April 29, 2019

Mr. Andrew Wheeler
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Submitted via regulations.gov

RE: Comments from Clean Air Task Force, Earthjustice, National Wildlife Federation, and Sierra Club on the U.S. Environmental Protection Agency's Proposed Rule - "Modifications to Fuel Regulations to Provide Flexibility for E15; Modifications to RFS RIN Market Regulations" 84 Federal Register 10584 (March 21, 2019); EPA–HQ–OAR–2018–0775

Dear Administrator Wheeler:

As national environmental and conservation organizations representing millions of members and supporters across the country, we respectfully submit these joint comments on the Environmental Protection Agency's (EPA) proposed rule - EPA–HQ–OAR–2018–0775 - "Modifications to Fuel Regulations to Provide Flexibility for E15; Modifications to RFS RIN Market Regulations" published in the Federal Register at 84 Fed. Reg. 10584 on March 21, 2019 (the "Proposed Rule"). Our members are deeply concerned with fighting global warming, protecting human health, promoting human rights, preserving natural habitats, protecting air, water, and soil quality, halting deforestation, and advocating for clean energy. We believe that policies designed to introduce more biofuels into the marketplace should be based not only on strong legal footing but also rigorous scientific research. Otherwise, public health, our environment, and climate will be put at risk.

As discussed in detail below, the Proposed Rule threatens harm to public health and the environment in a number of ways, most notably by promoting the growth of corn for ethanol which in turn induces the conversion of millions of acres of uncultivated land to cropland, leading to severe degradation of the quality of our air, water, and soil. For this reason, as well as all the reasons described below, we respectfully request that EPA withdraw this Proposed Rule and instead continue to limit the sale and use of E15 in a manner that better protects our health and environment.

I. Overview

The primary objective of the federal Clean Air Act (CAA) is "to protect and ensure the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population."[1] Toward

[1] Clean Air Act (CAA) §101(b)(1).

that end, the Act includes provisions that require the use of fuels made from renewable biomass, in an attempt to reduce the greenhouse gas emissions that result from the combustion of petroleum-based motor vehicle fuels.

Congress first enacted the Renewable Fuel Standard (RFS) in 2005 as part of the Energy Policy Act (EPAct)[2] and then dramatically expanded the program with the passage of the Energy Independence and Security Act of 2007 (EISA).[3] The core purpose of the RFS is "to ensure that transportation fuel sold or introduced into commerce in the United States" contains a specified volume of biofuel.[4] Although the initial EPAct version of the RFS mandated biofuels that could be blended into gasoline (meaning ethanol, for all intents and purposes), the revisions enacted in EISA require the production and consumption of a broader range of biofuels while also setting limits on the extent to which conventional corn ethanol (*i.e.*, ethanol made from corn starch) can be used to comply with the new mandates.[5] The EISA-revised version of the RFS sets annual consumption targets through the year 2022 for:

- An overarching category called *renewable fuel* that is scheduled to grow to 36 billion gallons.[6]
- A subset of renewable fuel called *advanced biofuel* that is scheduled to grow to 21 billion gallons. Advanced biofuels must have lifecycle greenhouse gas emissions that are at least 50 percent lower than the lifecycle GHG emissions from baseline petroleum fuel. The statute explicitly prohibits conventional corn ethanol from qualifying as an advanced biofuel.[7]
- A subcategory of advanced biofuel called *cellulosic biofuel* that is scheduled to grow to 16 billion gallons. Cellulosic biofuel must be made from cellulose, hemicellulose, or lignin, and it must have lifecycle GHG emissions that are at least 60 percent lower than those associated with petroleum fuel.[8]
- Another subcategory of advanced biofuel called *biomass-based diesel* that can be blended into biodiesel. The volumetric mandate biomass-based diesel subcategory must be at least 1 billion gallons per year, and the fuel's lifecycle GHG emissions must be at least 50 percent lower than those associated with petroleum diesel.[9]

Through EISA, Congress intended to expand US biofuel consumption from approximately 5 billion gallons in 2007 to 36 billion gallons in 2022—an increase of 31 billion gallons—and it also intended to limit the role that corn ethanol would play in that increase. Because EISA prohibits corn ethanol from qualifying as an advanced biofuel, the fuel can only earn compliance credits from the non-advanced portion of the renewable biofuels category—*i.e.*, a maximum of 15 billion gallons per year. Corn ethanol-based RFS compliance reached the statutory 15-billion-gallon ceiling in 2017.[10]

At the same time, as discussed in Part II, the CAA restricts the sale and use of fuels that contain a mixture of gasoline and ethanol to protect against the threats to human health and the environment stemming from the production and use of ethanol, particularly ethanol made from corn.[11]

EPA proposes to change the current regulatory landscape by authorizing the year-round sale and use of E15—a fuel blend containing gasoline and 15 percent ethanol that currently can be sold and used only under certain restricted conditions. To lawfully make this change, EPA must demonstrate that E15 conforms to the relevant

---

[2] Energy Policy Act of 2005, Pub. L. No. 109-58, 90 Stat. 304.
[3] Energy Independence and Security Act of 2007, Pub. L. No. 110-140, 33 Stat. 479.
[4] CAA §211(o)(2)(A)(i).
[5] *See id*.
[6] CAA §211(o)(2)(B)(i)(I).
[7] CAA §211(o)(1)(B), (2)(i)(II).
[8] CAA §211(o)(1)(E), (2)(i)(IV).
[9] CAA §211(o)(1)(D), (2)(i)(III).
[10] 81 Fed. Reg. 89746, 89747 (December 12, 2016).
[11] *See* CAA §§211(f) and (h).

statutory restrictions on gasoline-ethanol blends. Specifically, the Agency first must show either that E15 complies with the limit that Congress set for gasoline volatility (9 pounds per square inch (psi)), or that E15 can take advantage of a 1 psi waiver (discussed below) that Congress created to accommodate the use of E10—a fuel blend containing gasoline and 10 percent ethanol. Separately, EPA must demonstrate either that E15 is "substantially similar" to a fuel used by EPA to certify light duty vehicles, or that the use of E15 will not cause or contribute to a failure of any emission control device or system. As discussed in Part II, EPA has not satisfied any of these showings. At the same time, as discussed in Part III, the Proposed Rule incentivizes the cultivation of corn for ethanol, which in turn threatens harm to both public health and the environment. And the Proposed Rule also would create problems for small engines, older vehicles, and air quality, as discussed in Part IV.

Thus, EPA should not proceed with a rule that would lead to widespread environmental degradation and would harm public health, and that is plainly unlawful, contravening both the text and purpose of the Clean Air Act.

II. The Proposed Rule is Unlawful

Before it can allow the sale and use of E15 during the high ozone season (June 1 to September 15), EPA must demonstrate either that E15 complies with the limit that Congress set for gasoline volatility (9 psi) or that E15 can take advantage of a 1 psi waiver that Congress created to accommodate the use of E10; and it must demonstrate either that E15 is substantially similar to a fuel used by EPA to certify light duty vehicles, or that the use of E15 will not cause or contribute to a failure of any emission control device or system—even during the high ozone season. As discussed in this section, the Agency makes none of these showings.

A. EPA's application of the statutory 1 psi waiver to E15 is unlawful.

1. The Clean Air Act restricts the type of fuel that can be sold and used during the high ozone season.

Mixing ethanol into gasoline can raise the volatility of the blended fuel. Volatility is characterized in terms of Reid Vapor Pressure (RVP). High-RVP gasoline blends release more volatile organic compounds (VOCs) into the troposphere where those VOCs can contribute to ozone formation when they mix with NOx in the presence of sunlight. Because ozone pollution is damaging to human health and the environment,[12] Congress sought to limit its formation by setting an upper limit on RVP for gasoline during the high ozone season, when sunlight is more plentiful and higher temperatures are more common.

Toward that end, Congress enacted Section 211(h)(1) of the Clean Air Act in 1990, prohibiting the sale of gasoline with RVP greater than 9.0 psi during the high ozone season.

> *211(h)(1) Prohibition*. Not later than 6 months after November 15, 1990, the Administrator shall promulgate regulations making it unlawful for any person during the high ozone season … to sell, offer for supply, transport, or introduce into commerce gasoline with a Reid vapor pressure in excess of 9.0 pounds per square inch (psi) ….

Because gasoline-ethanol blends below E50 are more volatile than straight gasoline and cannot readily meet the 9.0 psi RVP requirement, Congress also created a 1 psi waiver at CAA §211(h)(4) that increases the RVP limit for gasoline during the high ozone season from 9.0 psi to 10.0 psi. However, the waiver is only available to "fuel blends containing gasoline and 10 percent denatured anhydrous ethanol."[13] That is, *only E10* can take advantage of the 1 psi waiver:

---

[12] *See, e.g.*, EPA, Health Effects of Ozone Pollution (https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution); EPA, Ecosystem Effects of Ozone Pollution (https://www.epa.gov/ground-level-ozone-pollution/ecosystem-effects-ozone-pollution).

[13] CAA §211(h)(4).

> *211(h)(4) Ethanol waiver*. For fuel blends containing gasoline and 10 percent denatured anhydrous ethanol, the Reid vapor pressure limitation under this subsection shall be one pound per square inch (psi) greater than the applicable Reid vapor pressure limitations established under paragraph (1).

Although E15 is slightly less volatile than E10, its RVP still typically exceeds 9 psi. E15 made with conventional blendstock for oxygenate blending (CBOB) needs a 1 psi waiver to meet the CAA §211(h) RVP limit in the same way that E10 does,[14] but the plain language of CAA §211(h)(4) renders it ineligible for such a waiver.

Over the course of the 29 years since Congress put the RVP 9.0 psi limit and 1 psi waiver in the Clean Air Act, EPA has applied the waiver only to E10, consistent with the plain language of the statute. EPA now proposes to break from this long regulatory history and reinterpret the 1 psi waiver provision so that it would apply to E15 as well. EPA has failed to explain how or why the plain language of the waiver provision (CAA §211(h)(4)) is now something other than plain, nor has it provided a reasonable basis for its alternative, E15-inclusive interpretation of the statutory text.

2. The plain meaning of CAA §211(h)(4) clearly restricts the 1 psi waiver to E10.

a. The statutory language unambiguously applies to E10 and not to E15.

When analyzing the lawfulness of a regulation, courts apply the test set forth in *Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 468 U.S. 837 (1984). Under the *Chevron* test, if Congress's intent is clearly and unambiguously discernible from statutory text—as it is in CAA §211(h)(4)—then implementing regulations must give effect to that intent:

> When a court reviews an agency's construction of the statute which it administers, it is confronted with two questions. First, always, is the question whether Congress has directly spoken to the precise question at issue. If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.[15]

The language of CAA §211(h)(4) is clear. Its key phrase—"fuel blends containing gasoline and 10 percent denatured anhydrous ethanol"—means just that: fuel that is a mixture of gasoline and 10 percent ethanol. It does not mean "fuel blends containing gasoline and *at least* 10 percent denatured anhydrous ethanol." An interpretation that treats the word "containing" as if it means "at least" is inconsistent with how the word "containing" is commonly used and understood. For example, if someone were to say that they had a jug containing a gallon of milk, anyone listening would expect the volume of milk in the jug to be one gallon—no more and no less.

EPA argues that ordinary use and the dictionary definition of "containing" (per Webster's Third New International Dictionary, "to have within: hold") supports its open-ended interpretation,[16] but the opposite is true. Returning to the milk analogy, if a person announced that their jug has within it, or holds, a gallon of milk, a listener would be surprised to learn that there is actually one-and-a-half gallons of milk in the jug.

EPA also argues that the lack of "terms modifying the term 'containing'" supports its contention that "containing" actually means *containing at least*.[17] But the term "containing" does not require modifying terms to make plain sense: it is often used alone, without modifying terms, and when it is used alone it is commonly understood to

[14] Per EPA, "E15 made with the same conventional blendstock for oxygenate blending (CBOB) that is used to make E10 by oxygenate blenders during the summer" would have a similar (slightly lower) RVP and would "maintain[] substantially the same level of emissions performance as E10." 84 Fed. Reg. at 10585/3. In other words, E15 made from CBOB would exceed the CAA §211(h)(1) RVP limit of 9 psi.
[15] *Chevron v. NRDC*, 467 U.S. 837, 842-43 (1984).
[16] 84 Fed. Reg. 10591/2.
[17] *Id*. at 10591/3.

mean that the vessel in question has within it, or holds, the amount that has been specified, and not some greater amount.

