ORAL ARGUMENT NOT SCHEDULED

IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

COMMONWEALTH OF KENTUCKY, et al., Petitioners, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY AND MICHAEL S. REGAN, ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, Respondents.	No. 24-1087

UNOPPOSED MOTION BY THE STATES OF CALIFORNIA, ARIZONA, COLORADO, CONNECTICUT, DELAWARE, HAWAII, ILLINOIS, MAINE, MARYLAND, MICHIGAN, MINNESOTA, NEW MEXICO, NEW JERSEY, NEW YORK, NORTH CAROLINA, OREGON, RHODE ISLAND, VERMONT, WASHINGTON, AND WISCONSIN, THE COMMONWEALTHS OF MASSACHUSETTS AND PENNSYLVANIA, THE DISTRICT OF COLUMBIA, THE CITY AND COUNTY OF DENVER, AND THE CITIES OF CHICAGO, LOS ANGELES, AND NEW YORK FOR LEAVE TO INTERVENE IN SUPPORT OF RESPONDENTS

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Pursuant to Federal Rule of Appellate Procedure (FRAP) 15(d) and D.C. Circuit Rule 15(b), the States of California (by and through its Governor Gavin Newsom, Attorney General Rob Bonta, and the California Air Resources Board), Arizona, Colorado, Connecticut, Delaware, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, New Mexico, New Jersey, New York, North Carolina, Oregon, Rhode Island, Vermont, Washington, and Wisconsin, the Commonwealths of Massachusetts and Pennsylvania, the District of Columbia, the City and County of Denver, and the Cities of Chicago, Los Angeles, and New York (collectively, Movant-Intervenor States) hereby move the Court for leave to intervene in case number 24-1087 in support of Respondents United States Environmental Protection Agency (EPA) and Michael Regan as Administrator of the United States Environmental Protection Agency.

STATEMENT OF INTEREST AND GROUNDS FOR INTERVENTION

Petitioners challenge EPA's final rule for federal greenhouse gas and criteria emissions standards, "Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles" (Final Rule). *See* 89 Fed. Reg. 27,842 (April 18, 2024). Movant-Intervenor States have a compelling interest in these standards because they are a crucial element of urgently needed measures to mitigate the substantial and growing adverse effects of climate change and criteria pollution in their States. As discussed in detail below, Movant-Intervenor States

will be injured if the petitioners obtain vacatur of the Final Rule, as such a decision would contribute to increased short- and long-term emissions of harmful pollution, resulting in direct injuries to state lands, resources, infrastructure, and public programs, not to mention grave injuries to our residents and industries. Indeed, the Supreme Court has recognized that States have significant "stake[s]" in the control of these very emissions from these very vehicles. *Massachusetts v. EPA*, 549 U.S. 497, 520 (2007). Movant-Intervenor States would be similarly injured by a ruling here that compromises EPA's ability to reduce these harmful vehicle emissions in the future, e.g., by limiting EPA's consideration of zero-emission technologies like the battery-electric powertrain. These legally protected interests of the States are distinct from Respondents' interests and not adequately represented by any party. Movant-Intervenor States seek to intervene in the challenges to EPA's standards to protect those established interests.

Petitioners (Commonwealth of Kentucky et al.) take no position on this motion. Respondents do not oppose this motion.

BACKGROUND

The Clean Air Act requires EPA to prescribe "standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in [the Administrator's] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public

health or welfare." 42 U.S.C. § 7521(a)(1). States, including many of the Movant-Intervenor States here, have a long history of intervening in litigation and otherwise urging EPA to rigorously control greenhouse gas emissions from new motor vehicles, *see e.g.*, *Massachusetts*, 549 U.S. at 514, because the transportation sector is the leading source of the Nation's greenhouse gas emissions.[1] The light- and medium-duty vehicles regulated by the greenhouse gas emissions standards at issue here constitute one of the Nation's most significant sources of such emissions, with light-duty vehicles alone accounting for 58% of U.S. transportation sector greenhouse gas emissions.[2]

In 2009, after *Massachusetts* was decided, EPA determined "that greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare," and that new motor vehicles and engines cause or contribute to that endangerment. 74 Fed. Reg. 66,496, 66,496-97 (Dec. 15, 2009) (Endangerment Finding). The Endangerment Finding triggered a duty for EPA to regulate greenhouse gas emissions from new motor vehicles. *See* 42 U.S.C. § 7521(a); *see Coalition for Responsible Regulation v. EPA*, 684 F.3d 102,

[1] *See* Comments of States and Cities Supporting EPA's Proposal to Strengthen Multipollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles ("Multistate Comment"), at 28 (July 5, 2023) (Docket ID EPA-HQ-OAR-2022-0829-0746) (citing April 2022 *Inventory of U.S. Greenhouse Gas Emissions and Sinks*); *accord* 89 Fed. Reg. at 27,844.

[2] 89 Fed. Reg. at 27,844 & n.9 (as of April 2023).

126 (D.C. Cir. 2012) ("By employing the verb 'shall,' Congress vested a non-discretionary duty in EPA.").

In 2010, EPA promulgated greenhouses gas emissions standards for light-duty vehicles for model years 2012 through 2016. 75 Fed. Reg. 25,324 (May 7, 2010). In 2012, EPA finalized greenhouse gas emissions standards for model years 2017 through 2025. 77 Fed. Reg. 62,624 (Oct. 15, 2012). EPA explained that it was responding "to the country's critical need to address global climate change," *id.* at 62,626-27, and it estimated that its standards would prevent "approximately 2 billion metric tons" of greenhouse gas emissions, *id.* at 62,627.

Following a change in presidential administrations, EPA in April 2020 revised and dramatically weakened light-duty vehicles' greenhouse gas emissions standards for model years 2021 through 2025 and promulgated similarly weak standards for model year 2026. 85 Fed. Reg. 24,174 (April 30, 2020) (SAFE 2). EPA projected that its SAFE 2 standards would *increase* greenhouse gas emissions by up to 923 million metric tons, *id.* at 24,176, and cause up to 1,000 premature deaths and other adverse health impacts due to increases in criteria emissions, *id.* at 25,119. Movant-Intervenor States challenged the SAFE 2 standards in this Court. Case No. 20-1145 (and consolidated cases). The Court placed those cases in abeyance, after another change in administrations, when President Biden directed

EPA to reconsider its SAFE 2 standards. Doc. No. 1892931, *Competitive Enterprise Institute, et al. v. EPA*, Case No. 20-1145 (D.C. Cir. Apr. 2, 2021).

In December 2021, EPA adopted revised and strengthened light-duty vehicle greenhouse gas emissions standards for model years 2023 through 2026. Following petitions for review, Movant-Intervenor States intervened as respondents to defend EPA's revised standards. Doc. No. 1943675, *Texas v. EPA*, Case No. 22-1031, (D.C. Cir. Apr. 20, 2022) (order granting intervention). That case was argued and submitted to the Court on September 15, 2022; the Court has not yet issued a decision.

In May 2023, EPA proposed new standards for light- and medium-duty vehicles' emissions of greenhouse gases and other harmful pollutants, such as nitrogen oxides and particulate matter, for model years 2027 and later. 88 Fed. Reg. 29,184 (May 5, 2023). The Movant-Intervenor States submitted comments generally supporting EPA's proposal, arguing the proposed standards (and, indeed, standards of greater stringency) were feasible and important to protecting public health and the environment against the climate crisis, helping our States attain and maintain federal ambient air quality standards for ozone and particulate matter, and reducing criteria and toxic pollution, including in disadvantaged communities near refineries and major roadways that are disproportionately burdened with pollution

and public health impacts from vehicle emissions.[3] Our comments detailed how increased emissions exacerbate the grievous, ongoing health and environmental impacts our residents, agriculture, marine industries, and ecosystems are already experiencing—such as the historic 2021 and 2022 heat waves across Northern California and the Pacific Northwest that killed hundreds of our residents and buckled roads,[4] the 2023 wildfire smog that blanketed the Atlantic seaboard in an orange haze of dangerous particulate matter,[5] and the record-setting fire seasons in California, Colorado, New Mexico, Oregon, and Washington.[6]

On April 18, 2024, EPA published its final rule, adopting standards in line with the proposed end-year stringency but on a more gradual timeline in the earlier years. 89 Fed. Reg. at 27,855. EPA estimates that, by 2055, its standards will reduce annual emissions of greenhouse gases by 410 million metric tons, nitrogen oxides by 36,000 tons, particulate matter by 8,700 tons, volatile organic compounds by 150,000 tons, and air toxics like benzene, 1,3-butadiene, and formaldehyde by 2,300, 290, and 440 tons, respectively. *Id.* at 27,858 (Tables 4-7). Cumulatively, EPA estimates a total greenhouse gas emissions reduction of 7

[3] Multistate Comment at 28-32.

