

Will Regulators Catch the Drift? NFFC v. EPA and Breathing New Life into Pesticide Regulation

By George Kimbrell, Sylvia Wu, and Audrey Leonard*

In the past half-century U.S. agriculture has become dramatically more industrialized, consolidated, and bifurcated between livestock and crop agriculture, resulting in significant negative environmental, health, and socioeconomic effects. One pillar propping up this unsustainable industrial model is heavy reliance on synthetic pesticides and fertilizers, chemical inputs necessary for large monoculture production. In the most recent 21st century version of this ever-entrenching paradigm, pesticide companies sell a seed/pesticide cropping system, comprised of crops genetically engineered to resist multiple pesticides, allowing “over the top” spraying at new times of the year and in new ways. These crop systems have significantly increased the pesticide load on our foods and into our environment, creating huge externalized environmental and health costs.

Pesticides are toxic substances intended to harm or kill. Yet, stakeholders best characterize current federal pesticide regulation under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) not by its rigor but by its weaknesses and loopholes. The U.S. Environmental Protection Agency (EPA), charged with administering FIFRA, increasingly approves new uses and variations of pesticides without fully taking into account the consequences these chemical cocktails have on public health, farmers, and our most imperiled species. This includes conditionally approving pesticides despite lacking vital data showing their safety and limiting the scope of agency review when it is applied. When EPA chooses to bend to the whim of powerful agrochemical corporations instead of truly evaluating the potential risks, environmentalists, farmers, and farmworker groups often turn to the courts to challenge EPA’s pesticide approvals.

A recent case, National Family Farm Coalition v. Environmental Protection Agency (NFFC), 960 F.3d 1120 (9th Cir. 2020) presented these issues in stark relief. Dicamba (3,6-dichloro-2-methoxybenzoic acid) is a broad-spectrum herbicide. Dicamba is an effective weed-killer, but its toxicity is not limited to weeds. It also can kill many desirable broadleaf plants, bushes, and trees. And it has a well-known drawback: dicamba is volatile, moving easily off a field on which a farmer has sprayed it. As a result of its toxicity and its tendency to drift, dicamba has historically been limited to clearing fields of weeds, either before crops were planted or before newly planted crops emerged. This changed in 2016: Despite scientists and farmers raising significant concerns, EPA conditionally registered for the first time new “over the top” dicamba pesticide spraying as the ‘next generation’ of pesticide-resistant cropping systems. That approval led to 20 million more pounds of dicamba sprayed annually, a 23-fold increase, across approximately 50 million acres at new times of the year and in novel ways.

This approval created a debacle that agronomists say is unprecedented in the history of U.S. agriculture: the spraying of massive amounts of dicamba, resulting in millions of acres of crops, trees, and wild plants damaged and sometimes

* The authors are attorneys for the Center for Food Safety (CFS), a nationwide public interest organization whose mission is to empower people, support farmers, and protect the earth from the harmful impacts of industrial agriculture. Mr. Kimbrell and Ms. Wu were counsel for the petitioners in *NFFC v. EPA*, as well as some of the other cases discussed. The authors thank their colleagues at CFS, particularly Bill Freese, Amy van Saun, and Martha Crouch, as well as Stephanie Parent, senior attorney for Center for Biological Diversity and their co-counsel in *NFFC*. This Article is based on a March 13, 2021 presentation given by Mr. Kimbrell at Lewis & Clark Law School for the Symposium *Food for Thought: The Impact of Food Choices in a Changing Climate*. Mr. Kimbrell is also an adjunct professor at Lewis & Clark, where he teaches *Food, Agriculture, and Environmental Law*, including the law of pesticides.

destroyed by dicamba spray droplets drifting off-field during application; dicamba vapor clouds damaging vast fields from fencerow to fencerow; dicamba-laced water running off sprayed fields; and even dicamba-contaminated rainfall in areas of intensive use. Millions of acres of off-field dicamba drift and runoff resulted in widespread destruction of crops, economic losses, social upheaval to rural communities, and harm to endangered species and other wildlife.

Environmentalists and farmers challenged EPA's approval of these dicamba products in 2016. And after four years of litigation, in summer 2020, the U.S. Court of Appeals for the Ninth Circuit issued a detailed 56-page opinion carefully analyzing the voluminous record evidence and holding that EPA violated FIFRA in no less than six ways, grounds upon which the Court then completely vacated the registration as unlawfully issued. The Court concluded that EPA violated FIFRA by substantially underestimating several important risks and costs, including the amount of dicamba sprayed, the number of injury reports, and the amount and costs of crop damage. The Court also held that EPA completely failed to consider and account for several other costs, such as economic losses ensuing from anti-competitive, monopolistic effects of the registrations, as well as the social costs of strife and dissension in farming communities triggered by rampant off-target dicamba damage to neighbors' crops. Finally, it also held that EPA violated FIFRA by predicating its core conclusion that its approval would have no adverse economic and environmental effects on mitigation—in the form of weather-related use restrictions—that substantial record evidence demonstrated were so extreme that farmers could not both follow them and have any hope of controlling weeds. EPA failed to consider and analyze whether following those directions was possible in real world farming conditions. All of these were precedential FIFRA holdings.

While the dicamba drift damage story is dramatic, EPA's mistakes and unlawful regulatory approach were not singular; they are instead emblematic of systemic, longstanding poor pesticide oversight. Make no mistake: The needed remedy is nothing short of a complete overhaul of EPA's mission with regards to pesticides and with it modern, 21st century legislation to address 21st century agricultural challenges. However, in the absence of the political will for such changes, the NFFC precedent, and a few other important current and past cases along with it, have the chance to improve pesticide regulation substantially going forward, and breathe some long overdue and badly needed new life into its old statutory bones.

Section I of this Article provides a brief history of pesticides and modern industrial agriculture, its current iteration of crop systems engineered with resistance to multiple pesticides, and the adverse impacts of this pesticide-promoting system on health and the environment. **Section II** sets forth how pesticides are regulated under FIFRA, its implementing regulations, and the EPA modus operandi. It summarizes the many problems in the regulatory structure and implementation, including limited scope, regulatory loopholes, lack of transparency, industry capture/bias, lack of enforcement, and limiting judicial interpretation. **Section III** presents the case study of NFFC v. EPA, and discusses the import of its holdings. **Section IV** places the NFFC case in the broader context of developing pesticide litigation and law, and the legal and cultural battle for the future of our food. This Article concludes on a cautiously optimistic note, as NFFC and other similar cases may be the leading edge of long-overdue improvements to how pesticides are regulated, to the betterment of health and environmental protection.

Introduction

On a muggy day in August 2017, a Missouri farmer looked out across his 58-acre soybean field, arms folded, and sighed.¹ What was shaping up to be one of his most productive plots was now full of plants with shriveled leaves, curled upward like little cups. It was an unmistakable pattern of destruction with which he was all too familiar: the herbicide dicamba. His field, adjacent to his own cattle pastures and a dirt road, shared one side with a neighboring farmer's soybean field. He recalled seeing his neighbor spray his crops recently, and noticed the damaged plants were on the side closer to his neighbor's land, a strong sign that dicamba had drifted onto his field.

He bent down to examine the leaves, took a picture with his phone, and thought about what to do next. He knew about the new soybean seeds on the market, genetically engineered to be resistant to yet another herbicide, the latest new techno-fix, now that the weeds had all become resistant to Roundup, their old standby weed-killer. He deliberately bought conventional seeds, not the patented ones engineered to resist the powerful herbicide that he purposefully avoided spraying in his own fields, and so that he may grow his own seeds for replanting, as he and his forefathers had done. But now he might have no choice: suffer more losses, stop planting the fields hit by drift, or give in and buy the damned GE seeds purely to defend himself from damage, from his neighbors.

This was not what the fourth-generation farmer had in mind for the future of the land his father bought with help from the G.I. Bill in 1948. And neither he nor his wife could have imagined something like this creating such tensions between them and their neighbors, arguments about who caused this damage and why it kept happening, leaving hard feelings and ill-will behind. He had heard how impossible it was to follow the lengthy, complex use directions, even if farmers tried their best to avoid drift, as he knew his neighbor had. Don't spray if the wind is blowing a certain direction, or if it is above or below a certain speed, or if it is going to rain within 24 hours, and on and on. Had whoever wrote these instructions ever been on a real Midwest farmfield in summer?

Unfortunately, versions of this story unfolded thousands of times over, from Arizona and Texas, to the farmer's home in Missouri and nearby Arkansas, up to Iowa, Nebraska and Minnesota, over to Tennessee and Illinois, and more. Soybean growers reported much of the dicamba damage, which often hammered their crops multiple times in a single season, but it was by no means limited to them. Because this herbicide is an equal opportunity destroyer—it damages just about any plant that produces a flower—many others had tales to tell. Fruit orchards and vineyards were injured, some devastated, organic vegetable farms and gardens torched. Millions of acres in all, waves of damage unlike any ever seen in the history of U.S. agriculture. It boggled his mind. At what costs, he thought? Money, sure. But livelihoods. And the loss of his freedom to farm, to decide what he grows. And in and beyond farms? Beekeepers across the country saw honey production plummet thanks to dicamba's suppression of flowering plants. Millions of trees damaged, in nature reserves, along rural roadways, in peoples' yards. In some farming towns, it is difficult to find a tree not affected by this potent plant-killer. And broader harm to flora and fauna, plants, birds, insects, and other common and imperiled creatures whose plant-based natural habitats are so disrupted by the damage it has wrought. How did we get to this point, he thought, where such devastation has become just another fact of life? Why did we?

¹ Adapted from Decl. of Darwin Bentlage at A093-A100, *NFFC v EPA*, ECF No. 70-1.

I. A Very Brief History of Pesticides and Modern Industrial Agriculture

Industrial agriculture as we know it today is a relatively recent development—a blip on the radar compared to humans' 12,000-year history of agricultural cultivation.² Many of the key developments transforming agriculture into its current industrial mode, prevalent especially in rich nations, have happened in the past 60 years.³ The second half of the 20th century brought the so-called “Green Revolution,” which involved promotion of new hybrid seeds and the many inputs—synthetic fertilizers, irrigation, insecticides, herbicides—they required to achieve their potential, as well as relentless mechanization and other technological changes.⁴ Its start coincided with World War II, when a litany of new chemicals were developed as poisons intended for chemical warfare.⁵ The industry that manufactured these chemicals needed a new purpose after the war ended and found it in our food system.⁶ Thus, along with fossil fuel-dependent mechanical technologies and government policies subsidizing broad-scale commodity crops like corn and soy for animal feed, pesticides quickly became a core pillar of the new age of industrial agriculture.⁷ Indeed, propped up by this heavy reliance on pesticides and fertilizers, farms grew larger and more specialized, with steadily expanding monocultures displacing farm animals, which were consigned to confined animal feeding operations. Rather than replenishing the soil in crop-diversified, livestock integrated, closed-loop farms, manure became a form of hazardous waste, and in the name of specialization took what was an elegant natural systemic solution, and created two separate incomplete systems, both creating pollution.⁸ Presto: Modern industrial agriculture was born.

Pesticide spraying grew exponentially to keep up with the demands of large-scale farming, benefiting from the development of World War II synthetic chemical insecticides.⁹ One of these was the now infamous DDT.¹⁰ DDT was effective for long-term pest control because of its persistence in the environment. As organisms are exposed to the pesticide, it accumulates in fatty tissues and is passed up the food chain to predators.¹¹ In 1962, American marine biologist, conservationist, and author Rachel Carson, regarded by many as the mother of the environmental movement, published *Silent Spring*, providing a vivid warning of the current (and future) ecological consequences of indiscriminate pesticide use.¹² Shortly thereafter, DDT was banned, Congress created the Environmental Protection Agency (EPA), and enacted many of today's fundamental environmental statutes for it to oversee.¹³ These statutes included a complete overhaul of our pesticide law, FIFRA, discussed *infra*.

² Erin Blakemore, *What was the Neolithic Revolution?*, NATIONAL GEOGRAPHIC (Apr. 5, 2019), <https://www.nationalgeographic.com/culture/article/neolithic-agricultural-revolution>. Another source found evidence of plant cultivation 23,000 years ago. SCIENCE DAILY, *First Evidence of Farming in Mideast 23,000 Years Ago*, (July 22, 2015), <https://www.sciencedaily.com/releases/2015/07/150722144709.htm#:~:text=Summary%3A,%2D%2D%20some%2023%2C000%20years%20ago>.

³ MARY JANE ANGELO ET AL., FOOD, AGRICULTURE, AND ENVIRONMENTAL LAW 35 (2013).

⁴ ANGELO ET AL., *supra* note ___ at 35.

⁵ *Id.*

⁶ *Id.*

⁷ *Id.*

⁸ See, e.g., Michael Pollan, *Farmer in Chief*, NY Times (Oct. 12, 2008), <https://michaelpollan.com/articles-archival/farmer-in-chief/> (“Subsidized monocultures of grain also lead directly to monocultures of animals: since factory farms could buy grains for less than it cost farmers to grow it, they could now fatten animals more cheaply than farmers could.”); see generally Angelo et al., *supra* note at 65-68, 90.

⁹ *Id.* at 36.

¹⁰ Dichloro-diphenyl-trichloroethane

¹¹ ANGELO ET AL., *supra* note ___ at 37.

¹² Rachel Carson, *Silent Spring* 297 (1962) (“Over increasingly large areas of the United States, spring now comes unheralded by the return of the birds, and the early mornings are strangely silent where once they were filled with the beauty of bird song.”)

¹³ U.S. EPA, Milestones in EPA and Environmental History, <https://www.epa.gov/history/milestones-epa-and-environmental-history>.

Yet environmental and health damage from pesticides has continued and increased. Because pesticides are designed to kill living organisms, it is unsurprising that pesticide poisoning is implicated in 24% of U.S. species decline.¹⁴ Countless mammals, birds, fish, and other wildlife are exposed to these toxins from direct spraying, consuming contaminated prey, and drinking contaminated water.¹⁵ These biocides are ubiquitous in our nation's waterways, from both runoff and spray drift.¹⁶ Of particular note are the documented effects of pesticides on bees, which play a vital pollination role in both nature and agriculture.¹⁷ Beyond concerns about acute toxicity, we know that pesticides have chronic effects on lifespan, physiology, reproduction, and behavior of non-target organisms, including humans.¹⁸ Farmworkers and farmers are on the front lines of exposure to agricultural chemicals and suffer from neurological problems, birth defects, and various types of cancer as a direct result.¹⁹ This creates an enormous equity issue, where who are most vulnerable are facing the greatest risks; and farmworkers often lack access to health care and fear workplace retaliation for reporting occupational exposure to pesticides.²⁰

Pesticides alone are only half the modern story. These environmental and human health harms have been exacerbated since the mid-1990s because of the large-scale planting of genetically engineered (GE) commodity crops specifically engineered to withstand the additional spraying of plant-killing pesticides (also known as herbicides) over a longer period of time.²¹ The overwhelming majority of commercial GE crops are genetically engineered by pesticide companies, such as Monsanto (recently acquired by Bayer), Syngenta (acquired by ChemChina), and Corteva (the merged agricultural divisions of Dow and DuPont), to withstand application of herbicides they also sell.²² Consequently, these GE crops have dramatically increased the overall pesticide output of American agriculture into our environment.²³ Monsanto's genetically engineered "Roundup Ready" crops,²⁴ which are resistant to glyphosate, made glyphosate the most used pesticide in history, with roughly 280 million pounds applied annually in U.S. agriculture since

¹⁴ ANGELO ET AL., *supra* note __ at 39.

¹⁵ *Id.*

¹⁶ John H. Minan & Tracy M. Frech, *Pesticides as "Pollutants" Under the Clean Water Act*, 47 SAN DIEGO L. REV. 109, 119-20 (2010).

¹⁷ ANGELO ET AL., *supra* note __ at 41; Xerces Society, *How Neonicotinoids Can Kill Bees*, <https://xerces.org/publications/scientific-reports/how-neonicotinoids-can-kill-bees>; (others?) see also Yijia Li et al., *Neonicotinoids and Decline in Bird Biodiversity in the United States*, 3 NATURE SUSTAINABILITY 1027 (2020) <https://www.nature.com/articles/s41893-020-0582-x>;

¹⁸ ANGELO ET AL., *supra* note __ at 41-42.

¹⁹ Thomas A. Arcury & Sara A. Quandt, *Chronic Agricultural Chemical Exposure Among Migrant and Seasonal Farmworkers*, 11 Soc. Nat. Res. 829 (1998).

²⁰ Joanne Bonnar Prado et al., *Acute Pesticide-Related Illness Among Farmworkers: Barriers to Reporting to Public Health Authorities*, 22 J. Agromedicine 395 (2017).

²¹ See David Mortensen et al., *Navigating a critical juncture for sustainable weed management*, 62 BioScience 75-84 (2012),

<http://goo.gl/RxZVM2>; Scott Kilman, *Superweed outbreak triggers arms race*, Wall Street Journal (June 4, 2010), <http://goo.gl/Fcolxd>

²² Kristina Hubbard, *The Sobering Details Behind the Latest Seed Monopoly Chart*, Civil Eats (Jan. 11, 2019),

<https://civileats.com/2019/01/11/the-sobering-details-behind-the-latest-seed-monopoly-chart/>. Further, despite billions of dollars in research and nearly three decades of commercialization, no GE crops are commercially produced to increase yields, reduce world hunger, or mitigate climate change. Doug Gurian-Sherman, Union of Concerned Scientists, *Failure to Yield: Evaluating the Performance of Genetically Engineered Crops*, at 1-5 (April 2009),

<https://www.ucsusa.org/resources/failure-yield-evaluating-performance-genetically-engineered-crops>; Jack A. Heinemann, *Reply to comment on sustainability and innovation in staple crop production in the US Midwest*, 12 Int'l J. of Ag. Sustainability 387-390 (2014), <http://goo.gl/GruWv>.

²³ Charles M. Benbrook, *Impacts of genetically engineered crops on pesticide use in the U.S. – the first sixteen years*, 24 Environmental Sciences Europe (2012), <https://enveurope.springeropen.com/articles/10.1186/2190-4715-24-24>.

²⁴ See generally *Ctr. for Food Safety v. Vilsack*, 718 F.3d 829, 841 (9th Cir. 2013) (discussing the pesticidal harms of these crop systems in the context of "Roundup Ready" alfalfa).

2012.²⁵ Reliance on these pesticide-promoting GE crop systems has caused a number of harms, including widespread pollution of our waterways and ecosystems,²⁶ degradation of the habitat of beneficial insects such as pollinators,²⁷ and harm to soil health.²⁸ And as discussed, *infra*, newer GE crop varieties have increased the use of older pesticides such as dicamba and 2,4-D.²⁹

The overuse of pesticides a related problem. Monsanto told farmers they could rely entirely on Roundup without weeds becoming resistant to glyphosate, contrary to weed science experts' warnings.³⁰ But as with overusing antibiotics, Roundup overuse generated an epidemic of glyphosate-resistant "superweeds" now infesting an estimated 120 million acres of U.S. cropland.³¹ These weeds have flourished, infesting farm fields and roadsides, complicating weed control for farmers, leading to use of more and increasingly toxic pesticides.³² And this set the stage for the current situation: the "next generation" of genetically engineered seeds, the pesticide industry's "solution" to the problem it created.³³ Their new business model is to engineer commodity crops with resistance to older, more toxic pesticides like 2,4-D, dicamba, imidazolinones, and others, often in combination.³⁴ These multiple, "stacked" herbicide-resistant crops continue the pesticide treadmill of spraying more and more toxic cocktails. Yet they are no panacea. Pesticide companies touted their products ability to kill glyphosate-resistant weeds, but after just a few seasons of the use, weeds have already begun developing resistance to dicamba, making them more intractable, as many experts predicted.³⁵ In truth, they will in turn foster more resistant weeds and the toxic cycle of increased pesticide use in response.

Now we are facing a new crop of public health and environmental harms from pesticides, as the American agricultural system is fully plunged in this "next generation" cycle of GE seeds and pesticide-

²⁵ Pesticide National Synthesis Project, *Pesticide Use Maps: Glyphosate*, U.S. Geological Survey (2012), <http://goo.gl/hSFYLC>; Charles M. Benbrook, *Impacts of genetically engineered crops on pesticide use in the U.S. – the first sixteen years*, 24 *Env't. Sci. Eur.* 1, 3 (2012); R. J. Seidler, *Pesticide use on genetically engineered crops*, *Ag/Mag Blog* (Sept. 15, 2014).

²⁶ Feng-Chih Chang *et al.*, *Occurrence and Fate of the Herbicide Glyphosate and its Degradate Aminomethylphosphonic Acid in the Atmosphere*, 30 *Env't. Toxicology & Chemistry* 548, 548-50 (2011); Richard H. Coupe *et al.*, *Fate and Transport of Glyphosate and Aminomethylphosphonic Acid in Surface Waters of Agricultural Basins*, 68 *Pest. Mgmt. Sci.* 16, 16-17 (2012).

²⁷ Richard Coniff, *Tracking the causes of sharp decline of the monarch butterfly*, *Yale Environment* 360 (Apr. 1, 2013), <http://goo.gl/EBCU33>; J.M. Pleasants & K.S. Oberhauser, *Milkweed loss in agricultural fields because of herbicide use: effect on the monarch butterfly population*, 6 *Insect Conservation and Diversity*, 135-144 (2013), <http://home.cc.umanitoba.ca/~frist/PLNT4600/biodiversity/icad196.pdf>.

²⁸ Robert J. Kremer, *Soil and environmental health after twenty years of intensive use of glyphosate*, 6 *Adv. Plants Agric.Res* 00224 (2017).

²⁹ David Mortensen *et al.*, *Navigating a critical juncture for sustainable weed management*, 62 *BioScience* 75-84 (2012); Brandon Keim, *New generation of GM crops put agriculture in a 'crisis situation'*, *Wired* (Sept. 25, 2014).

³⁰ The Center for Food Safety, *Comments to USDA's Animal and Plant Health Inspection Service on the Agency's draft Environmental Impact Statement on Monsanto Petitions for Determinations of Nonregulated Status for Dicamba-Resistant Soybean and Cotton Varieties* 34-35 (2014), https://www.centerforfoodsafety.org/files/cfs-dicamba-cotton-and-soy-deis-science-comments-i_21022.pdf.

³¹ J. Pucci, *The war against weeds evolves in 2018*, *CropLife* (March 20, 2018), <https://www.croplife.com/crop-inputs/the-war-against-weeds-evolves-in-2018/>.

³² David Mortensen *et al.*, *Navigating a critical juncture for sustainable weed management*, 62 *BioScience* 75-84 (2012), <http://goo.gl/RxZVM2>; Scott Kilman, *Superweed Outbreak Triggers Arms Race*, *Wall Street Journal* (June 4, 2010), <https://www.wsj.com/articles/SB1000142405274870402530457528439077746822>.

³³ Kilman, *supra* note 32.

³⁴ Kilman, *supra* note 32.

³⁵ Chris Bennett, *First Signs of Dicamba Resistance?*, *AGWEB* (Mar. 6, 2017), <https://www.agweb.com/news/crops/crop-production/first-signs-dicamba-resistance>; Matt Hagny, *Dicamba & Palmer Pigweeds*, *PINNACLE CROP TECH.* (May 2017), <http://www.agronomypro.com/Dicamba-Palmer-pigweeds.pdf>; Center for Biological Diversity, *Comments on Dicamba: New Use on Herbicide-Tolerant Cotton and Soybean* 18 (May 31, 2016), <https://www.regulations.gov/comment/EPA-HQ-OPP-2016-0187-0866>; David Mortensen *et al.*, *Navigating a critical juncture for sustainable weed management*, 62 *BioScience* 75-84 (2012).

reliance.³⁶ As farmers plant more and more acres of GE seed, to be sprayed with more pesticide cocktail mixtures, wild pollinators and the flowering plants they depend upon face increasingly existential threats. Threatened and endangered species are relentlessly subject to harm from the use of EPA-sanctioned pesticides, even while under the supposed protection of the Endangered Species Act (ESA).³⁷ In a 2020 evaluation, EPA found that 93% of endangered and threatened species exposed to the nation's most commonly-used pesticide, glyphosate, will likely experience adverse effects that could jeopardize their very existence.³⁸ At a time when endangered species are already facing incredible habitat loss due to human development and climate change, exposure to toxic pesticides could easily be the straw that breaks the back of any of these imperiled species.

II. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

There are currently over 18,000 pesticide formulations sold in the United States.³⁹ In order for a pesticide to be distributed or sold in the United States, it must first be registered and labeled by EPA under FIFRA.⁴⁰ First enacted in 1947, FIFRA has been improved slightly over the years by Congressional amendments to improve EPA's oversight of pesticide safety. Nonetheless, FIFRA still leans heavily towards a system of registration in favor of expeditious approval of pesticides.⁴¹ Over the years, EPA has also exercised its regulatory discretion to create several loopholes, resulting in pesticides being approved for widespread use without the agency analyzing the necessary safety data.

Congress first enacted FIFRA in 1947, giving the Secretary of Agriculture (USDA) authority to regulate "economic poisons" (pesticides) in interstate commerce, but the statute did not contain any environmental or safety standards for pesticides.⁴² The 1947 FIFRA centered on labeling and ensuring that pesticides were not adulterated, and allowed registration based on a description of the chemical's composition and what the chemical claimed to achieve.⁴³ That version remained in place until 1972, when Congress transferred authority to implement FIFRA from the USDA to the newly created EPA, and overhauled the statute with provisions aimed at better protecting human health and the environment.⁴⁴ Against the backdrop of the country's new awareness of the risks and consequences of unfettered pesticide use through new knowledge about DDT and the warnings of *Silent Spring*,⁴⁵ the 1972 FIFRA amendments provide the framework for pesticide registration and data requirements that we know today.⁴⁶

³⁶ Minan & Frech, *supra* note __ at 59.