As EPA acknowledges,[18] Congress has demonstrated elsewhere in the Clean Air Act that when it wants to set a minimum threshold, it knows how to use terms to communicate that intent.[19] The phrase "at least" appears *nine times* in other parts of Section 211.[20] Congress's decision to not use it in CAA §211(h)(4) is telling.

Courts generally presume that Congress acted intentionally where it leaves out language in one section that it included in another.[21] For example, in *Ethyl Corp. v. EPA*, the D.C. Circuit declined to follow EPA's interpretation that it had implied authority to consider certain criteria under a specific statutory section despite the lack of explicit language in that section because Congress had explicitly added that language about that criteria to other sections:

> In *American Methyl,* we stated that we 'see no need to imply authority under section 211(f) to reconsider waivers granted after due deliberation' in light of the mechanism established in 211(c)(1). Likewise, we see no need to imply authority under section 211(f)(4) to consider public health when Congress explicitly directed the Administrator to consider public health in 211(c)(1) proceedings.[22]

Notably, EPA's own past practice demonstrates an understanding of the statute as limiting the waiver to fuel that contains gasoline and 10% ethanol. For example, in 2010, EPA issued a partial waiver under CAA §211(f)(4) that allowed the sale of E15 between September 16 and May 31 – but not during high ozone season – to model year 2007 and newer light duty vehicles.[23] Likewise, in 2011, EPA extended the partial waiver to include model year 2001-2006 light duty vehicles.[24] And in 2011, EPA also finalized the E15 Misfueling Mitigation Rule (MMR) aimed at preventing the sale of E15 to other vehicle types and vintages.[25] In none of these cases did EPA claim that it could apply the section 211(h)(4) waiver to fuel containing more than 10 percent ethanol.

CAA §211(h)(4) is an accommodation—or as EPA describes it, an "allowance."[26] Congress enacted the waiver in section 211(h)(4) for the clearly specified purpose of accommodating E10 (*i.e.*, "fuel blends containing gasoline and 10 percent [ethanol]"). Nothing about the text supports EPA's assertion that it was written to *promote* the use of ethanol more generally.[27]

---

[18] *Id*. at 10591/2 (referencing CAA §211(m)(2)).
[19] The "mention of one thing implies the exclusion of another thing." 33 Fed. Prac. & Proc. Judicial Review § 8434 (2d ed.).
[20] CAA §§211(c)(4)(C)(v)(V); (o)(1)(B)(i); (o)(1)(D); (o)(1)(E); (o)(2)(A)(i) (appears twice); (o)(2)(B)(iii); (o)(7)(F)(i); (o)(7)(F)(ii).
[21] *Kucana v. Holder*, 558 U.S. 233, 249, 130 (2010) (quoting *Nken v. Holder,* 556 U.S. 418, 430, (2009) ("[W]here Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion.") (internal quotation marks omitted)).
[22] *Ethyl Corp. v. EPA*, 51 F.3d 1053, 1061 (D.C. Cir. 1995).
[23] 75 Fed. Reg. 68094, 68148/1 (November 4, 2010) ("[T]he partial waiver for E15 contains a condition that E15 must meet a maximum RVP of 9.0 psi during the summertime volatility season, May 1 through September 15.").
[24] 76 Fed. Reg. 4662, 4682/2 (January 26, 2011) ("The final fuel must have a Reid Vapor Pressure not in excess of 9.0 psi during the time period from May 1 to September 15.).
[25] 76 Fed. Reg. 44406 (July 25, 2011).
[26] 84 Fed. Reg. at 10588/1 ("CAA sec. 211(h)(4) further provides a 1.0 psi RVP *allowance* for 'fuels containing gasoline and 10 percent [ethanol]' …." (emphasis added)).
[27] *See* 84 Fed. Reg. at 10592/3. EPA writes: "Our primary consideration has been to balance the goals of limiting gasoline volatility … while also promoting the use of ethanol consistent with the purpose of CAA sec. 211(h)(4)." Section 211(h)(4) does not promote ethanol use; it accommodates or "allow[s]" the use of E10 within a measure designed to limit volatility-related emissions.

In the Proposed Rule, EPA notes that increasing a fuel's RVP from 9 to 10 psi increases the resulting emissions of criteria pollutants and air toxins.[28] Oddly, the Agency cites this fact to justify its extension of the 1 psi waiver from just E10 to both E10 *and* E15.[29] It fails to recognize that through the waiver provision, Congress created a specific allowance for E10 and E10 alone, despite the volatility problems associated with that fuel. Congress did not implicitly authorize EPA to exacerbate those problems by administratively allowing E15 to take advantage of the 1 psi waiver.

By stretching the phrase beyond its plain meaning—and, more specifically, by reconstruing the term "containing" to mean "containing *at least*"—EPA's new interpretation of CAA §211(h)(4) violates the plain meaning of the statute and cannot be lawfully implemented.

b. EPA's reliance on past regulatory practice is misplaced.

Because CAA §211(h)(4) is clear, that is the end of the inquiry. There is no need to look beyond the statutory language. Thus, EPA's reliance on the pre-1990 regulatory text to support its reinterpretation of Section 211(h)(4)[30] is misplaced. As discussed above, the statutory phrase "containing gasoline and 10 percent [ethanol]" plainly means a blend that consists of 90 percent gasoline and 10 percent ethanol. To avoid this inexorable conclusion, EPA tries to reorder the normal course of statutory analysis. Instead of beginning its analysis with a review of the relevant statutory text, the Agency puts the cart before the horse by starting with and then focusing extensively on its previous regulations and practices that relate to gasoline and "gasohol" volatility.[31] The historical explanation that EPA offers in support of its strained interpretation of CAA §211(h)(4) portrays the passage of controlling legislation as a minor event in a narrative defined by EPA's regulatory practice.

EPA's suggested rearrangement of authority is not compelling. The Agency, after all, is a "creature of statute."[32] Its authority is delegated to it by Congress through legislation. Whatever regulatory precedent an agency may have created is superseded when Congress enters the field, as it did here in 1990 when it legislated the conditions under which the 1 psi waiver can be utilized. EPA's assertions that Congress acted "in the context of EPA's prior regulatory actions" and that CAA §211(h) was "a codification of EPA's regulatory actions"[33] misunderstands the respective roles of Congress and executive branch agencies. EPA regulations must conform to the intent of Congress as spelled out in legislation, not the other way around.

EPA's "codification"-based argument also disregards important differences between the language in the Agency's preexisting regulation and the statutory text that Congress enacted in 1990. EPA's 1989 regulation on gasoline volatility described a "1 psi RVP allowance for [gasoline-alcohol] blends," provided that "[s]uch blends must contain *at least* 9% ethanol (by volume) and their maximum ethanol content may not exceed any applicable waiver conditions under section 211(f)(4) of the Clean Air Act."[34] Notably, EPA's regulatory text included the words "at least." But rather than codify EPA's regulatory language, Congress used different and significantly less open-ended terminology when it drafted CAA §211(h)(4): it made the 1 psi waiver applicable to "fuel blends

---

[28] *Id*. at 10603/2 ("Currently and historically, vehicle manufacturers have been required to certify their vehicles on test gasoline with a volatility of 9.0 psi RVP under severe operating conditions similar to what might be expected on high ozone days. The evaporative emission standards have been progressively made more stringent over time, such that under the Tier 3 standards they require essentially zero vapor loss during normal operation on 9.0-psi fuel. Increasing fuel RVP from 9.0 psi to 10.0 psi increases fuel vapor generation significantly under summertime conditions, which can overwhelm a vehicle's evaporative control system and push it out of compliance. Consequently, controlling the volatility of gasoline during the summer is important in order to control the evaporative VOC emissions produced by vehicles and engines in-use.").
[29] *Id*.
[30] *Id.* at 10588-589.
[31] *Id.* at 10587-590.
[32] *Michigan v. EPA*, 268 F.3d 1075, 1081 (D.C. Cir. 2001) ("EPA is a federal agency—a creature of statute. It has no constitutional or common law existence or authority, but only those authorities conferred upon it by Congress.").
[33] 84 Fed. Reg. at 10588/1; *see also id*. at 10589/2 ("EPA has interpreted CAA sec. 211(h) as largely a codification of our prior RVP regulations.").
[34] 54 Fed. Reg. 11868, 11879/2 (March 22, 1989) (emphasis added).

containing 10 percent denatured anhydrous ethanol,"[35] dropping the modifier "at least" from the text. EPA argues that the phrase "at least" is implied in CAA §211(h)(4), but there is no basis in law for the Agency's presumption that Congress silently adopted that term when it supposedly "codified" the broader regulatory approach.[36] Congress was presented with EPA's "at least" language and it opted for a different approach, one that clearly and unambiguously specifies that the 1 psi waiver applies to fuel that is a mixture of gasoline and 10 percent ethanol.

3. Congress's intent was to limit the 1 psi waiver to E10.

The plain language of CAA §211(h)(4) precludes the revised interpretation that EPA proposes here. But *even if* the relevant statutory provisions were somehow unclear or ambiguous, EPA's reinterpretation would not meet the reasonableness standard required of agency rulemakings. Under the *Chevron* test,

> [when a] court determines that Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction on the statute, as would be necessary in the absence of an administrative interpretation. Rather, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute.[37]

State Farm provides the seminal test for reasonable decisionmaking:

> [T]he agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.' In reviewing that explanation, we must 'consider whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment.' Normally, an agency rule would be arbitrary and capricious if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.[38]

"To determine whether EPA's rules are 'arbitrary and capricious,' we apply the same standard of review under the Clean Air Act as we do under the Administrative Procedure Act."[39]

Under the APA, a rule must be set aside if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law,"[40] or if it was promulgated "without observance of procedure required by law."[41] Under the Clean Air Act, "the court may reverse any action found to be":

> (A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;
> (B) contrary to constitutional right, power, privilege, or immunity;

---

[35] Courts have found that when legislation is drafted so as to incorporate some—but not all—aspects of a preexisting regulation, the omissions are meaningful. *See Kucana v. Holder*, 558 U.S. 233, 250 (2010) (finding that Congress largely, but not entirely, codified the Board of Immigration Appeals' regulations on filing motions to reopen, the Supreme Court explained "[h]ad Congress elected to insulate denials of motions to reopen from judicial review, it could have so specified together with its codification of directions on filing reopening motions.").

[36] *See Veterans Justice Group, LLC v. Secretary of Veterans Affairs*, 818 F.3d 1336, 1348 (Fed Cir. 2016) ("There is no reason to presume that when Congress codified the effective date regulation, it also legislatively adopted, *sub silentio*, the informal claims regulation.").

[37] *Chevron*, 467 U.S. at 842-43.

[38] *Motor Vehicles Manufacturers Ass'n v. State Farm*, 463 U.S. 29, 43 (1983) (internal citations omitted).

[39] *Allied Local & Reg'l Mfrs. Caucus v. EPA*, 215 F.3d 61, 68 (D.C. Cir. 2000).

[40] 5 U.S.C. §706(2)(A).

[41] *Id*. §706(2)(D).

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; or
(D) without observance of procedure required by law…[42]

Application of these tests to EPA's Proposed Rule leads to the inexorable conclusion that EPA's interpretation is unreasonable.

a. EPA has not provided a reasonable basis for reversing its 2010-2011 interpretation.

As an initial matter, EPA's Proposed Rule is inconsistent with its prior interpretation of the CAA, yet EPA unreasonably fails to adequately justify its reversal in position. Under its prior interpretations, EPA understood CAA §§211(h)(1) and (h)(4) as limiting the application of the 1 psi waiver to fuel containing at most 10 percent ethanol. This includes the partial waivers granted for E15 use in 2010/11 as well as the MMR promulgated by the Agency in 2011. EPA's new interpretation of the statute seemingly ignores these prior interpretations. Yet EPA does not provide a reasonable basis for reversing its position, and instead tries to justify its current Proposed Rule by pointing to "changed circumstances" and a "change in administration." Neither theory survives scrutiny.

i. "Changed circumstances"

EPA attempts to justify its decision to allow the sale and use of E15 during the high ozone season as "a response to changed circumstances."[43] That argument falls flat, because EPA has not identified material changes that permit a novel statutory interpretation.

The U.S. Supreme Court requires agencies that propose to change course to "provide a more detailed justification than would suffice for a new policy…when, for example, its new policy rests upon factual findings that contradict those which underlay its prior policy; or when its prior policy has engendered serious reliance interests that must be taken into account. It would be arbitrary and capricious to ignore such matters."[44] EPA fails to satisfy this requirement.

