 27, 2022).

⁶⁶ Office of Pesticide Programs Environmental Fate and Effects Division, Risks of Paraquat Use to Federally Threatened California Red-legged Frog (*Rana aurora draytonii*), June 10, 2009, Pg. 7. Available here: <https://www3.epa.gov/pesticides/endanger/litstatus/effects/redleg-frog/paraquat/analysis.pdf>.

⁶⁷ Anderson, R.B. 2016. Report for Amphibian Management and Monitoring at Palo Corona Regional Park, Garland Ranch Regional Park, and Frog Pond Wetland Preserve Monterey County, CA 20. Available here: https://mprpd.specialdistrict.org/files/c08de688e/AmphibianMgmtMonitoring_PCRP.2016.pdf.

⁶⁸ Pesticide Registration Review; Interim Decision for Paraquat Dichloride; Notice of Availability, 86 Fed. Reg. 41,471 (Aug. 2, 2021). Available here: <https://www.govinfo.gov/content/pkg/FR-2021-08-02/pdf/2021-16344.pdf>.

⁶⁹ Mot. for Voluntary Remand Without Vacatur, Dkt. 42-1, *California Rural Legal Assistance et al. v. EPA*, No. 21-71287 (9th Cir.).

⁷⁰ Pet’rs Opening Brief, Dkt. 27, *California Rural Legal Assistance et al. v. EPA*, No. 21-71287 (9th Cir.).

⁷¹ *Id.* at 25.

⁷² *Id.*

⁷³ *Id.*

In response to CRLA's arguments, EPA made a motion for voluntary remand so that it may reconsider its risk-benefit analysis and paraquat's potential for volatilization.⁷⁴ EPA admitted that its risk-benefit analysis "could have been more robust."⁷⁵ EPA also noted that there was "evidence in the record that paraquat may be likely to volatilize" and that it "wishes to consider this issue further."⁷⁶ Given EPA's decision to reconsider its registration of paraquat because of deficiencies in its analysis DPR should not rely on EPA's determination and should independently reconsider paraquat's registration through the reevaluation process.

II. DPR should pursue cancellation of paraquat

In addition to initiating the reevaluation process, DPR should also pursue cancellation proceedings for paraquat because of the well documented hazards to public health and wildlife identified by EPA and independent scientists. The Food and Agricultural Code identifies nine conditions that may warrant cancellation of a pesticide registration, any one of which can support cancellation. Food & Ag. Code § 12825. At least four of the conditions triggering cancellation exist for paraquat:

- a. Paraquat has "demonstrated serious uncontrollable adverse effects."
- b. Paraquat causes greater detriment to the environment than the benefit received.
- c. There are reasonable, effective, and practicable alternatives to paraquat that are less destructive to the environment.
- d. Even when used properly, paraquat "detrimental ... to domestic animals, or the public health and safety."

Food & Ag. Code § 12825(a), (b), (c), (d).

III. Use of paraquat is not necessary because there are adequate alternatives

There are adequate alternatives that obviate the need for paraquat use, including integrated pest management ("IPM") and numerous other herbicides already on the market. DPR understands its "legal mandate to encourage the use of environmentally sound pest management, including integrated pest management (IPM)."⁷⁷ DPR recognizes that IPM is an approach to pest control that "focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties."⁷⁸ With IPM, "[p]esticides are used only after monitoring indicates they are needed . . . and applied in a manner that minimizes risks to human health, beneficial and

⁷⁴ Mot. for Voluntary Remand Without Vacatur, *supra* note 69, at 10.

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Pest Management*, DPR, <https://www.cdpr.ca.gov/docs/pestmgmt/ipminov/ipmmenu.htm> (last visited Oct. 27, 2022).

⁷⁸ Berger, L., Farrar, J., Goodell, P., McIntyre, J. (2018). *Roadmap for Integrated Pest Management: Systems Thinking to Build Better IPM for All Californians*, California Department of Pesticide Regulation, p. iv, https://www.cdpr.ca.gov/docs/pestmgmt/ipm_roadmap.pdf.

nontarget organisms, and the environment.”⁷⁹ In addition to IPM, there are several registered herbicides that can be used in place of paraquat, including but not limited to glyphosate, carfentrazone, 2,4-D, bromoxynil, clethodim, hexazinone, iamazamox, and imazethapyr.⁸⁰ Therefore, the availability of other herbicides combined with IPM practices shows that using paraquat is unnecessary.

IV. DPR’s reevaluation decision must also comply with CEQA

DPR’s reevaluation decision must comply with CEQA because DPR’s pesticide registration program is a “certified program” subject to CEQA’s substantive requirements and policy goals. 14 Cal Code Regs. § 15250. Recently, a California appellate court affirmed that DPR’s pesticide reevaluation decisions must comply with CEQA. *See Raptors are the Solution v. The Superior Court of Alameda County*, No. A161787, 2022 Cal. App. Unpub. LEXIS 5902 (Sept. 27, 2022). Therefore, DPR’s reevaluation decision must comply with CEQA’s “policy of avoiding significant adverse effects on the environment where feasible.” 14 Cal Code Regs. § 15250; *see also Pesticide Action Network North America v. Department of Pesticide Regulation* (2017) 16 Cal.App.5th 224, 241 (*PANNA*).

V. DPR should immediately suspend registrations for paraquat

DPR should not wait until the termination of the reevaluation or cancellation process because the immediate suspension of paraquat is necessary and appropriate to prevent substantial harm that would occur during later proceedings. DPR should suspend a pesticide registration if there is “reason to believe” that (1) any one of the nine conditions warranting cancellation applies, and (2) continued use of the pesticide poses an “immediate substantial danger.” Food & Ag. Code § 12826. As noted above, at least four conditions justify cancellation of paraquat registrations. And the same adverse impacts that make cancellation necessary also pose “immediate substantial dangers” that cannot be allowed to continue during the time-consuming reevaluation and cancellation proceedings.

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⁷⁹ *Id.*

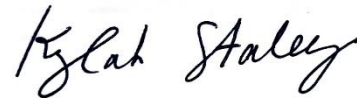
⁸⁰ Lanini et al., 2016. Pest Management Guidelines for Agriculture; Tomato Year-Round IPM Program. University of California. UCIPM. Available here: <https://www2.ipm.ucanr.edu/agriculture/tomato/Herbicide-Treatment-Table/>. Canevari, W.M., Orloff, S.B., Putnam, D.H. 2017c. Alfalfa: Integrated Weed Management in Seedling Alfalfa. University of California Statewide Integrated Pest Management Program. Available here: <http://ipm.ucanr.edu/PMG/r1701111.html>. R.F. 2019. Asparagus: Herbicide Treatment Table. University of California Statewide Integrated Pest Management Program. Available here: <https://www2.ipm.ucanr.edu/agriculture/asparagus/Herbicide-Treatment-Table/>.

Thank you for your consideration of these comments.

Sincerely,



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