[4] *Id.* at 3-4.

[5] *Id.* at 6.

[6] *Id.* at 4-6.

billion metric tons through 2055. *Id.* Petitioners here seek to vacate these standards and to constrain EPA's ability to set robust vehicular emissions standards in the future based on zero-emission vehicle technologies, the single most effective set of pollution controls for vehicles developed to date.

If Petitioners prevail, harmful emissions that threaten public health and the environment will increase. Those increases will be long-lasting, not only because of the longevity of greenhouse gases in the atmosphere, but also because of the longevity of higher-emitting vehicles sold under any weakened standards. Those increased emissions would exacerbate the climate change harms and public health harms Movant-Intervenor States are experiencing. Movant-Intervenor States respectfully request that this Court grant their motion to intervene to defend these important standards and EPA's ability to meaningfully control these emissions.

LEGAL STANDARD

Federal Rule of Appellate Procedure 15(d) states that a motion to intervene "must contain a concise statement of the interest of the moving party and the grounds for intervention" and be filed "within 30 days after the petition for review is filed." Because "[i]ntervenors become full-blown parties to litigation, . . . all would-be intervenors must demonstrate Article III standing." *Old Dominion Elec. Coop. v. FERC*, 892 F.3d 1223, 1232 (D.C. Cir. 2018); *see Crossroads Grassroots Policy Strategies v. FEC*, 788 F.3d 312, 316 (D.C. Cir. 2015) ("[W]here a party

tries to intervene as another defendant, we have required it to demonstrate Article III standing."). In deciding intervention motions, this Court draws on the standards for intervention in district court under Federal Rule of Civil Procedure (FRCP) 24. *Mass. Sch. of Law at Andover v. United States*, 118 F.3d 776, 779 (D.C. Cir. 1997).

For a party requesting intervention as of right, this Court looks to four factors analogous to those under FRCP 24(a):

> (1) timeliness of that application to intervene; (2) a legally protected interest; (3) that the action, as a practical matter, impairs or impedes that interest; and (4) that no party to the action can adequately represent the potential intervenor's interest.

Crossroads, 788 F.3d at 320. A court may also grant permissive intervention under FRCP 24(b) when a movant makes a "timely application" and the "applicant's claim or defense and the main action have a question of law or fact in common." *See EEOC v. Nat'l Children's Ctr., Inc.*, 146 F.3d 1042, 1045 (D.C. Cir. 1998).

ARGUMENT

I. MOVANT-INTERVENOR STATES ARE ENTITLED TO INTERVENTION AS OF RIGHT

Movant-Intervenor States have Article III standing and readily satisfy all the requirements for intervention as of right under this Court's precedents and under FRCP 24(a).

A. Movant-Intervenor States Have Article III Standing

To satisfy the requirements of Article III standing, Movant-Intervenor States must demonstrate: (1) that they "have suffered an injury in fact . . . which is [] concrete and particularized, and [] actual or imminent," (2) that there is a "causal connection between the injury and the conduct complained of," and (3) that it is "likely . . . the injury will be redressed by a favorable decision." *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-61 (1992). For purposes of intervention to defend an agency's action, causation and redressability are established if the party seeking intervention demonstrates that injury would result from a decision to grant the petition for review. *Crossroads*, 788 F.3d at 316-319.

Here, Movant-Intervenor States would be injured if Petitioners succeed in obtaining vacatur of EPA's emissions standards promulgated in the Final Rule, because any such decision would increase short- and long-term emissions by vacating or ultimately weakening standards applicable to millions of new vehicles sold in the United States in 2027 and afterwards. Movant-Intervenor States would also be injured by a ruling that compromises EPA's ability to reduce these harmful vehicle emissions in the future, e.g., by limiting EPA's consideration of zero-emission technologies like the battery-electric powertrain.

The administrative record contains abundant evidence of the types of injuries that Movant-Intervenor States would suffer as a result of weakened vehicle

emissions standards. *See Sierra Club v. EPA*, 292 F.3d 895, 899-900 (D.C. Cir. 2002) ("In many if not most cases the petitioner's standing to seek review of administrative action is self-evident; no evidence outside the administrative record is necessary for the court to be sure of it."). Movant-Intervenor States are currently experiencing direct and compounding climate harms that are projected to worsen without deep reductions in anthropogenic emissions of greenhouse gases, such as those from light- and medium-duty vehicles regulated by the Final Rule.[7] For example, rising temperatures caused by anthropogenic greenhouse gas emissions contribute to the frequency, severity, and duration of extreme heat events, reduced snowpack, increased drought, and warming waters.[8] Rising temperatures and drier conditions increase the frequency and intensity of wildfires.[9] A warmer climate intensifies costly extreme storms and flooding, which damage roads, power lines,

[7] Multistate Comment at 2-11; 89 Fed. Reg. at 27,861-64; *see* Decl. of E. Scheehle, Cal. Air Resources Bd. (Scheehle Decl.) ¶¶6-11, 17-31; Decl. of T. Soleau, Mass. Office of Coastal Zone Mgmt. (Soleau Decl.) ¶¶8, 10-26; Decl. of F. Kohlasch, Minn. Pollution Control Agency (Kohlasch Decl.) ¶¶5-12; Decl. of M. Hanna, N.J. Dept. of Envt. Protection (Hanna Decl.) ¶¶7-9, 14; Decl. of C. LaLone, N.Y. Dept. of Envt. Conservation (LaLone Decl.) ¶¶17-38; Decl. of E. Fleishman, Ore. Climate Change Research Inst. (Fleishman Decl.) ¶¶7-26.

[8] Multistate Comments at 3-4; 89 Fed. Reg. at 27,861, 27,863-64; Scheehle Decl. ¶¶17-21, 29-30; Kohlasch Decl. ¶8; Hanna Decl. ¶8.i; LaLone Decl. ¶19, 21, 23, 35-36; Fleishman Decl. ¶¶8-9, 23.

[9] Multistate Comment at 4-6; 89 Fed. Reg. at 27,864; Scheehle Decl. ¶¶24-28; Hanna Decl. ¶8.i; Fleishman Decl. ¶¶10-19.

sewerage and water treatment systems, and other critical infrastructure.[10] Human-induced climate change also leads to sea level rise that submerges sovereign territory in coastal States and increases saltwater intrusion into state waters and aquifers.[11]

Beyond harming our residents and industries, these climate impacts cause direct injuries to the Movant-Intervenor States: loss of state coastline and coastal property; damages to state parks, other public lands, and critical infrastructure; loss of state waters, forests, and other natural resources; and increased expenditure of funds on drought, wildfire, storm, and flood preparation and response, protection of public health, and strengthening and repairing roads, seawalls, ports, power lines, sewers, and waste treatment systems impacted by extreme weather.[12] Weaker emissions standards—which Petitioners seek by way of vacatur of the Final Rule—

[10] Multistate Comments at 7-8; 89 Fed. Reg. at 27,862-64; Scheehle Decl. ¶¶21-23, 30; Soleau Decl. ¶¶11-13; Kohlasch Decl. ¶¶5-6; Hanna Decl. ¶8.c, 8.d, 14.a, 14.d; LaLone Decl. ¶23-28, 31-34; Fleishman Decl. ¶¶7, 9, 24-25.

[11] Multistate Comments at 7-8; 89 Fed. Reg. at 27,862-64; Scheehle Decl. ¶¶23; Soleau Decl., ¶¶9, 10, 13-14, 21; Hanna Decl. ¶¶8.b, 8.d, 8.e; LaLone Decl. ¶25; Fleishman Decl. ¶23.