In the Proposed Rule, EPA points to the establishment of E10 as the certification test fuel for Tier 3 vehicles and "a changed marketplace since the Agency last issued implementing RVP regulations in 1990" to justify its reversal.[45] Neither provides a sufficient basis for the new statutory interpretation. First, it is not clear why EPA thinks that the use of E10 as a certification fuel justifies a reinterpretation of CAA §211(h)(4), especially given that E10 is the very fuel that qualifies for the 1 psi waiver under CAA §211(h)(4).

Second, although EPA insists "[t]he presence of E15 in the marketplace has increased since EPA interpreted CAA §211(h)(4) in the [2011] MMR,"[46] the increase has been too small to constitute a change in circumstances to allow the Agency to "simply disregard contrary or inconvenient factual determinations that it made in the past."[47] EPA cites data from Growth Energy that indicate there are now 1300 gas stations in the United States that offer E15. That number (1300) comes to just over 1 percent of the total number of gas stations in the country (121,998),[48]

---

[42] CAA §307(d)(9).
[43] 84 Fed. Reg. 10590/3.
[44] *FCC v. Fox Television Stations*, 556 U.S. 502, 515-16 (2009) (internal citation omitted); *see also Public Citizen v. Steed*, 733 F.2d 93, 98 (D.C. Cir. 1984) (Agency must '"cogently explain"' basis for reversal of prior position) (quoting *State Farm*, 463 U.S. at 48).
[45] 84 Fed. Reg. 10590/2.
[46] *Id*.
[47] *Fox Television*, 556 U.S. at 537 (Kennedy, J., concurring).
[48] National Association of Convenience Stores, US Convenience Store Count (December 2018) (NACS reports that there are 153,237 convenience stores in the United States, of which 121,998 sell motor fuel) (https://www.convenience.org/Research/FactSheets/ScopeofIndustry/IndustryStoreCount).

despite the allocation of public funds to build E15 fueling infrastructure.[49] There has been a similarly modest increase in the volume of E15 consumption since 2011: in its final 2017 Renewable Volume Obligations (RVO) rule, EPA estimated that 109 million gallons of ethanol would be mixed with gasoline to be sold as E15 in 2017, representing 0.75% of total ethanol consumption that year and less than 0.5% of total 2017 gasoline sales on an energy-equivalent basis.[50] Contrary to EPA's assertion, the current miniscule presence of E15 means that little has changed in the marketplace since 2011.

What *has* changed? Corn ethanol production has bumped against the E10 blend wall,[51] making it hard for the corn ethanol industry to maintain the growth rates it experienced in the immediate wake of EISA's passage. By allowing E15 to be sold during the high ozone season, the Proposed Rule would facilitate comparatively higher E15 sales in the near term while also keeping open the possibility—dear to ethanol producers—that E15 might someday replace E10 as the dominant gasoline blend in the US market. The growth goals of a subsector of the biofuels industry are irrelevant to a lawful interpretation of the Clean Air Act.[52]

ii. "Change in administration"

The second justification offered by EPA – that a "change in administration is a 'perfectly reasonable basis' for an agency's reappraisal of its regulations and programs"[53] – fairs no better. Though that statement is true, a change in administration is not *carte blanche*. An agency's interpretation must still follow the statute and its purposes, and the interpretation must still be reasonable.[54] An agency must also engage in reasoned decisionmaking, the indicators of which are laid out in *State Farm*.[55] This is especially true when the agency is overcoming a previous rulemaking.[56] EPA's failure to do so here – as discussed more fully below – renders the Proposed Rule unreasonable.

b. EPA's reinterpretation of the statute is inconsistent with Congressional intent.

EPA contends that Congress *meant* for the 1 psi waiver to apply to blends that include "*at least* 10 percent ethanol,"[57] because it is "Congress' intent to promote ethanol blending."[58] The argument is flawed in three primary ways.

First, EPA's argument misstates the objectives of CAA §211(h)(4) and mischaracterizes the purpose of EISA. As explained in Part II.A.2.a above, Congress enacted the waiver in section 211(h)(4) for the clearly specified purpose of accommodating E10; nothing about the text supports EPA's assertion that it was written to *promote* the use of ethanol more generally.

---

[49] The US DOE Alternative Fuels Data Center notes that "E15 is not widely available," even though the U.S. Department of Agriculture's Biofuels Infrastructure Partnership, announced in 2015, provided $100 million in federal grants (which were matched by states and private partners) for the installation of new ethanol infrastructure. US DOE AFDC, E15 (https://afdc.energy.gov/fuels/ethanol_e15.html; USDA, USDA Announces $210 Million to be Invested in Renewable Energy Infrastructure through the Biofuel Infrastructure Partnership (https://www.usda.gov/media/press-releases/2015/10/28/usda-announces-210-million-be-invested-renewable-energy).

[50] 81 Fed. Reg. 89746, 89780 (December 12, 2016).

[51] *See, e.g.* EPA's past Renewable Volume Obligation proposals, including 81 Fed. Reg. 89746, 89774/2-3 (December 12, 2016).

[52] As detailed in Parts I and III.C.3, key provisions in EISA and CAA §211(h) indicate that Congress wanted to limit the role of corn ethanol in the United States transportation fuel mix.

[53] 84 Fed. Reg. 10591 n. 61 (quoting *Nat'l Ass'n of Home Builders v. EPA*, 682 F.3d 1032, 1043 (DC Cir. 2012)).

[54] *Chevron*, 467 U.S. at 842-43.

[55] *State Farm*, 463 U.S. at 43.

[56] *Fox Television*, 556 U.S. at 515-16.

[57] 84 Fed. Reg. at 10591/1 (emphasis added).

[58] *Id*. at 10590/3.

Moreover, while the volume and breadth of the annual biofuel consumption mandates created by EISA confirm that Congress did indeed intend to increase US *biofuel* consumption, ethanol blending was given a subordinate role in that process. Congress wanted "advanced biofuels" that deliver greater environmental benefits to account for most of the increase.[59] In fact, Congress put an explicit cap on corn ethanol's role in RFS compliance when it defined "advanced biofuel" as "renewable fuel, *other than ethanol derived from corn starch*, that has lifecycle greenhouse gas emissions … that are at least 50 percent less than baseline lifecycle greenhouse gas emissions."[60] (Not only is corn ethanol made from corn starch, it does not come close to delivering a 50 percent reduction in lifecycle GHG emissions.)

Despite Congress's intent to limit the use of corn ethanol to satisfy RFS mandates, conventional corn ethanol—not "advanced biofuel," EISA's preferred biofuel—will be used for the foreseeable future to meet nearly all of the incremental ethanol demand that would arise if EPA were to authorize the sale of E15 during the high ozone season.[61] If any indication of Congressional intent can be gleaned from the specific elements and the overall structure of EISA, it is that Congress was interested in achieving something very different: promoting the development and deployment of biofuels *other* than corn ethanol.

Second, Congress has already addressed this issue and declined to adopt the interpretation that EPA currently proposes. In 2017, Senator Deb Fischer of Nebraska introduced a bill that would "amend the Clean Air Act with respect to the ethanol waiver for Reid vapor pressure limitations under such Act," in such a way as to allow the sale of E15 during the high ozone season. The bill would have amended the language of CAA §211(h)(4) "by inserting 'or more' after 10 percent"—so that the provision would have read: "For fuel blends containing gasoline and 10 percent *or more* denatured anhydrous ethanol, …."[62] In other words, the amendment would have rewritten the statute to achieve the same result that EPA now seeks to achieve through its proposed reinterpretation. The Committee on Environment and Public Works considered Senator Fischer's bill in a hearing on June 14, 2017, but it was not brought up for a vote by the committee and therefore did not become law. Similar versions of this legislation have been introduced in multiple recent Congresses, and each has been set aside. We therefore need not attempt to sift through tea leaves (or parse EISA's changes to the RFS) to divine Congress' intent with respect to E15 as it is eminently clear from Congress's past legislative efforts.

Third, legislative history cited by EPA further undermines its reading of the waiver provision as applying to fuel that contains "at least" 10 percent ethanol. EPA cites language from a 1990 House of Representatives bill that included the phrase "containing at least 10 percent ethanol," and claims that it supports the Agency's contention that CAA §211(h)(4) should be read as setting "a floor for ethanol content in gasoline."[63] However, the House language was not enacted, and the removal of the term "at least" from the legislation that *was* enacted points to the opposite conclusion: that Congress meant for the 1 psi waiver to apply to fuel that is a mixture of gasoline and 10 percent ethanol (and not to mixtures that contain a higher proportion of ethanol). If Congress wanted to set a floor, it certainly knew how to do so, and its rejection of the proposed "at least" language evidences a clear intent not do so here.

EPA also refers to a passage in a 1989 Senate report that suggests a 1 psi waiver for gasoline-ethanol blends was necessary to stave off possible "termination of the availability of ethanol in the marketplace."[64] The concern

---

[59] *See* CAA §211(o)(2)(B)(i). Under EISA's "applicable volume [for] calendar years after 2005," the implied annual corn ethanol mandate expands from 4 billion gallons in 2006 to 15 billion gallons in 2015 (and capped at 15 billion gallons per year thereafter), while the annual mandate for "advanced biofuel" begins in 2009 at 0.6 billion gallons and grows to 21 billion gallons in 2022. Congress intended that growth in "advanced biofuels" would be almost twice as large as growth in corn ethanol.

[60] CAA §211(o)(1)(B) (emphasis added).

[61] *See* Part III.A, below.

[62] S.517 Consumer and Fuel Retailer Choice Act (March 2, 2017) (https://www.congress.gov/115/bills/s517/BILLS-115s517is.pdf).

[63] 84 Fed. Reg. at 10591/3.

[64] *Id.* at 10592/1.

expressed in the Senate report is no longer relevant thirty years later. Ethanol will continue to be available in the marketplace regardless of whether E15 can be sold during the high ozone season.

c. EPA's proposed reinterpretation of CAA § 211(h)(4) unreasonably fails to adequately address an "important aspect of the problem," namely the impact of E15 use on ozone formation.

As discussed above, the volatility restrictions in CAA §211(h) are designed to limit the role that gasoline-ethanol blends play in ozone formation during the high ozone season. Although the specific provisions relate mainly to RVP, they do so in service of the overarching purpose of the CAA §211(h)—to check the formation of health- and environment-damaging ozone. Consequently, it would be unreasonable for EPA to approve the year-round sale and use of a fuel that likely contributes to an *increase* in ozone formation, particularly if that approval was based on an incomplete assessment of the E15's potential effect on ozone formation. Unfortunately, that is precisely what EPA proposes to do.

Ozone forms when VOCs and NOx mix in the atmosphere in the presence of sunlight. Ozone is particularly dangerous during summer months, when sunlight is more abundant (therefore allowing more ozone formation) and when hotter temperatures can worsen the incidence and severity of diseases that are aggravated by ozone pollution, such as asthma, emphysema, and chronic obstructive pulmonary disease. Violations of the National Ambient Air Quality Standard (NAAQS) trigger requirements for reducing the emissions of these precursor pollutants through deployment of emissions control strategies and the use of pollution offsets in the affected areas.

Adding ethanol to gasoline affects the emissions of both VOCs and NOx. The VOC impact is complicated. E10 is more volatile than straight gasoline (E0), and the additional volatility increases the evaporative emissions of VOCs. E15 is slightly less volatile than E10, so a switch from E10 to E15 could result in a very slight reduction in VOC release. The net result from a shift from E10 to E15 is likely either a wash or a slight decrease in VOC emissions.

The effect that different gasoline-ethanol blends have on NOx formation is less complicated. As the proportion of ethanol blended into gasoline increases, the oxygen content of the fuel also increases. In older vehicles (pre-2007) and newer vehicles that have not been adequately maintained, higher oxygen levels typically result in hotter combustion temperatures, which in turn typically results in higher NOx formation.

These general conclusions with respect to VOCs and NOx—*i.e.*, that a shift from E10 to E15 would likely result in the same or slightly lower evaporative emissions level of VOC and slightly higher combustion emissions level of NOx—are supported by the studies reviewed by EPA in the Proposed Rule.[65] In particular, EPA notes that statistical models for the EPAct/V2/E-89 study (2010) "estimate approximately 2% higher NOx" emissions from E15 as compared to E10—a result that is "meaningful despite being small."[66]

Modern light duty engines, especially those that have been built since 2007, have computerized fuel injection systems that work with a three-way catalyst to limit the release of NOx from the tailpipe. Older cars that do not have this emissions control technology—as well as newer cars in which the emissions controls may have degraded—are less effective at capturing the additional NOx that is created when they run on E15. (The current fleet is characterized by a mix of these vehicles and by the miles they are driven.)