³⁷ Mary Jane Angelo, *The Killing Fields: Reducing the Casualties in the Battle Between U.S. Species Protection Law and U.S. Pesticide Law*, 32 HARV. ENVTL. L. REV. 95, 101 (2008).

³⁸ EPA, Draft National Level Listed Species Biological Evaluation for Glyphosate 4-3, (2020) <https://www.epa.gov/endangered-species/draft-national-level-listed-species-biological-evaluation-glyphosate#executive-summary>.

³⁹ EPA, Pesticide Law: A Summary of the Statutes 1 (Nov. 2012), <http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RL31921.pdf>.

⁴⁰ 7 U.S.C. § 136a(a).

⁴¹ *Merrell v. Thomas*, 807 F.2d 776, 778 (9th Cir. 1986).

⁴² Ch. 125, 61 Stat. 163 (1947); ANGELO ET AL., *supra* note __ at 130.

⁴³ Ch. 125, 61 Stat. 163 § 4a(3)(4) (1947).

⁴⁴ ANGELO ET AL., *supra* note __ at 130.

⁴⁵ ANGELO ET AL., *supra* note __ at 130.

⁴⁶ EPA, Pesticide Law: A Summary of the Statutes 2 (Nov. 2012), <http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RL31921.pdf>.

A. The FIFRA Framework

FIFRA adopts a broad definition of pesticide that includes any chemical meant to control or kill any pest or plant.⁴⁷ The main mechanism used to regulate pesticides is known as registration.⁴⁸ Before any pesticide can be sold or used in the United States, EPA must register the pesticide: provide a license that establishes the terms and conditions under which the pesticide may be lawfully sold, distributed, and used within the United States.⁴⁹ The terms and conditions of the registration include exactly what product can be sold and used, and for what specific uses, and how it can be used (e.g., what crops it can be sprayed on and how).⁵⁰

In registering pesticides, the core baseline statutory standard EPA applies is the “unreasonable adverse effects” standard. EPA may deny an application for registration when “necessary to prevent unreasonable adverse effects on the environment.”⁵¹ FIFRA defines “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.”⁵² EPA and the courts have interpreted FIFRA’s “unreasonable adverse effect” standard to require EPA to conduct a cost-benefit analysis “to ensure that there is no unreasonable risk created for people or the environment from a pesticide.”⁵³ Thus, EPA balances the claimed economic and social benefits against the pesticide’s potential costs, or harms. Congress anticipated EPA’s careful balancing of costs and benefits would “take every relevant factor [the agency] can conceive into account.”⁵⁴

One difference between FIFRA and other environmental laws intended to control pollution such as the Clean Water Act is that it is a scheme that regulates by product label rather than direct use restrictions. That is, “the label is the law” and EPA’s ability to regulate pesticide *use* through FIFRA is limited to establishing label restrictions, such as application instructions or restrictions for use on only certain types of crops.⁵⁵ Generic label warnings may be difficult to translate into real-world application practices, while complex label restrictions put the onus on the applicator rather than on the registrant to prove that the pesticide is safe.

Congress tasked EPA with implementing the specific data that an applicant must submit to support this no “unreasonable adverse effect” finding.⁵⁶ In order to register a new pesticide, a manufacturer must submit an application for registration, describing how the pesticide will be used, the claims made of its benefits, the ingredients, and a description of all tests and studies done and their results, concerning the product’s health, safety, and environmental effects.⁵⁷

⁴⁷ 7 U.S.C. § 136(u).

⁴⁸ *Id.* § 136a(a).

⁴⁹ *Id.* § 136a(c).

⁵⁰ 40 C.F.R. §§ 152.115, 156.10.

⁵¹ 7 U.S.C. § 136a(a).

⁵² *Id.* § 136(bb).

⁵³ *Pollinator I*, 806 F.3d at 522-23 (quoting 7 U.S.C. § 136(bb)).

⁵⁴ S. Rep. 838, 92d Cong. 2d Sess., reprinted in 1972 U.S.C.C.A.N. 3993, 4032-33. Congress intended for EPA, among other relevant factors, to carefully consider “hazards to farmworkers, hazards to birds and animals and children yet unborn . . . the need for food and clothing and forest products, forest and grassland cover to keep the rain where it falls, prevent floods, provide clear water . . . aesthetic values, the beauty and inspiration of nature, the comfort and health of man.” *Id.*

⁵⁵ 40 C.F.R. § 156.10.

⁵⁶ See 7 U.S.C. § 136a(c)(2)(A).

⁵⁷ *Id.* § 136a(c).

FIFRA is the main regulatory hurdle⁵⁸ that a pesticide must clear. For example, while all federal agencies are subject to the requirements of the National Environmental Policy Act (NEPA) when taking federal action,⁵⁹ in *Merrell v. Thomas*, 807 F.2d 776 (9th Cir. 1986), the Ninth Circuit held that EPA is not required to comply with NEPA when approving pesticide registrations under FIFRA, finding that FIFRA's unreasonable adverse effect standard included consideration of environmental impact, and thus FIFRA served as a functional equivalent to NEPA.⁶⁰ This may be true as a textual matter, since FIFRA's "unreasonable adverse effect" definition broadly encompasses "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."⁶¹ However, because FIFRA is intended to authorize the use of chemicals that by their nature will harm living organisms and the environment using a risk-benefit standard means that for each environmental risk associated with a pesticide registration, EPA looks to answer the question of how much risk is reasonable. Unlike under NEPA, where a federal agency is focused solely on analyzing the environmental impacts of its proposed action.⁶²

B. Conditional Registrations and Registration Review

FIFRA requires pre-market data and approval before a pesticide can be used. However, Congress amended FIFRA in 1978 to authorize EPA to issue what is now commonly referred to as "conditional registrations" of pesticides, without all the required data for registration (commonly referred to as unconditional registration), in order to address the delay and backlog in approving new pesticide products made using old chemicals under the more stringent data standards set by the 1972 FIFRA amendment.⁶³ Per the 1978 amendments, EPA may nonetheless grant a temporary "conditional" registration for a pesticide that is lacking all required health and safety data, but only under three specific circumstances—(1) for pesticide uses for which identical or similar use exist for a previously-registered pesticides, commonly referred to as "me-too" registrations;⁶⁴ (2) for additional uses of a previously-registered pesticides;⁶⁵ or (3) for new pesticide active ingredients if certain conditions are met.⁶⁶

For the first category, EPA may conditionally register a proposed pesticide product if EPA determines that "the pesticide and proposed use are identical or substantially similar to any currently registered pesticide and use," or "differs only in ways that would not significant increase the risk of unreasonable adverse effect on the environment."⁶⁷ For the second category, subject to certain exceptions, EPA may also conditionally register additional uses of an already-registered pesticide if EPA finds that the agency has "(i) ... satisfactory data pertaining to the proposed additional use," and (ii) amending the registration in the manner proposed by the applicant would not significantly increase the risk of any

⁵⁸ As discussed *infra*, the Endangered Species Act (ESA) imposes additional mandatory legal duties that EPA must—but often does not—comply with in its pesticide registration process.

⁵⁹ See 42 U.S.C. § 4333 (2018).

⁶⁰ *Merrell v. Thomas*, 807 F.2d at 778 ("Congress created a registration procedure within FIFRA to ensure consideration of environmental impact—a procedure that apparently made NEPA superfluous."); see also Uma Outka, NEPA and Environmental Justice: Integration, Implementation, and Judicial Review, 33 B.C. Envtl. Aff. L. Rev. 601, 613 (2006).

⁶¹ 7 U.S.C. § 136(bb) (emphases added).

⁶² See *Save Our Ecosystem v. Clark*, 747, F.2d. 1240, 1247 (9th Cir. 1984) (The EPA registration process for herbicides under FIFRA is inadequate to address environmental concerns under NEPA...); see Michael Mahoney, *Perpetuating the Cycle: The Failure of APHIS and EPA to Consider the Cumulative Impact of Pairing Herbicides with Herbicide-Resistant Crops*, 40 COLUM. J. ENVTL. L. 183, 193-196 (2015).

⁶³ See *Mobay Chem. Corp. v. Costle*, 517 F. Supp. 254, 281 (W.D. Penn. 1981); see P.L. 94-140, November 28, 1975, 89 Stat. 751.

⁶⁴ 7 U.S.C. § 136a(c)(7)(A).

⁶⁵ *Id.* § 136a(c)(7)(B).

⁶⁶ *Id.* § 136a(c)(7)(C).

⁶⁷ *Id.* § 136a(c)(7)(A).

unreasonable adverse effect on the environment.”⁶⁸ This is the category of our case study, *NFFC v. EPA*, discussed *infra*. For the third category, EPA may conditionally register a pesticide containing a new active ingredient for which required data is otherwise lacking for a set period of time, but only if it finds that (1) “use of the pesticide is in the public interest,” (2) the required data “are lacking because a period reasonably sufficient for generation of the data has not elapsed since the Administrator first imposed the data requirement,” and (3) the “use of the pesticide during [the conditional registration] period will not cause any unreasonable adverse effect on the environment.”⁶⁹

The 1978 amendment also allowed EPA to require additional data to support the continued registrations of existing pesticide registrations.⁷⁰ EPA codified this authority to require reassessment every fifteen years, in a process referred to as registration review, to make sure that all registered pesticides continue to meet FIFRA’s no “unreasonable adverse effects” standard using the latest science and data.⁷¹ In practice however, EPA has failed to meet the 15 year registration review mark, instead allowing these lapsed pesticides to remain in use, in many cases despite overwhelming evidence demonstrating their harm to human health and the environment.⁷² EPA’s delay in registration review while still authorizing the continued use of these older pesticides is the subject of the ongoing litigation before the Ninth Circuit in *Rural Coalition v. EPA* cases discussed *infra*.

C. Application of the Unreasonable Adverse Effect Standard

Accordingly, whether it is unconditional registration, conditional registration, or registration review, the standard for EPA’s pesticide decision-making centers around some form of risk-benefit analysis, requiring EPA to make a finding that the registration will not have unreasonable adverse effect, or no significant increase in the risk of any unreasonable adverse effect, on the environment. This risk-benefit review standard sets FIFRA apart from other environmental statutes. While most environmental laws strive to prevent harm to the environment and living organisms, FIFRA is designed to approve the *release* of pesticides that are intended to kill or harm living organisms, and that by their nature carry unintended risks to mankind and the environment.⁷³

Even though the pesticide industry often claims that all registered pesticides have been thoroughly assessed under FIFRA and are therefore safe for the environment, the reality is that EPA often registers pesticides without giving due consideration of their potential environmental and human health effects.

Within FIFRA’s registration framework, EPA has abused its discretion and further weakened the “risks” or costs side of the “unreasonable adverse effect” analysis when it allows pesticides to be used without the requisite safety data required for unconditional registration. EPA overuses the conditional registration process.⁷⁴ Congress intended the conditional registration process to be the exception of pesticide registration, not the norm. Proponents of the conditional registration process explained that EPA

⁶⁸ *Id.* § 136a(c)(7)(B).

⁶⁹ *Id.* § 136a(c)(7)(C).

⁷⁰ *Id.* § 136a(c)(2)(B).

⁷¹ 40 C.F.R. § 155.40(a)(1).

⁷² See, e.g., EPA, Glyphosate Proposed Interim Registration Review Decision 4-6 (Apr. 23, 2019); EPA, Atrazine Proposed Interim Registration Review Decision 5-7 (Dec. 18, 2019), https://www.epa.gov/sites/production/files/2019-12/documents/atrazine_pid_signed_12_18_19.pdf (registration review begun in 2013, with only an interim registration decision issued in 2020); EPA, Chlorpyrifos, <https://www.epa.gov/ingredients-used-pesticide-products/chlorpyrifos#schedule> (chlorpyrifos first registered in 1965, and registration review begun 2000 and is still ongoing as of the date of this article).

⁷³ ANGELO ET AL., *supra* note __ at 138.

⁷⁴ See *supra* pp. __; see 7 U.S.C. § 136a(c)(7)(C).

was not to use the process “to allow the indiscriminate registration of any pesticide after an application for registration is filed, but before all the safety data is submitted.”⁷⁵ Similarly, the EPA Administrator at the time testified in Congress that conditional registration would be used for “rare” situations—for example, to prevent a serious pest outbreak.⁷⁶

In practice, however, this exception has become the rule; the majority of EPA pesticide registrations now appears to be conditional registrations, and with almost no accountability to ensure that the registrants of these conditionally registered pesticides timely submit the missing data.⁷⁷ A watchdog investigation found that as of August 2010, more than 11,000—about 65 percent—of the 16,000-plus currently active pesticide products have been conditionally registered and allowed on the market.”⁷⁸ The U.S. Government Accountability Office (GAO) conducted an examination of EPA’s use of conditional registrations, and confirmed that EPA’s own internal review found roughly 69 percent of the 16,156 active pesticide registrations were conditionally registered, though the number could have been overstated since the GAO report also revealed that EPA did not have an accurate database for tracking conditional registrations.⁷⁹ The GAO report also found significant issues relating to EPA’s management of conditional registrations. The GAO found that EPA did not have a system in place to track whether registrants submitted the required additional data within the timeframe set by the EPA.⁸⁰ Nor did EPA have a system in place to timely review any additional data that were submitted.⁸¹ Crucially, in addition to the lack of systemic tracking of conditional registrations, the GAO concluded that EPA has conditionally approved registrations for pesticides that did not meet the limited statutory criteria set forth for conditional registrations.⁸² The GAO report also criticized the lack of public transparency and information that EPA has regarding conditional registrations.⁸³ Since the publication of the GAO report, the EPA has stated it is taking steps to improve its internal tracking as well as making available to the public the status of conditional registrations of new active ingredients.⁸⁴

In addition to conditional registrations, EPA has also relied on its authority to grant emergency local use exemptions under section 18 of FIFRA to authorize uses of pesticides without making the requisite no “unreasonable adverse effect” finding.⁸⁵ Section 18 of FIFRA grants EPA the discretion to exempt any state and federal agencies from FIFRA’s registration requirements, so long as EPA “determines that emergency conditions exist which require such exemption.”⁸⁶ The scope of this exemption power is broad: EPA’s regulations authorize the agency to grant an exemption “in an emergency condition to avert”

⁷⁵ S. Rep. No. 95-334, at 10-11 (1977); see also 123 Cong. Rec. S13,092 (daily ed. July 29, 1977) (statement of Sen. Leahy) (“I want to stress this use of conditional registration would only be in exceptional cases.”).

⁷⁶ S. Rep. No. 95-334, at 74.

⁷⁷ See U.S. Gov’t Accountability Office, Pesticides: EPA Should Take Steps to Improve Its Oversight of Conditional Registrations (Aug. 2013), available at <https://www.gao.gov/assets/660/656825.pdf>.

⁷⁸ NRDC, Superficial Safeguards: Most Pesticides Are Approved by Flawed EPA Process 2 (Mar. 2013), available at <https://www.nrdc.org/sites/default/files/flawed-epa-approval-process-1B.pdf>.

⁷⁹ U.S. Gov’t Accountability Office, Pesticides: EPA Should Take Steps to Improve Its Oversight of Conditional Registrations 13 (Aug. 2013), available at <https://www.gao.gov/assets/660/656825.pdf>.

⁸⁰ *Id.* at 19.

⁸¹ *Id.*

⁸² *Id.* at 38.

⁸³ *Id.* at 39.

⁸⁴ See EPA, Conditional Pesticide Registration, <https://www.epa.gov/pesticide-registration/conditional-pesticide-registration> (last visited Mar. 1, 2021); see EPA, Status of Conditional Registrations under FIFRA sec. 3(c)(7)(C) from 2000 through 2020 (Aug. 4, 2020), available at https://www.epa.gov/sites/production/files/2020-08/documents/conditional-reg-updates_8-4-2020.pdf

⁸⁵ See 7 U.S.C. § 136p; see also Victoria Clark, *Enforcement of Pesticide Regulation in California: Case Study of the Experience with Methyl Bromide*, 31 GOLDEN GATE U. L. REV. 465, 472-76 (Spring 2001).

⁸⁶ 7 U.S.C. § 136p.

anything from significant economic loss,⁸⁷ to control “any pest that is an invasive species or is otherwise new”⁸⁸ to the United States or “any pest that will cause a significant risk to human health,”⁸⁹ and finally a catch-all exemption to avoid a crisis.⁹⁰ In recent years, EPA has repeatedly relied on the last, catch-all crisis exemption to authorize agricultural uses of pesticides for use on major crops, even though those uses have not been vetted through the FIFRA registration process, meaning that no “unreasonable adverse effect” finding has been made.⁹¹ The use of the FIFRA Section 18 exemptions does not end with just pesticide uses that EPA has yet to review. In the case of EPA’s sulfoxaflor pesticide registration discussed *infra*, after the Ninth Circuit held that EPA lacked substantial evidence to support its conclusion that sulfoxaflor would not result in unreasonable adverse effect on the environment, and vacated the unconditional registration. Following vacatur EPA went ahead and issued several emergency use exemptions to allow sulfoxaflor uses to continue while the registrant generated the additional studies called for by the Ninth Circuit ruling.⁹²

Outside of these exemptions, more fundamentally, as shown by the decisions discussed *infra*, even when faced with an application for unconditional registration, EPA often ignores its duty to risk-benefit assessment by relying on generalized benefit claims, without any actual weighing of the two factors.⁹³ On the benefits side of the scale, FIFRA allows EPA to waive data requirements regarding efficacy, which EPA has done by rule, essentially creating an assumption that economic or social benefits of any given pesticide.⁹⁴ As a result in approving new pesticide uses, EPA typically only offers generalized, unsubstantiated benefit claims—such as stating that a new active ingredient is beneficial because it provides a “new mode of action” for controlling pest, and therefore may increase agricultural yields by reducing pests, without making any attempt to quantify just how much the claimed benefit actually may be—such that the agency can then compare the benefits against potential risks.⁹⁵ And on the risks side of the scale, even though the definition of “unreasonable adverse effect” includes “the economic, social, and environmental costs,”⁹⁶ EPA often foregoes such analysis and instead claim that the costs are unquantifiable, or minimize their effect without any data or quantification,⁹⁷ although the recent cases have something to say about that, see *infra*.

Fundamentally, EPA’s pesticide registration analysis—whether conditional or unconditional—also suffers from EPA’s intentionally narrow scope of analysis to just the pesticide active ingredient that a registrant seeks to register, rather than the whole pesticide formulation. A pesticide formulation is a mixture of one or more active ingredients—the pesticide’s active ingredients, along with other chemicals, statutorily defined and so-called “inert” ingredients.⁹⁸ The mixture of the pesticide active ingredients and

⁸⁷ 40 C.F.R. § 166.2(a).

⁸⁸ *Id.* § 166.2(b).

⁸⁹ *Id.* § 166.2(c).

⁹⁰ *Id.* § 166.2(d).

⁹¹ See, e.g., 86 Fed. Reg. 8782 (Feb. 9, 2021); see also Victoria Clark, *Enforcement of Pesticide Regulation in California: Case Study of the Experience with Methyl Bromide*, 31 GOLDEN GATE U. L. REV. 465, 472-76 (Spring 2001).

⁹² See *infra* pp. ...; see, e.g., 81 Fed. Reg. 90, 836 (Dec. 15, 2016); 84 Fed. Reg., 28,041 (June 17, 2019);

⁹³ See *infra* pp. ...

⁹⁵ See, e.g. EPA, *Over-the-top Dicamba Products for Genetically Modified Cotton and Soybeans: Benefits and Impacts* (Oct. 2018), <https://www.regulations.gov/document/EPA-HQ-OPP-2016-0187-0966>; EPA, *Review of Benefits as Described by the Registrant of Enlist Duo 2,4-D Chlorine on Herbicide Resistant Enlist Cotton to Improve the Performance of Current Weed Control Systems and Provide New Weed Resistance Management Options* (Oct. 2016), <https://www.regulations.gov/document/EPA-HQ-OPP-2016-0594-0010>.

⁹⁶ 7 U.S.C. § 136(bb)

⁹⁷ See *infra* pp. ...

⁹⁸ National Research Council, *Committee on Ecological Risk Assessment under FIFRA and ESA, Assessing Risks to Endangered and Threatened Species from Pesticides* 65, National Academies Press (2013). The term inert is used to distinguish certain ingredients from active ingredients.

inert ingredients is what makes up a pesticide that are sold and used in the marketplace.⁹⁹ Though inerts may or may not have a direct effect on the target species, they can be toxic, biologically active and potentially hazardous.¹⁰⁰ A growing body of research indicates that a pesticide's active ingredients in combination with its inert and adjuvant ingredients can increase pesticide toxicity, ecotoxicity, and exposure, both independently and through their synergistic effects. Nonetheless, in regulating and approving pesticide usage, EPA focuses its data requirements on active ingredients *alone*—and often only the new or dominant active ingredient—largely ignoring inerts and adjuvants as well as synergistic effects of the chemicals once combined. EPA's insufficient safety assessment of pesticides endangers the health of the public and the environment as a whole.¹⁰¹ As a result, “[m]ost of the tests required to register a pesticide are performed with the active ingredient alone, not the full pesticide formulation.”¹⁰² Similarly, while farmers and pesticide applicators commonly mix different pesticides and apply them to the crops simultaneously, called “tank mixing,” EPA does not require testing of common tank mixtures before registration or any cumulative or synergistic effects from them.¹⁰³

Finally, despite the unmistakable clarity of the environmental risks of pesticide spraying and the cognizable of environmental costs to be considered by the agency in its process, EPA's regulatory data requirements largely focus on estimating the human health effects from exposure to pesticides, while testing and data requirements for ecological and wildlife effects are much more limited.¹⁰⁴ Even for the wildlife testing EPA does require, it only looks at acute toxicity and generally does not require data on behavioral, neurological, reproductive, or other chronic effects.¹⁰⁵ And as discussed above, even for the data that is required, the data reviewed is cabined to just the active ingredient in isolation, not the actual product formulation being approved and to which wildlife will be exposed.

Thus despite the broad definition of risks encompassed within FIFRA's unreasonable adverse effect standard, and the Congressional intent to pass amendments in 1972 to make FIFRA a comprehensive environmental protection statute, EPA has not applied it as such. Rather its approach has left gaps in the rigor and scope of the data applied; weaknesses in the legal threshold applied; lapses in the ways it has analyzed or considered (or failed to consider entirely) costs of registration; failings in transparency and accountability; and even circumventing that key data be submitted and analyzed at all before allowing registration. The reality is that EPA has relied on courts' tendency to defer to the agency's scientific expertise¹⁰⁶ to sidestep its duty to conduct a risk-benefit analysis of every pesticide before allowing its use in U.S. agriculture.

⁹⁹ *Id.*

¹⁰⁰ *Id.* at 66. See also Mullin *et al.* 2015, *supra* note ___ at 2 (“Numerous studies have found that pesticide active ingredients elicit very different physiological effects on nontarget organisms when combined with their formulation ingredients.”).

¹⁰¹ Generally, EPA requires data on the toxicological significance of the active ingredients in pesticide products, but not necessarily of the whole formulas. See 40 C.F.R. § 158.130(e) (hazards to nontarget species); § 158.500 (toxicology data requirements); § 158.630 (data requirements for terrestrial and aquatic nontarget organisms); see generally 40 C.F.R. § 158.320.

¹⁰² See Cox and Surgan (2006), *supra* note _ at 1804 (“Of the 20 toxicologic tests required (or conditionally required) to register a pesticide in the United States, only 7 short-term acute toxicity tests use the pesticide formulation; the rest are done with only the active ingredient. The medium-and long-term toxicity tests that explore end points of significant concern (cancer, reproductive problems, and genetic damage, for example) are conducted with the active ingredient alone. The requirements for other types of tests are similar. Only half of the required (or conditionally required) tests of environmental fate use the formulated product, as do only a quarter of the tests for effects on wildlife and nontarget plants (U.S. EPA 2005a, Parts 158.290, 158.340, 158.490, and 158.540).”).

¹⁰³ See EPA, Memorandum: Ecological Risk Assessment for Dicamba DGA Salt and its Degradate, 3,6-dichlorosalicylic acid (DCSA), for the Proposed Post-Emergence New Use on Dicamba-Tolerant Cotton (MON 87701); EPA, Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean 22 (Nov. 9, 2016).

¹⁰⁴ ANGELO ET AL., *supra* note ___ at 131.

¹⁰⁵ ANGELO ET AL., *supra* note ___ at 132.

¹⁰⁶ See, e.g., *Kleppe v. Sierra Club*, 427 U.S. 390, 412 (1976)

III. Case Study: The Dicamba Issue and Litigation

Dicamba is an herbicide in the Benzoic Acid family used for selective control of emerged broadleaf weeds.¹⁰⁷ It is extremely toxic to all broadleaf plants, including conventional cotton and soybean. It damages or kills fruiting vegetables, fruit trees, grapes, beans, peas, potatoes, tobacco, squash-family plants, ornamentals—essentially any flowering plant.¹⁰⁸ Dicamba also damages or kills many species of large trees, including oaks, elms, and maples.¹⁰⁹ Dicamba damage is easily identified by its signature marker: “leaf cupping.”¹¹⁰

Consequently, EPA previously restricted dicamba’s soybean and cotton uses to before planting (pre-plant) to clear a field of early-season weeds and to season’s end to control late-season weeds (pre-harvest in soybeans, postharvest in cotton); EPA had never before allowed direct, over-the-top application to these crops during the critical growing seasons of spring and summer.¹¹¹ However, in 2005, Monsanto (now Bayer) announced the development of genetically engineered soybean and cottons that altered the use pattern of dicamba. Monsanto licensed the gene that, when genetically engineered into soybean and cotton crops, made them resistant to dicamba.¹¹² Monsanto and BASF developed dicamba herbicides for use on these engineered crops.¹¹³

A. Dicamba and Drift Harm

Several dicamba properties render it much more likely than other herbicides to cause widespread damage to plants and other organisms, both on treated fields and in surrounding areas. First, as described above, dicamba is highly toxic to an extremely broad range of flowering plants, including trees, shrubs, soybeans and cotton, as well as nearly all vegetables and fruit crops. Second, dicamba is also very potent, such that vanishingly small amounts can cause considerable damage.¹¹⁴ And third, while the majority of herbicides pose a drift threat only when they are being applied, dicamba is extremely volatile and is known to volatilize from soil and plant surfaces days after the initial application, forming vapor clouds that drift and damage plants at great distances and in all directions from the application site.¹¹⁵

¹⁰⁷ EPA, Registration Decision for the Continuation of Uses of Dicamba on Dicamba Tolerant Cotton and Soybean 4 (Oct. 31, 2018); EPA, Memorandum Supporting Decision to Approve Registration for the Uses of Dicamba on Dicamba Tolerant Cotton and Soybean 12 (Oct. 27, 2020), https://www.epa.gov/sites/production/files/2020-10/documents/dicamba-decision_10-27-2020.pdf.