[12] 89 Fed. Reg. at 27,862, 27,864; *see* Scheehle Decl. ¶¶21-23, 26, 29; Soleau Decl. ¶¶11-14, 19-25; Kohlasch Decl. ¶¶5-6; Hanna Decl. ¶¶8.b-8.e, 8.i, 14.a, 14.c, 14.d; LaLone Decl. ¶¶19, 21-29, 31-34; Fleishman Decl. ¶¶7, 9, 12-14, 20, 24-25.

would result in increased emissions and greater harms to Movant-Intervenor States.[13]

The Supreme Court and this Court have repeatedly found that these types of climate harms establish standing that supports state intervention. In *Massachusetts*, the Supreme Court decided that States, including many of the Movant-Intervenor States here, had standing to intervene to compel EPA to determine that this very type of emissions—greenhouse gas emissions from new motor vehicles—endanger public health and welfare. 549 U.S. at 522-23. The Court noted that "U.S. motor-vehicle emissions make a meaningful contribution to greenhouse gas concentrations and hence . . . to global warming," and "reducing domestic automobile emissions . . . would slow the pace of global emissions increases, no matter what happens elsewhere." *Id*. at 525. Similarly, this Court has permitted many of the Movant-Intervenor States here to intervene to defend past EPA decisions, including EPA's Endangerment Finding, *see Coalition for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102, 126 (D.C. Cir. 2012), *rev'd in part on unrelated issues*, *Util. Air Regul. Grp. v. EPA*, 573 U.S. 302 (2014); EPA's first greenhouse gas emissions standards for passenger cars and light trucks, Doc. No. 1406411, *Plant Oil Powered Diesel Fuel Sys., Inc. v. EPA*, No. 12-1428 (D.C. Cir.

[13] Scheehle Decl. ¶16, 31; Soleau Decl. ¶26; Hanna Decl. ¶15; LaLone Decl. ¶16; Fleishman Decl. ¶3.

Nov. 23, 2012); EPA's greenhouse gas emissions standards for heavy-duty trailers, Doc. No. 1665427, *Truck Trailer Mfrs. Ass'n, Inc. v. EPA*, No. 16-1430 (D.C. Cir. Mar. 10, 2017); and, most recently, EPA's revised light-duty greenhouse gas emissions standards, Doc. No. 1943675, *Texas v. EPA*, Case No. 22-1031, (D.C. Cir. Apr. 20, 2022). Here, the Court should likewise find that the States have standing and grant their intervention.

The Final Rule's multi-pollutant emissions standards would also decrease emissions of criteria pollutants and toxic chemicals.[14] Movant-Intervenor States would be injured by emissions that would result if the Final Rule did not become effective, which would strain state budgets and make it more difficult for States to attain and maintain National Ambient Air Quality Standards established by EPA to protect public health.[15] In the absence of strong federal standards for vehicular emissions of nitrogen oxides (an ozone precursor) and particulate matter, States have to take additional actions and expend significant resources meeting federal air

[14] 89 Fed. Reg. at 27,858 (Tables 6-7); *see* Multistate Comments at 11-13; Decl. of S. Vanderspek, California Air Resources Bd. (Vanderspek Decl.) ¶16; LaLone Decl. ¶10.

[15] Multistate Comment at 11-13, 30-31; Vanderspek Decl. ¶¶18-21; Hanna Decl. ¶12-13; LaLone Decl. ¶¶4, 13; *see also* Scheehle Decl. ¶29; Hanna Decl. ¶11; Fleishman ¶15 (average temperature rise, more severe wildfires, and lost rainfall due to climate change worsens ground-level concentrations of ozone and particulate matter).

quality standards; for example, the California Air Resources Board spends up to $33,000 to mitigate a single ton of nitrogen oxides emissions.[16] Because States depend on early planning to reduce the costs of compliance, changes in federal regulatory approaches that significantly increase criteria emissions can be costly and disruptive to the States, as well as to regulated industries within those States.[17] Movant-Intervenor States thus satisfy the requirements for Article III standing.

B. Movant-Intervenor States Also Satisfy the Other Requirements for Intervention as of Right

As noted above, courts look to FRCP 24 when analyzing motions for leave to intervene in petitions for review. *Supra* at 9. FRCP 24(a) requires a court to grant intervention as of right to anyone who, on a timely motion, "claims an interest relating to the property or transaction that is the subject of the action, and is so situated that disposing of the action may as a practical matter impair or impede the movant's ability to protect its interest, unless existing parties adequately represent that interest." Under this Court's precedent, a prospective intervenor "need not show anything more than that it has standing to sue in order to demonstrate the

[16] Multistate Comment at 30-31; Vanderspek Decl. ¶18, 21; Hanna Decl. ¶¶12-13; *see also* LaLone Decl. ¶¶4, 8, 13. California air districts have priced NOx emissions as high as $38,706 and $47,864 per ton in 2023 and 2022, and the Air Resources Board's on-road zero-emission technology cost limit goes all the way up to $500,000 per ton. Vanderspek Decl. ¶18.

[17] *See* Vanderspek Decl. ¶¶11, 14, 18, 21.

existence of a legally protected interest for purposes of Rule 24(a)." *See Mova Pharmaceutical Corp. v. Shalala*, 140 F.3d 1060, 1076 (D.C. Cir. 1998).

As demonstrated above, Movant-Intervenor States have Article III standing. Even if more were required, intervention should still be granted because the disposition of these petition could impair or impede Movant-Intervenor States' ability to protect their interests. *See Fund for Animals, Inc. v. Norton*, 322 F.3d 728, 733 (D.C. Cir. 2003) (determining that intervention in administrative review proceedings is appropriate where the movant would be harmed by a successful challenge to a regulatory action and that harm could be avoided by a ruling denying the relief sought by the petitioner).

This Court has made clear that a party need only "show[] that representation of [its] interest 'may be' inadequate; and the burden of making that showing should be treated as minimal." *Id*. at 735 (quoting *Trbovich v. United Mine Workers*, 404 U.S. 528, 538 n.10 (1972)). "[I]nterests need not be wholly adverse before there is a basis for concluding that existing representation of a different interest may be inadequate." *Nuesse v. Camp*, 385 F.2d 694, 703 (D.C. Cir. 1967) (quotation marks omitted). Courts have also recognized that federal and state entities may not share the same interests. *See Forest Conserv. Council v. U.S. Forest Serv.*, 66 F.3d 1489, 1499 (9th Cir. 1995) (finding the interests of the State of Arizona were not

necessarily represented by the U.S. Forest Service), *abrogated on other grounds by Wilderness Soc. v. U.S. Forest Serv.*, 630 F.3d 1173 (9th Cir. 2011).

Movant-Intervenor States have sovereign interests in preventing harm to their natural resources and state-owned parks and other public lands within their boundaries. *See Massachusetts*, 549 U.S. at 519 (citing *Georgia v. Tennessee Copper Co.*, 206 U.S. 230, 237 (1907)). Movant-Intervenor States likewise have sovereign interests in protecting their public infrastructure (like state roads and waterfronts), reducing damage-related costs, and limiting emergency response costs. *See Massachusetts*, 549 U.S. at 521-23. The history of EPA's greenhouse gas emissions standards demonstrates that these interests have not always aligned with those of Respondents. EPA promulgated standards in 2012, found that those standards remained appropriate in 2017, reversed its finding of appropriateness in 2018, significantly weakened its standards in 2020, and increased the stringency of its standards in 2021 and 2024. While Movant-Intervenor States currently share EPA's broad aim of opposing the petitions seeking to vacate the Final Rule, EPA's past shifts in positions underscore that the specific interests of EPA and Movant-Intervenor States may diverge as the litigation progresses. More generally, given our States' and Cities' distinct interests, Movant-Intervenor States may choose to advance different arguments or make different strategic choices than EPA in this litigation. During the comment period, the Petitioners, in arguing against EPA's

adoption of the Final Rule, also attacked California's separate vehicle emissions standards and other state-law policies and practices related to electric vehicles and charging infrastructure.[18] To the extent any such issues may be presented here—properly or not—California and other States that have adopted its vehicle standards pursuant to 42 U.S.C. § 7507 would have a distinct interest from EPA's in responding to such arguments. Movant-Intervenor States seek to intervene here in order to adequately protect the important and substantial interests described above.