The potential additional NOx emissions are important, because in most parts of the country, ozone formation is more sensitive to changes in NOx emissions than it is to changes in VOC emissions. According to a modeling study that EPA conducted in 2017,

[65] *See* 84 Fed. Reg. at 10599-600 (evaporative emissions) and 10598-599 (exhaust emissions).
[66] *Id.* at 10598/3.

> The model results suggest that a much larger area of the country would experience ozone reductions with NOx emissions reductions compared to an equivalent percentage reduction in anthropogenic VOC. Further, the ozone improvements from NOx emissions reductions tend to be larger in magnitude than those shown for VOC emissions reductions.[67]

The EPA study finds that in most cities, the impact of NOx reductions on ozone formation is 1.5 – 5 times greater than the impact of comparable VOC reductions. In nonurban areas, EPA found NOx reductions are over 10 times more impactful than VOC reductions.[68]

VOC reductions remain important to public health and the environment, and we should continue to require efforts to drive down VOC emissions. When it comes to determining the net impact that increased use of E15 will have on ozone formation, however, the potential for increased NOx emissions are the more important factor.

Although the emissions increases due to introduction of E15 may be relatively modest, several areas of the country experience ozone readings that are just below or just above the level of violation for the ozone NAAQS:

CSA/CBSA Name	2015-17 Design Value (ppm)
Phoenix-Mesa-Scottsdale, AZ	0.076
Chico, CA	0.076
Seattle-Tacoma, WA	0.076
Fort Collins, CO	0.075
Atlanta--Athens-Clarke County--Sandy Springs, GA	0.075
Washington-Baltimore-Arlington, DC-MD-VA-WV-PA	0.075
San Antonio-New Braunfels, TX	0.074
Grand Rapids-Wyoming-Muskegon, MI	0.074
Las Vegas-Henderson, NV-AZ	0.074
Cleveland-Akron-Canton, OH	0.074
Manitowoc, WI	0.074
Boston-Worcester-Providence, MA-RI-NH-CT	0.073
South Bend-Elkhart-Mishawaka, IN-MI	0.073
Payson, AZ	0.073
Detroit-Warren-Ann Arbor, MI	0.073
Cincinnati-Wilmington-Maysville, OH-KY-IN	0.073
Milwaukee-Racine-Waukesha, WI	0.073
Yuma, AZ	0.072
San Luis Obispo-Paso Robles-Arroyo Grande, CA	0.072
El Paso-Las Cruces, TX-NM	0.072
St. Louis-St. Charles-Farmington, MO-IL	0.072
Portland-Vancouver-Salem, OR-WA	0.072
Columbus-Marion-Zanesville, OH	0.071

[67] EPA Office of Air Quality Planning and Standards, Air Quality Modeling Group, *Supplemental Information for Ozone Advance Areas Based On Pre-Existing National Modeling Analyses* (May 2017) (https://www.epa.gov/sites/production/files/2017-05/documents/national_modeling.advance.may_2017.pdf).
[68] *Id.*

Louisville/Jefferson County--Elizabethtown--Madison, KY-IN	0.071
Springfield-Greenfield Town, MA	0.071
Pittsburgh-New Castle-Weirton, PA-OH-WV	0.070
Harrisburg-York-Lebanon, PA	0.070
Baton Rouge, LA	0.070
Reno-Carson City-Fernley, NV	0.070
Dayton-Springfield-Sidney, OH	0.070
Buffalo-Cheektowaga, NY	0.070
Charlotte-Concord, NC-SC	0.070
Lancaster, PA	0.070
Boise City-Mountain Home-Ontario, ID-OR	0.070
Indianapolis-Carmel-Muncie, IN	0.070

Excerpt of 2015-17 Ozone Design Values for areas whose pollution levels are near the 2008 and 2015 ozone standards of 0.075 and 0.070 ppm. Modest increases in emissions could prevent some areas currently out of attainment from reaching it or push some areas that just meet the standard back above it.

EPA data and analysis indicate that small incremental increases in summer ozone due to increased NOx formation from the introduction of E15 in the summer might be enough to push or keep these areas over the limit, triggering increased adverse health impacts and additional control requirements. By failing to address this possibility in the Proposed Rule, the Agency has failed to draw a "rational connection between the facts found and the choice made."[69] Because EPA "entirely failed to consider an important aspect of the problem," its proposal to allow the sale and use of E15 during the high ozone season is unreasonable.[70]

d. EPA unreasonably fails to adequately address canister breakthrough problems and resultant air quality problems caused by E15 use at 10.0 psi RVP.

Ethanol fuel blends at 10.0 psi RVP were found to cause canister emissions breakthrough problems in Tier 2 vehicles that were tested during the high ozone season prior to EPA's issuance of the partial E15 waivers in 2010 and 2011.[71] As EPA explained at the time,

> As the volatility of the fuel was increased, the number of motor vehicles which experienced canister emissions breakthrough also increased, with seven of eight Tier 2 motor vehicles experiencing canister breakthrough at 10.0 psi RVP. These elevated diurnal emissions are not unexpected since the increased volatility of 10.0 psi versus 9.0 psi fuel results in roughly a 25% increase in evaporative vapor generation that must be captured by the canister beyond what has been required of manufacturers in motor vehicle certification. Almost any canister breakthrough would be enough to cause Tier 2 motor vehicles to exceed their evaporative emissions standard.[72]

EPA does not point to any new underlying data on the incidence of canister breakthrough problems that would justify a change from its 2010-2011 decisions to restrict the use of E15 during the high ozone season in order to protect air quality.

Overall, EPA's proposed reinterpretation of CAA §211(h)(4) is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law" because the Agency has not identified a reasonable basis for reinterpreting the statute (or revising its 2010-2011 E15 regulations), it fails to draw rational connections between facts and

[69] *State Farm*, 463 U.S. at 43.
[70] *Id*.
[71] 76 Fed. Reg. at 4675/2; 75 Fed. Reg. at 68117/1.
[72] 75 Fed. Reg. at 68117/1.

decisions in the proposal, and its proposal "fails to consider"[73] important air quality impacts that could result from the rule.

B. EPA has not demonstrated that E15 is "substantially similar" to E10, nor has it demonstrated that E15 will not cause or contribute to the failure of any device or system used to control vehicle emissions.

Pursuant to CAA §211(f)(1), a fuel or fuel additive cannot be sold for use in light duty vehicles unless it is "substantially similar" (or "sub sim") to a fuel or fuel additive that has been used in the certification of light duty vehicles. Under CAA §211(f)(4), fuels and fuel additives that are not sub sim to a vehicle certification fuel can get a waiver if EPA determines that the fuel or fuel additive will not cause or contribute to the failure of any device or system used to control vehicle emissions. EPA has previously based sub sim determinations on an assessment of the effect of the fuel or fuel additive on exhaust and evaporative emissions, materials compatibility, and driveability.[74]

In order to allow year-round sale of E15, EPA must show either that E15 is substantially similar to a fuel used by EPA to certify light duty vehicles, or that the use of E15 will not cause or contribute to a failure of any emission control device or system—even during the high ozone season. As discussed below, EPA has not made either showing.

The Proposed Rule describes two different approaches that EPA might use to demonstrate that E15 is sub sim to E10. First, the Agency proposes to determine that E15 with an RVP of 10 psi is sub sim to the certification fuel for Tier 3 vehicles—*i.e.*, E10 with an RVP of 9 psi. Alternatively, EPA would determine that E15 with an RVP of 9.0 psi is sub sim to the Tier 3 vehicle certification fuel.[75]

The proposed approaches are unlawful for two reasons: first, because E15's similarity to certification fuel is legally irrelevant for the purposes of this proposal, and second, because EPA fails to provide a reasonable basis for or a reasoned explanation of it sub sim determination.

1. E15's similarity to certification fuel is legally irrelevant for the purposes of this Proposed Rule because the 1 psi waiver cannot be applied to E15.

As an initial matter, EPA's use of a sub sim analysis is entirely misplaced. The proposal's sub sim determination hinges on EPA's flawed interpretation of CAA §211(h)(4). Whether E15 is substantially similar to E10 certification fuel only matters here because EPA is prepared to misinterpret the term "containing gasoline and 10 percent denatured anhydrous ethanol" to mean "containing gasoline and *at least* 10 percent denatured anhydrous ethanol." If the term "containing" is given its plain meaning (as discussed in Part II.A.2, above), EPA cannot apply the 1 psi waiver to E15. If the 1 psi waiver cannot be used for E15 (which it cannot), then E15 cannot meet the 9 psi requirement established in CAA §211(h)(1) and it does not matter if EPA determines that E15 is sub sim to any vehicle certification fuel.

2. EPA fails to identify a reasonable basis for making its sub sim determination.

Assuming *arguendo* that CAA §211(h)(4) can be read as authorizing the application of the 1 psi waiver to E15 and, as a result, there is a legitimate legal basis for EPA to conduct a sub sim determination for E15, the Agency's interpretation still fails. To pass muster, EPA must draw a "rational connection between the facts found and the choice made," and it must show that its "decision was based on a consideration of the relevant factors" rather than "on factors which Congress has not intended it to consider."[76] EPA must not "entirely fail[] to consider an important aspect of the problem, offer[] an explanation for its decision that runs counter to the evidence before

[73] *State Farm*, 463 U.S. at 43.
[74] 84 Fed. Reg. at 10597-598.
[75] *Id*. at 10596/1-2.
[76] *State Farm*, 463 U.S. at 43.

the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise."[77]

EPA has not provided a reasonable basis for abandoning its 2010-2011 rationale for creating partial waivers. It cites "changed circumstances,"[78] but as discussed above in Part II.A.3.a, circumstances have not changed in any way that would justify the Agency's proposed statutory reinterpretation. The extra-legal, market-focused case that EPA offers in favor of allowing the sale and use of E15 during the high ozone season does not differ significantly from the case that was made in 2010. EPA thus fails to sufficiently justify its change in position.

3. EPA does not provide reasoned explanation for its proposed determination that E15 is sub sim to E10.

Not only does EPA fail to provide adequate justification for making a sub sim determination, it likewise fails to justify the sub sim determination it reached. A fuel that can cause a different set of problems than those caused by E10 when used during the high ozone season and is incompatible throughout the year with older, small, and off-road engines (as discussed below) cannot be considered substantially similar to E10. In light of the different emissions impacts discussed below, it would be unreasonable for EPA to make a sub sim determination.

EPA acknowledges both that "[the use of] E15 compared with Tier 3 E10 certification test fuel would have small emissions changes in Tier 3 vehicles"[79] and that its understanding of those changes is incomplete.[80] The Agency contends, however, that because small emissions increases are "within the scope of what we have determined to be sub sim in our prior sub sim interpretative rulemakings," the different emission profiles of E15 and E10 do not render the fuels substantially dissimilar.[81]

EPA's sub sim determination is entirely unreasonable. It dismisses potential increases in air pollution associated with year-round sale and use of E15 despite a surfeit of troubling emissions data in the proposal and elsewhere. Despite EPA's characterization, these increases in air pollutions render the fuels sufficiently dissimilar to prevent any sub sim determination.

EPA acknowledges that PM emissions from E15 may increase as much as 10% as compared to E10,[82] along with higher NOx[83] and NMOG emissions.[84] As discussed above (Part II.A.3.c) and also as acknowledged in EPA's past triennial reviews,[85] increased use of E15 is likely to cause a small but meaningful increase in NOx emissions, which could significantly impact the ozone attainment status of some parts of the United States. EPA does not address this possibility in the proposal and ignores data pointing to higher emissions of E15.