¹⁰⁸ EPA, Xtendimax Registration Notice and Label 264-1210-20201027 at 8 (pdf p. 27) (Oct. 26, 2020).

¹⁰⁹ Brian Dintelmann et al., *Evaluations of Dicamba and 2,4-D Injury on Fruiting Trees and Various Other Woody Species*, Mizzou Weed Science (2018), https://www.greatplainsgrowersconference.org/uploads/2/9/1/4/29140369/2018_gpgc_trees_evaluations_of_dicamba_and_24-d_injury.pdf

¹¹⁰ EPA, *Dicamba DGA and BAPMA Salts – 2020 Ecological Assessment of Dicamba Use on Dicamba-Tolerant (DT) Cotton and Soybean Including Effects Determinations for Federally Listed Threatened and Endangered Species* 134 (Oct. 26, 2020), <https://www.regulations.gov/document/EPA-HQ-OPP-2020-0492-0002>; Cornell University, *Weed Ecology and Management Laboratory: Banvel/dicamba*, <https://weedecology.css.cornell.edu/herbicide/herbicide.php?id=2> (last visited Feb. 23, 2021).

¹¹¹ EPA Memo, *supra* note 107 at 6-7.

¹¹² Monsanto, *Monsanto, UNL Sign Agreement to Develop Dicamba-Tolerant Crops* (Mar. 23, 2005), <https://hh-ra.org/wp-content/uploads/2017/07/Monsanto-Press-Release-2005-Dicamba-Tolerant-Crops.pdf>.

¹¹³ Caitlin Dewey, *This Mirical Weed Killer was Supposed to Save Farms. Instead, it’s Devastating Them.*, Washington Post (Aug. 29, 2017).

¹¹⁴ O. Adewale Osipitan, *Sensitivity of Grape and Tomato to Micro-rates of Dicamba-Based Herbicides*, Cropwatch (May 3, 2013), <https://cropwatch.unl.edu/2018/sensitivity-grape-and-tomato-micro-rates-dicamba-based-herbicides>.

¹¹⁵ University of Missouri, *Off Target Movement of Dicamba in Missouri. Where do we go From Here?* (Aug. 21, 2017), https://ipm.missouri.edu/IPC/M/2017/8/OffTarget_movement/; Larry Steckel, *Dicamba Drift Problems not an Aberration*,

Dicamba contaminates the environment via spray drift, vapor drift, in rainfall, and in runoff from dicamba-treated fields. Such pollution has ramped up dramatically with the over-the-top spraying dicamba registrations due to increased use over a longer season. Spray drift, also called particle drift, occurs during application. As dicamba spray solution is forced under pressure through a nozzle, spray droplets are formed. Small droplets remain aloft for considerable periods and are carried by even moderate winds to damage crops or wild plants in neighboring fields. Spray drift damage increases with wind speed and is characterized by injury that declines in severity with distance from the treated field.¹¹⁶

On the other hand, vapor drift arises from volatilization of dicamba, that is, its conversion from liquid or solid form to vapor. Dicamba volatilizes during spray operations, but also up to several days after an application, as dicamba residues left on treated soil and plant surfaces evaporate.¹¹⁷ Vapor drift increases with temperature, and thus is far more common with late spring and summer over-the-top spraying of dicamba than with traditional preplant use.¹¹⁸ Vapor drift is also worse under still conditions, with little or no wind, which promote temperature inversions.¹¹⁹ Finally, vapor drift is characterized by broad-scale injury that is uniform in severity, fencerow to fencerow.¹²⁰

The damaging effects of spray and vapor drift increase dramatically during a temperature inversion, an extremely common atmospheric condition in which cool air at the earth's surface is trapped by warmer air above it.¹²¹ The trapped cool air accumulates a concentrated cloud of dicamba spray droplets and vapor, which is then easily moved by light winds to cause broad-scale injury to crops and plants near and far from application areas.¹²² Dicamba is also subject to atmospheric loading, where intensive spraying by many farmers in a localized area results in substantial clouds of airborne dicamba that can then, as with temperature inversions, move off-field to cause widespread damage. Dicamba can also damage off-field plants when rainfall washes it out of the atmosphere and brings it down to earth.¹²³ Moreover, rainfall washes dicamba from the plant surfaces and soil of a treated field, resulting in dicamba-contaminated runoff water that can damage plants.¹²⁴

FARMPROGRESS (Aug. 8, 2018), <https://www.farmprogress.com/weeds/dicamba-drift-problems-not-aberration>, Greg D. Horstmeier, *Dicamba's PTFE Problem*, THE PROGRESSIVE FARMER (Aug. 29, 2017), <https://www.dmpf.com/agriculture/web/ag/blogs/editors-notebook/blog-post/2017/08/29/dicambas-ptfe-problem>.

¹¹⁶ Robert E. Wolf, *Strategies to Reduce Spray Drift* (Mar. 2000), <http://cotton.tamu.edu/Weeds/Spray%20Drift%20Strat.pdf>; Mark Loux & Bill Johnson, *Ohio Soybeans: Dicamba Drift Injury Becoming More Evident*, AGFAX (July 12, 2017), <https://agfax.com/2017/07/12/ohio-soybeans-dicamba-drift-injury-becoming-more-evident/>.

¹¹⁷ Robin Booker, *Dicamba Volatility Causes Anxiety as New Season Nears*, WESTERN PRODUCER (May 3, 2018), <https://www.producer.com/crops/dicamba-volatility-causes-anxiety-as-new-season-nears/>; University of Missouri, *Off Target Movement of Dicamba in Missouri. Where do we go From Here?* (Aug. 21, 2017), https://ipm.missouri.edu/IPCM/2017/8/Off-target_movement/.

¹¹⁸ David A. Mortensen et al., *Navigating a Critical Juncture for Sustainable Weed Management*, 62 *BioScience* 75, 80 (2012).

¹¹⁹ See *infra* note __.

¹²⁰ University of Missouri, *Off Target Movement of Dicamba in Missouri. Where do we go From Here?* (Aug. 21, 2017), https://ipm.missouri.edu/IPCM/2017/8/Off-target_movement/; Loux & Johnson, *supra* note __.

¹²¹ University of Missouri, *Off Target Movement of Dicamba in Missouri. Where do we go From Here?* (Aug. 21, 2017), https://ipm.missouri.edu/IPCM/2017/8/Off-target_movement/.

¹²² Robin Booker, *Dicamba Volatility Causes Anxiety as New Season Nears*, Western Producer (May 3, 2018), <https://www.producer.com/crops/dicamba-volatility-causes-anxiety-as-new-season-nears/>.

¹²³ Emily Unglesbee, *New 2,4-D and Dicamba Data*, Progressive Farmer (Dec. 7, 2020), <https://www.dmpf.com/agriculture/web/ag/crops/article/2020/12/07/four-things-missouri-scientists-2-4>; B.D. Hill et al., *Phenoxy Herbicides in Alberta Rainfall: Potential Effects on Sensitive Crops*, 82 *CANADIAN J. OF PLANT SCI.* 481 (2002).

¹²⁴ EPA, *Dicamba DGA and BAPMA Salts*, *supra* note at 61-62, 297-98; EPA, *Summary of New Information and Analysis of Dicamba Use 132* (Oct. 31, 2018).

The environmental risks from dicamba use are numerous. Animals and plants, including threatened and endangered species, those in danger of extinction, may be exposed to dicamba via atmospheric loading (spray drift, volatilization), contamination of soils, and runoff from treated fields.¹²⁵ Spray drift and volatilization of dicamba impacts vegetation near crop fields, and also at a distance, impacting plants in many different habitats as well as the animals that consume and rely upon them and the larger ecosystem.¹²⁶

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Mammals, birds, and insects are directly exposed to dicamba and its far more toxic breakdown product, 3,6-dichlorosalicylic acid (DCSA), through ingesting it in treated fields, through ingesting crop material that leaves the field via wind or runoff, and through consuming insects that have fed on crops contaminated with dicamba products.¹²⁷ Bees and other pollinators are at risk from direct exposure to dicamba spray or vapor drift and by feeding on dicamba-sprayed crops and other plants exposed to dicamba.¹²⁸ Importantly, dicamba spray and vapor drift has also impacted pollinators indirectly, far beyond the treated field, by suppressing the flowering plants they require for pollen and nectar.¹²⁹ Dicamba enters water bodies via runoff and drift, where it has been frequently detected.¹³⁰ Dicamba-laced runoff water can impact off-field plants for weeks after application.¹³¹

Dicamba also harms plants through its presence in rainwater. A recent study of twelve sites in Missouri during the 2019 season revealed that, at some sites, dicamba remained detectable throughout the season.¹³² The detection of dicamba in rainwater directly correlated with adoption rates of dicamba-resistant crops; areas with higher adoption had more dicamba in rainwater.¹³³ University of Missouri weed scientists determined that, in the sites located in the southeastern corner of Missouri, the amounts in rainwater were high enough to harm sensitive crops, especially with repeated exposure.¹³⁴

B. Chronological History

While dicamba has been sold in other forms since 1967, prior to EPA's 2016 new use registration actions for dicamba, dicamba uses on soybeans and cotton were limited to pre-plant and pre-harvest applications in soybeans and pre-plant and post-harvest applications in cotton.¹³⁵ Monsanto first sought registrations for new uses of dicamba on genetically engineered soy and cotton in 2010 and 2012, originally seeking registration of a different dicamba pesticide, M1691.¹³⁶ Monsanto and BASF developed new

¹²⁵ Complaint for Declaratory and Equitable Relief at 24, *CBD v. U.S. EPA* 4:20-cv-00555-DCB, ECF No. 1.

¹²⁶ *Id.*

¹²⁷ EPA, Dicamba DGA and BAPMA Salts, *supra* note at 12-15 (table), 28 (DCSA 17x more toxic to mammals than dicamba), 35-40 (birds, reptiles, terrestrial amphibians, mammals, dicamba and DCSA).

¹²⁸ EPA, Dicamba DGA and BAPMA Salts, *supra* note at 42-47.

¹²⁹ Liza Gross, *Bees Face Yet Another Lethal Threat in Dicamba, a Drift-Prone Pesticide*, GRIST (Jan. 28, 2019), <https://grist.org/article/bees-face-yet-another-lethal-threat-in-dicamba-a-drift-prone-pesticide/>; Eric W. Bohnenblust et al., *Effects of the Herbicide Dicamba on Nontarget Plants and Pollinator Visitation*, 35 *Envtl. Tox. & Chem.* 144 (2015).

¹³⁰ E.M. Thurman et al., *Regional Water-Quality Analysis of 2,4-D and Dicamba in River Water Using Gas Chromatography-Isotope Dilution Mass Spectrometry*, 79 *INT'L J. ENVTL. ANALYTICAL CHEM.* 185 (2001).

¹³¹ EPA, Dicamba DGA and BAPMA Salts, *supra* note at 297-298.

¹³² See Unglesbee, *supra* note .

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ EPA, Registration Decision for the Continuation of Uses of Dicamba on Dicamba Tolerant Cotton and Soybean 5 (Oct. 31, 2018).

¹³⁶ EPA, Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean 2-3 (Nov. 9, 2016).

dicamba products, while DuPont/Corteva obtained a license to market Monsanto's product under a different name.¹³⁷

As shown in the graph below, from 2012-2016, farmers applied, on average, 768,000 pounds of dicamba to soybeans and cotton, combined, each year. In just the first year of dicamba's registration for over-the-top spraying, dicamba usage on these crops rose to nearly 10 million pounds per year. The 2018-2020 saw further substantial increases. The 13 million pounds applied to soybeans and nearly 5 million pounds sprayed on cotton represented a more than 23-fold increase in the amount of dicamba sprayed on these crops in just the second year over-the-top spraying was permitted. The large volume of dicamba sprayed, and the spraying later in the season when hot conditions exacerbated drift, had devastating consequences.

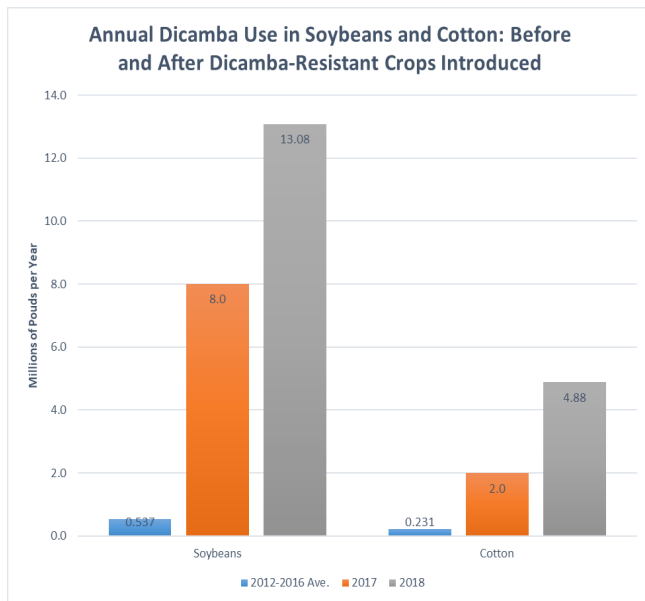


Figure 1: Annual dicamba use for soybeans and cotton before dicamba-resistant crops were introduced (average figure for 2012-2016) and the two years after broad introduction (2017, 2018). Based on EPA figures.

i. "A Potential Disaster"

According to discovery documents uncovered in subsequent civil litigation brought by peach farmers whose peach trees were damaged by dicamba drift, Monsanto knew of the serious drift threat posed by its dicamba-resistant crop system for more than a decade. The issue was extensively discussed in meetings

¹³⁷ See Carey Gillam, *Monsanto, DuPont Strike 1.75 Billion Licensing Deal, End Lawsuits*, REUTERS (Mar. 26, 2013), <https://www.reuters.com/article/us-monsanto-dupont-gmo/monsanto-dupont-strike-1-75-billion-licensing-deal-end-lawsuits-idUSBRE92P0IK20130326>.

of the company's Dicamba Advisory Council as far back as 2009.¹³⁸ Monsanto and its advisors not only foresaw drift damage, but anticipated lawsuits ("neighbors suing each other"), and discussed possible measures to address it, such as an "indemnity fund for crop loss."¹³⁹ Rather than reconsider its dicamba project, however, Monsanto decided that the threat of dicamba drift damage could be exploited to market its seeds to soybean farmers "who do not see value in [the dicamba-resistance] trait" for their own purposes.¹⁴⁰ These farmers would be "educated" into buying dicamba-resistant soybean seeds to avoid drift damage arising from a neighbor's use of dicamba (i.e. "Protection from your neighbor.").¹⁴¹

In 2010, Monsanto officer John Soteres was developing arguments to "defend[] dicamba relative to drift and volatilization to nearby crops," noting that Monsanto would need to address these issues not only with regulators, "but also potentially in the courts."¹⁴² Monsanto received further warnings of the damaging effects its dicamba crop system would have in 2011. One of its employees wrote in a summary of academic surveys the company commissioned, "DON'T DO IT; expect lawsuits,"¹⁴³ while Del Monte Foods called the new system a "potential disaster" in a 2011 letter.¹⁴⁴ Agronomists studying dicamba drift also informed EPA that Monsanto's system would likely harm off-field plants, affecting organisms that rely on those plants, including pollinators, via habitat loss.¹⁴⁵ EPA was also aware that dicamba use would increase with resistant crops and that neighbors of dicamba users would plant resistant crops for self-defense.¹⁴⁶

Unsurprisingly, Monsanto observed extensive dicamba drift damage in its own field trials. From 2012-2014, the company reported to EPA 73 off-target incidents that occurred during its testing of M1691, the precursor to the XtendiMax product that Monsanto first sought to register for over-the-top use.¹⁴⁷ The Missouri Dept. of Agriculture informed EPA of two incidents in 2013 and 2014, in which M1691 dicamba vapor caused drift damage to non-resistant soybeans at 2,800 feet and 2.2 miles, respectively, from treated fields of dicamba-resistant soy.¹⁴⁸

Instead of studying the issue further, Monsanto responded to EPA's growing concern by halting its own field-testing of XtendiMax with VaporGrip Technology in 2015.¹⁴⁹ Monsanto also prohibited trials by independent academics and expressed concerns to BASF about "how tightly BASF controls the release of

¹³⁸ Johnathan Hettinger, 'Buy it or else': Inside Monsanto and BASF's moves to force dicamba on farmers, Midwest Center for Investigative Reporting (Dec. 4, 2020), <https://investigatamidwest.org/2020/12/04/buy-it-or-else-inside-monsanto-and-basfs-moves-to-force-dicamba-on-farmers/>.

¹³⁹ Bader exhibit 6 - see box.com files

¹⁴⁰ Bader exhibit 6 - see box.com files

¹⁴¹ Bader exhibit 6 - see box.com files

¹⁴² Bader exhibit 502 - see box.com files

¹⁴³ Hettinger, *buy it or else*

¹⁴⁴ <https://beta.documentcloud.org/documents/6816097-Baderfarm-Exhibits-All.html#document/p2090/a560195>

¹⁴⁵ EPA, Ecological Risk Assessment for Dicamba and its Degradate, 3,6-dichlorosalicylic acid (DCSA), for the Proposed New Use on Dicamba-Tolerant Soybeans (MON 87708) at 20 (Mar. 8, 2011), <https://www.regulations.gov/document/EPA-HQ-OPP-2016-0187-0008>.

¹⁴⁶ *Id.*

¹⁴⁷ <https://beta.documentcloud.org/documents/6940689-19-70115-Vol-07-Excerpts-of-Record.html#document/p22/a566950>;

EPA, Dicamba DGA: Second Addendum to the Environmental Fate and Ecological Risk Assessment for Dicamba DGA salt and its Degradate, 3,6-dichlorosalicylic acid (DCSA) for the Section 3 New Use on Dicamba-Tolerant Soybean 6-7 (Mar. 24, 2016).

¹⁴⁸ *Id.* at 7-8.

¹⁴⁹ Bader exhibits 493 - see box.com

data by third parties.”¹⁵⁰ EPA proposed a small omnidirectional vapor drift buffer zone far smaller in width than the distances it knew dicamba vapor could travel, but subsequently dropped even this proposal.¹⁵¹

In 2016, Monsanto elaborated upon its 2009 scheme of using protection from drift damage as a marketing strategy. The company conducted a careful analysis to project the number of dicamba damage episodes—from 1,300 to over 3,200—that would occur in each of the first five years of its system’s use and calculated the staff budget that would be required for investigation of these complaints.¹⁵² Similarly, in a September 2016 meeting, BASF also identified “defensive planting” as a marketing strategy.¹⁵³ That following January, BASF had a market research document that confirmed the role of defensive planting in contributing to sales.

ii. 2016 Registration

In November 2016, EPA conditionally registered three dicamba products for new use under FIFRA section 3(c)(7)(B).¹⁵⁴ The 2016 registration greatly extended permissible times to spray dicamba deep into the hot summer months, for the first time allowing a new use for post-emergent, over-the-top applications to cotton and soybean crops genetically engineered with resistance to the pesticide.¹⁵⁵ The registration covered millions of acres in 34 states.¹⁵⁶

EPA based its 2016 registration on the supposition that the three dicamba products were less volatile than prior dicamba formulations.¹⁵⁷ Even so, EPA found it necessary to impose a host of use instructions, a form of mitigation, contained on a lengthy label.¹⁵⁸ These instructions restricted applications to a narrow range of wind speeds, required a downwind buffer, stipulated a maximum spray boom height, and specified temperature and humidity adjustments, among other instructions.¹⁵⁹ EPA claimed these instructions would “effectively limit” any impacts if followed.¹⁶⁰ These registrations were time-limited with two-year automatic expiration dates “because of the concerns about resistance and off-target movement,” unless EPA determined before that date that off-site incidents were not occurring at “unacceptable frequencies or levels.”¹⁶¹

¹⁵⁰ Bader exhibits 293 and 1149 – see box.com

¹⁵¹ EPA, M-1691 Herbicide, EPA Reg. No. 524-582 (Active Ingredient: Dicamba Diglycolamine Salt) and M-1768 herbicide, EPA Reg. No. 524-617 (AI: Diglycolamine Salt with VaporGrip™) – Review of EFED Actions and Recent Data Submissions Associated with Spray and Vapor Drift of the Proposed Section 3 New Uses on Dicamba-Tolerant Soybean and Cotton 2-3 (Nov. 8, 2016), <https://www.regulations.gov/document/EPA-HQ-OPP-2016-0187-0955>.

¹⁵² Bader exhibits 158

¹⁵³ Bader 1009.

¹⁵⁴ EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* 1-2 (2016).

¹⁵⁵ EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* 3-4 (2016).

¹⁵⁶ EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* 2, 28 (2016).

¹⁵⁷ EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* 29, 35 (2016); Ag Professional, *EPA Responds to Dicamba Complaints*, *The Scoop* (Aug. 29, 2017), <https://www.thedailyscoop.com/news/epa-responds-dicamba-complaints> (“The 2-year expiration was put in place because of the concerns about resistance and off-target movement”).

¹⁵⁸ See EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* 29-36 (2016); see generally EPA, Supplemental Labeling: XtendiMax with VaporGrip Technology (Nov. 9, 2016).

¹⁵⁹ See EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* 29-36 (2016); see generally EPA, Supplemental Labeling: XtendiMax with VaporGrip Technology (Nov. 9, 2016).

¹⁶⁰ See EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* 29-36 (2016); see generally EPA, Supplemental Labeling: XtendiMax with VaporGrip Technology (Nov. 9, 2016).

¹⁶¹ EPA, *Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean* 35 (2016); AG PROFESSIONAL, *EPA Responds to Dicamba Complaints*, *THE SCOOP* (Aug. 29, 2017), <https://www.thedailyscoop.com/news/epa-responds-dicamba-complaints>.

Monsanto knew its research left many unanswered questions about the real-world risks posed by dicamba's volatility. In a February 2016 email to coworkers, a Monsanto researcher wrote: "We don't know how long a sensitive plant needs in a natural setting to show volatility damage. We don't know what concentration in the air causes a response, either . . . There is a big difference for plants exposed to dicamba vapor for 24 vs. 48 hours. Be careful using this externally."¹⁶² BASF also knew dicamba still posed risks. A BASF executive admitted that "from a practical standpoint" the Engenia product was not different from older dicamba versions,¹⁶³ and the company privately told applicators that drift could harm farmers' harvests.¹⁶⁴ Monsanto responded to BASF's admission that volatility was an issue with an email from a Monsanto salesman to coworkers stating: "We need to get on this right now . . . Deny! Deny! DENY!"¹⁶⁵

In response to the registrations, four environmental and farming nonprofits filed a lawsuit on behalf of farmers and conservationists in January 2017. The petitioners¹⁶⁶ argued that EPA disregarded environmental and crop harms from foreseeable off-field drift, failed to consider socioeconomic impacts, and lacked substantial evidence to support the registrations.

iii. The 2017 Season: "We have never seen have never seen anything like this before . . . in our agricultural history."

Farmers began using the dicamba products for the first time during the 2017 planting season under the new use registration. The events that transpired were unprecedented in the history of U.S. agriculture. In the registration decision, EPA had concluded that its label mitigation was "expected to eliminate any offsite exposures." But complaints skyrocketed. By the end of the season Professor Kevin Bradley of the University of Missouri issued a report finding 2,708 formal complaints nationwide.¹⁶⁷ Based on estimates by university weed scientists, 2.5 million acres of soybean were damaged by dicamba drift by mid-July, a figure rising to 3.6 million acres by the end of the summer.¹⁶⁸ This was about 4% of all soybean acreage nationwide. And these numbers substantially under-reported the total damage, since the majority of injured farmers do not report drift incidents. In addition, a still higher percentage of susceptible soybeans were injured: an astounding fifty percent of non-dicamba-resistant soybeans in Illinois.

And this was just the soybean damage; many other crops were also damaged, including tomatoes, melons, fruit and nut trees, and vegetables, as well as residential gardens, shrubs, and trees.¹⁶⁹ According to

¹⁶² <https://beta.documentcloud.org/documents/6816097-Baderfarm-Exhibits-All.html#document/p1125/a557940>

¹⁶³ <https://beta.documentcloud.org/documents/6816097-Baderfarm-Exhibits-All.html#document/p2076/a560186>

¹⁶⁴ <https://beta.documentcloud.org/documents/6816097-Baderfarm-Exhibits-All.html#document/p1927/a560163>

¹⁶⁵ <https://beta.documentcloud.org/documents/6816097-Baderfarm-Exhibits-All.html#document/p1519/a558939>

¹⁶⁶ Under FIFRA's judicial review provision, 7 U.S.C. § 136n, EPA's dicamba registration decision was subject to direct petition for review in the courts of appeals, rather than federal district court. Accordingly this article refers to what would otherwise be "plaintiffs" in district court cases as "petitioners" when discussing direct petition for review cases. The nonprofits are the National Family Farm Coalition, Pesticide Action Network, Center for Biological Diversity, and Center for Food Safety.

¹⁶⁷ UNIV. OF MISSOURI, *A Final Report on Dicamba-Injured Soybean Acres* (Oct. 30, 2017), https://ipm.missouri.edu/ipcm/2017/10/final_report_dicamba_injured_soybean/.