Finally, this motion is timely, because it was filed within 30 days after the petitions for review were filed. *See* Fed. Rule of App. Proc. 15(d). For all the above reasons, Movant-Intervenor States satisfy the requirements for intervention of right.

II. ALTERNATIVELY, MOVANT-INTERVENOR STATES SHOULD BE GRANTED PERMISSIVE INTERVENTION

Movant-Intervenor States also satisfy the less burdensome requirements for permissive intervention. FRCP 24(b) allows a court to grant intervention to anyone

[18] Comments of Kentucky Office of the Attorney General et al., at 10-11 (July 5, 2023) (Docket ID EPA-HQ-OAR-2022-0829-0451); *see also* Comments of Clean Fuels Development Coalition et al., at 28-29 (July 5, 2023) (Docket ID EPA-HQ-OAR-2022-0829-0712); Comments of American Fuel & Petrochem. Mfrs., at 28 (July 5, 2023) (Docket ID EPA-HQ-OAR-2022-0829-0714); Comments of Valero Energy Corp., at 89-91 (July 5, 2023) (Docket ID EPA-HQ-OAR-2022-0829-0707). These latter three sets of commenters were co-petitioners with most of Petitioners here in *Texas v. EPA*, Case No. 22-1031, challenging EPA's previous round of light-duty vehicle greenhouse gas emissions standards, and may also challenge the Final Rule.

who, on timely motion, "has a claim or defense that shares with the main action a common question of law or fact" so long as the intervention would not "unduly delay or prejudice the rights of the original parties." This Court has "eschewed strict readings of the phrase 'claim or defense,'" and its body of precedents instead "compels a flexible reading of Rule 24(b)." *EEOC*, 146 F.3d at 1046.

As demonstrated above, Movant-Intervenor States have compelling interests in preventing any weakening of the standards for model years 2027 through 2032 as well as preserving the ability of EPA to adopt robust standards in the future. In recognition of similar interests, this Court has previously permitted Movant-Intervenor States to participate in litigation over other vehicle emission standards. *See supra* at 13-14. This motion is timely and granting it will not cause undue delay or prejudice the rights of any parties. Petitioners filed their petitions for review on April 18, 2024, their initial submissions are not due until May 20, 2024, and Respondents have until June 3, 2024 to file the certified index. Moreover, the Court has not yet set a briefing schedule. Thus, Movant-Intervenor States meet the requirements for permissive intervention.

CONCLUSION

For the reasons stated herein, Movant-Intervenor States respectfully request that the Court grant them intervention as of right or, in the alternative, permissive intervention, in case number 24-1087.

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CERTIFICATE OF COMPLIANCE

I hereby certify that the foregoing motion complies with the type-volume limitations of Federal Rule of Appellate Procedure 27(d)(2) because it contains 4,118 words. I further certify that this motion complies with the typeface requirements of Federal Rules of Appellate Procedure 27(d)(1)(E), 32(a)(5), and 32(a)(6) because it has been prepared using a proportionally spaced typeface (Times New Roman) in 14-point font.

Dated: April 22, 2024

/s/ Theodore A. McCombs
Theodore A. McCombs
Attorney for State of California

CERTIFICATE OF PARTIES ADDENDUM

Pursuant to Circuit Rule 27(a)(4) and 28(a)(1)(A), I certify that the parties—including proposed intervenors and amici curiae—are set forth below.

Petitioners: The Commonwealths of Kentucky and Virginia and the States of Alabama, Alaska, Arkansas, Florida, Georgia, Idaho, Indiana, Iowa, Kansas, Louisiana, Mississippi, Missouri, Montana, Nebraska, New Hampshire, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Utah, West Virginia, and Wyoming.

Respondents: United States Environmental Protection Agency and Michael S. Regan, Administrator, United States Environmental Protection Agency.

Proposed Intervenors: The States of California, Arizona, Colorado, Connecticut, Delaware, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, New Mexico, New Jersey, New York, North Carolina, Oregon, Rhode Island, Vermont, Washington, and Wisconsin, the Commonwealths of Massachusetts and Pennsylvania, the District of Columbia, the City and County of Denver, and the Cities of Chicago, Los Angeles, and New York.

Amici Curiae: There are no amici curiae at the time of this filing.

Dated: April 22, 2024

/s/ Theodore A. McCombs
Theodore A. McCombs
Attorney for State of California

CERTIFICATE OF SERVICE

I hereby certify that on April 22, 2024 I electronically filed the foregoing motion with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit using the Court's CM/ECF system.

I further certify that all the above parties are participating in the Court's CM/ECF system and will be served electronically by that system.

Dated: April 22, 2024

/s/ Theodore A. McCombs
Theodore A. McCombs
Attorney for State of California

DECLARATION OF ELIZABETH SCHEEHLE

I, Elizabeth Scheehle, state and declare as follows:

Experience

1. I am currently the Chief of the Research Division of the California Air Resources Board (CARB). I have a B.S. in Earth and Atmospheric Sciences from the Georgia Institute of Technology, a Master of Public Policy from the Kennedy School of Government at Harvard University, and a Master of Public Health from the Bloomberg School of Public Health at Johns Hopkins University.

2. I have worked for over 20 years in climate change and air quality programs, starting at the U.S. Environmental Protection Agency (U.S. EPA), where I led national and international efforts on non-carbon dioxide greenhouse gases (GHGs). I served as an expert for the United Nations Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change (IPCC). In that role, I earned recognition for contributing to the IPCC's Nobel Prize. I continued my career at the U.S. EPA, developing its Carbon Capture and Sequestration expertise, including comprehensive risk assessment considerations.

3. I joined CARB's Research Division in 2007 and led three climate change-related efforts: carbon capture and sequestration, an ozone-depleting substance offset protocol, and an early action climate measure. I was a Section

Manager of the Research Division's GHG Technology and Field-Testing Section before joining the Cap-and-Trade Program in CARB's Industrial Strategies Division. In 2014, I became a Branch Chief in the Industrial Strategies Division, overseeing programs related to oil and gas operations, alternative fuel regulations, and carbon capture and sequestration.

4. In 2018, I began my current role as Chief of the Research Division. In that capacity, I oversee CARB's research program, which investigates the causes of human health and welfare impacts from air pollutant emissions and the potential for reducing those impacts through emission reduction strategies. I also lead the development and implementation of multidisciplinary research plans and studies to provide a robust scientific foundation for our air quality and climate policy decisions. In addition, the Division implements programs on indoor air quality and high global warming potential gas mitigation. I have broad experience with climate science and research.

5. I make this declaration based on my knowledge and expertise in the matters within and upon my review of relevant rulemaking, reports, and other documents discussed below. I submit this declaration in support of the Movant-Intervenor State of California's Motion to Intervene.

Climate Change

6. Climate change is driven by the accumulation of greenhouse gases in the atmosphere. Greenhouse gases retain heat that would otherwise escape back to space. Increasing concentrations of greenhouse gases in the atmosphere thus cause a continuing increase of the planet's average temperature over time, which in turn disrupts established geophysical systems (such as ocean circulation) and ecosystems across the globe. Since the Industrial Revolution, the predominant source of climate change-causing greenhouse gas emissions has been human activities. Human activities cause the emission of greenhouse gases in various ways, including deforestation and the combustion of fossil fuels for energy.

7. Of all the long-lived greenhouse gases, the ones with the largest climate impact are carbon dioxide (CO_2), methane, and nitrous oxide. Of those three, CO_2 is the most important because, even though it absorbs less heat per molecule than methane or nitrous oxide, it is more abundant and stays in the atmosphere much longer. Before the Industrial Revolution started in the mid-1700s, the global average amount of CO_2 was about 280 parts per million. The most recent data from the National Oceanic and Atmospheric Association (NOAA) shows average global CO_2 concentrations, measured at Mauna Loa Observatory, peaked for 2023 in May at a monthly average of 424 parts per million (ppm)—a new record, reaching a level more than 50% higher than at the

onset of the industrial era.[1] In August 2021, the IPCC Working Group 1 released part of the 6th Assessment Report (AR6) titled "Climate Change 2021: The Physical Basis,"[2] which reaffirmed with high confidence that there is a near-linear relationship between cumulative anthropogenic CO_2 emissions and the global warming they cause. This temperature response to increasing carbon dioxide levels in the atmosphere is a critical metric that provides foresight into the potential adverse impacts of climate change.