EPA's "fail[ure] to consider an important aspect of the problem"—i.e., an examination of the air quality impacts of a rule that would be promulgated under the Clean Air Act, particularly E15 combustion's impact on ozone levels —renders EPA's proposed sub sim determination unreasonable.[86]

---

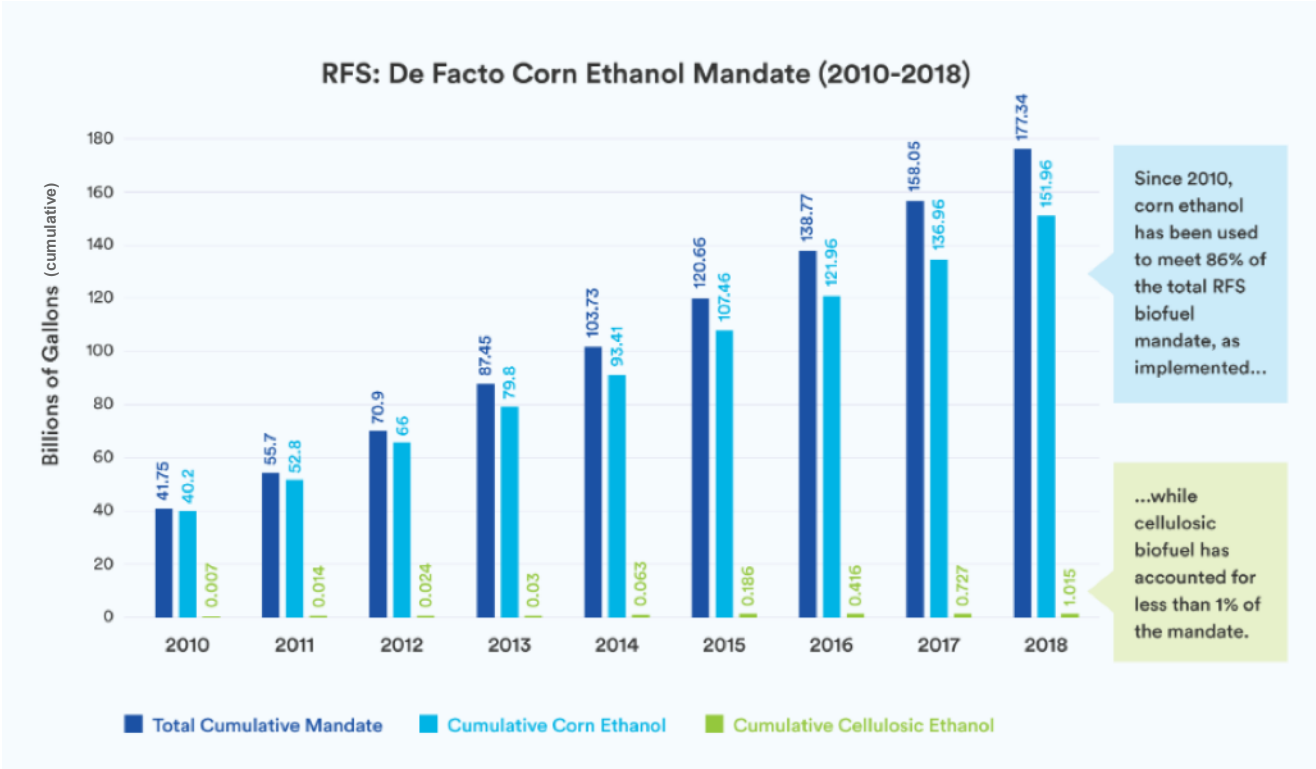
[77] *Id*.
[78] 84 Fed. Reg. at 10591/1.
[79] *Id*. at 10601/2.
[80] *See, e.g.*, 84 Fed. Reg. at 10599/1 (with respect to exhaust emissions from the combustion of E15, "there are limited data on Tier 3 vehicles").
[81] *Id*. at 10599/2.
[82] *Id.* at 10598/3-10599/1.
[83] *Id.* at 10599/1.
[84] *Id.* at 10598/2-3.
[85] EPA, *Biofuels and the Environment: Second Triennial Report to Congress* (hereafter "EPA Second Triennial Report") (2018) at 55 (https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=536328&Lab=IO).
[86] *State Farm*, 463 U.S. at 43.

III. More Ethanol Consumption Means More Corn Ethanol Production, Leading to Increased Corn Ethanol-Related Damage to Public Health and the Environment

By proposing to expand the sale and use of E15, EPA is authorizing greater consumption of ethanol. As countless studies have shown, this in turn will lead to increased production of corn ethanol, which will have severe environmental and public health impacts.[87] Yet despite the documented harms stemming from expanded corn production – including by EPA itself – the Proposed Rule is notably silent on these issues. EPA's failure to even acknowledge, let alone address, these deleterious effects renders the Proposed Rule unreasonable.

A. An increase in ethanol consumption will lead to an increase in corn ethanol production.

The history of the Renewable Fuel Standard (RFS) and the realities of current and foreseeable biofuel production mean that any E15-driven increase in ethanol consumption will drive more corn ethanol production.



Cumulative Volumes of RFS-Compliant Biofuels, Corn Ethanol, and Cellulosic Biofuel Since 2010

Corn ethanol and cellulosic biofuel have accounted for 86% and 0.6%, respectively, of the total cumulative RFS volume obligations since EPA implemented the expanded version of the RFS (as adjusted by EISA) in 2010.[88] In 2018, corn ethanol accounted for 95% of the total volume of ethanol required to meet RFS mandates, with sugarcane ethanol, cellulosic liquid ethanol, and other advanced ethanol providing the remaining 5%.[89] EISA assumed cellulosic biofuel (derived from agricultural residues and perennial grasses) would be a significant

[87] The environmental damage associated with corn ethanol production includes negative impacts to federally listed species and Endangered Species Act implications. *See* comment letter submitted by Sierra Club to this docket.
[88] 75 Fed. Reg. 14670, 14718/1 (March 26, 2010); 75 Fed. Reg. 76790, 76793 (December 9, 2010); 77 Fed. Reg. 1320, 1323 (January 9, 2012); 78 Fed. Reg. 49794, 49798 (August 15, 2013); 80 Fed. Reg. 77420, 77422 (December 14, 2015); 81 Fed. Reg. at 89747; 82 Fed. Reg. 58486, 58487-88 (December 12, 2017).
[89] Specifically, EPA set 2018 Renewable Volume Obligations (RVOs) assuming 100 million gallons of sugarcane ethanol, 14 million gallons of cellulosic liquid ethanol, and 20 million gallons of other advanced ethanol. 82 Fed. Reg. 58503/3, 58512/3, 58513/1 (December 12, 2017).

source of ethanol, but production levels have remained quite low—so low, in fact, that EPA had to reduce the 2019 cellulosic mandate by 94% as compared to the cellulosic biofuels consumption level that the statute targeted for the year.[90] At the same time, the volume of imported sugarcane ethanol from Brazil has shrunk from 404 million gallons in 2012 to just 77 million gallons in 2017.[91]

As a result of these production trends, the RFS has become a de facto corn ethanol mandate. Thus, any new demand for ethanol associated with a policy change that allows year-round sales and use of E15 will be met, by and large, by increased corn ethanol production.[92]

B. Corn ethanol production drives significant damage to the environment.

1. RFS-driven biofuel demand is causing environmentally-damaging land use change in the United States and abroad.

If EPA's proposal to allow the sale of E15 year-round results in additional ethanol consumption, the policy will exacerbate the environmentally-damaging land use change that corn ethanol production is causing in the United States and abroad. A recent study by Tyler Lark *et al*. (2019), which combines U.S. Department of Agriculture (USDA) National Resources Inventory county-resolution data to estimate the amount of land change due to the RFS with satellite imagery to more precisely identify where that conversion might be occurring shows that between 2008-2016:

- "[C]orn planted on existing cropland… [increased] by an average of 6.9 million acres, or 8.2% more than would have occurred without the RFS" to meet increased demand for corn;
- "[T]otal cropland area… [increased] 2.8 million acres, which accounts for 43% of the total cropland area change observed during the period." Specifically, the researchers estimated that at least 1.6 million acres of new land such as grasslands or pasture were converted to cropland for the purpose of growing renewable biomass for the RFS, in addition to at least 1.2 million acres that stayed in crop production instead of returning to conservation programs or pasture as they would have in the absence of the mandate.[93]

Lark *et al*. (2019) builds on earlier research from Wright *et al.* (2017) that found that from 2008 to 2012, "nearly 4.2 million acres of arable non-cropland [was] converted to crops within 100 miles of [ethanol] refinery locations, including 3.6 million acres of converted grassland."[94] Previous research from Lark *et al.* (2015) also found that, during this same time period (2008-2012), an estimated 7.34 million acres of land that had been uncultivated since

---

[90] CAA §211(o)(2)(B)(i)(III) (setting "the applicable volume of cellulosic biofuel" for 2019 at 7 billion gallons); 83 Fed. Reg. 63704, 63705 (December 11, 2018) (adjusting the 2019 cellulosic biofuel mandate downward to 418 million gallons).

[91] U.S. Energy Information Administration (EIA), U.S. Imports from Brazil of Fuel Ethanol (March 29, 2019) (https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MFEIM_NUS-NBR_1&f=A); EIA, U.S. Exported a Record Amount of Fuel Ethanol in 2017 (April 27, 2018) (https://www.eia.gov/todayinenergy/detail.php?id=35972).

[92] The corn ethanol industry believes that increased use of E15 will lead to increased corn ethanol production. *See* Jennifer Carrico, "Fueling Corn Demand?", *SeedWorld* (November 15, 2018) (https://seedworld.com/fueling-corn-demand/) (quoting Monte Shaw of the Iowa Renewable Fuels Association that, "Over time, E15 could add nearly 7 billion gallons of new ethanol demand, which would use 2 billion bushels of additional corn per year," and calculating that "this would about be the equivalent of needing to add another Illinois-sized corn crop each year.").

[93] Tyler J. Lark, *et al.*, *Impacts of the Renewable Fuel Standard on America's Land and Water Resources,* presented at the AAAS Annual Meeting at 3, 7 (2019) (http://www.gibbs-lab.com/wp-content/uploads/2019/03/RFS_synthesis_report_3.7.2019_embargoed.pdf).

[94] Christopher K. Wright, *et al.* 2017. Recent Grassland Losses Are Concentrated Around U.S. Ethanol Refineries. *Environmental Research Letters* 12(4): 1-16. DOI: 10.1088/1748-9326/aa6446 (https://iopscience.iop.org/article/10.1088/1748-9326/aa6446/pdf).

at least 2001, including 1.6 million acres of long-term unimproved grasslands, moved into crop production, with corn acres accounting for just over half (3.8 million acres) of this conversion.[95]

EPA reviewed several of these studies in 2018 and rightfully found linkages between biofuel production and domestic and international land use change. EPA's report, *Biofuels and the Environment: Second Triennial Report to Congress*, notes that corn acreage in the United States has increased at the expense of other crops and/or natural landscapes, "with strong indications that some of this increase is a consequence of increased biofuel production."[96] The RFS is likely driving harmful land use change practices in other countries as well. "Reports suggest that demands for biofuel feedstocks have led to market-mediated land use impacts (both direct and indirect land use changes) in the past decade," writes EPA. "Cropland expansion and natural habitat loss (including forests) have been observed internationally, and it is likely that increased biofuel production has contributed to these land use changes."[97]

2. Ethanol production and use emits high levels of greenhouse gases.

Though Congress mandated the use of biofuel in fuel as a way to reduce GHG emissions associated with the use of fossil fuels, EPA's own data has found that the incremental additional corn ethanol produced in response to the 2007 expansion of the Renewable Fuel Standard (RFS) has higher lifecycle greenhouse gas (GHG) emissions than gasoline. The National Research Council (NRC) analyzed EPA's lifecycle GHG emissions data in 2011 and reported that:

> EPA found corn-grain ethanol, regardless of whether the coproduct is sold wet or dry, to have life-cycle GHG emissions higher than gasoline in 2012 or 2017 unless it is produced in a biorefinery that uses biomass as a heat source.