¹⁶⁸ *Id.*

¹⁶⁹ Pets. Excerpts of Rec. Vol. III at ER 382-91, ER 439 NFFC v. EPA, No. 17-70196, ECF No. 71-3; Pets. Excerpts of Rec. Vol. II at ER122, NFFC v. EPA, No. 17-70196, ECF No. 71-2; David Bennett, *Might Dicamba be Affecting Pollinators?*, FARMPROGRESS (Sept. 26, 2017), <https://www.farmprogress.com/weeds/might-dicamba-be-affecting-pollinators>.

Missouri weed science expert, Dr. Kevin Bradley, “[w]e have never seen anything like this before . . . in our agricultural history.”¹⁷⁰

Numerous state agricultural departments also reported to EPA extensive damage. University scientists expressed unanimous concern that the dicamba products were more volatile than manufacturers admitted.¹⁷¹ One of the key messages from state and academic experts was that the EPA label restrictions were not working because they did not address volatility.¹⁷² During this time, university scientists affirmed volatility, or vapor drift, as one of the major routes of dicamba drift injury, based on air sampling data, field volatility studies, and field visits.¹⁷³ EPA received extensive test results showing that, contrary to Monsanto’s claims, the products volatilized for as many as 3 or 4 days following the application.¹⁷⁴

By late summer 2017, Monsanto and BASF began responding to these damage reports by taking measures to shield themselves from lawsuits.¹⁷⁵ Among other pretexts, Monsanto began to blame the damage on a different BASF weed killer, glufosinate.¹⁷⁶ Monsanto designed a form for investigators to use in looking into farmer complaints, which would “gather data that could defend Monsanto.”¹⁷⁷ BASF

¹⁷⁰ UNIV. OF MISSOURI, *Off-Target Movement of Dicamba in Missouri. Where do we go From Here?*, (Aug. 21, 2017), https://ipm.missouri.edu/IPCM/2017/8/Off-target_movement/. EPA was well aware of the unfolding crisis, sharing newspaper and wire reports, yet took no action. Pets. Excerpts of Rec. Vol. II at ER280-84, NFFC v. EPA, No. 17-70196, ECF No. 71-2 (sharing Tom Polansek, *U.S. Regulator Aiming to Allow Controversial Herbicide use with Safeguards*, REUTERS (Sept. 19, 2017), <https://www.reuters.com/article/us-usa-pesticides-epa-idUKKCN1BU2YV> via email); Pets. Excerpts of Rec. Vol. III at ER 355-63, NFFC v. EPA, No. 17-70196, ECF No. 71-3 (sharing Tom Polansek & Emily Flitter, *Exclusive: EPA Eyes Limits for Agricultural Chemical Linked to Crop Damage*, REUTERS (Sept. 5, 2017), <https://www.reuters.com/article/us-usa-pesticides-epa-exclusive/exclusive-epa-eyes-limits-for-agricultural-chemical-linked-to-crop-damage-idINKCN1BG1GT> and Tiffany Stecker, *As Dicamba Dust Settles, Scientists and Industry Spar*, BLOOMBERG LAW (Aug. 30, 2017), <https://news.bloomberglaw.com/environment-and-energy/as-dicamba-dust-settles-scientists-and-industry-spar/context=article-related> via email); Pets. Excerpts of Rec. Vol. III at ER 396-404, NFFC v. EPA, No. 17-70196, ECF No. 71-3 (sharing David Koon, *Farmer vs. Farmer*, ARKANSAS TIMES (Aug. 10, 2017), <https://arktimes.com/news/cover-stories/2017/08/10/farmer-vs-farmer> via email); Pets. Excerpts of Rec. Vol. II at ER 188, NFFC v. EPA, No. 17-70196, ECF No. 71-2 (sharing Tom Polansek, *U.S. Scientists to Skip Monsanto Summit on Controversial Weed Killer*, REUTERS (Sept. 26, 2017), <https://www.reuters.com/article/us-usa-pesticides-monsanto/u-s-scientists-to-skip-monsanto-summit-on-controversial-weed-killer-idUSKCN1C13CK> via email); Pets. Excerpts of Rec. Vol. III at ER 379-81, NFFC v. EPA, No. 17-70196, ECF No. 71-3 (sharing Tom Polansek & Karl Plume, *U.S. Farmers Confused by Monsanto Weed Killer’s Complex Instructions*, REUTERS (Aug. 21, 2017), <https://www.reuters.com/article/us-usa-pesticides-labels/u-s-farmers-confused-by-monsanto-weed-killers-complex-instructions-idUSKCN1B110K> via email); Pets. Excerpts of Rec. Vol. II at ER 291-92, NFFC v. EPA, No. 17-70196, ECF No. 71-2 (sharing Gil Gullickson, *Monsanto Levels Criticism at Arkansas Weed Scientists*, SUCCESSFUL FARMING (Sept. 11, 2017), <https://www.agriculture.com/crops/soybeans/monsanto-levels-criticism-at-arkansas-weed-scientists?did=169450>); see Pets. Excerpts of Rec. Vol. III at ER 369, NFFC v. EPA, No. 17-70196, ECF No. 71-3 (stating that EPA was “waiting on registrants to voluntarily [take action]”).

¹⁷¹ Tiffany Stecker, *As Dicamba Dust Settles, Scientists and Industry Spar*, BLOOMBERG LAW (Aug. 30, 2017), <https://news.bloomberglaw.com/environment-and-energy/as-dicamba-dust-settles-scientists-and-industry-spar/context=article-related>.

¹⁷² Pets. Excerpts of Rec. Vol. III at ER 442-44, ER 423-24, NFFC v. EPA, No. 17-70196, ECF No. 71-3; see Pets. Excerpts of Rec. Vol. II at ER 293-345, NFFC v. EPA, No. 17-70196, ECF No. 71-2 (45 pages of independent vapor drift testing by universities); *Id.* at ER 390-91 (listing dicamba-sensitive species).

¹⁷³ UNIV. OF MISSOURI, *Off-Target Movement of Dicamba in Missouri. Where do we go From Here?*, (Aug. 21, 2017), https://ipm.missouri.edu/IPCM/2017/8/Off-target_movement/.

¹⁷⁴ *Id.*; Tiffany Stecker, *As Dicamba Dust Settles, Scientists and Industry Spar*, BLOOMBERG LAW (Aug. 30, 2017), <https://news.bloomberglaw.com/environment-and-energy/as-dicamba-dust-settles-scientists-and-industry-spar/context=article-related> (university field test illustrating XtendiMax volatilization).

¹⁷⁵ Johnathan Hettinger, *‘Buy it or else’: Inside Monsanto and BASF’s moves to force dicamba on farmers*, Midwest Center for Investigative Reporting (Dec. 4, 2020), <https://investigatamidwest.org/2020/12/04/buy-it-or-else-inside-monsanto-and-basfs-moves-to-force-dicamba-on-farmers/>.

¹⁷⁶ Hettinger, *supra* note 138.

¹⁷⁷ <https://beta.documentcloud.org/documents/6816097-Baderfarm-Exhibits-All.html#document/p1534/a585205>

drafted a script for its investigators that directed them to deny liability for drift damage and to assure the complainant that even severe damage would not result in yield loss.

In internal communications in summer 2017, Monsanto made clear it would only investigate a dicamba drift complaint if it came from a Monsanto customer. It treated its employees' investigative visits to such "driftees" as an opportunity to sell them dicamba-resistant seeds to avoid crop injury from future drift.¹⁷⁸ A Monsanto sales employee emailed: "I think we can significantly grow business and have a positive effect on the outcome of 2017 if we reach out to all the driftee people."¹⁷⁹

Faced with the unprecedented 2017 summer of drift, and pressured by state pesticide departments and farmers to take some action to stop it, EPA briefly considered state experts' recommendations to prohibit use after a spring "cutoff date" to mitigate vapor drift damage, but rejected it after Monsanto opposed it.¹⁸⁰ When EPA finally acted, it took its orders not from the states or their experts, but from Monsanto, repeatedly meeting with its representatives and letting them dictate what label changes EPA would make.¹⁸¹ Upon sending the final new label back to Monsanto, the EPA official assured them: "*like I said, no surprises.*"¹⁸² In October 2017, EPA and Monsanto amended the 2016 registration and added further new mitigation, use instructions, and requirements. These label amendments included a restricted use pesticide designation for the dicamba products, a lower application wind speed limit, applicator training, greater record-keeping burdens, and a ban on spraying from dusk to dawn.¹⁸³ But crucially and contrary to the state experts' urgent requests, EPA's changes did nothing to address volatility or vapor drift.

Overall, despite the evidence of how wrong its 2016 decision and risk assessment had been, EPA declared that the revised document "did not affect the conclusions in the supporting assessment of risk," and that, rather than provide any new data or analysis supporting the new measures' efficacy, EPA "continue[d] to rely on all the assessments" supporting the original registration."¹⁸⁴ In other words, EPA continued to rely on its 2016 conclusions and risk assessments. The challengers amended their petition for review to encompass these new revisions to the registration and the case continued.

¹⁷⁸ Hettinger, *supra* note 138.

¹⁷⁹ <https://beta.documentcloud.org/documents/6816097-Baderfarm-Exhibits-All.html#document/p910/a557582>

¹⁸⁰ Tom Polansek & Emily Flitter, *Exclusive: EPA Eyes Limits for Agricultural Chemical Linked to Crop Damage*, REUTERS (Sept. 5, 2017), <https://www.reuters.com/article/us-usa-pesticides-epa-exclusive/exclusive-epa-eyes-limits-for-agricultural-chemical-linked-to-crop-damage-idINKCN1BG1GT>; Tom Polansek, *U.S. Regulator Aiming to Allow Controversial Herbicide use with Safeguards*, REUTERS (Sept. 19, 2017), <https://www.reuters.com/article/us-usa-pesticides-epa-idUKKCN1BU2YW>; Donnelle Eller, *Iowa Farmers Make Record Number of Pesticide Misuse Claims*, Des Moines Register (Sept. 11, 2017), <https://www.desmoinesregister.com/story/money/agriculture/2017/09/11/iowa-investigates-record-number-pesticide-dicamba-drift-claims/643577001/>.

¹⁸¹ Pets. Excerpts of Record Vol. IV of IX at ER 0955-57, ER 0953-54, ER 0910, ER 0908-909, ER 0905-907, NFFC v. EPA, No. 19-70115.

¹⁸² Pets. Excerpts of Record Vol. IV of IX at ER 0910, NFFC v. EPA, No. 19-70115 (emphasis added).

¹⁸³ Faced with EPA's inaction and catastrophic losses, several states passed restrictions to address vapor drift, such as spray cut off dates and temperature limits. Pamela Smith, *Dicamba 2018L States Struggle with Application Restrictions*, AgFax (Dec. 14, 2017), <https://agfax.com/2017/12/14/dicamba-2018-states-struggle-with-application-restrictions-dtn/> ("Most of the state-by-state changes are being made, they stated, because the federal EPA labels do not address herbicide volatility."); Pets. Excerpts of Record Vol. III of IX at ER 0597-610, NFFC v. EPA, No. 19-70115.

¹⁸⁴ NFFC, 960 F.3d at 1128.

iv. *The 2018 Growing Season*

The 2017 label amendments failed to prevent continuing massive dicamba drift damage in 2018. By July, Dr. Bradley reported an estimated 1.1 million acres of soybean damage in 18 states. The number of official dicamba damage reports rose even higher than 2017 in the leading soybean-production states of Iowa, Illinois, Indiana, Ohio, Nebraska, and North Dakota.¹⁸⁵

Dicamba drift slowed the growth of affected soybeans and often slashed yields, costing farmers many millions of dollars in lost revenue. The damage was so severe that by late July 2018, the U.S.'s fourth largest soybean seed seller wrote to EPA urging prohibition of over-the-top applications of dicamba. Another university expert told EPA that the 2018 season demonstrated “*that minimizing the off target movement of dicamba to a reasonable level is NOT possible.*”¹⁸⁶ Just as Monsanto and BASF had anticipated years before, the widespread damage placed pressure on farmers to purchase dicamba-resistant soybean seeds, not out of choice, but defensively, to protect themselves from rampant dicamba drift damage.¹⁸⁷

However, growers of other crops, who lacked a dicamba-resistant alternative, were left defenseless.¹⁸⁸ As in 2017, dicamba caused extensive damage to specialty crops, vegetables, tobacco, and fruit trees.¹⁸⁹ For example, a North Dakota vegetable farmer had his crops destroyed by successive waves of dicamba drift.¹⁹⁰ An Arkansas beekeeping operation experienced sharp declines in honey production in areas hard-hit by dicamba drift, which deprived his bees of sufficient flowering plants for their nectar needs, causing him to move his operation out of state.¹⁹¹

A second year of massive atmospheric loading of dicamba also took a toll on residential and shade trees as well as other ornamental plants throughout rural America.¹⁹² Dicamba drift damage also provoked disputes between dicamba users and those affected by drift, turning farmer against farmer, family against family, tearing apart the fabric of rural communities. In at least one case, a dicamba drift dispute resulted in a gunshot death.¹⁹³ Overall, two years of dicamba use in 2017 and 2018 resulted in 4,200 official complaints and more than 4.7 million acres of soybeans injured, as well as scores of other plants and crops, including valuable specialty crops.¹⁹⁴

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¹⁸⁵ *Id.* at 1127-28.

¹⁸⁶ *Id.* 1139 (emphasis added).

¹⁸⁷ *Id.* at 1142.

¹⁸⁸ Complaint for Declaratory and Equitable Relief at 35, *CBD v. U.S. EPA* 4:20-cv-00555-DCB, ECF No. 1.

¹⁸⁹ *Id.*

¹⁹⁰ *Id.*

¹⁹¹ *Id.*

¹⁹² *Id.*

¹⁹³ *Id.*

¹⁹⁴ *Id.*

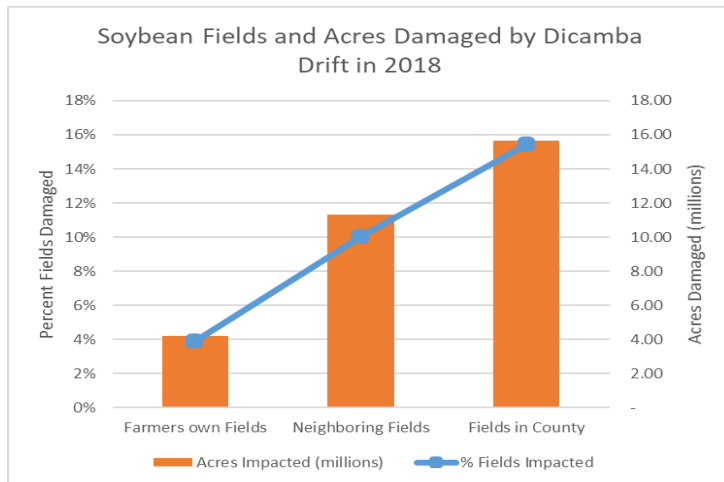


Figure 2: Farmers in 19 major soybean states were surveyed by USDA and reported dicamba damaged fields of their own, their neighbors', and in their counties. Source: USDA Agricultural Resource Management Survey (2018), as reported in EPA, *Dicamba Use on Genetically Modified Dicamba-Tolerant (DT) Cotton and Soybean: Incidents and Impacts to Users and Non-Users from Proposed Registrations 31*, tbl. 8 (Oct. 26, 2020).

Notably these figures, as dramatic as they are, are substantial *underestimates*, however, since only a small fraction of injured farmers report drift damage episodes.¹⁹⁵ Indeed, as shown in Figure 2, a USDA survey in 2018 found that soybean growers alone suffered at least 65,000 adverse effect incidents to their own fields from dicamba drift, “25 times the number of dicamba incidents reported to EPA for all crops.” Farmers reported still more injury when queried about dicamba damage to their neighbors’ fields and in their county, with damage rising to an astounding 10% and nearly 16% of soybean fields, representing over 11 million and *nearly 16 million damaged acres*, respectively.¹⁹⁶

v. The 2018 Registration Continuation

Despite these two years of unprecedented widespread drift damage, in late October 2018, EPA continued the 2016 new use registration for another 2 years.¹⁹⁷ EPA continued the registration even though it did not make a finding that drift damage episodes were not occurring at “unacceptable frequencies or levels” – the condition that EPA had stipulated for continuing the registration.¹⁹⁸

EPA for the first time assessed field studies of dicamba spray and vapor drift conducted by university scientists from 2016 to 2018.¹⁹⁹ These twelve studies collectively revealed dicamba drift damage to susceptible off-field plants at far greater distances than the registrant studies and modeling EPA had

¹⁹⁵ *NFFC*, 960 F.3d at 1138.

¹⁹⁶ See *supra* fig. 2.

¹⁹⁷ EPA, Registration Decision for the Continuation of Uses of Dicamba on Dicamba Tolerant Cotton and Soybean 3 (Oct. 31, 2018).

¹⁹⁸ EPA, Final Registration of Dicamba on Dicamba-Tolerant Cotton and Soybean 35-36 (Nov. 9, 2016); see EPA, Registration Decision for the Continuation of Uses of Dicamba on Dicamba Tolerant Cotton and Soybean (Oct. 31, 2018).

¹⁹⁹ See generally EPA, *The Scientific Basis for Understanding the Off-Target Movement Potential of Xtendimax* (2018), <https://www.regulations.gov/document/EPA-HQ-OPP-2016-0187-0973>.

relied upon for prior registrations.²⁰⁰ More than half of the studies identified injury to plants at distances greater than 130 feet (39.6 m).²⁰¹

Based on these studies, EPA scientists provisionally recommended expansion of the action area to 196 feet (60 meters) on all sides of fields where overlap would be possible with endangered species' range. Once EPA scientists had confirmed the validity of an additional 2018 study, which revealed injury to dicamba-sensitive soybeans 136 meters from the edge of a treated field, they then recommended expansion of the action area to 443 feet (135 meters) beyond the fields. Yet EPA added only a 57-foot buffer, a buffer eight times smaller than recommended by the EPA's scientists, which is only required in the minority of counties with listed species (8% of counties).

Again, rather than address volatility problems *inherent* with the dicamba products and assuring safety, EPA just piled even more complex use mitigation instructions on farmers, such as further limiting the time of day when application could be made, limiting the number of applications and the length of time after planting the application could be made, and allowing only certified applicators to make applications.²⁰²

vi. The 2019 and 2020 Growing Seasons

The 2019 and 2020 summer growing seasons followed the same damaging drift patterns as those prior: drift damage to crops, trees, gardens, and the environment writ large; real world farming conditions making it impossible to effectively and lawfully spray; state regulators overwhelmed with injury complaints even as farmers stopped filing them, feeling them futile; and more farmers forced to defensively adopt dicamba-resistant soybeans.

From 2017-2019, nearly 5,600 farmers reported dicamba damage to Bayer and BASF, makers of dicamba.²⁰³ EPA estimated this could be as much as a 25-fold underreporting of incidents. In 2019, nearly 3,000 drift incidents were reported to EPA.²⁰⁴ Compared to prior years, 2019 was "*as bad, if not worse, than last year*," according to Leo Reed, president-elect of the Association of American Pesticide Control Officials (AAPCO) and pesticide licensing manager for the Office of Indiana State Chemist.²⁰⁵ According to AAPCO, there was approximately a 10% increase in reported incidents as compared to 2018.²⁰⁶ In Illinois, the number of complaints soared from about 120 in the pre-dicamba era to more than 700. In Indiana, it

²⁰⁰ *Id.*

²⁰¹ *Id.*

²⁰² *NFFC*, 960 F.3d at 1130.

²⁰³ Johnathan Hettinger, *EPA documents show dicamba damage worse than previously thought*, Midwest Center for Investigative Reporting (Oct. 30, 2020), https://www.stltoday.com/news/local/state-and-regional/epa-documents-show-dicamba-damage-worse-than-previously-thought/article_36f21c52-7459-5ee0-8bae-21bf5e9f89d2.html.

²⁰⁴ EPA, *Memorandum Supporting Decision to Approve Registration for the Uses of Dicamba on Dicamba Tolerant Cotton and Soybean 9* (Oct. 27, 2020), https://www.epa.gov/sites/production/files/2020-10/documents/dicamba-decision_10-27-2020.pdf. [hereafter 2020 Dicamba Registration Decision].

²⁰⁵ Emily Unglesbee, *EPA Gets Limited Dicamba Data*, PROGRESSIVE FARMER (Aug. 20, 2019), <https://www.dmpf.com/agriculture/web/ag/crops/article/2019/08/20/dicamba-injury-complaints-rise-epa>.

²⁰⁶ EPA, 2020 *Dicamba Registration Decision*, *supra* n. ____.

went from 60 to 200.²⁰⁷ (And as explained above, these numbers are gross underestimates, since most incidents go unreported).

Illinois led the country in dicamba injury, with regulators actively investigating 724 cases of alleged dicamba injury, a record for the state.²⁰⁸ Illinois regulators mentioned that you would be hard-pressed to find a non-dicamba-resistant soybean field in some counties that was not damaged because there were whole counties that appeared to be damaged. With the exception of Missouri, most of the states in EPA Region 7 (Iowa, Kansas, Missouri, and Nebraska) investigated as many or more injury cases in 2019 than 2018.²⁰⁹ In Indiana, dicamba drift complaints rose from 135 in 2018 to 178 in 2019.²¹⁰

Despite the exponential numbers of reported injuries, these numbers nonetheless discount the actual drift incidents dramatically.²¹¹ In states like Missouri, complaint numbers went down, but almost certainly not because drift stopped. Rather, according to a 2019 survey of farmers in Missouri, 80% of them are not bothering to file formal complaints anymore, in large part because they do not think it did any good.²¹² All but one of Missouri's eight pesticide inspectors left their jobs in 2018-2019, with heavy workload and burnout as contributing factors. A survey of farmers across 60 counties in Nebraska found that only 7% of farmers who saw dicamba injury filed an official complaint with the Nebraska Department of Agriculture.²¹³ Similarly, in a survey conducted by AAPCO, 19 states reported nearly 1,400 cases of alleged dicamba injury in 2019.²¹⁴ The regulators from these states acknowledged that these numbers are likely far lower than the actual cases of injury. "We're hearing the same thing as other regulators—people are just not reporting," said Ryan Williams, an Oklahoma pesticide regulator who represented the EPA Region 6 states of Arkansas, Louisiana, New Mexico, Oklahoma, and Texas at the meeting. "*They're tired of reporting and not getting any results.*"²¹⁵

The extraordinary costs from dicamba injury fell upon state agencies as well. Indiana regulators investigated 178 injury cases in 2019, another state record.²¹⁶ The Missouri Department of Agriculture

²⁰⁷ Dan Charles, *Pesticide Police, Overwhelmed By Dicamba Complaints, Ask EPA For Help*, NPR (Feb. 6, 2020), <https://www.npr.org/sections/thesalt/2020/02/06/800397488/pesticide-police-overwhelmed-by-dicamba-complaints-ask-epa-for-help>.

²⁰⁸ Emily Unglesbee, *Dicamba Fatigue*, *Progressive Farmer* (Dec. 9, 2019), <https://www.dmpf.com/agriculture/web/ag/crops/article/2019/12/10/states-report-another-year-dicamba>.

²⁰⁹ *Id.*

²¹⁰ Robert D. Waltz, *Analysis of Off-Target Movement of Dicamba Herbicides in Indiana*, The Office of Indiana State Chemist (Oct. 30, 2019), https://www.oisc.purdue.edu/pesticide/iprb/iprb_159_dicamba_24c_analysis.pdf.

²¹¹ Kevin Bradley, *Your Dicamba Report Card*, University of Missouri (2019), <https://plantsciencesweb.missouri.edu/cmcc/pdf/2019/bradley-dicamba.pdf>.

²¹² Charles, *supra*.

²¹³ Rodrigo Werle et al., *Survey of Nebraska Farmers' Adoption of Dicamba-Resistant Soybean Technology and Dicamba Off-Target Movement*, 32 *Weed Technology* 754 (Dec. 2018), <https://www.cambridge.org/core/journals/weed-technology/article/abs/survey-of-nebraska-farmers-adoption-of-dicamba-resistant-soybean-technology-and-dicamba-off-target-movement/7BBA31C5FB37C66E6E413EA025098812>.

²¹⁴ Unglesbee, *supra*.

²¹⁵ *Id.*

²¹⁶ *Id.*

added six new positions to address the dicamba backlog, expected to cost over \$600,000 a year.²¹⁷ Communication with EPA over dicamba problems hit an all-time low in 2019.²¹⁸ For reasons that are unclear, unlike the near weekly conference calls and data reporting of 2018, suddenly very little regular communication between state regulators and EPA occurred in 2019 and whatever meetings or calls were held were not logged.

a. Tree damage

States have also reported environmental harm beyond crop fields from 2018-2020.²¹⁹ Illinois regulators noticed a decline in tree health and began investigating. Nebraska state foresters saw an increase in damage to the state's trees. South Dakota State University scientists analyzed samples from injured trees as part of a study on the long-term effects of herbicide injury on trees. In some areas, the damage is so severe that tree mortality is higher than from the Emerald Ash Borer, an insect that has killed tens of millions of trees across 25 states.²²⁰ "Our No. 1 problem on our trees is herbicide damage," said Laurie Stepanek, forest health specialist with the Nebraska Forest Service. Stepanek said the damage has no boundaries, ranging from urban communities to native forests to tree nurseries. "We've got it everywhere, unfortunately. It's so widespread and affecting so many trees." Lou Nelms, a retired biologist and former nursery owner who has documented tree injury in central Illinois for five straight years, has been finding injured sycamore trees in the middle of downtown areas across central Illinois, as far as a mile and a half from the closest crops.²²¹ Lab samples confirmed that dicamba was present.