8. Because of this dramatic uptick in CO_2 concentrations, the average global surface temperature has increased by around 1.1 degrees Celsius compared with the average in 1850–1900—a level that hasn't been witnessed since 125,000 years ago, before the most recent ice age.[3] According to analyses by the National Aeronautics and Space Administration (NASA) and NOAA, 2023 was by far the warmest year on record and produced many costly climate-driven weather events in the United States and worldwide. The ten warmest years in the 174-year record

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[1] NOAA Global Monitoring Laboratory, https://www.noaa.gov/news-release/broken-record-atmospheric-carbon-dioxide-levels-jump-again https://www.esrl.noaa.gov/gmd/ccgg/trends/.

[2] IPCC AR6 Climate Change 2021: The Physical Science Basis. Sixth Assessment Report (ipcc.ch)

[3] IPCC AR6 2021, *Summary for Policymakers*, *https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf* (IPCC uses the reference period 1850–1900 to approximate pre-industrial temperature, as this is the earliest period with near-global observations.).

have all occurred during the last decade (2014–2023). An early outlook for 2024 suggests a one-in-three chance that this year will be warmer than 2023, with a 99% chance that 2024 will rank among the top five warmest years recorded.[4] The average global surface air temperature in February 2024 was 13.54 degrees Celsius (roughly 56.4 degrees Fahrenheit), which is 1.77 degrees Celsius above the pre-industrial average for February, leading it to become the ninth consecutive month where each month was the warmest on record globally.[5]

9. The warming climate is also driving up ocean surface temperatures. In the past 150 years, humans have greatly increased the amount of CO_2 in the atmosphere, and the ocean has absorbed about 29% of this additional carbon. Adding additional CO_2 to the ocean is changing its chemistry, making it more acidic and slowing its ability to take up more CO_2. If the ocean starts to take up less CO_2, more is left in the atmosphere where it can contribute to additional warming. Furthermore, warming global and regional temperatures are contributing to rising sea levels, from both thermal expansion of the ocean itself and melting sea ice and glaciers around the world. The IPCC 2021 Summary for Policymakers

[4] Wink, *NASA and NOAA: 2023 was the warmest year on record* (Jan. 12, 2024), https://winknews.com/2024/01/12/nasa-noaa-press-conference/; NOAA, 2023 was the world's warmest year on record, by far (Jan. 12, 2024), https://www.noaa.gov/news/2023-was-worlds-warmest-year-on-record-by-far.
[5] NOAA, *Earth just had its warmest February on record* (Mar. 14, 2024), https://www.noaa.gov/news/earth-just-had-its-warmest-february-on-record

(SPM)[6] provides a high-level summary of the understanding of the current state of the climate. The SPM report states it is very likely to virtually certain that regional mean relative sea level rise will continue throughout the 21st century. Extreme sea level events that occurred once per century in the recent past are projected to occur at least annually, leading to loss of land, resources, infrastructure, and life. Several recent studies further demonstrated the extraordinary nature of these impacts by finding that prior studies had underestimated the impacts of sea-level rise, storms, and flooding in California,[7] demonstrating that local CO_2 concentrations above Monterey Bay fluctuate by time of day likely because of the surrounding environment and topography, likely increasing the expected rate of acidification of

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6 https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf

7 Patrick L. Barnard, et al., "Dynamic Flood Modeling Essential to Assess the Coastal Impacts of Climate Change," 9 SCIENTIFIC REPORTS 4309 (Mar. 13, 2019) (submitted to the docket in NGO Letter, Apr. 5, 2019 (Docket #EPA-HQ-OAR- 2018-0283-7452)).

the Bay;[8] and showing the waters of the California current ecosystem have already acidified by over twice the global average.[9]

10. The timing of mitigation of greenhouse gas emissions affects the level of damage because greenhouse gases can remain in the atmosphere for long periods. Hence, their warming effect is compounded by future emissions, thereby accelerating climate impacts. Carbon dioxide, in particular, remains in the atmosphere longer than the other major greenhouse gases emitted as a result of human activities. Carbon dioxide's lifetime is difficult to represent with a single value because it moves at varying rates among different parts of the ocean–atmosphere–land system. Some excess CO_2 is absorbed quickly (for example, by the ocean surface), but some will remain in the atmosphere for thousands of years due in part to the very slow process by which carbon is transferred to ocean sediments. As explained in the Fourth National Climate Assessment, "[w]aiting to begin reducing emissions is likely to increase the damages from climate-related

[8] Northcott D., Sevadjian J., Sancho-Gallegos D.A., Wahl C., Friederich J., Chavez F.P. (2019) Impacts of urban carbon dioxide emissions on sea-air flux and ocean acidification in nearshore waters. PLoS ONE 14(3): e0214403. https://doi.org/10.1371/journal.pone.0214403 (submitted to the record in CARB Letter, May 31, 2019 (NHTSA-2018-0067-12411)).

[9] Osborne, E.B., Thunell, R.C., Gruber, N. *et al.* Decadal variability in twentieth-century ocean acidification in the California Current Ecosystem. *Nat. Geosci.* (2019) doi:10.1038/s41561-019-0499-z.

extreme events (such as heat waves, droughts, wildfires, flash floods, and stronger storm surges due to higher sea levels and more powerful hurricanes)."[10]

11. The more complex reality is that the cumulative effects of continued greenhouse gas emissions could potentially trigger what scientists refer to as climate tipping points. Thus, the timing and the amount of greenhouse gas emissions could also affect the likelihood of reaching climate tipping points. Tipping points are thresholds of abrupt and irreversible change (such as creating an irreversible shift to a hotter world with higher sea levels, changes in ocean circulation, or near-permanent drought in some regions). Two IPCC Special Reports (published in 2018 and 2019)[11,12] suggest that tipping points could be exceeded by warming of even between 1 and 2 degrees Celsius. The IPCC 2021 AR6 places new emphasis on climate tipping points. The report defines a tipping point as an "abrupt change"—a threshold that, once crossed, can cause elements of the Earth system to change into an entirely different state. These tipping points have varying degrees of probability but are high risk in that they could lead to

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[10] Global Change Research Program, Impacts, Risks, and Adaptation in the United States: National Climate Assessment, Volume I, at 1488 (2018).
[11] IPCC, *Global Warming of 1.5°C* (2018), https://www.ipcc.ch/sr15/.
[12] IPCC, *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (2019), https://www.ipcc.ch/site/assets/uploads/sites/3/2019/12/SROCC_FullReport_FINAL.pdf .

dramatic changes in the climate system. A commentary in the journal Nature warned that the acceleration of ice loss and other effects of climate change have brought the world "dangerously close" to tipping points.[13] As global temperature increases, threshold environmental events are increasingly likely to occur that will themselves significantly accelerate climate change beyond current projections. The IPCC is expected to develop a Special Report on "Climate Tipping Points and their Implications for Habitability and Resources" as part of the framework of the IPCC's 7th Assessment Cycle.[14]

California's Climate Laws and Light-Duty Vehicle Emission Standards

12. California has been proactive in taking steps to reduce greenhouse gas emissions. In 2004, California enacted the Nation's first law requiring limits on vehicular greenhouse gas emissions, Cal. Health & Safety Code § 43018.5, and CARB subsequently adopted regulations establishing such limits, 13 Cal. Code Regs. §§ 1961.1, 1961.3. In 2006, California enacted Assembly Bill (AB) 32, the Global Warming Solutions Act, requiring the State to reduce its greenhouse gas

[13] Timothy M. Lenton, et al., *Comment: Climate Tipping Points - Too Risky to Bet Against*, NATURE (Apr. 9, 2020) https://www.nature.com/articles/d41586-019-03595-0.