NRC further found that:

> Thus, according to EPA's own estimates, corn-grain ethanol produced in 2011, which is almost exclusively made in biorefineries using natural gas as a heat source, is a higher emitter of GHG than gasoline.[98]

Indeed, the only way that EPA could find a scenario under which incremental additional corn ethanol would achieve a 20% net reduction in life-cycle GHG emissions was to start its modeling analysis in 2022, which allowed the Agency to (a) ignore 60% of the land use change emissions that should have been attributed to expanding corn ethanol production; and (b) assume a greater volume of ethanol would be produced in biorefineries that burn biomass to generate process heat.[99]

The ethanol industry argues that EPA's analysis is flawed and that corn ethanol's lifecycle GHG emissions are significantly less than those of gasoline. But to reach this conclusion, industry relies on studies that dramatically undercount emissions from RFS-driven land use changes—much as EPA did in 2010. Many of the studies

---

[95] Lark, *et al.* 2015. Cropland Expansion Outpaces Agricultural and Biofuel Policies in the United States. *Environmental Research Letters* 10(4): 1-11. DOI: 10.1088/1748-9326/10/4/044003 (https://iopscience.iop.org/article/10.1088/1748-9326/10/4/044003/pdf).
[96] EPA Second Triennial Report at 110.
[97] *Id*. at 108-109.
[98] Lester Lave, *et al*. 2011. *Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy* 221 (Report by the National Research Council Committee on Economic and Environmental Impacts of Increasing Biofuels Production) (internal citations omitted) (http://www.nap.edu/openbook.php?record_id=13105).
[99] *See* CATF, *Corn Ethanol GHG Emissions Under Various RFS Implementation Scenarios* (2013) (http://www.catf.us/resources/whitepapers/files/20130405-CATF%20White%20Paper-Corn%20GHG%20Emissions%20Under%20Various%20RFS%20Scenarios.pdf).

(including reports released in 2017 and 2019 by USDA[100]) rely extensively on an industry-funded, non-peer reviewed 2014 staff report from Iowa State University that uses questionable data and makes several important methodological errors.[101, 102] It also ignores the fact that the RFS has increased the supply of motor vehicle fuel in the United States by requiring refiners to add billions of gallons of biofuel into the US fuel supply each year, and this increased supply drives down the price of fuel. The lower prices incentivize drivers to buy more fuel than they otherwise would and to emit more GHG emissions as a result.[103] This is known as the rebound effect.

Both EPA and the ethanol industry also overestimated the extent to which the mandated biofuels actually displace petroleum fuels, a key factor in determining the RFS's climate impact. As explained by the University of Minnesota's Jason Hill *et al.*, "increasing the supply of low-carbon fuel only partially displaces fossil fuel. This results in lower GHG emissions only when the savings from the reduction in carbon intensity outweighs the increase in GHG emissions from additional fuel use."[104]

Hill *et al*. generously assume that every 100 gallons of biofuel mandated by the RFS displace 50 energy-equivalent gallons of gasoline or diesel. They also assume (again, generously) that all of the biofuels used to comply with the RFS—even corn ethanol—actually achieve the GHG reduction targets set by Congress in 2007. The resulting analysis indicates that the RFS is not a useful tool for mitigating climate change:

> Taking this [50%] fuel market rebound effect into account and assuming the biofuels in RFS2 achieve their targeted GHG emissions reductions in all years, RFS2 actually leads to a net increase in GHG emissions of 22 million metric tons in 2022, and of 431 million metric tons cumulatively from 2006 to 2022. In sum, this mandate for the production of less GHG intense fuels actually increases net GHG emissions to the atmosphere relative to no action due to the low amounts of gasoline being displaced. In other words, RFS2 increases GHG emissions instead of reducing them when individual fuel GHG reduction targets are met.[105]

Notably, the bulk of the additional GHG emissions identified by Hill *et al*. is attributable to corn ethanol, which has accounted for 86% of the biofuel used to comply with the RFS since 2010. In a subsequent paper, Hill and

---

[100] Flugge, M., *et al*., *A Life-Cycle Analysis of the Greenhouse Gas Emissions of Corn-Based Ethanol*, report prepared by ICF under USDA Contract No. AG-3142-D-16-0243 (January 12, 2017) (hereafter "ICF-USDA 2017") (https://www.usda.gov/oce/climate_change/mitigation_technologies/USDAEthanolReport_20170107.pdf); Jan Lewandrowski, *et al.* 2019. The Greenhouse Gas Benefits of Corn Ethanol – Assessing Recent Evidence. *Biofuels*. DOI: 10.1080/17597269.2018.1546488 (study uses similar approach and has similar flaws to the ICF-USDA 2017 report) (https://www.tandfonline.com/doi/full/10.1080/17597269.2018.1546488).

[101] *See, e.g.,* B.A. Babcock, & Z. Iqbal, *Using Recent Land Use Changes to Validate Land Use Change Models*, Center for Agricultural and Rural Development, Iowa State University (2014) (hereafter "Babcock & Iqbal 2014") (study uses unreliable FOAstat data on planted area and land abandonment, and makes selective use of Brazilian land use data to support the paper's crop intensification narrative while ignoring period extensification was more prevalent; study also makes unsupported assumptions about the drivers behind decisions to double-crop and about the relationship between regional and global agriculture markets) (http://www.card.iastate.edu/publications/dbs/pdffiles/14sr109.pdf).

[102] For a full analysis of ICF-USDA 2017 and its problematic reliance on Babcock & Iqbal 2014, *see* Chris Malins, *Navigating the Maize: A Critical Review of the Report "A Life-Cycle Analysis of the Greenhouse Gas Emissions of Corn-Based Ethanol"* (2017) (https://www.catf.us/wp-content/uploads/2018/10/CATF_Pub_NavigatingTheMaize.pdf).

[103] Jason Hill, *et al*. 2016. Climate Consequences of Low-carbon Fuels: The United States Renewable Fuel Standard. *Energy Policy* 97: 351-353. DOI: 10.1016/j.enpol.2016.07.035 (https://reader.elsevier.com/reader/sd/pii/S0301421516303962?token=46F4FF0116B871A14795AE145647190B1CDFF3E9FEF44DB0EF8EC63044DB1A3208E2458EFBD765DE15174FEBAF4ACB26).

[104] *Id*.

[105] *Id*.

other researchers estimate that lifecycle GHG emissions from total US corn production results in climate damages of US$4.9 billion (range: US$1.5–7.5 billion), or US$15/tonne of corn.[106]

The recent study by Lark *et al*. (2019), described above, further demonstrates the extent to which EPA missed the mark with its 2010 assessment that the lifecycle GHG emissions from corn ethanol are 21% lower than those from the baseline petroleum fuel[107] because the Agency grossly underestimated domestic land use change resulting from the implementation of RFS2. In particular, EPA overlooked the tremendous emissions of GHG resulting from the conversion of uncultivated land to cropland to grow corn for ethanol:

> Cropland extensification can cause substantial emissions of carbon by degrading ecosystem carbon stocks embodied in plants and soils. We estimate that total committed carbon emissions from cropland expansion associated with the RFS2 from 2008 to 2016 were 116 MMT CO2e, or approximately 15 MMT CO2e yr-1 … At the same time, foregone sequestration due to reduced rates of cropland abandonment because of the RFS2 was 103 MMT CO2e assuming the land would have been enrolled in the CRP and sequestering carbon for 15 years. Together, the change in cropland area due to the RFS caused a total net flux of 219 MMT CO2e (95% CI: 205 - 239 MMT CO2e) to the atmosphere, or 27.1 MMT CO2e yr-1. These land use change emissions are in addition to any management-related emissions associated with the increased agricultural activity on the additional cropland extent.[108]

In addition to increasing greenhouse gases from land conversion, increased production of corn ethanol will lead to increased use of nitrogen fertilizer, which in turn increases emissions of nitrous oxide (N2O), a potent greenhouse gas that has a warming potential that eclipses that of CO_2 by nearly 300 times.[109] N_2O emissions occur not from physical land-use change, but rather from use of nitrogen fertilizer on newly converted cropland.[110] Native grasslands naturally recycle soil nutrients without requiring additional nitrogen inputs. By contrast, biofuel row crops require fertilizer to replenish soil nutrients that are removed during harvest, and to maintain productive yields. However, the crop only takes up around 40 to 50% of the nitrogen fertilizer applied to soil.[111] The remaining 50 to 60% of nitrogen fertilizer remains in the soil, where it either runs off with surface water or leaches into ground water, or is converted by soil bacteria into N_2O, which is then emitted into the

---

[106] Jason Hill, *et al*. 2019. "Air-quality-related health damages of maize," *Nature Sustainability* DOI: 10.1038/s41893-019-0261-y (https://www.nature.com/articles/s41893-019-0261-y).

[107] 75 Fed. Reg. 14670, 14786/3 (March 26, 2010).

[108] Lark, *et al*. (2019) at 7.

[109] Susan Solomon *et al*., *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (2007) (https://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4_wg1_full_report.pdf).

[110] Paul J. Crutzen *et al*. 2007. N2O release from agro-biofuel production negates global warming reduction by replacing fossil fuels*, Atmospheric Chemistry and Physics Discussions* 7:11191, 11191-11205 (2007), (https://www.atmos-chem-phys.net/8/389/2008/acp-8-389-2008.pdf).

[111] United Nations Environment Programme, *Drawing Down N2O to Protect Climate and the Ozone Layer: A UNEP Synthesis Report*, UNEP) 20 (https://wedocs.unep.org/bitstream/handle/20.500.11822/8489/- Drawing%20down%20N2O%20to%20protect%20climate%20and%20the%20ozone%20layer_%20a%20UNEP%20synthesis%20report- 2013UNEPN2Oreport.pdf?amp%3BisAllowed=&sequence=3); *see also* Kenneth G. Cassman *et al.* 2002. Agroecosystems, Nitrogen use, Efficiency, and Nitrogen Management, *Ambio*, 31: 132, 133 (http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1356&context=agronomyfacpub); Vaclav Smil. 1999. Nitrogen in Crop Production: An Account of Global lows, *Global Biogeochemical Cycles* 13:647, 653 (http://vaclavsmil.com/uploads/smil- article- global- biogeochemical- cycles.1999.pdf); J ames N. Galloway & Ellis B. Cowling. 2002. Reactive nitrogen and the world: 200 years of change, *Ambio* 31:64, 65- 66 (https://www.researchgate.net/profile/James_Galloway/publication/11297112_Reactive_Nitrogen_and_The_World_200_Years_of_Change/links/00b7d5304e858afb66000000/Reactive-Nitrogen-and-The-World-200-Years-of-Change.pdf).

atmosphere.[112] N_2O gas may also be emitted indirectly when excess nitrogen from fertilizer is lost to the environment via run-off or leaching, and is later converted to N_2O. And as discussed in more detail below, nitrogen from fertilizer not only impacts climate, but it also harms the environment. For example, run-off fertilizer in the form nitrate (NO_3^-) pollutes water supplies and leads to eutrophication, the process by which excessive nutrients in a body of water cause dense growth of plant life and death of animal life due to a lack of oxygen.

On average, the U.S. application rate of 140 pounds of nitrogen fertilizer per acre of corn[113] releases 1.3 pounds of N_2O per acre.[114] To further exacerbate the problem, the N_2O emission response to nitrogen input in agriculture is non-linear: higher rates of nitrogen fertilizer application on converted croplands will produce disproportionately large greenhouse gas impacts.[115]

Recognizing that land conversion to grow renewable biomass releases tremendous amounts of GHG emissions that could offset the emission reductions gained by blending fossil fuel with biofuels, Congress included in EISA provisions to protect against widespread land conversion. Specifically, EISA required that land used to produce RFS biofuels feedstocks must have been in agriculture production prior to December 2007. The provision was intended to ensure "that growing renewable fuel sources would not cause the release of harmful greenhouse gases into the atmosphere and undercut the very benefits the program sought to achieve."[116] Yet despite this clear statutory requirement, EPA adopted a scheme – known as "aggregate compliance" - that undermines Congress's intentions by failing to verify that biofuels feedstocks used to comply with the RFS are actually grown on previously cultivated cropland.[117] Instead, EPA analyzes only whether total land in agriculture production remains at or below 402 million acres, the baseline from enactment of EISA in 2007. This ignores the fact that much previously farmed land is lost to development while millions of acres of native grasslands have been converted to agriculture production over the past decade. EPA itself reported that 4-7.8 million additional acres have become actively managed cropland since passage of EISA, with corn used for ethanol one of the main drivers of land conversion.[118]

3. Corn ethanol production is linked to food and commodity price impacts.

Increased demand for corn ethanol and substitute crops has also been linked to food security risks due to volatile commodity prices.[119] Particularly during years of supply shocks such as the 2012 drought, commodity and food

---

[112] If the soil contains ample oxygen content, N_2O is generated as a byproduct when soil bacteria transform inorganic ammonium to nitrate (*nitrification*). If oxygen levels in the soil are too low, soil bacteria convert nitrate to dinitrogen (N_2), releasing N_2O gas in the process (*denitrification*).

[113] Soy does not require as much nitrogen fertilizer as corn because soy is a legume that is able to biologically fix most of its needed nitrogen.