Research out of the University of Missouri found that 1/200th of the current dicamba application concentration can injure trees, with apple, red maple, peach, and pin oak being the most sensitive.²²² Pecan trees were found to be similarly sensitive,²²³ and the University of Georgia extension office estimates that synthetic auxins (dicamba, 2,4-D) score an 8 out of 10 for their potential to contribute to long-term injury to pecan trees.²²⁴ Monitoring by the Arkansas Audubon Society identified 243 instances of possible or

²¹⁷ Brendan Crowley, *Hundreds seeking dicamba complaint resolutions; regulators say they need help* (Mar. 3, 2020), https://www.joplinglobe.com/news/local_news/hundreds-seeking-dicamba-complaint-resolutions-regulators-say-they-need-help/article_a123cc30-caa7-5c71-bc7b-d6f7f6274304.html.

²¹⁸ Unglesbee, *supra* note.

²¹⁹ *Id.*

²²⁰ Johnathan Hettinger, "We've got it everywhere": Dicamba damaging trees across Midwest and South, Midwest Center for Investigative Reporting (June 16, 2020), <https://investigatmidwest.org/2020/06/16/weve-got-it-everywhere-dicamba-damaging-trees-across-midwest-and-south/>.

²²¹ *Id.*

²²² Brian R. Dintelmann et al, *Investigations of the sensitivity of ornamental, fruit, and nut plant species to driftable rates of 2,4-D and dicamba*, 34 *Weed Technology* 331 (June 2020), <https://www.cambridge.org/core/journals/weed-technology/article/abs/investigations-of-the-sensitivity-of-ornamental-fruit-and-nut-plant-species-to-driftable-rates-of-24d-and-dicamba/73EACCF936DD92308C28D0AFD62EA2E1>.

²²³ M. Lenny Wells et al., *Simulated Single Drift Events of 2,4-D and Dicamba on Pecan Trees*, 29 *HortTechnology* 360 (Apr. 2, 2019), <https://journals.ashs.org/horttech/view/journals/horttech/29/3/article-p360.xml>.

²²⁴ Lenny Wells, *Herbicide Injury of Pecan Trees*, UGA Cooperative Extension Circular (Apr. 2019), https://secure.caes.uga.edu/extension/publications/files/pdf/C%201146_1.PDF.

probable dicamba damage on a wide variety of plants across 17 eastern Arkansas counties in 2019.²²⁵ Similar monitoring in 2020 identified 116 instances of probable dicamba damage and 4 instances of possible dicamba damage. Eleven monitored sites where damage was documented in 2019 had signs of damage in 2020 as well, indicating that damage to species was occurring in multiple years. The most frequently reported species of plant with probable damage was the sycamore tree.

Another 2019 monitoring study across 21 Illinois counties found that 59 out of the 83 locations analyzed had dicamba damage that was rated as moderate, severe, or extreme.²²⁶ Trees were the type of plant that most often showed symptoms of damage. Ohio State University extension states that “For woody plants and other perennial species, the potential for long-term or accumulating effects is a concern. Herbicide drift may reduce winter hardiness and long-term vigor, which can result in high replacement costs and years of lost revenue waiting for new plants to produce.”²²⁷ More than 60 areas managed by the Illinois Department of Natural Resource, including state parks and nature preserves, reported herbicide damage in 2018 or 2019.²²⁸

b. 2020 Injuries

States continued to struggle with dicamba damage in 2020. For example, Iowa recorded a record-high 215 investigations into auxin injury (potentially dicamba), up from a confirmed 83 dicamba injury cases in the state in 2019.²²⁹ By July 2020, scientists said weather conditions had made a “perfect storm” leading to drift from June spraying. “It’s far worse than past years,” said Meaghan Anderson, a field agronomist for Iowa State University, based in central Iowa.²³⁰ “You can tell pretty quickly which soybean fields are not Xtend soybeans in my area, because they are all cupped and puckered up.”²³¹

In 2020, complaints increased in Minnesota as compared to 2018 and 2019 to over 9,000 acres, most related to soybeans, but also involving trees and specialty crops.²³² Bayer/Monsanto received more complaints in 2020 from Iowa and Minnesota than in prior years.²³³ In Indiana, the number of 2020

²²⁵ Dan Scheiman, *Dicamba Symptomology Community Science Monitoring Report*, Audubon Arkansas (Nov. 9, 2020), https://ar.audubon.org/sites/default/files/static_pages/attachments/community_science_monitoring_report_1920.pdf.

²²⁶ Kim Erndt-Pitcher & Martin Kemper, *Tree and Plant Health Monitoring Report*, Prairie Rivers Network (2018-2019), <https://prairierivers.org/wp-content/uploads/2020/07/Tree-and-Plant-Health-Monitoring-Report.pdf>.

²²⁷ Cassandra Brown et al., *Frequently Asked Questions*, Ohio State University College of Food, Agricultural, and Environmental Sciences, <https://ipm-drift.cfaes.ohio-state.edu/dicamba-and-24-d-fact-sheet-series/frequently-asked-questions>.

²²⁸ Hettinger, *supra*

²²⁹ Emily Unglesbee, *EPA Registers Dicamba Again*, Progressive Farmer (Oct. 27, 2020), <https://www.dmpf.com/agriculture/web/ag/crops/article/2020/10/27/epa-approves-three-dicamba-federal>

²³⁰ Emily Unglesbee, *Off Target, Once Again*, Progressive Farmer (July 9, 2020), <https://www.dmpf.com/agriculture/web/ag/crops/article/2020/07/09/amid-legal-limbo-dicamba-injury-rise>.

²³¹ *Id.*

²³² Gil Gullickson, *Dicamba: Sunrise or Sunset?*, Successful Farming (October 7, 2020), <https://www.agriculture.com/news/crops/dicamba-sunrise-or-sunset>.

²³³ *Id.*

dicamba complaints still exceeded the state's overall average of 13 annual pesticide investigations before dicamba-resistant crops were commercialized.²³⁴

The label remained impossible to follow in real world farming conditions. For example, data compiled by the University of Minnesota showed that central Minnesota farmers had fewer than 40 hours when they could legally apply dicamba from June 1 to June 15.²³⁵ During the ideal two-week window for spraying dicamba in North Central Iowa in 2020, there were *only a total of 40 hours that dicamba could legally be sprayed*, “resulting in large quantities of dicamba being applied in a small time period.”²³⁶

C. The Ninth Circuit's Decision

In the litigation challenging the 2016 registration, as amended in 2017, the parties completed briefing, and the Court heard oral argument in August 2018. However, before the Court could issue a decision EPA continued the registration in October 2018. Because EPA added even more use instructions and reviewed data from the prior season before the 2018 registration continuation, the Court subsequently dismissed petitioners' petition for review as moot and required petitioners to refile, but expedited any such new case.²³⁷ Petitioners then filed their petition for review of the October 2018 registration.²³⁸ After further briefing, the Court again held oral argument in April 2020 and in June 2020 handed down its opinion.

Judge William Fletcher authored the opinion for the unanimous three judge panel, joined by Judges Margaret McKeown and Michael Hawkins. The 56-page opinion set forth the Court's painstaking review of the detailed and voluminous administrative record²³⁹ before holding that EPA had violated FIFRA six different ways, broken into two subsets of three.²⁴⁰ First, EPA had “substantially understated” three risks the agency acknowledged. *Id.* Second, EPA had also “entirely failed to acknowledge three other risks.”²⁴¹ As to remedy the Court then fully vacated the registrations.²⁴²

First, the Court explained that because the registration was a conditional new use registration, EPA had to make two determinations: a determination that the applicant had submitted satisfactory data and a determination that the registration would not “significantly increase the risk of any unreasonable adverse effect on the environment.”²⁴³ These made up the overarching controlling legal standard. Both of these findings would need to be supported by substantial evidence when considering the record as a whole.²⁴⁴

²³⁴ Emily Unglesbee, *States Mull 2021 Dicamba Limits*, *Progressive Farmer* (Dec. 8, 2020), <https://www.dmpf.com/agriculture/web/ag/crops/article/2020/12/08/states-working-restrict-dicamba-2021>.

²³⁵ Gullickson, *supra*

²³⁶ Bob Hartzler & Prashant Jha, *Dicamba 2020: What went wrong in Iowa?*, Iowa State University (July 8, 2020), <https://crops.extension.iastate.edu/blog/bob-hartzler-prashant-jha/dicamba-2020-what-went-wrong-iowa>.

²³⁷ *Nat'l Family Farm Coal. v. EPA*, 747 F. Appx. 646 (9th Cir. 2019).

²³⁸ *NFFC II*, 960 F.3d at 1130.

²³⁹ *Id.* at 1125-36.

²⁴⁰ *Id.* at 1124 & 1144 (summarizing holdings in each place).

²⁴¹ *Id.*

²⁴² *NFFC II*, 960 F.3d at 1120-1145.

²⁴³ *Id.* at 1124 (citing 7 U.S.C. § 136a(c)(7)(B)); *id.* at 1133 (“We conclude that substantial evidence does not support the EPA's conclusion that both statutory prerequisites were satisfied.”).

²⁴⁴ 7 U.S.C. § 136n(b).

i. Satisfactory Data

The Court began with the first prerequisite, the “satisfactory data” showing. As to the studies of the herbicide products, the Court noted that Monsanto, prior to the 2016 registration, did not permit its formulation nor its volatility to be available for independent study, so the few small field trials were all only done by Monsanto itself.²⁴⁵ Based on these studies, EPA had concluded in 2016 that the dicamba products would “eliminate any offsite exposures and effectively prevent risk potential to people and non-target species” and that the products “created minimal risks, if they existed at all.”²⁴⁶ However, the Court explained “EPA’s conclusion was incorrect,” as the record evidence of massive drift damage in 2017 and 2018 showed and “EPA later acknowledged.”²⁴⁷ In 2018, Monsanto and EPA added other studies it characterized as “confirmatory,” that is, confirming the data used to support the 2016 registration and its conclusions; but, as the Court underscored, that 2016 data, far from being satisfactory, had instead “of course, resulted in millions of acres of reported dicamba damage.”²⁴⁸

In support of its satisfactory data finding EPA also relied on hundreds of telephone reports from farmers to Monsanto of crop injury, for which Monsanto almost entirely “absolved” its product and instead blamed the drift damage on older formulations of dicamba sprayed on adjacent post-emergent corn fields.²⁴⁹ The Court rejected that argument, concluding that explanation “is not supported by the data,” because those older varieties had been in use for a number of years prior and neither EPA nor Monsanto explained why “the number of herbicide drift complaints had skyrocketed in 2017 and 2018, after XtendiMax, Engenia, and a third identical dicamba formulation called FeXapan were registered for post-emergent use.”²⁵⁰ In fact, record evidence showed that the use of older dicamba formulations on corn had been falling, not rising and was only used on about 12% of corn acreage.²⁵¹

Finally, the record data also included research conducted by various universities such as Arkansas, Purdue, Wisconsin-Madison, Michigan State, and Nebraska in 2018 when Monsanto finally permitted them to undertake independent studies of volatility.²⁵² However, rather than support EPA’s conclusions, those data showed that the over-the-top dicamba formulations actually “could volatilize and drift, resulting in visual injury to plants.”²⁵³ Nonetheless, while the Court held that EPA’s data had “several flaws,”²⁵⁴ it concluded that it ultimately did not need to determine whether substantial evidence supported that registration finding or not, because it held that EPA did not support with substantial evidence the second required registration finding, the no “significant increase the risk of any unreasonable adverse effect” finding, for multiple reasons.²⁵⁵

ii. Failure to Support Registration with Substantial Evidence

On this registration factor—whether EPA supported its determination that amending the registration to add the new uses would not “significantly increase the risk of any unreasonable adverse effect

²⁴⁵ *NFFC II*, 960 F.3d at 1134.

²⁴⁶ *Id.*

²⁴⁷ *Id.*

²⁴⁸ *Id.* at 1135.

²⁴⁹ *Id.*

²⁵⁰ *Id.* (emphases added).

²⁵¹ *Id.*

²⁵² *Id.*

²⁵³ *Id.*

²⁵⁴ *Id.* at 1124.

²⁵⁵ *Id.* at 1124, 1135-36.

on the environment”²⁵⁶—the Court made 6 different FIFRA holdings with supporting factual findings, separated into two parts of three each. As explained above, the core FIFRA legal standard of “unreasonable adverse effect on the environment” is defined to include “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.”²⁵⁷ First, the Court held that EPA “substantially understated three risks it acknowledged.”²⁵⁸ Second, EPA “also entirely failed to acknowledge three other risks.”²⁵⁹

iii. Substantially Understated Risks

As to the first trio of violations—those risks EPA at least acknowledged but failed to support with substantial evidence—first, the Court held that EPA “substantially understated” the amount of dicamba-resistant seed acreage that farmers planted, and thus correspondingly “the amount of dicamba herbicide that had been sprayed on post-emergent crops.”²⁶⁰ Specifically, the Court held that EPA relied on a Monsanto acreage prediction and that such “reliance was improper” because the record evidence showed it was at least a 25% underestimate of the actual dicamba-resistant seed acreage and commensurately the amount of dicamba herbicide sprayed.²⁶¹

Second, the Court held that EPA’s conclusion that state dicamba drift injury reports “could have either under-reported or over-reported” the actual amount of damage was not supported by substantial evidence; rather, “the record clearly shows that complaints understated the amount of dicamba damage.”²⁶² As EPA’s own documents showed, drift injury complaints spiked in 2017 and 2018, and the agency had “no explanation for the spike other than” the new over-the-top products.²⁶³ EPA attempted to minimize “the significance of the increase in complaints” by crediting a view that injuries could be being over-reported. While EPA acknowledged that many stakeholders—the Association of American Pesticide Control Officials, university researchers, and some growers—said the complaints were *under*-reported, it claimed that “others” instead believed injuries were being *over*-reported.²⁶⁴ However, the Court examined the record and found that which showed that “Monsanto, and only Monsanto, was the ‘others’” on which EPA opaquely relied.²⁶⁵ Monsanto speculated that the damage was caused by older dicamba or other herbicides used on nearby corn fields, but the Court determined, as explained above, that such corn-based use was decreasing, and dicamba damage is easily detected from other herbicides by a signature “leaf cupping” on affected plants.²⁶⁶

Accordingly the Court held that EPA’s “purported agnosticism” as to the damage being over or under reported was “contradicted by *overwhelming record evidence* that dicamba damage was substantially

²⁵⁶ 7 U.S.C. § 136a(c)(7)(B).

²⁵⁷ 7 U.S.C. § 136(bb).

²⁵⁸ 960 F.3d at 1124 & 1135-36.

²⁵⁹ *Id.*

²⁶⁰ *Id.*

²⁶¹ *Id.* at 1136.

²⁶² *Id.* at 1137.

²⁶³ *Id.*

²⁶⁴ *Id.*

²⁶⁵ *Id.* This issue also came up during oral argument, with the Court asking EPA’s attorneys who these “others” were and EPA’s counsel unable to provide any others besides Monsanto. U.S. Courts for the Ninth Circuit, Oral Argument Recording for case *NFFC v. EPA*, No. 19-70115 (Apr. 21, 2020), https://www.ca9.uscourts.gov/media/view_video.php?pk_vid=0000017284 at 20:54-22:56.

²⁶⁶ 960 F.3d at 1137.

*under-reported.*²⁶⁷ For example, the Court pointed to the conclusion of Iowa State professor Robert Hartzler, who surveyed university field agronomists in midwest farm states and sent EPA his conclusion that “We know the reported incidences represent a very small fraction of total drift cases. As farmers are reluctant to involve regulatory agencies.”²⁶⁸ Similarly, an Indiana state official estimated that only 1 out of 10 farmers damaged by dicamba drift actually filed complaints.²⁶⁹ And in record documents, EPA itself had even admitted that “not all reports of crop damage were reported.”²⁷⁰ If complaints to state departments of agriculture were under-reported, then “the amount of actual dicamba damage was, of course, even greater” than what EPA’s 2018 decision document admitted.²⁷¹

Third, the Court held that EPA violated FIFRA when it “refused to quantify or estimate the amount of damage caused” or “even to admit that there was any damage at all.”²⁷² In the 2018 decision EPA claimed that non-dicamba-resistant soybean crop damage was merely “potential” and that it did “not have information” to quantify the damages.²⁷³ And with regards to all other damage—to specialty crops, vegetable, and ornamental, fruit, and shade trees—EPA referred to them generally as only “alleged” damage to the “landscape.”²⁷⁴

The Court held that EPA in fact did have “information from which it could have quantified dicamba damage, even if it could not have calculated with precision the reduction in yield caused by the damage.”²⁷⁵ EPA officials themselves had given a September 2018 presentation that showed in 2017 that more than 3.6 million acres of soybeans were damaged by dicamba, and in the registration decision EPA again used the 3.6 million figure. The same source, Professor Bradley of the University of Missouri, had reported that by mid-July 2018, months before the 2018 decision, already another 1.1 million acres had been damaged.²⁷⁶ In reality, EPA actually had a “great deal of quantitative information about extensive dicamba damage during both 2017 and 2018.”²⁷⁷

The Court again found that EPA’s decision was belied by the record evidence: EPA had sufficient information to quantify the damage, including a number of studies, presentations, articles, and other documentation which included acreage totals and significant numbers of complaints.²⁷⁸ Among them, the Court pointed to emails to EPA officials from university weed scientists and state department of agriculture representatives reporting injury to “specialty crops, vegetables, and ornamental, fruit, and shade trees.”²⁷⁹ The Court recounted numerous transmittals from state experts to EPA on damage, including Dr. Ford Baldwin of Arkansas and Dr. Bradley of Missouri.²⁸⁰ And the Court gave some vivid examples. From the Kansas Department of Agriculture: “we have been over run with dicamba complaints.”²⁸¹ From North Dakota State University’s pesticide program specialist: “what we now know, in 2018, is that minimizing off

²⁶⁷ *Id.* (emphases added).

²⁶⁸ *Id.* at 1138 (concluding that less than 25% were reported).

²⁶⁹ *Id.*

²⁷⁰ *Id.*

²⁷¹ *Id.*

²⁷² *Id.*

²⁷³ *Id.*

²⁷⁴ *Id.*

²⁷⁵ *Id.*

²⁷⁶ *Id.*

²⁷⁷ *Id.*

²⁷⁸ *Id.*

²⁷⁹ *Id.*

²⁸⁰ *Id.* at 1138-39.

²⁸¹ *Id.* at 1139.

target movement of dicamba to a reasonable level is NOT possible . . . this level of movement is completely unacceptable.”²⁸² From Tennessee: “wave after wave of dicamba exposure.”²⁸³ Professor Larry Steckel of the University of Tennessee stated that the drift crisis “is like nothing I have ever seen before . . . Dicamba drift for the past three years has often travelled a half mile to three-quarters of a mile and all too frequently, well beyond that.”²⁸⁴ Accordingly, the Court held that EPA’s refusal to quantify the amount of damage caused was contrary to FIFRA and not supported by substantial evidence.

iv. Risks EPA Unlawfully Failed to Acknowledge and Consider

In addition to the ways in which EPA substantially understated the risks it acknowledged, the Court held a second trio of FIFRA violations, risks that EPA “entirely failed to acknowledge,” including risks that EPA was “statutorily required to consider.”²⁸⁵ First, EPA failed to acknowledge and consider problems of users’ inability to follow the label instructions, despite EPA’s heavy reliance on these instructions as mitigation.²⁸⁶ “Extensive evidence” in the record indicated there was a risk of “substantial non-compliance” with the EPA label.²⁸⁷ The product use instructions are a form of mitigation: that is, EPA’s “no unreasonable adverse effect” determination was predicated on the label being able to be followed. Thus the inability to follow those directions would result in dicamba drift damage, and undermined any such “no unreasonable adverse effect” conclusion.

As an initial matter, the term “label” is a misnomer here “as that term is normally understood.”²⁸⁸ Rather, the dicamba products’ use directions were 40 pages long.²⁸⁹ Even those were not static but ever-shifting as discussed *supra*; they had gone through several iterations (2016, 2017 revisions, and 2018 revisions). They included myriad spray instructions and restrictions, including: time of day; wind speed (between 3-10 mph); temperature inversions; whether there was rain coming within 24 hours, whether the wind direction was blowing towards “dicamba-sensitive” crops; an in-field downwind spray buffer; spraying equipment ground speed; spraying equipment length and height above ground; the number of applications per season and per crop; restricted use certification and training; and others.²⁹⁰

As one might expect, the Court found that the record evidence was “substantial” that “even conscientious applicators had not been able to consistently adhere” to the use directions in real world farming conditions.²⁹¹ Rather, the record evidence showed that the instructions were “difficult if not impossible” to follow.²⁹² The dicamba use “label” was “probably the most complex label I have ever seen in my 40-year career,” according to one agricultural company executive.²⁹³ Other users told EPA that “there doesn’t appear to be any way for an applicator to be 100% legal in their application” and “there is *no legal*

²⁸² *Id.*

²⁸³ *Id.*

²⁸⁴ *Id.* (estimating 40% of Tennessee non-DT soybean acres damaged).

²⁸⁵ *Id.* at 1139.

²⁸⁶ *Id.* at 1139-40.

²⁸⁷ *Id.* at 1139.

²⁸⁸ *Id.* at 1140.

²⁸⁹ *Id.*; see also EPA, Master Label for EPA Reg. No. 524-617 Registered Use Pesticide: M1768 Herbicide (Nov. 5, 2018), https://www3.epa.gov/pesticides/chem_search/ppls/000524-00617-20181105.pdf.

²⁹⁰ *Id.*

²⁹¹ *Id.*

²⁹² *Id.* at 1124 (emphasis added).

²⁹³ *Id.* at 1140 (estimating that over the course of the entire 2017 summer, his operation only had 44 hours of application time that would have been allowed under the label).

way to spray the field,” putting applicators in a “no win” situation.²⁹⁴ A state survey of Illinois commercial applicators showed that only 66% believed they were able to follow the label effectively and included comments like “I believe it is *impossible to make an on-label application* as the label is written”²⁹⁵ Still others were more blunt, saying that trying to follow the instructions in real world farming conditions in their locations—such as blustery west Texas—“*basically a fairy tale. You can’t do it. Your fairy godmother has to pull out a wand, tap a pumpkin and turn it into a carriage.*”²⁹⁶

Nor was the evidence merely experiential. The Court explained that Purdue professors calculated the difficulty in complying with the label using actual rainfall events in 2018, taking into account the restrictions based on wind speed and temperature inversions and calculated that there were *only 47 hours during the entire month of June* in which spraying the dicamba products would have been legal.²⁹⁷ And of those total monthly hours, there were only 2 (24 hour) days where, during an 8-hour day, application would have been possible (11 hours one day, 8 hours another); the remaining hours were scattered throughout the rest of the month in smaller stray increments.²⁹⁸ The data underscored that, “in the real world,” there are not “very many hours” where applicators can be “completely compliant.”²⁹⁹

Further, the Court noted that much of the record evidence naturally dealt with the impossibility of adhering to the earlier 2016 and 2017 use directions despite farmers’ best efforts, but in the fall 2018 registration EPA added *even more directions*, such as reducing further the time of day when application can occur and total days after planting.³⁰⁰ Thus the record evidence of substantial non-compliance with the prior label showed that compliance with the 2018 label “[would] be even more difficult.”³⁰¹ Despite this elephant in the room—again, on which EPA had moored its core “no unreasonable adverse effect on the environment” conclusion—EPA “nowhere acknowledged the evidence in the record showing there had been substantial difficulty complying with the mitigation requirements of the earlier labels.”³⁰²

Second, the Court explained that FIFRA requires EPA to consider as part of the cost-benefit analysis, “any unreasonable adverse effects to man or the environment, taking into account the economic, social, and environmental costs” of the pesticide.³⁰³ Yet the Court held that EPA had nonetheless “entirely failed to acknowledge risks of economic and social costs.”³⁰⁴ As to economic costs, the Court held that EPA “entirely failed to acknowledge an economic cost that is *virtually certain to result*” from the registrations: namely, anti-competitive, monopolistic effects to the seed and related agricultural markets.³⁰⁵

As discussed above, the predecessor to the dicamba-resistant crop system was the glyphosate-resistant (or “Roundup Ready”) crop system, with the seeds and pesticide (Roundup) sold together as a crop system. These crop systems already had become a near monopoly, with 90% of soybeans in 2008 being

²⁹⁴ *Id.* (emphasis added).

²⁹⁵ *Id.* at 1141 (emphasis added).

²⁹⁶ *Id.* (emphasis added).

²⁹⁷ *Id.*

²⁹⁸ *Id.*

²⁹⁹ *Id.*

³⁰⁰ *Id.*

³⁰¹ *Id.*

³⁰² *Id.* at 1142.

³⁰³ *Id.* (quoting 7 U.S.C. § 136(bb)).

³⁰⁴ *Id.*

³⁰⁵ *Id.* (emphasis added).