[14] Climate Tipping Points, Irreversibility and their Consequences for Society, Environment and Economies | Switzerland's Proposal for an IPCC Special Report: https://www.genevaenvironmentnetwork.org/events/climate-tipping-points-irreversibilty-and-their-consequences-for-society-environment-and-economies-switzerlands-proposal-for-an-ipcc-special-report/.

emissions to 1990 levels by 2020. This legislation directed CARB to adopt regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions. It further directed CARB to develop a Scoping Plan laying out California's strategy for meeting its climate goals, to be updated every five years. In 2016, the State Legislature set more ambitious goals in Senate Bill (SB) 32, which directs CARB to ensure that State greenhouse gas emissions are reduced 40% below 1990 levels by 2030. And in 2022, the State Legislature passed AB 1279, establishing targets of net-zero greenhouse gas emissions by 2045 (and net-negative thereafter) and a reduction of anthropogenic greenhouse gas emissions to 85% below 1990 levels by 2045.

13. As part of its efforts to reduce both greenhouse gas emissions and criteria pollutants (air pollutants with national ambient air quality standards), California has regulated emissions from light-duty vehicles since 1959. In 2012, CARB combined these emission standards and established its Advanced Clean Cars program. In 2013, California obtained from U.S. EPA a waiver of preemption under the Clean Air Act for this program (the 2013 waiver), including the State's vehicle criteria pollutant standards, greenhouse gas emission standards, and zero-emission vehicle (ZEV) mandate. In 2022, CARB adopted its Advanced Clean Cars II program, which further strengthened its zero-emission vehicle and criteria pollutant standards.

14. California's ZEV mandate is technology forcing, as it has required increasing numbers of ZEVs to be sold annually within the State since 2009.[15] And it has been successful: sales of ZEVs have risen to 25% of new car sales in California, equal to more than 450,000 ZEVs and plug-in hybrids in 2023.[16] California achieved its goal to have 1.5 million ZEVs sold by 2025 two years ahead of schedule, and its ZEV regulations are keeping California well on track to achieve its goal of 5 million ZEVs sold by 2030. California's light-duty vehicle greenhouse gas standards also produce year-over-year reductions in greenhouse gas emissions by about 5% per year for model years 2020 through 2025, at which point the standards flatline.[17] Because light-duty vehicles remain the largest source of emissions within the transportation sector and are responsible for about 70% of the State's transportation greenhouse gas emissions, California's light-duty vehicle greenhouse gas emission standards and the ZEV mandate with its resulting technological penetration were key pieces to California's 2017 and 2022 Scoping

[15] 13 Cal. Code Regs. §§ 1962.1, 1962.2.
[16] California Energy Commission (2023). New ZEV Sales in California. Data last updated December 31, 2023. Retrieved April 10, 2023 from https://www.energy.ca.gov/zevstats.
[17] 13 Cal. Code Regs. § 1961.3.

Plan updates, by which the State outlined how it would meet its increasingly stringent climate obligations.[18]

U.S. EPA's Light-Duty Vehicle Emission Standards

15. In 2023, U.S. EPA proposed to strengthen both its criteria and greenhouse gas emissions standards for light- and medium-duty vehicles for model years 2027-2032.[19] CARB submitted comments generally in support of the proposal, advocating for the most stringent standards feasible, demonstrating the proposed and more stringent alternatives are both achievable, and recommending further protections like anti-backsliding.[20] U.S. EPA finalized its emissions standards largely as proposed, though with some adjustments like a slower beginning trajectory for its greenhouse gas emission standards, an extra year phase in on its particulate matter standard, and a slightly higher fleet average emission standard for non-methane organic gases and oxides of nitrogen.[21] These standards

[18] *E.g.*, CARB, *California's 2017 Climate Change Scoping Plan* at 25 (Nov. 2017), https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf; CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (Dec. 2022), 2022 Scoping Plan Update (ca.gov).
[19] 88 Fed. Reg. 29,184 (May 5, 2023).
[20] Analysis in Support of Comments of the California Air Resources Board on Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles (July 5, 2023), Docket. No. EPA-HQ-OAR-2022-0829-0780.
[21] 89 Fed. Reg. 27,842 (April 18, 2024).

are anticipated to reduce greenhouse gas emissions by 7.2 billion metric tons cumulatively through 2055.[22]

16. U.S. EPA's emissions standards for model years 2027-2032 have now been challenged. Should these standards not go into effect, the critical emission reductions would not occur. This loss of greenhouse gas emissions reductions amplifies the risk of further climate impacts California is already facing, as discussed below.

Climate Change Impacts on California

17. California is one of the most geographically and ecologically diverse regions in the world, with landscapes ranging from chaparral and grasslands to sandy beaches and rugged coastal areas to redwood rainforests and dense interior forests to snow-covered alpine mountains to dry desert valleys. Each of these regions experiences a unique combination of impacts from climate change. From record temperatures to increasingly intense wildfires[23] to rising sea levels and

[22] *Id.* at 27,858, Table 5.
[23] N.S. Diffenbaugh, A.G. Konings, C.B. Field, (2021). Atmospheric variability contributes to increasing wildfire weather but not as much as global warming. Proceedings of the National Academy of Sciences Nov 2021, 118 (46) e2117876118; DOI: 10.1073/pnas.2117876118. https://www.pnas.org/content/118/46/e2117876118.

increasingly acidic seas[24] to less reliable snowpack[25] to increased risk of megaflooding,[26] climate change poses an immediate and escalating threat to California's environment, public health, and economic vitality.

18. California is already experiencing the effects of climate change, and it is expected that these effects will worsen in the coming decades, particularly if actions are not taken to mitigate greenhouse gas emissions. For instance, consistent with global and US observations, California temperatures have risen since records began in 1895, with the rate of increase accelerating since the 1980s.[27] Average summer temperatures in California have risen by approximately 3 degrees Fahrenheit (1.8 degrees Celsius) since 1896, with more than half of that increase occurring since the early 1970s. A wide range of impacts on ecosystems,

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[24] E.B. Osborne, et al., *Decadal Variability in Twentieth-century Ocean Acidification in the California Current Ecosystem*, 13 NAT. GEOSCI. 43–49 (2020), https://doi.org/10.1038/s41561-019-0499-z.

[25] P.W. Mote, et al., *Dramatic Declines in Snowpack in the Western US*, 1 NATURE PARTNER JS. CLIM. ATMOS. SCI. (2018), https://doi.org/10.1038/s41612-018-0012-1.

[26] Climate Change Doubles Megaflood Risk in California: https://climateadaptationplatform.com/climate-change-doubles-megaflood-risk-in-california/

[27] Office of Environmental Health Hazard Assessment, California Environmental Protection Agency (2018). Indicators of Climate Change in California. https://oehha.ca.gov/media/downloads/climate-change/report/2018caindicatorsreportmay2018.pdf.

human health, and well-being are associated with increased temperatures.[28] If global greenhouse gas emissions continue at current rates, the State will likely experience further warming.

19. Some of the most striking impacts of warming will be felt during short-period heat events (*e.g.*, days exceeding 106.6 degrees Fahrenheit). For example, if emissions continue at current rates, Fresno will likely suffer 43 extreme heat days per year between 2050 and 2099, 10 times more than its yearly average between 1961 and 2005. Moreover, the mid-summer heat waves are getting stronger in generally cooler, more moderate coastal areas where millions of Californians live.[29] Coastal regions and central Los Angeles will experience three times more days of temperatures over 95 degrees Fahrenheit, and the San Fernando and San Gabriel Valleys will also have even more extremely hot weather. By mid-century, the number of counties experiencing at least one day with a heat index above 125 degrees Fahrenheit is projected to increase from 50 to over 1,000.[30] Extreme heat is the leading cause of climate-related deaths, and it is

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[28] Office of Environmental Health Hazard Assessment, *Indicators of Climate Change*, oehha.ca.gov/climate-change/document/indicators-climate-change-california.