[114] Iurri Shcherbak, *et al*. 2014. Global metaanalysis of the nonlinear response of soil nitrous oxide (N_2O) emissions to fertilizer nitrogen, *Proc. Nat'l Acad. Sci*. 111:9199, 9202 (http://www.pnas.org/content/pnas/111/25/9199.full.pdf).

[115] J.P. Hoben *et al*. 2011. Nonlinear nitrous oxide (N_2O) response to nitrogen fertilizer in on-farm corn crops of the US Midwest, 17 *Global Change Biology* 1140, 1140 (https://pdfs.semanticscholar.org/22c0/ce0fa1d21a5ddb6dac284d78bfe2a550a062.pdf?_ga=2.132502793.661887377.1539277952-2076078948.1537993308); Dong-Gill Kim, *et al*. 2013. Linear and nonlinear dependency of direct nitrous oxide emissions on fertilizer nitrogen input: A meta-analysis, *Agric., Ecosystems & Env't* 168: 53 (https://www.sciencedirect.com/science/article/pii/S0167880912000837).

[116] Earthjustice and Clean Air Task Force, *Petition to US EPA to Amend its Aggregate Compliance Approach to the Definition of "Renewable Biomass" Under the Renewable Fuel Standard in Order to Prevent the Conversion of Native Grassland* at 5 (October 30, 2018) (https://earthjustice.org/sites/default/files/files/AggregateCompliancePetition.pdf).

[117] *Id*.

[118] EPA Second Triennial Report at 37.

[119] International Food Policy Research Institute, *Biofuels and Food Security: Balancing Needs for Food, Feed, and Fuel* (2008) (http://www.ifpri.org/publication/biofuels-and-food-security); Chris Malins, *Thought for Food - A Review of the Interaction Between Biofuel Consumption and Food Markets* (2017) (https://www.transportenvironment.org/sites/te/files/publications/Cerulogy_Thought-for-food_September2017.pdf); T.

prices rise because a significant portion – nearly 40 percent - of the US corn crop[120] is used for ethanol production. As the Government Accountability Office (GAO) reported, "Using biofuels, particularly in high-level blends as a substitute for oil in transportation fuels, is subject to a number of limitations," including increased livestock feed and human food prices.[121] The recent study from Lark *et al.* (2019) estimated that on average from 2006 to 2010, the price of corn in the US was 31% higher than it would have been without the expansion of the RFS in 2007.[122] Although in 2007 Congress envisioned that an increasing portion of biofuels used to comply with the RFS would be made with non-food-based crops, corn ethanol continues to dominate the mandate and is likely to for the foreseeable future. The E15 waiver opens the door to a possible significant increase in demand for corn and therefore corn ethanol, tightening the market and risking a return to the price spikes seen during previous expansions.

4. Corn ethanol production severely degrades water and soil quality.

Not only does increased corn ethanol production for E15 lead to an increase in land conversion and GHG emissions, it will also negatively affect water and soil quality in corn-growing regions of the United States and those downstream. As EPA itself recognizes, "water quality is adversely affected by the production of biofuel feedstocks, primarily due to the sediment, nutrients, pesticides, and pathogens directly or indirectly released during different biofuel production phases."[123]

Corn has the highest fertilizer use per acre of any biofuel feedstock, and the production of corn for ethanol requires tremendous quantities of agricultural chemicals. For each year between 2008 and 2016, it is estimated that, on average, 6.9 million acres of corn that would not have been produced absent the RFS program was grown on existing cropland, and that this production required an additional 319,000 metric tons of nitrogen (N) fertilizer per year.[124] Assuming that all of the 1.6 million acres of non-cropland converted for biofuel feedstock production to meet RFS2 demand was used to grow corn, this conversion introduced another 102,000 metric tons of N to the landscape.[125] Overall, by EPA's own calculations, each gallon of ethanol produced requires 0.33 lb. of N and 0.13 lb. of phosphorus (P).[126]

Searchinger, *et al.* 2015. "Do Biofuel Policies Seek to Cut Emissions by Cutting Food?" *Science* DOI: 10.1126/science.1261221 (https://science.sciencemag.org/content/347/6229/1420).

[120] US Department of Agriculture, *World Agricultural Supply and Demand Estimates* at 12 (April 9, 2019) (https://www.usda.gov/oce/commodity/wasde/wasde0419.pdf).

[121] US Government Accountability Office (GAO), *Biofuels: DOE Lacks a Strategic Approach to Coordinate Increasing Production with Infrastructure Development and Vehicle Needs* (June 2007) (https://www.gao.gov/assets/270/261771.html).

[122] Lark, *et al.* (2019) at 2; C.A. Carter, G.C. Rausser and A. Smith. 2017. Commodity Storage and the Market Effects of Biofuel Policies. *American Journal of Agricultural Economics* 99(4): 1027-1055 (https://doi.org/10.1093/ajae/aaw010).

[123] EPA Second Triennial Report at 65.

[124] Lark, *et al.* (2019).

[125] This figure is calculated using a U.S. average nitrogen fertilizer application rate of 140 lbs. per acre for corn. *See* USDA Nat'l Agric. Stats. Serv., *Agricultural Chemical Usage* (last updated September 28, 2018) (http://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Chemical_Use/); USDA Econ. Res. Serv., *Fertilizer Use and Price* (last updated February 21, 2018) (https://www.ers.usda.gov/data-products/fertilizer-use-and-price/fertilizer-use-and-price). EPA performed a similar calculation in its 2018 Second Triennial Report using a value of "1.28 million acres of extensification . . . due to corn." *See* EPA Second Triennial Report at 70.

[126] Based on average fertilizer application rate, average corn yield of 154 bushels/acre, and average ethanol yield of 2.7 gallons/bushel. EPA, National Center for Environmental Assessment, *Biofuels and the Environment: First Triennial Report to Congress,* Report no. EPA/600/R-10/183F (2011) (https://cfpub.epa.gov/ncea/biofuels/recordisplay.cfm?deid=235881); EPA, Office of Transportation and Air Quality, Assessment and Standards Division, *Renewable Fuel Standard Program (RFS2) Regulatory Impact Analysis*, Report no. EPA-420-R-10-006 (February 2010); *see also,* S. K. Hoekman, *et al.* 2018. Environmental Implications of Higher Ethanol Production and Use in the US: A Literature Review. Part I–Impacts on Water, Soil, and Air Quality. *Renewable and Sustainable Energy Reviews 81*: 3140-3158 (https://www.sciencedirect.com/science/article/pii/S1364032117306871).

The increased fertilizer use has been devastating to the quality of our water. According to the Agency's FY2016-17 *National Water Program Guidance*, "nitrogen and phosphorus pollution is one of the most serious and pervasive water quality problems."[127] It harms both surface and ground water. As EPA acknowledges, "demand for biofuel feedstocks increases agriculture-related nutrient loadings to surface waters."[128] Between 25-35% of fertilizer applied to crops inevitably leaches into surface water due to runoff, poor tile drainage, and sediment transport.[129] The surplus phosphorus and nitrogen, often in reactive nitrate form (NO_3^-), stimulate excessive algae and microbe growth, which exhausts oxygen in the water column and breeds toxic algal blooms, a process called eutrophication.[130] This eutrophication in turn can lead to mass aquatic life mortality and costs the nation $1.3 to $4.2 billion in damages each year.[131]

Not only does the increased use of chemical fertilization for the production of ethanol feedstock have deleterious effects on surface water, but it also degrades ground water. As EPA found in its Second Triennial Report, corn intensification between 2002 and 2022 could result in a 56-80% increase in nitrate concentrations in ground water in corn-growing areas.[132]

A vivid example of the harmful impact the expansion of ethanol production has on water quality is bottom water hypoxia in the Gulf of Mexico, a process that causes mass marine life mortality in the region every spring when the northern Gulf of Mexico dead zone swells to the size of Massachusetts.[133] In the summer of 2017, EPA recorded the largest ever dead zone at 22,720 km^2.[134] Currently, agriculture contributes 60% of total nitrogen loads to the Mississippi-Atchafalaya River Basin ("MARB"), polluting the Gulf with approximately 840,000 tons of nitrogen each year.[135] Field measurements confirm that fertilizer leached from corn crops is responsible for the

---

[127] EPA Office of Water, *FY2016-2017 National Water Program Guidance* at 15 (April 2015) (https://nepis.epa.gov/Exe/ZyPDF.cgi/P100MDWZ.PDF?Dockey=P100MDWZ.PDF).

[128] EPA Second Triennial Report at 71.

[129] Susan E. Powers. 2007. Nutrient Loads to Surface Water from Row Crop Production. *Int'l J. Life Cycle Assessment* 12(6): 399, 399-407 (https://link.springer.com/content/pdf/10.1065/lca2007.02.307.pdf); R. Dominguez-Faus, *et al.* 2009. The Water Footprint of Biofuels: A Drink or Drive Issue? *Envtl. Sci. & Tech.* 43: 3005, 3008 (https://pubs.acs.org/doi/pdf/10.1021/es802162x).

[130] EPA Office of Water, *Preventing Eutrophication: Scientific Support for Dual Nutrient Criteria* (2015) https://www.epa.gov/sites/production/files/documents/nandpfactsheet.pdf; V.H. Smith, *et al.* 1999. Eutrophication: Impacts of Excess Nutrient Inputs on Freshwater, Marine, and Terrestrial Ecosystems. *Envtl. Pollution* 100(1-3): 179, 187 (https://pdfs.semanticscholar.org/80cd/d0a042482b590b01620192193d8c13107beb.pdf?_ga=2.65952937.661887377.1539277952-2076078948.1537993308).

[131] EPA Office of Water, *A Compilation of Cost Data Associated with the Impacts and Control of Nutrient Pollution* (2015) (https://www.epa.gov/sites/production/files/2015-04/documents/nutrient-economics-report-2015.pdf); *See* Walter K. Dodds *et al.* 2009. Eutrophication of U.S. Freshwaters: Analysis of Potential Economic Damages. *Envtl. Sci. & Tech.* 43(1): 12 (https://pubs.acs.org/doi/10.1021/es801217q).

[132] EPA Second Triennial Report at 68-69. *See* M. Wu, *et al.* 2012. Simulated Impact of Future Biofuel Production on Water Quality and Water Cycle Dynamics in the Upper Mississippi River Basin. *Biomass and Bioenergy* 41: 44-56 (https://www.sciencedirect.com/science/article/pii/S0961953412000402); V. Garcia, *et al.* 2017. Examining the Impacts of Increased Corn Production on Groundwater Quality Using a Coupled Modeling System. *Science of The Total Environment* 586: 16-24 (https://www.ncbi.nlm.nih.gov/pubmed/28199875).

[133] The five-year average size of the zone is 14,024 km^2; the actual size of hypoxic zone varies temporally. *See* EPA Office of Water (2015).

[134] EPA, *Northern Gulf of Mexico Hypoxic Zone* (last visited Oct. 12, 2018) (https://www.epa.gov/ms-htf/northern-gulf-mexico-hypoxic-zone).

[135] This figure is calculated from 60% of the 5-year average annual nitrogen load (1.4 million tons) for 2010 to 2015. *See supra* note 71. Given that newly converted land requires greater amounts of nitrogen fertilizer, greater extensification would likely lead to greater increases in dissolved inorganic nitrogen flux.

large majority of agricultural nitrogen exports.[136] Corn expansion and intensification to meet EISA targets contribute an increase of 10 to 18% in annual dissolved inorganic nitrogen flux in the MARB.[137] In fact, fertilizer runoff from projected corn ethanol production in the MARB will completely jeopardize EPA's goal to reduce nitrogen inputs in the Gulf by 20% by 2025.[138]

Ethanol production's degradation of water quality not only harms marine life, but it also has severe public health consequences. Harmful algae blooms caused by eutrophication release a host of biological toxins into the water. For example, in Toledo, Ohio, fertilizer run-off caused a devastating algae bloom in Lake Erie in 2011 and 2014, compromising the drinking water supply of over 500,000 people.[139] EPA determined that drinking water contaminated with the bacterial toxins in Toledo waters could lead to "[a]bdominal pain, [h]eadache, [s]ore throat, [v]omiting and nausea, [d]ry cough, [d]iarrhea, [b]listering around the mouth, and [p]neumonia."[140] Similar events could occur more frequently in the future if corn acreages continue to increase with demand for ethanol.[141] Nitrate contamination in drinking water also has serious health effects, especially in babies and young children.[142] Toxic pesticides and herbicides, such as atrazine and the potentially carcinogenic glyphosate, may also leach from corn crops into drinking water.[143]

Not only does ethanol feedstock production harm water quality, but it also increases soil erosion. Soil erosion is a significant concern with intensive, monoculture corn production. Erosion is linked to lower crop productivity, waterway and dam damage from sediment clogging, and a higher risk of flooding.[144] Conversion of grasslands, including Conservation Reserve Program (CRP) land, to grow corn for ethanol undermines soil structure and

---

[136] Sixty to 99% of excess leached nitrogen in MARB can be allocated to corn fertilizer, as opposed to soybean. *See* Powers (2007).