Roundup Ready.³⁰⁶ It also caused a related agronomic problem: weed resistance.³⁰⁷ As with overusing antibiotics, Roundup overuse generated an epidemic of glyphosate-resistant “superweeds” infesting over 120 million acres of U.S. cropland.³⁰⁸

Then, because of that overuse, as also explained above, the resistant weed problem led to Monsanto’s short-term “solution” to the crisis of its own creation: dicamba-resistant crops. As such, dicamba-resistant crops were quickly “well on their way to the same degree of market dominance.”³⁰⁹ By 2017, dicamba-resistant crops constituted 25% of soybeans, and by 2018, 50%.³¹⁰ Moreover the record evidence showed that farmers felt *compelled* by the increased planting of dicamba-resistant crops and the accompanying and increasing off-field drift damage to change from conventional soybeans to dicamba-resistant soybeans as a defensive measure, known as “defensive adoption.” Seed company executives wrote to EPA in 2017 and 2018, warning them about this anticompetitive economic cost.³¹¹ Professors and weed scientists from North Dakota, Tennessee, and Arkansas told EPA similarly.³¹² Dr. Baldwin told EPA “dicamba has a chemistry problem that likely cannot be fixed, or at least no evidence has been provided that it can be successfully applied . . . renewing the cotton and soybean registrations will leave the industry no choice but to plant 100% of the soybean acreage [with] this technology.”³¹³

Accordingly, the Court held that the over-the-top registrations “create[] a substantial risk that DT soybeans, and possibly DT cotton, will achieve a monopoly or near-monopoly.” This “anti-competitive effect” of the registrations would “impose a clear economic cost,” but EPA failed to even identify it, let alone take it into account.³¹⁴

Third and finally, the Court held that EPA had also “entirely failed to acknowledge the social cost that farming communities had already been experiencing and was likely to increase.”³¹⁵ FIFRA expressly required EPA to take into account not just economic and environmental costs, but also “social” costs,³¹⁶ and there was “extensive evidence” that the dicamba herbicides had “torn apart the social fabric of many farming communities.”³¹⁷ Letters to EPA from stakeholders told them of the high, unprecedented cost, “pitting neighbor against neighbor; farmers threatening other farmers.”³¹⁸ Responses to an Illinois survey

³⁰⁶ *Id.*

³⁰⁷ Greg D. Horstmeier, *Dicamba’s PTFE Problem*, PROGRESSIVE FARMER (Aug. 29, 2017), <https://www.dmpf.com/agriculture/web/ag/blogs/editors-notebook/blog-post/2017/08/29/dicambas-ptfe-problem>; The Center for Food Safety, Comments to EPA on Notice of Receipt of Application to Register New Use of Dicamba on Monsanto’s Dicamba-Resistant MON 87708 Soybean (2012), <https://www.centerforfoodsafety.org/files/cfs-science-comments-on-dicamba-use-registration-for-dicamba-resistant-soybeans.pdf>; EPA, *Registration Decision for the Continuation of Uses of Dicamba on Dicamba Tolerant Cotton and Soybean 14* (Oct. 31, 2018).

³⁰⁸ Center for Biological Diversity, Comments on Dicamba: New Use on Herbicide-Tolerant Cotton and Soybean 20-21 (May 31, 2016), <https://www.regulations.gov/comment/EPA-HQ-OPP-2016-0187-0866>.

³⁰⁹ 960 F.3d at 1142.

³¹⁰ *Id.*

³¹¹ *Id.* at 1142 (“Even more alarming is the number of my customers who have told me they will plant all Xtend varieties, instead of my [conventional] seed, as a defensive measure against damage from [drift]”); *id.* (“over and over again from our farmer customers” we are hearing “I guess I will have to plant dicamba resistant soybeans next year to avoid the off target injury. I cannot afford to keep getting my soybeans damaged from dicamba.”).

³¹² *Id.* at 1143.

³¹³ *Id.*

³¹⁴ *Id.*

³¹⁵ *Id.*

³¹⁶ 7 U.S.C. § 136(bb).

³¹⁷ 960 F.3d at 1143.

³¹⁸ *Id.*

included “in 43 years of business I have never seen a more divisive product among neighbors both farm and non-farm.”³¹⁹ An Arkansas farmer was shot and killed in an argument over dicamba drift damage. Not just farmers but homeowners and gardeners suffered damage as well: severe damage to trees, ornamental plants, shrubs, and vegetables.³²⁰ Accordingly, the Court held that the “severe strain on social relations in farming communities” where the dicamba products were being sprayed was a “clear social cost,” but that EPA failed to identify and take it into account.³²¹

v. Summary of Holdings and Remedy

For all these reasons and considering the record as a whole, the Court then concluded that substantial evidence did not support the new use registration decision.³²² While EPA had found two benefits from the uses, it had “failed to perform a proper analysis of the risks and the resulting costs of those uses.”³²³

First, EPA “substantially understated the costs it acknowledged.”³²⁴ These included the total acreage planted with dicamba-resistant soybeans and the resulting use of dicamba. EPA relied on a Monsanto prediction when the record evidence before EPA showed the actual acreage was “much higher” and the combined soybean and cotton acreage “higher still.”³²⁵ Further, EPA recognized there had been an “enormous increase” in dicamba drift complaints in 2017 and 2018, but it purported not to know whether those complaints under-reported or over-reported the damage. In fact, the record evidence showed the complaints “substantially under-reported the actual amount of damage.”³²⁶ Finally, EPA “substantially understated the amount of dicamba damage,” characterizing it as only “potential” or “alleged” and claiming there was insufficient data from which to estimate the amount of damage. In fact, the record evidenced showed that dicamba drift damage from the over-the-top new use registrations in 2017 and 2018 had “caused *enormous and unprecedented* damage.”³²⁷

Second, EPA also entirely failed to acknowledge and consider other costs.³²⁸ EPA entirely failed to account for the substantial degree of non-compliance with the label mitigation, given the impossibility of following it in real world farming conditions, and what that would mean for increased drift damage.³²⁹ That is, EPA based its registration decision on the premise that the label’s mitigation would be followed and thus limit off-field drift, when the evidence was that label instructions were “difficult if not impossible” to follow.³³⁰ Further, EPA failed to recognize and consider the economic costs of drift damage coercing farmers to defensively adopt dicamba-resistant crops, and the anti-competitive, monopolistic results on the soybean and cotton industries.³³¹ Finally, EPA failed to recognize and consider the “*enormous social cost to*

³¹⁹ *Id.* (“This technology cannot continue as is if we ever wish to raise a susceptible crop or maintain healthy relationships with our residential and environmental neighbors.”).

³²⁰ *Id.* at 1143 (e.g., “These are 100-year old oaks. We’re senior citizens and we don’t have time to plant new trees and watch them get even halfway to maturity.”).

³²¹ *Id.*

³²² *Id.* at 1144; see also *id.* at 1124.

³²³ *Id.* at 1144.

³²⁴ *Id.*

³²⁵ *Id.*

³²⁶ *Id.*

³²⁷ *Id.* at 1144 (emphasis added).

³²⁸ *Id.*

³²⁹ *Id.* at 1144.

³³⁰ *Id.* at 1124.

³³¹ *Id.* at 1144.

farming communities of the new use registrations, where the products had “turned farmer against farmer, neighbor against neighbor.”³³²

Finally, turning to remedy and applying the Ninth Circuit’s criteria for vacatur, the Court vacated the registrations.³³³ EPA and Monsanto had argued for leaving the registrations in effect, which the Court rejected. EPA made “multiple errors,” and its “fundamental flaws” were “substantial.”³³⁴ The Court found it “exceedingly unlikely” that EPA could (lawfully) issue the same registration again for the new uses.³³⁵ The Court carefully weighed the practical effects of the decision on farmers’ current use and any difficulty finding alternative pesticide options, noting that it was aware of the “adverse impact on growers” that had already purchased the products and that they had been placed in the situation “through no fault of their own,” but concluded that the absence of substantial evidence to support the registrations compelled vacatur.³³⁶ To ensure its decision became effective immediately the Court took the rare step of issuing the mandate concurrent with the decision.³³⁷

vi. Postscript

Several fairly extraordinary things happened next over the course of just a few weeks after the Court handed down its ruling. First EPA issued an administrative order prohibiting any further sale but nonetheless allowing the continuing use of existing, already purchased stocks of the products for another two months.³³⁸ Given the expedited context and ongoing summer spraying, the petitioners then filed an emergency motion for the Court to enforce its vacatur, which the respondents (EPA, Monsanto, and now BASF and DuPont, see below) opposed.³³⁹

Further, in its June 3 decision, the Court had agreed with petitioners that that the scope of the case encompassed all three dicamba products covered by the registration decision, not just Monsanto’s product, and vacated all three.³⁴⁰ Monsanto had previously been the only intervenor; BASF and DuPont now moved to intervene,³⁴¹ and BASF filed its own emergency motion, to recall and stay the Court’s issuance of the mandate.³⁴² After the Court granted the very belated motions to intervene but denied both emergency

³³² *Id.* (emphasis added).

³³³ *Id.* at 1144-45.

³³⁴ *Id.*

³³⁵ *Id.*

³³⁶ *Id.* The petitioners had also raised a half dozen arguments as to how and why the registration violated the Endangered Species Act, creating risks to hundreds of species within the footprint of the registration approval. However because the Court already completely vacated the registrations based on the FIFRA violations, it found it unnecessary to reach petitioners’ Endangered Species Act arguments. *Id.* at 1125. For a brief discussion of EPA’s duties under the ESA when it registers pesticides, see *infra* pp. ___.

³³⁷ 960 F.3d at 1145 (“The mandate shall issue forthwith.”). Normally the mandate does not issue for several weeks in order in order to give parties a chance to seek rehearing. See generally FRAP 41; 9th Cir. R. 41-2.

³³⁸ https://www.epa.gov/sites/production/files/2020-06/documents/final_cancellation_order_for_three_dicamba_products.pdf

³³⁹ Pets. Emergency Mot. to Enforce Vacatur and Hold EPA in Contempt, NFFC v. EPA, No. 19-70115, ECF No. 127-1; EPA’s Resp. to Pets. Emergency Mot., NFFC v. EPA, No. 19-70115, ECF No. 144; BASF Corp. Opp. to Pets. Emergency Mot., NFFC v. EPA, No. 19-70115, ECF No. 145; Monsanto Co. Opp. to Pets. Emergency Mot., NFFC v. EPA, No. 19-70115, ECF No. 146.

³⁴⁰ 960 F.3d at 1131-32.

³⁴¹ E.I. du Pont de Nemours Co. Emergency Mot. to Intervene, NFFC v. EPA, No. 19-70115, ECF No. 129; BASF Corp. Emergency Mot. to Intervene, NFFC v. EPA, No. 19-70115, ECF No. 130. The American Farm Bureau, Croplife, and several crop associations also filed late amicus briefs during this window. [cite amicus briefs ECFs in docket](#)

³⁴² BASF Corp. Opp. to Pets. Emergency Mot., NFFC v. EPA, No. 19-70115, ECF No. 145.

motions,³⁴³ all the Intervenor filed three separate petitions for rehearing *en banc*,³⁴⁴ all of which were subsequently denied.³⁴⁵

D. Dicamba 3

Finally, while this round was now complete, this litigation is far from over. On July 2, 2020, less than one month after the Ninth Circuit held the prior registrations of these products unlawful for multiple violations of FIFRA and vacated them, Bayer and BASF submitted registration applications for the same products (XtendiMax and Engenia) for use on cotton and soybeans.³⁴⁶ EPA responded by assigning fifty staff members to work on the 2020 Registration Actions in a rush to issue them before Election Day.³⁴⁷ On October 27, 2020, just six days before the presidential election and without providing an opportunity for public notice and comment, EPA again registered the same products that had been vacated fewer than five months prior.³⁴⁸ EPA made the announcement not in Washington, D.C. but during an event on a farm in Georgia, to a crowd including the American Farm Bureau Federation president Zippy Duvall, the National Cotton Council of America Chairman Kent Fountain, two Georgia congressmen, and the Georgia Commissioner of Agriculture.³⁴⁹ While the prior approvals had been limited to two year registrations and conditional, this time, despite everything that had occurred to this point, EPA *unconditionally* registered the products and issued the registrations for the next *five* years.³⁵⁰

Just as the prior 2016 and 2018 decisions allowed, the 2020 decision allows for the use of these dicamba products in 34 states, totaling over 100 million acres of U.S. farmland.³⁵¹ EPA mainly based the new decision on past studies, previously available to EPA for its prior 2016 and 2018 registration decisions, while relying on only a handful of further assessments of the risks to human health and the environment put together in fewer than four months following Bayer and BASF's applications on July 2.³⁵² Although EPA claimed in the decision to have addressed and complied with the Court's opinion, in reality numerous deficiencies identified by the Court remain unaddressed.³⁵³

In December 2020, the same four nonprofits challenged this registration, litigation which is ongoing.³⁵⁴

³⁴³ Order: Mots. to Intervene & Amicus Granted, NFFC v. EPA, No. 19-70115, ECF No. 162; Order: Pets. Oversized Reply Granted & Pets. Emergency Mot. Denied, NFFC v. EPA, No. 19-70115, ECF No. 163; Order: BASF Mot. to Recall Stay Denied, NFFC v. EPA, No. 19-70115, ECF No. 169.

³⁴⁴ Pet. for Reh. En Banc, NFFC v. EPA, No. 19-70115, ECF No. 170; E.I. du Pont de Nemours Co. Pet. for Reh. En Banc, NFFC v. EPA, No. 19-70115, ECF No. 172; Monsanto Co. Pet. for Reh. En Banc, NFFC v. EPA, No. 19-70115, ECF No. 173. These were followed by more amicus briefs by the same parties. Amicus Curiae CropLife America, NFFC v. EPA, No. 19-70115, ECF No. 175-2; Amicus Curiae American Farm Bureau Fed., NFFC v. EPA, No. 19-70115, ECF No. 176-2.

³⁴⁵ Order: Pet. to Reh. En Banc Denied, NFFC v. EPA, No. 19-70115, ECF No. 178; Mandate: June 3, 2020 Judgment in Effect, NFFC v. EPA, No. 19-70115, ECF No. 179.

³⁴⁶ Complaint for Declaratory and Equitable Relief at 58, CBD v. U.S. EPA 4:20-cv-00555-DCB, ECF No. 1.

³⁴⁷ *Id.*

³⁴⁸ *Id.* at 58-59; EPA, 2020 Dicamba Registration Decision, *supra* n. ____.

³⁴⁹ Complaint for Declaratory and Equitable Relief at 59, CBD v. U.S. EPA 4:20-cv-00555-DCB, ECF No. 1; EPA, Administrator Wheeler Meets with Agricultural Stakeholders in Florida, Georgia (Oct. 27, 2020), <https://www.epa.gov/newsreleases/administrator-wheeler-meets-agricultural-stakeholders-florida-georgia>.

³⁵⁰ Complaint for Declaratory and Equitable Relief at 59, CBD v. U.S. EPA 4:20-cv-00555-DCB, ECF No. 1.

³⁵¹ *Id.*

³⁵² *Id.*

³⁵³ *Id.* at 60.

³⁵⁴ The Arizona district court plaintiffs are the same as the prior petitioners: Center for Biological Diversity, National Family Farm Coalition, Center for Food Safety, and Pesticide Action Network North America. Complaint for Declaratory and Equitable Relief,

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IV. Pulling Back and Going Forward

Critics have long derided EPA's implementation of its FIFRA authority to oversee pesticides as weak and inadequate, resulting in significant adverse impacts to farmers, public health, and the environment.³⁵⁵ While a legislative overhaul is needed and fully warranted,³⁵⁶ the recent dicamba decision, coupled with some other recent important pesticide litigation, reveal EPA's oversight failings may well be more political than statutory or regulatory in nature. As such these new precedents and ongoing litigation may help force long-needed agency improvements in environmental protection, breathing some new and direly needed life back into FIFRA oversight.

A. *The Dicamba Decision: Lessons Learned*

The dicamba decision—holding unlawful and vacating the dominant pesticide being sprayed over two major commodity crops across millions of acres—reverberated across the country in national news.³⁵⁷ The impact of the case could also be measured in Monsanto/Bayer's allegations of catastrophic economic losses to U.S. agriculture from the pesticides' absence or lost sales,³⁵⁸ or the nearly immediate reaction of the Trump administration in trying to undermine the Court's decision predicated on hyperbolic claims of threats to the "global food supply,"³⁵⁹ or in the intensive weeks of further emergency litigation briefing immediately following the decision's issuance.³⁶⁰ But it can also be measured in precedential terms, where it

CBD v. U.S. EPA 4:20-cv-00555-DCB, ECF No. 1. However, despite EPA's decision being another "new use" registration for the products, unlike in 2016, EPA did *not* hold public notice and comment on its 2020 decision. EPA, *Memorandum Supporting Decision to Approve Registration for the Uses of Dicamba on Dicamba Tolerant Cotton and Soybean* 7 (Oct. 27, 2020). FIFRA divides judicial review between appellate courts for those decisions following a "hearing," which courts have interpreted to include notice and comment rulemaking, *United Farm Workers of Am. v. Envtl. Prot. Agency*, 592 F.3d 1080, 1082-83 (9th Cir. 2010), and those not following a hearing, which go to district court. See 7 U.S.C. § 136n. Due to this lack of clarity caused by EPA, consequently, the nonprofits filed in both district court and the Ninth Circuit directly. Pet. for Review, NFFC v. EPA No. 20-73750 ECF No. 1-6.

³⁵⁵ Cite GAO, law review articles critical of EPA/FIFRA or supra to beginning

³⁵⁶ See <https://www.govtrack.us/congress/bills/116/4406>,

S. 4406 (116th): Protect America's Children from Toxic Pesticides Act – elaborate somewhere on what it does

<https://investigatmidwest.org/2020/08/26/new-pesticide-regulations-would-fix-broken-and-outdated-system-at-the-epa-sponsors-say/>

³⁵⁷ Joel Rosenblatt, *Bayer Faces More Weedkiller Woes*, BLOOMBERG (June 3, 2020), <https://www.bloomberg.com/news/articles/2020-06-03/bayer-s-dicamba-registration-pulled-by-court-on-herbicides-risk>; Jesse Newman, *Court Overturns EPA Approval of Bayer's Dicamba Spray*, WSJ (June 4, 2020), https://www.wsj.com/articles/court-vacates-epa-approval-of-bayers-dicamba-spray-11591294833?mod=article_inline;

Associated Press, *Federal Court Rejects EPA Approval of Widely Used Herbicide*, US NEWS (June 4, 2020), <https://www.usnews.com/news/business/articles/2020-06-04/federal-court-rejects-epa-approval-of-widely-used-herbicide>; Bob Egelko, *Federal Court in SF Tells EPA to Revoke Approval of Widely Used Herbicide*, SF CHRON. (June 3, 2020),

<https://www.sfchronicle.com/nation/article/Federal-court-in-SF-tells-EPA-to-revoke-approval-15315636.php>; Carey Gilliam, *Court Overturns EPA Approval of Popular Herbicide Made by Monsanto*, THE GUARDIAN (June 4, 2020), <https://www.theguardian.com/us-news/2020/jun/04/monsanto-herbicide-court-overrules-epa>; Mikkel Pates, *Appeals Court Outlaws use of Dicamba*, AGWEEK (June 4, 2020), <https://www.agweek.com/business/agriculture/6522003-Appeals-court-outlaws-use-of-dicamba>.

³⁵⁸ [WSJ article \(300 million\)](#); Br. for Int.-Resp. Monsanto Co. Redacted at 58, NFFC v. EPA No. 19-70115, ECF No. 61 ("crop losses [could be catastrophic.]); Br. of Amicus Curiae Croplife Am. in Support of Resp. U.S. EPA's Response to Pets. Emergency Mot. at 11-13, NFFC v. EPA No. 19-70115, ECF No. 147-2 ("This uncertainty would wreak havoc on the agricultural market.").

³⁵⁹ EPA, *EPA Offers Clarity to Farmers in Light of Recent Court Vacatur of Dicamba Registrations* (Jun. 8, 2020) <https://www.epa.gov/newsreleases/epa-offers-clarity-farmers-light-recent-court-vacatur-dicamba-registrations>.

³⁶⁰ See generally NFFC v. EPA No. 19-70115, ECF Nos. 127-169 (briefing between June 3 and June 25).

seeded important new ground in its holdings. Faculty at U. Cal. Berkeley and UCLA law schools deemed the decision one of “The Ninth Circuit’s 10 Most Important Environmental Decisions of 2020.”³⁶¹

First, FIFRA’s statutory rubric speaks in terms of benefits and costs, the risks or adverse impacts of the decision.³⁶² Yet, very few if any cases have previously fleshed out exactly what types of “costs” EPA must consider, analyze, and balance against a pesticide’s alleged benefits. Pesticide drift has an economic as well as environmental component; EPA must grapple with both in future registration decisions. This includes a duty not just to consider but to quantify such damages when it had record evidence permitting such calculation.³⁶³ Another “clear economic cost”³⁶⁴ that EPA must take into account when it considers approving future registrations is the creation of anti-competitive monopolies³⁶⁵ in seed and pesticide markets, and the loss of choice for farmers of what they want to grow and how they want to farm. Furthermore, in addition to economic and environmental costs, despite the statute’s express language mandating that “social” costs also be weighed,³⁶⁶ never before had EPA been called to task for its failure to consider such costs in a registration; the agency must consider and weigh the broader potential adverse impacts on rural communities from its pesticide decisions in its decision.³⁶⁷ Finally, for all aspects of its decision, EPA cannot ignore record evidence contrary to its conclusions.

Commented [GK5]: Also generally cite back to the section on the opinion’s findings for each, see *supra* ____.

Second, the heart of FIFRA’s registration scheme is the pesticide label. Unlike other statutes like the Clean Water Act or Clean Air Act, oversight is not by permit or restrictions on actual use, but by label statements. The label is the law and following it is the sole obligation placed by FIFRA on users of pesticides.³⁶⁸ Particularly in these circumstances, then, the efficacy of regulation depends entirely on the label restrictions being meaningful; otherwise oversight is simply a paper exercise, not real. EPA could determine it found “no unreasonable adverse effects on the environment” if farmers sprayed a pesticide so long as “unicorns are present in the field,” knowing full well that unicorns are imaginary but still meet its statutory obligations. Yet in approving “over-the-top” uses on pesticides, EPA has basically done the equivalent. EPA relied on a 40 page long byzantine “labels” without ever actually analyzing if farmers could actually follow them in real world farming conditions. Even though farmers— from windy west Texas to the heat and humidity (and frequent temperature inversions) of Missouri, to the flat lands and high temperatures of the delta regions of Arkansas and Tennessee—repeatedly told them the contrary. These use limitations are mitigation, without which unreasonable adverse effects on the environment may occur, based on EPA’s own conclusions. Thus the agency must support them with substantial evidence if it is to register pesticides based on them, and that includes analyzing if it is feasible to follow them in the weather and geography in which it is approving pesticide uses.

Commented [GK6]: Cite the label sections above

³⁶¹ Richard Frank, *The Ninth Circuit’s 10 Most Important Environmental Law Decisions of 2020*, LEGAL PLANET (Dec. 31, 2020), <https://legal-planet.org/2020/12/31/the-ninth-circuits-10-most-important-environmental-law-decisions-of-2020/>.

³⁶² 960 F.3d at 1136.

³⁶³ *Id.* at 1138.

³⁶⁴ *Id.* at 1143.

³⁶⁵ *Id.* at 1142-43.

³⁶⁶ 7 U.S.C. § 136(bb).

³⁶⁷ 960 F.3d at 1143-44.

³⁶⁸ See *infra* n. ____ and accompanying text.

B. *Putting NFFC in Context*

The NFFC decision is part of a body of recent decisions sowing new seeds in FIFRA's substantial evidence standard of review and the requirement that EPA finds no unreasonable adverse effect on the environment prior to registering a pesticide. These other cases, summarized briefly below, have strengthened what EPA is required to show in support of its decision to register a pesticide use under FIFRA's various registration standards, but have also left open new questions that await adjudication in other ongoing or future cases.

i. *Pollinator Stewardship Council v. EPA (Pollinator I)*

While the NFFC court only addressed the sufficiency of the data before EPA in issuing the dicamba conditional registration in dicta, in *Pollinator Stewardship Council v. EPA (Pollinator I)*, 806 F.3d 520 (9th Cir. 2015), the Ninth Circuit examined EPA's duties to abide by the agency's existing data requirements for unconditional registrations. In that case, beekeepers had challenged EPA's decision to unconditionally register a new insecticide, sulfoxaflor, even though the screening-level studies EPA had received from the pesticide registrant Dow (now Corteva) showed that the insecticide was "highly toxic to bees,"³⁶⁹ and even though the additional, higher-tiered data Dow submitted had so many flaws that EPA found their results inconclusive as to sulfoxaflor's harms to bees.³⁷⁰

The Court struck down the registration as unlawful. In so holding, the Court explained that, under EPA's own framework for assessing pesticide risks to bees and other pollinators, the pesticide registrant is required to first submit screening-level studies, referred to as Tier 1 studies, to identify whether potential risks to bees exist.³⁷¹ If the screening-level data found potential risks exist, the framework then requires further field studies, referred to as Tiers 2-3 studies, to better assess the pesticide's risks to bee colonies in the real world.³⁷² The court found that EPA admitted that the screening-level Tier 1 sulfoxaflor data triggered the need for further studies, and Dow thus submitted three additional Tier 2 studies. Yet, EPA itself admitted that the additional Tier 2 studies, which suffered from various flaws and limitations, were "inconclusive" as to the effect of sulfoxaflor on colony health.³⁷³ Instead of requiring additional Tier 2 studies to evaluate sulfoxaflor's risks to bees, EPA instead unconditionally registered sulfoxaflor use at a lower application rate than the registrant had sought, and with various proposed limitations.³⁷⁴

The Court rejected EPA's attempt to unconditionally register sulfoxaflor on those terms, finding that "[t]he record does not indicate the EPA had ever received any additional data on the effect of such measures."³⁷⁵ The Court explained that once the requirements for additional data set by EPA were triggered, EPA lacked the discretion to proceed with registration without such additional data to support the registration decision.³⁷⁶ Instead, "EPA's basis for unconditionally registering sulfoxaflor in the absence of sufficient data documenting the risk to bees does not hold up under its own rationale," and thus the

³⁶⁹ 806 F.3d at 522.

³⁷⁰ 806 F.3d at

³⁷¹ 806 F.3d at 524.

³⁷² 806 F.3d at 525 ("[W]hereas the Tier 1 analysis focuses on the effects of the insecticides on individual bees, Tier 2 and 3 analyses attempt to measure the effect on the colony as a whole.").

³⁷³ 806 F.3d at 526.

³⁷⁴ 806 F.3d at 526.

³⁷⁵ 806 F.3d at 526; see *id.* at 528 (noting that the data submitted by the registrant "did not support the approval of sulfoxaflor at either the maximum rate ... or the reduced maximum rate.").