[29] How will temperature change in California: https://scripps.ucsd.edu/research/climate-change-resources/faq-climate-change-california

[30] John Muyskens et al., The Washington Post, *More dangerous heat waves are on the way: See the impact by Zip code* (Aug. 15, 2022), available at

the deadliest climate threat already affecting Californians, claiming more lives than wildfires, floods, or drought. Scientists predict that climate change will continue to cause even more extreme heat in the future.

20. The increasing temperatures and occurrence of extreme heat events are requiring local governments to expand the provision of cooling centers. Each cooling center costs around $2,000 per day to operate.[31] The State's 2021-2022 spending plan also included, for the first time, a 3-year climate resiliency package totaling $3.7 billion, with $800 million specifically allocated for extreme heat-related efforts (including mitigation, urban greening, and community resilience centers);[32] subsequent spending plans have maintained similar resiliency

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https://www.washingtonpost.com/climate-environment/interactive/2022/extreme-heat-risk-map-us/.

[31] *E.g.*, Chris Nichols, *Despite The Heat, Few Take Advantage Of Sacramento Cooling Centers*, CAPRADIO (June 18, 2021), Despite The Heat, Few Take Advantage Of Sacramento Cooling Centers - capradio.org; Emily Alpert Reyes, *L.A. suffered deadly heat, yet chairs sat empty at its cooling centers*, L.A. TIMES (Sept. 19, 2020), Few used L.A. cooling centers during record heat wave - Los Angeles Times (latimes.com); *see also* Lance Howland, *In High-Temperature Areas, What are Cities and Counties Doing For Residents?*, PUBLICCEO (July 14, 2009), In High-Temperature Areas, What are Cities and Counties Doing For Residents? – PublicCEO.

[32] Legislative Analyst's Office, *The 2021-22 California Spending Plan: Natural Resources and Environmental Protection* (Oct. 18, 2021), The 2021-22 Spending Plan: Natural Resources and Environmental Protection (ca.gov).

packages.[33] Having to expand these services and efforts in response to the changing climate comes at the expense of other actions for the public benefit.

21. Warmer air temperatures alter precipitation and runoff patterns, affecting the availability of freshwater supplies and increasing the risk of severe weather events. In addition to aggravating drought conditions, climate change also increases the risk of a California megaflood. The intense rainfall California faced in early 2023 caused landslides and floods, leading to billions of dollars in damage and at least 20 deaths. Similarly, in early 2024, a powerful atmospheric river—a narrow but intense jet of Pacific Ocean moisture—resulted in landslides that destroyed homes and blocked roads, powerful winds, and power outages.[34] Atmospheric rivers are also predicted to become more extreme as the climate warms, with a sharp increase in rainfall rates.

22. California's infrastructure is at increasing risk from climate change. California owns and operates a wide range of physical assets and infrastructure, including the state highway system, university campuses, parks, and historic structures. These assets are worth billions of dollars, and the State uses this

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[33] *E.g.*, Legislative Analyst's Office, *The 2023-24 California Spending Plan: Resources and Environmental Protection* (Oct. 16, 2023), The 2023-24 California Spending Plan: Resources and Environmental Protection.

[34] Climate Change Doubles Megaflood Risk in California: https://climateadaptationplatform.com/climate-change-doubles-megaflood-risk-in-california/

infrastructure to provide critical services to its residents. Climate change impacts, including sea-level rise, more severe heat days, more frequent drought, increased risk of wildfires, and increased risk and intensity of floods, heighten the risk of the State's infrastructure being damaged or lost, disruption to the State providing key services, and impairment of natural habitats within the State.[35]

23. Ocean-driven melting of floating ice shelves in the Amundsen Sea is currently the main process controlling Antarctica's contribution to sea-level rise.[36] Melting ice from Antarctica is causing higher sea-level rise in California than the global average. California has the nation's largest ocean economy, valued at over $44 billion per year, with the vast majority of it connected to coastal recreation and tourism as well as ports and shipping. Many of the facilities and infrastructure that support California's ocean economy—not to mention the public beaches themselves—lie within a few feet of the present high tide line. Rising sea levels from global warming thus are the leading cause of the biggest impacts on California's coastal land, infrastructure, and development, through more frequent

[35] Legislative Analyst's Office, *Assessing Vulnerability of State Assets to Climate Change* (Jan. 9, 2020), https://lao.ca.gov/Publications/Report/4133.

[36] Naughten, K.A., Holland, P.R. & De Rydt, J. Unavoidable future increase in West Antarctic ice-shelf melting over the twenty-first century. Nat. Clim. Chang. 13, 1222–1228 (2023). https://doi.org/10.1038/s41558-023-01818-x

flooding and inundation as well as increased cliff, bluff, dune, and beach erosion.[37]

24. In addition, a warming climate in the western United States is causing changes to the wildfire regime, with wildfires increasing in frequency, duration, and severity in the western United States.[38,39,40] A 2016 study published in Proceedings of the National Academy of Sciences concluded that anthropogenic climate change has doubled the cumulative wildfire area burned in the West during 1984–2015.[41] California's annual wildfire extent has increased fivefold

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[37] G. Griggs, et al. (California Ocean Protection Council Science Advisory Team Working Group), *Rising Seas in California: An Update on Sea-Level Rise Science. California Ocean Science Trust* (Apr. 2017).

[38] Anthony LeRoy Westerling, *Wildfire Simulations for the Fourth California Climate Assessment: Projecting Changes in Extreme Wildfire Events with a Warming Climate* in *California's Fourth Climate Change Assessment*, Cal. Energy Commiss'n, Pub. No. CCCA4-CEC-2018-014 (2018), http://www.climateassessment.ca.gov/techreports/docs/20180827-Projections_CCCA4-CEC2018-014.pdf.

[39] J.K. Balch, et al., *Human-started Wildfires Expand the Fire Niche Across the United States*, 114(11) Proc. of the Nat'l Acad. of Sci. 2946–51 (2017), https://doi.org/10.1073/pnas.1617394114.

[40] Kasha Patel, *6 Trends to Know about Fire Season in the Western U.S.*, NASA, Earth Matters (Nov. 29, 2018), https://earthobservatory.nasa.gov/blogs/earthmatters/category/natural-hazards/.

[41] B.J. Harvey, *Human-caused Climate Change is Now a Key Driver of Forest Fire Activity in the Western United States*, 113 Proc. of the Nat'l Acad. Sci. USA 11649–50 (2016).

since the 1970s.[42] This trend was mainly due to an eightfold increase in summertime forest-fire area and was very likely driven by the drying of fuels promoted by human-induced warming.[43] Tracking with rising temperatures, California's 2020 fire season was record-breaking, not only because over 4 million acres burned but also because 5 of the 6 largest wildfires in California history occurred in 2020.[44] Some of those fires burned so hot that they created their own tornadoes and lightning storms.[45]

25. California's Fourth Climate Change Assessment[46] states that "[c]limate change will make forests more susceptible to extreme wildfires" and suggests that climate change will lead to wildfires in the next few decades that will

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[42] Williams, A. P., Abatzoglou, J. T., Gershunov, A., Guzman-Morales, J., Bishop, D. A., Balch, J. K., & Lettenmaier, D. P. (2019). Observed impacts of anthropogenic climate change on wildfire in California. Earth's Future, 7, 892–910. https://doi.org/10.1029/2019EF001210

[43] A.P. Williams, et al., *Observed Impacts of Anthropogenic Climate Change on Wildfire in California*, 7 EARTH'S FUTURE 892–910 (2019), https://doi.org/10.1029/2019EF001210.

[44] John Myers, "California unveils sweeping wildfire prevention plan amid record fire losses and drought," LA TIMES, Apr. 8, 2021, https://www.latimes.com/california/story/2021-04-08/california-wildfire-prevention-536-million-newsom-lawmakers; Burke at al., *The Changing Risk and Burden of Wildfire in the United States*, PNAS 118(2) e2011048118 (Jan. 12. 2021), https://doi.org/10.1073/pnas.2011048118.

[45] A.P. Williams, et al., Observed Impacts of Anthropogenic Climate Change on Wildfire in California, 7 EARTH'S FUTURE 892–910 (2019), https://doi.org/10.1029/2019EF001210.