[137] Values based on 2008 model projections. *See* Simon D. Donner & Christopher J. Kucharik. 2008. Corn-based Ethanol Production Compromises Goal of Reducing Nitrogen Export by the Mississippi River. *Proc. Nat'l Acad. Sci.* 105(11): 4513 (http://www.pnas.org/content/pnas/105/11/4513.full.pdf). Similar results from price commodity model comparison to 1997 baseline. *See* Silvia Secchi, *et al.* 2011. Potential Water Quality Changes Due to Corn Expansion in the Upper Mississippi River Basin. *Ecological Applications* 21(4): 1068, 1068-1084 (https://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1002&context=agecon_articles). The studies looked at the conversion of Conservation Reserve Program grassland and soy crops to corn.

[138] The Mississippi-Atchafalaya River Basin encompasses all Midwest Corn Belt states, where overall corn production and grassland conversion are concentrated. *See* Donner and Kucharik (2008). The cited study looks at the impact of increased corn production from intensification and extensification combined. Given that corn grown on newly converted land requires a greater amount of fertilizer, increasing land conversion would likely result in increased nitrogen runoff.

[139] A.M. Michalak, *et al.* 2013. Record-setting Algal Bloom in Lake Erie Caused by Agricultural and Meteorological Trends Consistent with Expected Future Conditions. *Proceedings of the National Academy of Sciences 110*(16): 6448-6452 (https://www.pnas.org/content/110/16/6448); Emma G. Fitzsimmons, "Tap Water Ban for Toledo Residents," *New York Times* (Aug. 3, 2014) (https://www.nytimes.com/2014/08/04/us/toledo-faces-second-day-of-water-ban.html?mtrref=undefined).

[140] EPA, *Health and Ecological Effects* (last updated June 22, 2017) (https://www.epa.gov/nutrient-policy-data/health-and-ecological-effects#what1).

[141] EPA Second Triennial Report at 71; Michalak, *et al.* (2013).

[142] World Health Organization (WHO), *Nitrate and Nitrite in Drinking-water: Background Document for Development of WHO Guidelines for Drinking-water Quality* at 11 (2016) (http://www.who.int/water_sanitation_health/dwq/chemicals/nitrate-nitrite-background-jan17.pdf).

[143] EPA Second Triennial Report at 17. *See also* USDA National Agricultural Statistics Service: Agricultural Chemical Use – Corn (2016) (https://quickstats.nass.usda.gov/); International Agency for Research on Cancer, WHO, *IARC Monographs Volume 112: Evaluation of Five Organophosphate Insecticides and Herbicides* (March 20, 2015) (https://www.iarc.fr/wp-content/uploads/2018/07/MonographVolume112-1.pdf).

[144] Pimentel and Burgess (2013), *supra* note 133; R. Lal. 1998. Soil Erosion Impact on Agronomic Productivity and Environment Quality. *Critical Rev. Plant Sci.* 17(4): 319, 319-348 (https://www.tandfonline.com/doi/abs/10.1080/07352689891304249); Luise Kohl, *et al.* 2014. Agricultural Practices Indirectly Influence Plant Productivity and Ecosystem Services through Effects on Soil Biota. *Ecological Applications* 24(7): 1842 (https://dspace.library.uu.nl/bitstream/handle/1874/308320/1.pdf?sequence=1).

integrity.[145] This conversion eliminates the benefits achieved from long-term plant biomass, which physically anchors and shields the soil from wind and water stress while retaining soil nutrients such as nitrogen and phosphorus.[146] Plowing grassland reduces soil organic matter by up to 17% in the first year of cultivation, stunting soil fertility.[147] Even conversion from perennial grassland to no-tillage systems destroys 57% of original root biomass.[148]

Compounding these harms, increased erosion leads to higher rates of nutrient loss. The soil that is lost as a result of the land conversion contains up to three times more nutrients than what is left in the remaining soil.[149] An acre of land converted from grassland to continuous corn can lose up to 27 pounds of soil nitrogen annually.[150] In North and South Dakota, for instance, converting one million acres of native prairie to cropland will cost $6.4 million annually in soil loss related damages.[151]

5. Corn ethanol production and use severely degrades air quality.

Increased use of E15 would affect air quality in various ways, some beneficial and others detrimental. Because the overarching purpose of the statutory provision most relevant to EPA's proposal (CAA § 211(h)) is to limit the formation of ozone during the high ozone season, the Agency's proposal and these comments focus mainly on the emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx)—two of the key ingredients in the formation of ozone. E15 has complicated bi-directional impacts on ozone formation: combusting E15 instead of E10 in an automobile engine may produce slightly less VOC pollution and slightly more NOx pollution.[152] As discussed in Part II.A.3.c, however, it does not appear that the impacts would cancel each other out, because in many parts of the United States ozone formation is much more sensitive to changes in NOx levels than it is to changes in VOC levels. Consequently, the detrimental effects of a small increase in NOx emissions from the motor vehicle sector are likely to outweigh the beneficial effects of a small decrease in VOC emissions.

A recent study published in *Nature Sustainability* "explore[s] the human health effects of air pollution caused by the production of maize [corn]—a key agricultural crop that is used for animal feed, ethanol biofuel and human consumption," and found that:

> reduced air quality resulting from maize production is associated with 4,300 premature deaths annually in the United States, with estimated damages in monetary terms of US$39 billion (range: US$14–64 billion). Increased concentrations of fine particulate matter ($PM_{2.5}$) are driven by emissions of ammonia—a $PM_{2.5}$ precursor—that result from nitrogen fertilizer use. Average health damages

[145] William R. Gascoigne, *et al.* 2011. Valuing Ecosystem and Economic Services Across Land-use Scenarios in the Prairie Pothole Region of the Dakotas, USA. *Ecological Econ.* 70: 1715, 1715-1725 (https://esanalysis.colmex.mx/Sorted%20Papers/2011/2011%20USA%20-CS%20USA%20ND%20SD,%20BiodivCO2%20Econ.pdf).
[146] David Pimentel & Michael Burgess. 2013. Soil Erosion Threatens Food Production. *Agric*. 3: 443, 443-463 (https://www.bmbf.de/files/agriculture-03-00443.pdf).
[147] H. Tiessen, *et al.* 1982. Cultivation Effects on the Amounts and Concentrations of Carbon, Nitrogen, and Phosphorus in Grassland Soils. *Agronomy J.* 74(5): 831 (https://dl.sciencesocieties.org/publications/aj/abstracts/74/5/AJ0740050831).
[148] S. Tianna DuPont, *et al.* 2010. No-tillage Conversion of Harvested Perennial Grassland to Annual Cropland Reduces Root Biomass, Decreases Active Carbon Stocks, and Impacts Soil Biota. *Agric., Ecosystems & Env't* 137: 25, 25-32 (https://landinstitute.org/wp-content/uploads/2009/12/notill.pdf).
[149] David Pimentel & Nadia Kounang. 1998. Ecology of Soil Erosion in Ecosystems. *Ecosystems* 1: 416-426 (http://www.doc-developpement-durable.org/file/eau/lutte-contre-erosion_protection-sols/Ecology%20of%20Soil%20Erosion.pdf).
[150] According to USDA Economic Research Service (ERS) data, the average price of corn from 2007 to 2012 is $196.70 per ton; this study models effects of crop expansion at $196.84 per ton of corn in Iowa. Secchi, *et al.*, *supra* note 140, at 741.
[151] Gascoigne, *et al.*, *supra* note 144 at 1722.
[152] EPA, Renewable Fuel Standard Program – Standards for 2019 and Biomass-Based Diesel Volume for 2020: Response to Comments (November 2018) (https://www.regulations.gov/document?D=EPA-HQ-OAR-2018-0167-1387).

> from reduced air quality are equivalent to US$121 t^{-1} of harvested maize grain, which is 62% of the US$195 t^{-1} decadal average maize grain market price.[153]

Environmental groups and others have long urged EPA to look into the air quality impacts of E15, so the cursory treatment in the Proposed Rule is both insufficient and disappointing. EPA notes that increased E15 use would likely lead to a small but "meaningful" increase in NOx emissions, but it inexplicably fails to analyze what that increase could mean for ozone formation and areas' efforts to achieve (or maintain) attainment of National Ambient Air Quality Standards for ozone.

IV. EPA Must Maintain Restrictions on E15 Use in Small and Older Engines

Per EPA, if E15 is found to be sub sim to E10, the E15 partial waivers from 2010/11 would no longer be necessary, but the misfueling mitigation rule (MMR) would still apply.[154] EPA requests comment on whether it should still impose restrictions on E15 use in small and older engines.[155] It undoubtedly should, as EPA acknowledges that no new data has become available that would warrant the use of E15 in these engines.

In addition, EPA seeks comment on any additional misfueling mitigation measures that should be put in place to mitigate E15 being used in older or smaller engines.[156] EPA seeks comment on the costs of these potential new measures. Misfueling with E15 causes higher emissions, harming public health and the environment. In addition, misfuelling small engines and older vehicles with E15 may result in engine damage and higher emissions. Therefore, at a minimum, the restrictions that were in place in 2010/11 for the E15 waivers should remain in place, because the use of small engines in boats, lawn mowers, all-terrain vehicles, etc. is greater during summer months. Furthermore, if the proposal's goals are met, then large numbers of new gas stations could be induced to begin offering E15 to their customers once the barrier to summertime use has been removed. This would expose potentially millions of new consumers to the new fuel, increasing exponentially the odds of misfueling and the associated costs of engine damage.

According to GAO, higher ethanol blends "may cause older automobiles to experience higher emissions of some pollutants and higher catalyst temperatures."[157] EPA admits that when fueled with E15, older vehicles and small/off-road engines may exceed emissions standards.[158] Interagency comments highlighted this challenge and argued that appropriate protections should be kept in place to ensure these engines do not increase certain air pollutants.[159]

---

[153] Hill *et al*. (2019).
[154] 84 Fed. Reg. at 10593.
[155] *Id*. at 10603/1.
[156] *Id*. at 10603/2.
[157] GAO, *Challenges to the Transportation, Sale, and Use of Intermediate Ethanol Blends* (June 2011) (https://www.gao.gov/new.items/d11513.pdf).
[158] 84 Fed. Reg. at 10602/3.
[159] Office of Management and Budget, Thomas Boylan 3/11/2019 (2) email from Benjamin Hengst, to Chad Whiteman, copied to Jessica Mroz *et al.*, regarding the various passback documents on the draft E15/RIN reform proposal, including the "Summary of Interagency Working Comments on Draft Language under EO 12866 and EO 13563 Interagency Review. Subject to Further Policy Review," at 3 ("When even small emissions changes are applied across the vehicle fleet, in particular for the older part of the fleet that appears to be most susceptible to emission increased due to higher ethanol blends, the monetized and air quality impacts may be large. EPA denied part of the E15 waiver in 2010 ([65] FR 68094 (November 4, 2010)), in part because the agency was concerned the older vehicles would exceed their emission standards over their useful lives.") (https://www.regulations.gov/document?D=EPA-HQ-OAR-2018-0775-0071).

V. Conclusion

For all of the reasons described above, we respectfully request that EPA reconsider its Proposed Rule and its effort to allow the sale and use of E15 during the high ozone season and instead follow the clear mandate of the CAA, which protects against the very types of harms that this Proposed Rule would cause.

Respectfully submitted,

Jonathan Lewis, Senior Counsel
Sheila Karpf, Consultant
CLEAN AIR TASK FORCE

Peter Lehner, Managing Attorney
Carrie Apfel, Staff Attorney
Claire Huang, Science Fellow
EARTHJUSTICE

David DeGennaro, Agriculture Policy Specialist
NATIONAL WILDLIFE FEDERATION

Devorah Ancel, Senior Attorney
SIERRA CLUB