³⁷⁶ 806 F.3d at 531-32; 806 F.3d at 532 ("We have previously held that we cannot allow the EPA to avoid its own regulations when actual measurement trigger risk concerns.") (citing *Natural Res. Def. Council v. EPA*, 735 F.3d 873, 883-84 (9th Cir. 2013)).

Court vacated the pesticide registration,³⁷⁷ holding that EPA’s decision to move forward with unconditionally registering the insecticide without the data called for by EPA’s own testing framework violated FIFRA.³⁷⁸

ii. *Natural Resources Defense Council/Center for Food Safety v. EPA (Nanosilver)*

The Ninth Circuit’s decision in *Natural Resources Defense Council v. EPA (Nanosilver)*, 857 F.3d 1030 (9th Cir. 2017), marked the first instance in which courts have examined and reigned in EPA’s abuse of its conditional registration authority.³⁷⁹ In that case environmental and consumer protection groups challenged EPA’s conditional registration of an antimicrobial pesticide (NSPW), containing the new active ingredient nanosilver.³⁸⁰ EPA approved NSPW as a “materials preservative [to be] incorporated into plastic and textile products” to suppress the growth of harmful organisms such as bacteria and mold.³⁸¹ While EPA had long registered silver as an antimicrobial pesticide, the new active ingredient nanosilver had a much smaller particle size, and as the Ninth Circuit observed, this resulted in the new chemical “hav[ing] significantly different properties than conventional silver.”³⁸²

Because of these different properties and the lack of nano-specific data, EPA conditionally registered NSPW under 7 U.S.C. § 136a(e)(7)(C), the conditional registration provision for new active ingredients.³⁸³ To conditionally register the new active ingredient, EPA must conclude, among other things that—despite lacking sufficient data for EPA to make the no “unreasonable adverse effect” finding necessary for unconditional registration³⁸⁴—the registration of the new antimicrobial active ingredient would nonetheless be “in the public interest.”³⁸⁵ In its registration decision, EPA stated that conditionally registering nanosilver would be in the public interest because NSPW, which had a lower application rate and was less mobile than conventional-silver pesticides, “[had] the ‘potential’ to reduce the amount of silver released into the environment.”³⁸⁶

On review, the Ninth Circuit found that EPA failed to substantiate its public interest finding that NSPW had the “potential” to reduce the amount of silver that is released in the environment.³⁸⁷ The court found that EPA’s public interest finding rested on two assumptions: (1) “that the current users of conventional-silver pesticides will replace those pesticides with NSPW,” and (2) “that NSPW will not be incorporated into new products to the extent that such incorporation would actually increase the amount of silver released in the environment,” neither of which was supported by any evidence in the record.³⁸⁸ The court also found that if either assumptions turns out to be incorrect, rather than serving any public interest,

³⁷⁷ 806 F.3d at 532.

³⁷⁹ See *supra* notes [FIFRA conditional registration loophole section] and accompanying text.

³⁸⁰ *Nanosilver*, 857 F.3d at 1034.

³⁸¹ *Id.* at 1034.

³⁸² *Id.* at 1034.

³⁸³ *Id.* at 1035.

³⁸⁴ 7 U.S.C. § 136a(c)(5).

³⁸⁵ *Id.* § 136a(c)(7)(C); see *supra* notes [FIFRA conditional registration section] and accompanying text.

³⁸⁶ 857 F.3d at 1038.

³⁸⁷ *Id.* at 1040.

³⁸⁸ *Id.* at 1039-41.

“NSPW may increase the amount of silver released into the environment and *contravene the identified public interest.*”³⁸⁹

In holding that EPA’s public interest finding lacked substantial evidence, the Court held, after discussing the legislative history of FIFRA’s conditional registration provisions, that the public-interest finding prerequisite for conditional registrations of new pesticide active ingredients “is an additional, ‘more stringent test’ that distinguishes conditional registration of new active ingredients from unconditional registration.”³⁹⁰ While acknowledging that under FIFRA’s substantial evidence standard, EPA need not “support its public-interest finding with ‘scientific certainty,’” the Court held that EPA was required to *at least* support the finding “with substantial evidence when considered on the record as a whole.”³⁹¹ Additionally, the Court rejected EPA’s argument that EPA could collect data to substantiate its public-interest finding after granting conditional registration, holding that FIFRA plainly requires EPA to make the public interest finding “*before* granting conditional registration.”³⁹² The Court explained that it was not enough for EPA to simply say that a new pesticide “has the ‘potential’ to be in the public interest,” “especially where the pesticide also has the ‘potential’ to contravene the public interest.”³⁹³ Rather, because EPA’s public interest finding of nanosilver was “only supported by bare assumptions,” EPA had failed to support the issuance of the conditional registration under FIFRA.³⁹⁴

The *Nanosilver* decision is precedential in clarifying that the public interest requirement for conditional registrations of new pesticide active ingredients is an additional, more stringent test that EPA must support with substantial evidence. Crucially, the Court rejected EPA’s “bare assumptions” that nanosilver would bring about a public benefit by replacing older, more toxic pesticide counterparts, a rationale that EPA has often relied on in its registration of newer pesticide active ingredients, without any data or evidence to suggest that pesticide users would actually switch over to the new, often more expensive, patented pesticide formulations.³⁹⁵ Yet post-*Nanosilver*, EPA is required to substantiate that conclusion with substantial evidence in the record.

iii. *National Family Farm Coalition v. EPA (Enlist Duo)*

Pollinator I and *Nanosilver* both emphasize the need for EPA to substantiate its pesticide registration decisions with sufficient evidence before the agency in approving new pesticides, whether conditionally or unconditionally. On the other hand, the Ninth Circuit’s recent decision in *National Family Farm Coalition v. EPA (Enlist Duo)*, 966 F.3d 893 (9th Cir. 2020), examined a different category of pesticide approvals, referred to as “me-too” registrations, which are pesticide uses similar to previously-registered uses of similar or identical pesticides.³⁹⁶ In *Enlist Duo* the Ninth Circuit was faced with a challenge to a me-too product registration sold by the brand name Enlist Duo, which contains 2,4-D and glyphosate, two pesticide ingredients that had both been previously registered. Like dicamba in *NFFC*, Enlist Duo was specifically designed as a companion to corn, soy, and cotton crops that had been genetically engineered to withstand

³⁸⁹ *Id.* at 1040 (emphasis added).

³⁹⁰ *Id.* at 1042 (quoting 123 Cong. Rec. 25,706 (1977)).

³⁹¹ *Id.* at 1041.

³⁹² *Id.* at 1041-42 (emphasis in original).

³⁹³ *Id.* at 1042.

³⁹⁴ *Id.*

³⁹⁵ **Need a conditional registration example.**

³⁹⁶ See *Enlist Duo*, 966 F.3d at 913; see EPA, Pesticide Registration Manual chapter 2, <https://www.epa.gov/pesticide-registration/pesticide-registration-manual-chapter-2-registering-pesticide-product#meetoo> (defining “identically/substantially similar” pesticide products).

its application, allowing 2,4-D to be sprayed later in the season, over the top of the growing crops.³⁹⁷ As noted by the Ninth Circuit, Enlist Duo pesticide thus changed the use pattern of 2,4-D, but not that of glyphosate, which was already approved for later-season spraying on those crops.³⁹⁸

Environmental and farmer groups challenged the registration on multiple grounds under FIFRA, as well as the ESA, as discussed *infra*. On review of the FIFRA claims, the panel largely upheld EPA's conditional registration of the me-too pesticide. First, the panel held that the conditional registration standard for a me-too pesticide, which requires EPA to find that "the registration would not 'significantly increase the risk of any unreasonable adverse effect on the environment,'"³⁹⁹ is a lower standard than the no "unreasonable adverse effect" finding required for unconditional registration because the scope of EPA's review is limited to "only ... evidence that bears on whether the new or additional use changes EPA's original conclusion that the pesticide or active ingredient will 'not generally cause unreasonable adverse effects.'"⁴⁰⁰ Nonetheless, the court held that even under that standard, the me-too registration was unlawful because EPA admitted that it failed to assess how the destruction of milkweed in treated fields by Enlist Duo may affect the iconic monarch butterfly, whose population has been threatened by the loss of milkweed habitat in large part due to the prevalence of agricultural pesticide use.⁴⁰¹

Although EPA argued in litigation that milkweed on crop fields would be destroyed by some other pesticide even without the Enlist Duo pesticide registration, the court rejected this post-hoc litigation position.⁴⁰² Significantly, the court went on to explain that, even if EPA had offered the justification as part of its registration decision, "it would likely be premised legal error."⁴⁰³ This is because, according to the panel, that the milkweed would likely be destroyed by other pesticides merely goes to "suggest[] that registering Enlist Duo may not be 'unreasonable' under FIFRA," but "says nothing about whether an effect would be 'adverse.'"⁴⁰⁴ The court emphasized that "EPA was required, under FIFRA, to determine whether an effect was 'adverse' before determining whether an effect on the environment was, on the whole, 'unreasonable.'"⁴⁰⁵ While the court's clarification on this last point is dicta, it nonetheless has significant import in the context of judicial review of EPA's administration of me-too pesticides going forward, since the very nature of me-too registration means that there are always other pre-existing pesticides that would carry the same risks as the proposed me-too pesticide. Under the rationale articulated by the court in *Enlist Duo*, EPA still needs to examine such risks, and determine whether or not they are adverse, then proceed to

³⁹⁷ See 966 F.3d at 904. The petitioners in *Enlist Duo* challenged the registration under both FIFRA and the ESA, but this note focuses on the Court's review of the FIFRA challenges.

³⁹⁸ See *id.* at 905.

³⁹⁹ *Id.* at 913 (quoting 7 U.S.C. § 136a(C)(7)(A)).

⁴⁰⁰ 966 F.3d at 915. Moreover, the court found that EPA actually registered *Enlist Duo* according to the unconditional registration standard, finding that the pesticide would not result in unreasonable adverse effects on the environment. See 966 F.3d at 914 ("[T]he documents indicate EPA applied the broader 'cause any unreasonable adverse effects' standard for unconditional registrations."). However this holding also sheds light on the *NFFC* decision in *dicamba*, since there the Court also addressed the not 'significantly increase the risk of any unreasonable adverse effect on the environment' standard, albeit for conditional new use registrations. In that case the panel held that EPA did not meet even this narrower and slightly easier (according to the *enlist* panel) registration standard.

⁴⁰¹ See FWS, Monarch Butterfly, <https://www.fws.gov/savethemonarch/> (last visited Feb. 22, 2021) (determining that monarch butterfly warranted protection under the federal Endangered Species Act but declined to take action in light of other higher priorities, and finding that "[p]esticides use can destroy the milkweed monarchs need to survive.").

⁴⁰² 966 F.3d at 917 ("Despite the intuitive appeal of EPA's argument, we must reject it. EPA did not assert this rationale as a reason for declining to assess the destruction of milkweed on target fields, so neither can we.")

⁴⁰³ 966 F.3d at 917.

⁴⁰⁴ *Id.*

⁴⁰⁵ *Id.*

evaluating whether the level of risks presented by the me-too registration would be unreasonable on the environment as a whole.

The *Enlist Duo* decision also raises another aspect of EPA's pesticide registration authority, the registration review process, which is front and center in two ongoing cases before the Ninth Circuit described below.⁴⁰⁶ As mandated by FIFRA, under registration review, EPA conducts periodic reviews of registered pesticides.⁴⁰⁷ After holding that EPA only needed to examine the increased risk caused the new 2,4-D use pattern, the court went on to explain that "this does not mean, of course, that new data about glyphosate will go unconsidered."⁴⁰⁸ Rather, the court pointed to the registration review process under FIFRA as the appropriate forum for EPA to analyze such risks, explaining that that process "serves as a backstop to ensure that pesticides do not remain registered once new data has shown them to be harmful to human or the environment."⁴⁰⁹ Based on the same rationale, the court also rejected one of petitioners' argument that EPA was required to consider the synergistic effect of the future potential of mixing Enlist Duo with glufosinate, another pesticide, in a common agricultural practice where different pesticides are mixed in the field before application, because any such arguments can be presented during the ongoing registration review processes for 2,4-D and glyphosate.⁴¹⁰

C. The Next Chapter: Ongoing FIFRA Battlegrounds

Taken together, *NFFC*, *Nanosilver*, *Pollinator I*, and *Enlist Duo* show that, in spite of the historical deference that courts have afforded agencies on scientific and technical matters such as a pesticide registration,⁴¹¹ FIFRA's "substantial evidence" standard is a searching and careful standard of judicial review. These cases teach that FIFRA's registration standard requires that EPA substantiate its assumptions and assessments with substantial record evidence. The rulings in *NFFC* and *Enlist Duo* further add to that, and put the substantial evidence standard of review in the context of FIFRA's "unreasonable adverse effect" substantive requirement. They clarify that, at a minimum, EPA must assess all risks—environmental, economic, and social. They also instruct that where EPA entirely fails to consider certain risks or substantially understate known risks, the resulting registration lacks substantial evidence and violates FIFRA. Similarly, where EPA relies on mitigation like use restrictions, it must grapple with record evidence and support the efficacy and practicability of those measures.

That said, these cases do not fully address the level of detail EPA must provide in order to substantiate its pesticide registration action to quantify risks, or to support its conclusion that the risks are not unreasonable. Nor do the cases address EPA's duties in the registration review context for older pesticides. These questions instead will perhaps be addressed in the next generation of ongoing cases concerning many of the same pesticides previously reviewed by the courts.

As mentioned previously, the ongoing sequel to the *NFFC* decision will examine whether EPA's latest dicamba registration sufficiently cures the deficiencies in EPA's prior risk assessment, and the court's

⁴⁰⁶ See *infra* notes ___ and accompanying text.

⁴⁰⁷ 7 U.S.C. § 136a(g).

⁴⁰⁸ 966 F.3d at 918.

⁴¹⁰ *Id.* at 923.

⁴¹¹ *Pollinator I*, 806 F.3d at 532-34 (J. Smith, concurring) ("[A] court's deference must be at its highest when examining factual disputes that 'implicate substantial agency expertise.'") (quoting *Marsh v. Or. Nat. Res. Def. Council*, 490 U.S. 360, 376-77); see *Lands Council v. McNair*, 537 F.3d 981 (9th Cir. 2008) (en banc).

holding therein will be crucial to further defining EPA's duties in conducting the risk-benefit assessment under FIFRA.

Sulfoxaflor, the bee-killing insecticide at issue in the *Pollinator I* decision, is also having its second act. In 2019 EPA reapproved many of the sulfoxaflor uses vacated by the *Pollinator I* decision, uses on crops utilized by bees and pollinators and therefore have the potential to harm them.⁴¹² The beekeeper petitioners in *Pollinator I* and other environmental organizations petitioned for review, challenging the 2019 sulfoxaflor use approvals under both FIFRA as well as the Endangered Species Act.⁴¹³ Specific to the FIFRA context, the *Pollinator II* cases picks up on where *Pollinator I* left off, and the petitions for review seek judicial review of the sufficiency of the additional Tier 2 studies that EPA relies upon in issuing the 2019 registration decision. The *Pollinator II* petitioners also rely on the Ninth Circuit's ruling in *NFFC* to argue that EPA underestimated the risks of sulfoxaflor to non-honey bees, as well as the risks sulfoxaflor has on the environment as compared to alternative insecticides.

Two other ongoing FIFRA petitions for review bring into question EPA's FIFRA duties in the registration review context. As discussed *supra*, the court in *Enlist Duo* rejected the petitioners' challenge to EPA's determination concerning the glyphosate component of Enlist Duo because, according to the court, any unreasonable adverse effects of glyphosate use would be addressed in EPA's registration review of that pesticide.⁴¹⁴ EPA issued an interim registration review decision—so called because a final registration decision is still forthcoming—for glyphosate in January of 2020, after more than a decade of registration review that it started in 2009, and despite admitting that the agency still lacked data necessary to make a final decision.⁴¹⁵ Environmental and farmworker groups⁴¹⁶ petitioned for review to the Ninth Circuit based on EPA's failure to comply with FIFRA and the ESA.⁴¹⁷ EPA issued a similar interim registration decision concerning another pesticide, atrazine, a toxic herbicide that EPA itself had classified for "restricted use"⁴¹⁸ given its unreasonable adverse effects on the environment, again because EPA open admits it still lacked all the requisite data to make a final registration review determination.⁴¹⁹ In both instances, EPA also issued the interim registration decisions without completing the consultation required under the ESA. The Ninth Circuit's decisions in these two interim registration challenges would thus determine with more precision what is required of EPA under FIFRA and the ESA when undertaking pesticide registration review.

⁴¹² See EPA, *Decision Memorandum Supporting the Registration Decision for New Uses of the Active Ingredient Sulfoxaflor on Alfalfa, Cacao, Citrus, Corn, Cotton, Cucurbits, Grains, Pineapple, Sorghum, Soybeans, Strawberries and Tree Plantations and Amendments to the Labels* (July 12, 2019).

⁴¹³ See *Pollinator Stewardship Council et al. v. USEPA*, No. 19-72280 (9th Cir. filed Sept. 6, 2019); *Ctr. for Food Safety et al. v. USEPA*, No. 19-72109 (9th Cir. filed Aug. 20, 2019) (collectively, the *Pollinator II* cases). Significantly, a little over a year after petitioners filed the *Pollinator II* petitions for review, in a motion to the Court, EPA admitted that it had failed to comply with its consultation duties under the Endangered Species Act prior to approving sulfoxaflor use.

⁴¹⁴ 966 F.3d at 918 (citing 7 U.S.C. § 136a(g)).

⁴¹⁵ EPA, *Glyphosate Interim Registration Review Decision* (Jan. 22, 2020), <https://www.epa.gov/sites/production/files/2020-01/documents/glyphosate-interim-reg-review-decision-case-num-0178.pdf>.

⁴¹⁶ Petitioners are Rural coalition, Organización en California de Lideres Campesinas, Farmworker Association of Florida, Beyond Pesticides, and Center for Food Safety.

⁴¹⁷ Pet. for Review at 2, *Rural Coalition v. EPA* No. 20-70801, ECF No. 1-5 (Mar. 20, 2020).

⁴¹⁸ See 7 U.S.C. § 136a(d)(1)(C) ("restricted pesticides" are so classified because EPA determined that their use "may generally cause, without additional regulatory restrictions, unreasonable adverse effects on the environment, including injury to the applicator.")

⁴¹⁹ Pet. for Review, *Rural Coalition v. EPA* No. 20-73220, ECF No. 1-6 (Oct. 30, 2020); EPA, *Atrazine Interim Registration Review Decision* 11 (Sept. 2020).

D. Pesticide Litigation Outside of FIFRA

It is worth noting two other litigation battlegrounds, outside of the FIFRA context, that have profound impacts on how pesticides are regulated and used in U.S. agriculture. First, as discussed *supra*, because pesticides indiscriminately harm not only the targeted pests, but other living organisms, pesticides have been identified as one of the major contributing factors in the significant decline of our nation's federally protected endangered and threatened species. Yet, as the cases amply demonstrate, the EPA has continued to disregard potential harm of pesticide exposure to federally protected species in its administration of FIFRA, in violation of the ESA.⁴²⁰ Second, the vast amount of crop and health damage suffered by farmers and pesticide users have led those users to look to private courses of action such as product liability claims, to hold the agrochemical conglomerates accountable. While these cases are outside of the main focus of this Article, below, we briefly summarize their import.

i. Endangered Species Act

The ESA is “the most comprehensive legislation for the preservation of endangered species ever enacted by any nation.”⁴²¹ Congress “[made] it abundantly clear that the balance has been struck in favor of affording endangered species the highest of priorities.”⁴²² Section 7(a)(2) of the ESA reflects Congress's intent to “give endangered species priority over the ‘primary missions’ of federal agencies.”⁴²³ It mandates that “[e]ach federal agency” “insure” its action—including any pesticide registration action—“is not likely to jeopardize the continued existence of any endangered species ... or result in the destruction or adverse modification of habitat of such species.”⁴²⁴ Accordingly, section 7 of the ESA establishes a process requiring EPA to evaluate a pesticide's effects “in consultation with and with the assistance of” the agencies Congress designated as having expertise in determining effects on endangered species: U.S. Fish and Wildlife Service and National Marine Fisheries Service (the Expert Agencies).⁴²⁵ The consultation process to assess a pesticide's effects is integral to “insuring” EPA implements the ESA's substantive protections for imperiled species.⁴²⁶ The first step in the Section 7(a)(2) process requires EPA to determine whether the registration “may affect” any listed species or designated critical habitat. If it *may*, EPA then *must* consult.⁴²⁷

Courts have repeatedly affirmed that compliance with the ESA's consultation mandates is an indispensable part of EPA's pesticide registration process.⁴²⁸ Nevertheless, EPA has continued to evade its ESA consultation duties in registering pesticides, failing to engage in consultation even after finding “may affect” in its risk assessment of a pesticide registration, only to concede later in litigation of its legal

⁴²⁰ See, e.g., *Wash. Toxics Coalition v. EPA*, 413 F.3d 1024, 1028-29 (9th Cir. 2005) (failure to consult before registering 54 pesticides); *Ellis v. Housenger*, 252 F. Supp. 3d 800, 820 (N.D. Cal. 2017) (68 pesticide approvals unlawfully issued without ESA consultation).

⁴²¹ *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 180 (1978).

⁴²² *Id.* at 194.

⁴²³ *Id.* at 185.

⁴²⁴ 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.02; 16 U.S.C. § 1532(5)(A); *Sierra Club v. Marsh*, 816 F.2d 1376, 1385 (9th Cir. 1987) (ESA's mandate is “rigorous”).

⁴²⁵ 16 U.S.C. § 1536(a)(2); 50 C.F.R. §§ 402.14(a), 402.01(b).

⁴²⁶ *Thomas v. Peterson*, 753 F.2d 754, 764 (9th Cir. 1985), *abrogated on other grounds by Cottonwood Envtl. Law Ctr. v. U.S. Forest Serv.*, 789 F.3d 1075 (9th Cir. 2015).

⁴²⁷ 50 C.F.R. § 402.14(a).

⁴²⁸ *Wash. Toxics*, 413 F.3d at 1032 (“[EPA] cannot escape its obligation to comply with the ESA merely because it is bound to comply with [FIFRA.]”);

violation.⁴²⁹ Even after such admissions in court, rather than committing to cure its ESA violation as expeditiously as possible, EPA instead throws its hands in the air, and points to the ever-growing backlog of ESA consultations on older pesticides that the agency has yet to complete.⁴³⁰ To give just one example of several, in *Ellis v. Housenger*, a district court in the Northern District of California held that EPA violated the ESA when it issued pesticide registrations for several bee-harming pesticides where EPA conceded in summary judgment that “it has not consulted [the Expert Agencies] nor made a ‘no effect’ determination.”⁴³¹

As a result, these ESA violations often end up being resolved through a lengthy settlement process, often involving EPA and the pesticide registrants, whereby the plaintiffs try to stop or reduce use of the challenged pesticide while negotiating a reasonable timeline for EPA to belatedly comply with the ESA.⁴³² As a result, EPA and the registrants agreed to remove some of the pesticide products from the market while EPA engages in making an effects determination within the timeframe set by the parties via settlement.⁴³³ Similarly, in the ongoing *Pollinator II* litigation, more than a year after the petitioners sought review of EPA’s sulfoxaflor registration decision, EPA admitted that it had failed to abide by the ESA’s consultation mandates, but stated that it would not be able to even make the initial ESA effects determination for another seven years, due to its backlog of ESA violations.⁴³⁴

Nor is the backlog of ESA consultations for preexisting pesticides shrinking. In issuing interim registration decisions on glyphosate and atrazine discussed *supra*, EPA confessed that it had not made ESA determinations concerning either pesticide, but nonetheless issued the interim registration decisions to allow the pesticide uses to continue.⁴³⁵ Whether EPA’s issuance of the interim registration decision without ESA compliance violates the ESA is one of the issues that will be adjudicated by the Ninth Circuit in the ongoing glyphosate interim registration challenge.

To address continuing disagreements over the consultation process, EPA and the Expert Agencies requested that the National Academy of Sciences (Academy) evaluate the best scientific approach for assessing the effects of registrations on endangered species. The resulting 2013 report by the Academy⁴³⁶ pointed out that EPA’s FIFRA risk assessment matrix is “not scientifically defensible” for assessing risks to

⁴²⁹ See, e.g., *Ellis v. Housenger*, 252 F. Supp. 3d 800, 820 (N.D. Cal. 2017); *Ctr. for Biological Diversity v. EPA*, 861 F.3d 174, 188 (D.C. Cir. 2017).

⁴³⁰ See Mot. for Vol. Remand Without Vacatur at 5-6, 19-72109 No. 51-1 (describing EPA’s ESA- “backlog” and “noncompliance”).

⁴³¹ *Ellis v. Housenger*, 252 F. Supp. 3d at 820. See also *Wash. Toxics Coal. v. EPA*, 413 F.3d 1024 (9th Cir. 2005); *Ctr. for Biological Diversity v. EPA*, 430 U.S. App. D.C. 15, 29, 861 F.3d 174, 188 (2017) (“EPA has therefore violated section 7(a)(2) of the ESA by registering [a pesticide] before making an effects determination or consulting”); *Def. of Wildlife v. EPA*, 882 F.2d 1294 (8th Cir. 1989). Settlements: *NRDC v. EPA et al.*, 17-cv-02034-TSC (D.D.C.); *CBD et al v. Johnson et al.*, e 3:02-cv-01580-JSW (N.D. Cal.); *CBD et al v. EPA et al.*, 11-cv-293-JCS (N.D. Cal.); *Ellis et al v. Keigwin Jr. et al.*, 13-cv-01266-MMC (N.D. Cal). EPA, *Endangered Species Litigation and Associated Pesticide Limitations*, <https://www.epa.gov/endangered-species/endangered-species-litigation-and-associated-pesticide-limitations> (last visited Mar. 1, 2021).

⁴³² NAT. RES. DEF. COUNCIL, *Court Settlement: EPA Must Evaluate Impacts of Harmful Pesticide on Imperiled Species* (Jan. 28, 2021), <https://www.nrdc.org/media/2021/210128-0>; Decl. of Brett Hartl in Support of Pls’ Remedy Reply 4, 9-11, 3:13-cv-01266-MMC, ECF No. 325; Appx. to Mot. for Vol. Remand Without Vacatur at A-8, A-14-A-15, 19-72109 No. 51-2.

⁴³³ CITE? – not sure where to cite for this

⁴³⁴ Mot. for Vol. Remand Without Vacatur at 5-7, 19-72109 No. 51-1; Appx. to Mot. for Vol. Remand Without Vacatur at A-1-A-16, 19-72109 No. 51-2.

⁴³⁵ EPA, *Glyphosate Interim Registration Review Decision 33* (Jan. 2020), <https://www.epa.gov/sites/production/files/2020-01/documents/glyphosate-interim-reg-review-decision-case-num-0178.pdf>.

⁴³⁶ Nat’l Academy of Sciences, *Assessing Risks to Endangered and Threatened Species from Pesticides* (2013), <https://www.nap.edu/catalog/18344/assessing-risks-to-endangered-and-threatened-species-from-pesticides>.

federally protected species.⁴³⁷ This conclusion is understandable, since FIFRA and the ESA have completely different risk thresholds. As discussed *supra*, under FIFRA, EPA is tasked with evaluating whether a potential pesticide risk rises to the level of “unreasonable effect.”⁴³⁸ On the other hand, the ESA’s “may affect” standard is extremely low: “[A]ctions that have any chance of affecting listed species or critical habitat—even if it is later determined that the actions are ‘not likely’ to do so—require at least some consultation under the ESA.”⁴³⁹ The Academy’s report made clear that any potential exposure to a pesticide is a “may affect” trigger under the ESA, and called for EPA to adopt a more probabilistic approach in assessing pesticide risks to federally protected species.⁴⁴⁰ According to the Academy, if there is any spatial overlap between a pesticide’s potential use and the habitats of listed species, EPA should at least informally consult the Expert Agencies.⁴⁴¹ Following the Academy’s report, EPA and the Expert Agencies jointly published a guidance document outlining how they would conduct pesticide consultations going forward.⁴⁴² Consistent with the report, the guidance document provides that to comply with the ESA in registering pesticides, EPA must conclude that a pesticide “may affect” any species or critical habitat if it finds species or habitats that overlap with the “potential [pesticide] use sites” and “area of potential effects in and around use sites.”⁴⁴³ And when there is a “may affect,” EPA must at least information consultation—to assess in conjunction with and requiring the concurrence of the Expert Agencies—the degree of impacts on protected species, and if necessary beyond that, formally consulting the Expert Agencies.⁴⁴⁴

While the *NFFC* decision on dicamba did not reach the petitioners’ very similar ESA claims, the *Enlist Duo* decision, discussed *supra*, did examine EPA’s ESA consultation duties in light of the Academy’s recommendations and EPA’s subsequent adoption of them. As in *NFFC*, the *Enlist Duo* case involves a situation where EPA unilaterally concluded that there was “no effect” on endangered species by relying on its much-criticized FIFRA risk assessment framework to conclude that endangered and threatened species would not be exposed to the pesticide at levels sufficient to, under EPA’s FIFRA framework, have an “effect.”⁴⁴⁵ Petitioners challenged the “no effect” finding by EPA, in addition to FIFRA claims discussed *supra*. The petitioners argued the ESA consultation duty was triggered because EPA’s own preliminary FIFRA assessment had found that the pesticide Enlist Duo “may affect” hundreds of endangered species, but EPA subsequently reached a no-effect finding after unilaterally adopting mitigation measures, such as downwind buffer and other use restrictions, that the agency claimed would eliminate effect on species.⁴⁴⁶ The petitioners also argued that, EPA’s reliance on its FIFRA risk assessment matrix, which was rejected by

⁴³⁷ *Id.* at 15.

⁴³⁸ See *supra* note ___ and accompanying text.

⁴³⁹ *Karuk Tribe of Cal. v. U.S. Forest Serv.*, 681 F.3d 1006, 1027 (9th Cir. 2012) (emphases added); *id.* (Any possible effect, whether beneficial, benign, adverse or of an undetermined character triggers the requirement) (quoting *Lockyer*, 575 F.3d at 1018-19) (quotation omitted).

⁴⁴⁰ Nat’l Academy of Sciences, *Assessing Risks to Endangered and Threatened Species from Pesticides* 31 (tbl. 2-1), 148-52 (2013), <https://www.nap.edu/catalog/18344/assessing-risks-to-endangered-and-threatened-species-from-pesticides>.

⁴⁴¹ *Id.* at 9.

⁴⁴² EPA, *Interim Approaches for National-Level Pesticide Endangered Species Act Assessment Based on the Recommendations of the National Academy of Sciences April 2013 Report* (July 2017), available at <https://www.epa.gov/sites/production/files/2015-07/documents/interagency.pdf> (Interim Approaches). EPA subsequently issued an updated guidance (Revised Method), which again affirmed the same three-step process. See EPA, *Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides* (Mar. 12, 2020), available at <https://www3.epa.gov/pesticides/nas/revised/revised-method-march2020.pdf>.

⁴⁴³ *Id.* at 4-5.

⁴⁴⁴ *Id.*; see also EPA, *Revised Method for National Level Listed Species Biological Evaluations of Conventional Pesticides* (Mar. 12, 2020), <https://www3.epa.gov/pesticides/nas/revised/revised-method-march2020.pdf>.

⁴⁴⁵ *Pets. Opening Br.* at 20-31, *NFFC v. EPA* 17-70810, 17-70817, ECF No. 64-1.

⁴⁴⁶ *Enlist Duo*, 966 F.3d at 924.

the Academy's report, violated the ESA's mandate that agencies "use the best scientific and commercial data available."⁴⁴⁷

While conceding that EPA's FIFRA matrix was criticized by the Academy, the majority in *Enlist Duo* upheld EPA's "no effect" finding. The court stated that the Academy recognized that transition from EPA's FIFRA matrix to the probabilistic approach it recommended would require new data to be generated, and upheld EPA's decision to continue utilizing its current FIFRA risk assessment matrix, explaining that the best scientific data requirement "does not require the agency to conduct new tests or make decisions on data that does not yet exist."⁴⁴⁸ In so holding, the court relied on the fact that EPA had begun implementing the new approach in selected pesticide registration reviews, and concluded that EPA's utilization of its inappropriate FIFRA matrix "is [a scientific judgment] we do not expect to reoccur given EPA's commitment to gather the data necessary to implement [the Academy's approach] going forward."⁴⁴⁹

Crucially, Judge Watford dissented from the plurality panel's ESA ruling, explaining he would have held that EPA had violated the ESA's "best available scientific data" mandate when it assessed *Enlist Duo*'s risks to endangered species using its unreliable FIFRA matrix.⁴⁵⁰ His dissent points out that the *Enlist Duo* holding could set a dangerous precedent that effectively incentivizes agencies not to implement the necessary scientific method to obtain the necessary data, directly contradicting Congress's intent to require federal agencies to use the best scientific data available in assessing risks to endangered species.⁴⁵¹

For now, it remains to be seen what will come of these mixed decisions. On the one hand, courts have held EPA liable when the agency entirely fails to make any effects determination prior to registering a pesticide. On the other hand, under *Enlist Duo*, for at least a short time until EPA generates the necessary data to apply the National Academy of Sciences' methodology, EPA can continue to rely on its FIFRA risk assessment matrix to find "no effect," despite recognition by scientists and the court that the FIFRA matrix is not scientifically defensible to protect endangered species. Fortunately, as the *Enlist Duo* decision recognized, and as recently pointed out by the petitioners in *Pollinator II* briefing, as EPA embarks upon ESA consultations required as part of settlement agreements that came out of previous ESA litigation, the agency already possesses much of the data necessary for EPA to conduct the probabilistic assessment called for by the Academy. The existence of such data should make it difficult to impossible for EPA to rely on FIFRA's risk-benefit standard to evade the ESA mandate that the agency prioritizes protection of endangered species above all else.⁴⁵²

ii. State Product Liability Claims

Another important part of this story is federal pesticide regulation's interaction with state law regulation of pesticides and state law based claims like product liability. FIFRA's scheme is one of cooperative federalism, leaving ample room for state action in both forms.⁴⁵³ While the EPA label is

⁴⁴⁷ *Id.*

⁴⁴⁸ *Id.* at 926 (quoting *Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv.*, 807 F.3d 1031, 1047 (9th Cir. 2015)).

⁴⁴⁹ *Id.*

⁴⁵⁰ *Id.* at 933 (Watford, J. dissenting).

⁴⁵¹ *Id.* (Watford, J. dissenting). Petitioners in *Enlist Duo* sought rehearing en banc based in part on the rationale articulated in Judge Watford's dissent, but the Ninth Circuit denied the rehearing request. Order: Pet. for Reh. Denied (Nov. 18, 2020), 17-70810, ECF No. 246.

⁴⁵² Pet. CFS et al. Opening Br. (Feb. 16, 2021), 19-72019, ECF No. 71.

⁴⁵³ Angelo et al. *supra* note at 141.

preemptive, states (and even local governments, if not preempted by their given state)⁴⁵⁴ can regulate the use of pesticides.⁴⁵⁵ This strong presumption against preemption reflects the historical role that states had in pesticide regulation, and extends to state-based causes of action, such as defective product claims.⁴⁵⁶

As one might imagine, the dicamba drift crisis spawned hundreds if not thousands of farmer plaintiffs suing for damages. In the first, *Bader Farms v. Monsanto & BASF*,⁴⁵⁷ Bader Farms, a Missouri peach orchard, experienced significant drift damage from neighboring crop fields.⁴⁵⁸ In early 2020, a jury found in Bader's favor on all counts, awarding \$15 million in actual damages and \$250 million in punitive damages.⁴⁵⁹ It found Monsanto and BASF liable for negligent design of their products and failure to warn.⁴⁶⁰ It also found the companies conspired to create an "ecological disaster" of off-target pesticide movement and damage to increase profits.⁴⁶¹ Contrary to their arguments in the *NFFC* litigation and EPA's registration decision bases, over 180 discovery documents showed that Monsanto knew its product would move off-field and cause harm.⁴⁶² Monsanto projected thousands of drift incidents, and prohibited testing of drift properties to more easily obtain EPA registration.⁴⁶³ Also contrary to their arguments in the *NFFC* litigation, documents conceded drift despite label-compliant application, and drift-caused yield loss.⁴⁶⁴ And the jury rejected Monsanto's defense that damage was because of farmer misapplication, not their pesticide.⁴⁶⁵

Consolidated cases of hundreds, if not thousands of other farmers followed.⁴⁶⁶ In December 2020, Bayer entered into a settlement with damaged soybean farmers for \$300 million.⁴⁶⁷ Growers with non-soybean crop or plant injury in the multi-district litigation are in the process of settling their claims separately at the time of writing.⁴⁶⁸

⁴⁵⁴ *Wisconsin Public Intervenor v. Mortier*, 501 U.S. 597 (1991).

⁴⁵⁵ *Bates v. Dow Agrosciences*, 544 U.S. 431 (2005).

⁴⁵⁶ *Id.* at 449.

⁴⁵⁷ *Indiv. Case No. 1:16-cv-00299-SNLJ* (E.D. Missouri), MDL No. 1:18-md-02820-SNLJ Docket Entries 549, 550, 551 (Feb. 14 & 15, 2020).

⁴⁵⁸ Hettinger, *Jury orders Monsanto, BASF to pay peach farmer \$250 million in punitive damages*, MIDWEST CTR. FOR INVESTIGATIVE REPORTING (Feb. 15, 2020), <https://investigatamidwest.org/2020/02/15/jury-fines-monsanto-basf-250-million-in-punitive-damages/>.

⁴⁵⁹ *Id.*; *Indiv. Case No. 1:16-cv-00299-SNLJ* (E.D. Missouri), MDL No. 1:18-md-02820-SNLJ Docket Entries 550, 551, 558.

⁴⁶⁰ Docket Entry 550.

⁴⁶¹ Docket Entry 551; Ruff, *Monsanto, BASF Will Pay \$250 Million in Punitive Damages in First Dicamba Trial*, ST. LOUIS PUBLIC RADIO (Feb. 15, 2020), <https://news.stlpublicradio.org/post/monsanto-basf-will-pay-250-million-punitive-damages-first-dicamba-trial>.

⁴⁶² Hettinger, *Five key takeaways from trial of peach farmer's lawsuit vs. Bayer, BASF*, MIDWEST CENTER FOR INVESTIGATIVE REPORTING (Feb. 14, 2020), <https://investigatamidwest.org/2020/02/14/reporters-notebook-five-key-takeaways-from-trial-of-peach-farmers-lawsuit-vs-bayer-basf/>. While damage included the 2015/2016 season from older dicamba formulations, it dramatically increased in 2017, *id.*, after EPA's approval of the Monsanto and BASF pesticides at issue here. EPA, Registration Decision for the Continuation of Uses of Dicamba on Dicamba Tolerant Cotton and Soybean 4-5, tbl.2 (Oct. 31, 2018).

⁴⁶³ *Id.*

⁴⁶⁴ *Id.*

⁴⁶⁵ *Id.*

⁴⁶⁶ *In Re: Dicamba Herbicides Litigation*, 1:18-md-02820-SNLJ (E.D. Missouri). Hettinger, *For Dicamba Lawsuits, Bader Verdict is Just the Beginning*, MIDWEST CENTER FOR INVESTIGATIVE REPORTING (Feb. 20, 2020), <https://investigatamidwest.org/2020/02/20/for-dicamba-lawsuits-bader-verdict-is-just-the-beginning/>.

⁴⁶⁷ Emily Unglesbee, *Dicamba Settlement Is a Go*, PROG. FARMER (Dec. 17, 2020), <https://www.dmpf.com/agriculture/web/ag/crops/article/2020/12/17/300-million-dicamba-settlement-claim>; see also Emily Unglesbee, *Dicamba Injury Payments*, PROG. FARMER (June 26, 2020), <https://www.dmpf.com/agriculture/web/ag/news/article/2020/06/25/know-bayers-400-million-dicamba>.

⁴⁶⁸ *Id.*

The dicamba class action settlement was part of a proposed glyphosate class action settlement by Bayer,⁴⁶⁹ attempting to clean up several of its Monsanto liabilities at once. There are currently also thousands of lawsuits against Monsanto/Bayer, by more than 100,000 plaintiffs, alleging cancer from glyphosate exposure.⁴⁷⁰ Monsanto has lost all three bellwether trials.⁴⁷¹ These cases involve people who used glyphosate at home or at work, with each plaintiff later developing non-Hodgkin lymphoma. Following extensive jury trials, these plaintiffs were awarded over \$2 billion in compensatory and punitive damages combined because glyphosate was a “substantial factor” in causing their cancers and Monsanto failed to warn that its glyphosate-based pesticides could cause cancer. To settle the remaining non-Hodgkin lymphoma cases, Bayer has agreed to a proposed massive \$10 billion settlement, one of the largest settlements ever in U.S. civil litigation.⁴⁷² The settlement does not cover at least 30,000 claims from plaintiffs who did not join the settlement. Bayer has not agreed to include a warning about increased risk of cancer on any glyphosate product labels.⁴⁷³ However the settlement is far from certain. The overseeing district court judge heavily criticized the first iteration in summer 2020 for, among other things, attempting to bind not just current but also future plaintiffs, and it was subsequently scuttled;⁴⁷⁴ the parties filed a second version in early February 2021, but it is also under fire as creating a dangerous precedent.⁴⁷⁵

In the meantime, one of those bellwether cases, *Hardeman v Monsanto*, is pending on appeal and in October 2020, the Ninth Circuit heard oral argument over whether failure-to-warn claims over Monsanto’s Roundup labeling are preempted by EPA’s approval of glyphosate under FIFRA.⁴⁷⁶ Mr. Hardeman won an \$80 million verdict, with the jury finding that the weedkiller was a “substantial factor” in causing his non-Hodgkin’s lymphoma, and that Monsanto should be held liable for its failure to warn that Roundup may cause cancer.⁴⁷⁷ Council for Hardeman explained that FIFRA should not preempt failure-to-warn claims because FIFRA itself states that, “in no event shall registration of an article be construed as a defense” against a FIFRA violation, and that registration under FIFRA only serves as evidence that labeling and packaging comply with the statute.⁴⁷⁸ On appeal, the parties briefed whether state labeling statute claims are preempted by FIFRA, or if they can be brought when state claims are consistent with FIFRA, as held in *Bates v. Dow Agrosciences*, 544 U.S. 431 (2005). As such the decision could be very important in terms of determining whether people harmed by future pesticide exposures will have a course of action against

⁴⁶⁹ Emily Unglesbee, *Dicamba Injury Payments*, PROG. FARMER (June 26, 2020), <https://www.dmpf.com/agriculture/web/ag/news/article/2020/06/25/know-bayers-400-million-dicamba>.

⁴⁷⁰ U.S. RIGHT TO KNOW, *Monsanto Roundup & Dicamba Trial Tracker: Bayer backs away from plan to contain future Roundup cancer claims* (July 8, 2020), <https://usrtk.org/monsanto-roundup-trial-tracker/index/#:~:text=More%20than%20100%2C000%20people%20in,covered%20up%20the%20cancer%20risks>.

⁴⁷¹ *Johnson v. Monsanto Co.*, No. CGC-16-550128 (Cal. Super. Ct. 2018); *Hardeman v. Monsanto Co.*, No. C 16-00525-VC (N.D. Cal. 2019); *Pilliod v. Monsanto Co.*, No. RG17862702, JCCP No. 4953 (Cal. Super. Ct. 2019).

⁴⁷² Patricia Cohen, *Roundup Maker to Pay \$10 Billion to Settle Cancer Suits*, NY TIMES (June 24, 2020), <https://www.nytimes.com/2020/06/24/business/roundup-settlement-lawsuits.html>.

⁴⁷³ *Id.*

⁴⁷⁴ Carey Gilliam, *Bayer Backs Away from Plan to Contain Future Roundup Cancer Claims*, US RIGHT TO KNOW (July 8, 2020), <https://usrtk.org/monsanto-roundup-trial-tracker/bayer-backs-away-from-plan-to-contain-future-roundup-cancer-claims/>.

⁴⁷⁵ Carey Gilliam, *Bayer’s Plan for Settling Future Roundup Cancer Claims Faces Broad Opposition*, US RIGHT TO KNOW (Feb. 26, 2021) <https://usrtk.org/monsanto-roundup-trial-tracker/bayers-plan-for-settling-future-roundup-litigation-faces-broad-opposition/>.

⁴⁷⁶ U.S. Courts for the Ninth Circuit, Case Recording: *Hardeman v. Monsanto* (Oct. 23, 2020), https://www.ca9.uscourts.gov/media/view_video.php?pk_vid=0000018203.

⁴⁷⁷ Julia Jacobs, *Monsanto Ordered to Pay \$80 Million in Roundup Cancer Case*, NY TIMES (Mar. 27, 2019), <https://www.nytimes.com/2019/03/27/us/monsanto-roundup-california-verdict.html>.

⁴⁷⁸ 7 U.S.C. § 136a (f)(2).

pesticide manufacturers for failing to adequately warn users of the risks involved with handling these chemicals.

More generally, the robust dicamba crop damage and glyphosate cancer class action litigation illustrate the important regulatory backstop purpose that state-law claims can play, theoretically providing strong economic liability incentives to companies not to cut health and safety corners. But they also underscore the *inherent* weakness in those types of litigation: they are always necessarily *ex post facto* and mainly financial, and thus cannot address irreparable types of injuries, like environmental and health harms, *before* they happen. No amount of money cure Mr. Hardeman's cancer. And no amount of money can make up for the loss of an endangered plant or pollinator from pesticide drift, or a farmer's fundamental right to choose what seeds she plants.

Accordingly most relevantly here, the robust state-law based action taking place reveals the regulation weaknesses at the center of this article: they are needed in part because of how significantly EPA has failed at its job and how weak the registration approval process is. Pesticides that cause the problems at issue in the glyphosate and dicamba class action litigation should never have been approved in the first place, at least not in the form and manner they were; but they were so approved. As such, their very existence and necessity reiterates in all caps the urgent need for regulatory reform and improvements.

V. Conclusion

For far too long, EPA has overly constricted its FIFRA mandate (and entirely shirked its ESA duties), approving pesticides in manners that have not protected public health or the environment. When challenged, EPA has sought refuge in the pesticides' scientific complexity and the reflexive tendency of courts to defer to agencies. However, the recent cases discussed in this Article have collectively breathed some much needed life back into FIFRA's "no unreasonable adverse effect" registration standard, as well as given new bite to the substantial evidence standard of judicial review. With the caveat that nothing short of legislative and regulatory overhaul is needed, at a minimum these cases have winnowed some of the oversight loopholes and shored up some of the regulatory weaknesses that previously allowed EPA to greenlight pesticides without actually ascertaining that their use would not result in "unreasonable adverse effects on the environment" by "taking into account the economic, social, and environmental costs and benefits" of the pesticide use, as FIFRA mandates.⁴⁷⁹

To that end, it is illuminating to close by overlaying *NFFC* and the other decisions and their various holdings with the Section II's discussion of EPA registration weaknesses. One such major loophole is conditional registrations.⁴⁸⁰ Taken together, the Ninth Circuit's recent holdings in *Nanosilver*, *NFFC*, and *Enlist Duo* set a higher bar (than the previous non-existent one) that EPA must clear in order to conditionally register pesticides. *Nanosilver* gives meaning for the first time to the statutory "public interest finding" requirement for conditional registrations of new active ingredients,⁴⁸¹ clarifying that the public interest finding is an additional determination, and instructing that EPA must support any such public interest determinations with record evidence.⁴⁸² Further, *Enlist Duo* clarified that the no "significant increase" to "the risk of any unreasonable adverse effect on the environment" test for conditional registrations of me-too pesticides and new uses of previously-registered pesticides is a different and

⁴⁷⁹ 7 U.S.C. § 136(bb).

⁴⁸⁰ See Section II *supra* ____.

⁴⁸¹ See 7 U.S.C. § 136a(c)(7)(C).

⁴⁸² See *supra* pp. ____.

somewhat narrower standard than the “no unreasonable adverse effect on the environment” test for unconditional registration. Yet concurrently the *NFFC* decision demonstrated the breadth of the types of risks of unreasonable adverse effect that EPA *still* must consider, analyze, and support with substantial evidence, and can fail, *even under that less stringent standard*.⁴⁸³

Another fundamental oversight has been EPA’s failure to grapple with, or even acknowledge, the true costs or risks of registrations.⁴⁸⁴ In that regard, the *NFFC* precedent fleshes out the risk side of the FIFRA’s risk-benefit analysis, and underlines that the textual mandate to EPA for “unreasonable adverse effect on the environment” includes not just environmental effects, but also social and economic ones. These economic effects include the economic costs to individual farmers suffering crop damage from pesticide drift, and the broader anticompetitive market costs resulting from the approval of pesticide uses on patented genetically engineered seeds. It also includes the social effect of pesticide use on rural and farming communities. EPA must examine these effects, must quantify them when there is record evidence for so doing, and must support its conclusion about whether they are reasonable in conjunction with the purported benefits of the pesticide registration, with substantial evidence in the record.

The same goes for EPA’s lapses when it comes to environmental and human health costs, data, and adverse effects of pesticides.⁴⁸⁵ *Pollinator I* and *Enlist Duo* both emphasize EPA’s duties to examine adverse effects to non-target species—honey bees in the case of *Pollinator I* and monarch butterflies in the case of *Enlist Duo*—and support the agency’s conclusion with substantial evidence. The *Nanosilver* decision addresses human health effects, requiring EPA to examine critically the risks to the public at large before it conditionally approves new pesticide active ingredients.

Another singular weakness of registration has been EPA’s reliance on regulation through label instructions rather than use limitations.⁴⁸⁶ The *NFFC* decision for the first time requires EPA to support with substantial evidence the efficacy and practicability of its labels and consider whether or not farmers can follow them in real world farming conditions. It will no longer be enough for EPA to make a finding of “no unreasonable adverse effects” predicated on mitigation the agency assumes but has not assessed and supported.

Another huge problem has been the conflict and inconsistency between EPA’s registration of pesticides under FIFRA and its duties under the ESA.⁴⁸⁷ EPA’s methodology and approach for common species is not scientifically defensible for endangered species, nor does EPA have the expertise to alone assess harms to them.⁴⁸⁸ However, a growing body of cases have established EPA can no longer flout its ESA duties for pesticide decisions, must comply with both statutes in making such decisions, and must use ESA metrics, not FIFRA metrics, for ESA decisions.⁴⁸⁹

Finally, EPA has escaped accountability and transparency for many of its regulatory shortcomings, hiding in the weeds of agency deference. Judge Smith’s concurrence in *Pollinator Stewardship I* specifically addressed the rigor of substantial evidence review. The *NFFC* decision provided a meticulous review of the administration record, holding over and over again multiple places where EPA’s decision was flatly contrary

⁴⁸³ See *supra* pp. ____.

⁴⁸⁴ See Section II *supra* ____.

⁴⁸⁵ See Section II *supra* ____.

⁴⁸⁶ See Section II *supra* ____.

⁴⁸⁷ See *supra* ____.

⁴⁸⁸ *Id.*

⁴⁸⁹ *Id.*

to the evidence before the court. Even in the *Enlist Duo* decision largely upholding the registration, the panel carefully reviewed and rejected the agency's argument with regard to impacts on monarch butterflies. All of these cases show the growing strength of substantial evidence judicial review.

Much, much more is needed, including programmatic legislative and regulatory action. And in the interim, there is plenty still up in the air. But the judicial winds seem to have shifted, blowing a gathering storm of long-overdue and urgently needed improvements, for the betterment of health and environmental protection. The incoming Biden administration's EPA would do well to catch the drift.