[46] CA.GOV, California's Fourth Climate Change Assessment, http://www.climateassessment.ca.gov/.

be unprecedented in size and severity.[47] If greenhouse gas emissions continue to rise, one study found that by 2100, the frequency of extreme wildfires burning 25,000 acres or more would increase by nearly 50%, and the average area burned statewide would increase by 77%.[48]

26. California's wildfire spending has already more than tripled since 2005 because of the climate-change-induced increase in the number and severity of wildfires.[49] And the State's 2021-2022 spending plan included an almost fivefold increase in funding for wildfire prevention and forest health improvement.[50] As greenhouse gas emissions rise and extreme wildfires expand, California's expenditures will only continue to increase at the expense of other funds and services.

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[47] State of California, *California's Fourth Climate Change Assessment: Statewide Summary Report* at 9 (2018), https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018013_Statewide_Summary_Report_ADA.pdf.

[48] *Id.*

[49] Adam Beam, *California Oks new spending on drought, wildfire prevention*, ASSOCIATED PRESS (Sept. 9, 2021), California OKs new spending on drought, wildfire prevention | AP News; *see also* Legislative Analyst's Office, *State Wildfire Response Costs Estimated to Be Higher Than Budgeted*, Fig. 3 (Oct. 19, 2020), State Wildfire Response Costs Estimated to Be Higher Than Budgeted (ca.gov).

[50] Legislative Analyst's Office, *The 2021-22 California Spending Plan: Natural Resources and Environmental Protection* (Oct. 18, 2021), The 2021-22 Spending Plan: Natural Resources and Environmental Protection (ca.gov).

27. Public health concerns are also increasing over wildfires that reach the wildland-urban-interface (zone of transition between unoccupied and undeveloped land and human development), where human-made objects are engulfed and burned, releasing diverse and mostly uncharacterized levels of air toxics and reactive chemicals into the atmosphere. Wildfire smoke is often transported to local and regional population centers, affecting the surface-level air quality and worsening air pollution exposures to air pollutants. For example, during the 2020 wildfire season, California came under siege from record-breaking heat waves and smoke from more than 7,000 fires burning simultaneously, and the Bay Area even awoke to an eerie deep-orange sky.[51] A study suggests that smoke from wildfires like these is a rapidly growing health threat and could become one of the deadliest climate impacts within decades.[52] Continued climate change will further amplify

[51] Thomas Fuller & Christopher Flavelle, "A Climate Reckoning in Fire-Stricken California," N.Y. TIMES, Sept. 18, 2020, https://www.nytimes.com/2020/09/10/us/climate-change-california-wildfires.html.
[52] Tony Barboza, "Wildfire smoke now causes up to half the fine-particle pollution in Western U.S., study finds," L.A. TIMES, Jan. 13, 2021, https://www.latimes.com/california/story/2021-01-13/wildfire-smoke-fine-particle-pollution-western-us-study (new study blames climate change for worsening air quality and health risks in both urban and rural communities in recent years); Marshall Burke, et al., *The Changing Risk and Burden of Wildfire in the United States*, PNAS 118(2) e2011048118 (Jan. 12. 2021), https://doi.org/10.1073/pnas.2011048118.

the number of days with extreme fire weather by the end of the century (absent any additional actions taken in accordance with the U.N. Paris commitments).[53]

28. Wildfires also damage crops and soil, harm livestock, and create a high-risk environment for agricultural workers. As the largest agricultural-producing state in the U.S., California farmers are carrying an unimaginable burden right now to protect their land, animals, families, and workers while providing continued sustenance for the world. Agricultural land restoration efforts are essential after a wildfire but come with a considerable cost at a time when those affected are recovering from substantial losses. In 2020, industry estimates show California growers had losses of $601 million from unharvested wine grapes that went unharvested.[54] Estimates on the full economic impact of wildfires on agriculture for the 2020 fire season are still being investigated. For instance, in 2017, fires in Napa and Sonoma caused an estimated $75 million in economic loss, but that number does not account for the loss of buildings used for agriculture proposes. Furthermore, based on the location of many recent fires, a bigger impact is expected compared to 2017 estimates.

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[53] Michael Goss, et al., *Climate Change is Increasing the Risk of Extreme Autumn Wildfire Conditions Across California*, ENVT'L RES. LETTERS (2020), DOI: 10.1088/1748-9326/ab83a7.

[55] *E.g.*, American Lung Association, *State of the Air 2018* at 4, https://www.lung.org/assets/documents/healthy-air/state-of-the-air/sota-2018-full.pdf.

29. Climate change also exacerbates other air pollution problems throughout California. Increasing temperatures generally cause increases in ozone concentrations in California's polluted regions.[55] The increasing frequency and intensity of wildfires are already having a measurable effect on air quality.[56] For instance, in 2020, intense heat waves and widespread wildfire smoke caused Southern California to experience worse air pollution readings and the highest number of health-damaging bad air-days since the mid-1990s. There were 157 bad-air days for ozone pollution across the vast, coast-to-mountains basin spanning Los Angeles, Orange, Riverside, and San Bernardino Counties—the most days above the federal health standard since 1997.[57] And particulate matter exposure is a heightened problem during droughts, which climate change is also

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[55] *E.g.*, American Lung Association, *State of the Air 2018* at 4, https://www.lung.org/assets/documents/healthy-air/state-of-the-air/sota-2018-full.pdf.

[56] Proc. of the Nat'l Acad. Sci. USA (Jul. 16, 2018), pii: 201804353, doi: 10.1073/pnas.1804353115, https://www.ncbi.nlm.nih.gov/pubmed/30012611; *see also* X. Liu, et al., *Airborne Measurements of Western U.S. Wildfire Emissions: Comparison with Prescribed Burning and Air Quality Implications*, 122 J. GEOPHYS. RES. ATMOS. 6108-29 (2017), doi:10.1002/2016JD 026315 (showing that wildfires emit fine particulate matter at over three times the level previously estimated).

[57] Tony Barboza, "L.A. began 2020 with a clean-air streak but ended with its worst smog in decades," L.A. Times, Dec. 6, 2020, https://www.latimes.com/california/story/2020-12-06/2020-la-air-quality-southern-california-pollution-analysis.

anticipated to exacerbate in California as changes in weather patterns could block rainfall from reaching the State.[58,59] Worse air quality leads to an increased risk of respiratory infections like bronchitis and pneumonia, which will result in greater health costs to the State.[60,61,62]

30. Despite successes in increasing agricultural yields in the state, California's agriculture is uniquely vulnerable to climate change. Rising temperatures, constrained water resources, and increased pest and disease pressure are among the climate change impacts that threaten to fundamentally challenge California agriculture in the coming years and decades. Climate change has the potential to increase the number and intensity of extreme weather events in the

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[58] A.P. Williams, et al., *Contribution of Anthropogenic Warming to California Drought During 2012-2014*, 42 GEOPHYS. RES. LETT. 6819–28 (2015), http://doi.org/10.10022015GL064924.

[59] I. Cvijanovic, B.D. Santer, C. Bonfils, C. et al., *Future Loss of Arctic Sea-ice Cover Could Drive a Substantial Decrease in California's Rainfall*, 8 NAT. COMMUN. 1947 (2017), https://doi.org/10.1038/s41467-017-01907-4.

[60] John A. Romley, Andrew Hackbarth & Dana P. Goldman, *Cost and Health Consequences of Air Pollution in California*, Santa Monica, CA, RAND Corp. (2010), https://www.rand.org/pubs/research_briefs/RB9501.html.

[61] M. Wang, C.P. Aaron, J. Madrigiano, et al., *Association Between Long-term Exposure to Ambient Air Pollution and Change in Quantitatively Assessed Emphysema and Lung Function*, 322(6) J. AM. MED. ASSOC. 546-56 (2019), doi:10.1001/jama.2019.10255.

[62] A. Inserro, *Air Pollution Linked to Lung Infections, Especially in Young Children*, AM. J. MANAGED CARE (May 6, 2018), https://www.ajmc.com/newsroom/air-pollution-linked-to-lung-infections-especiallyin-young-children.

State, which may have profound impacts on agriculture. For example, flooding in the Delta and Central Valley farmland is likely to increase due to the combination of rapid snow melt resulting from warmer temperatures in the Sierra Nevada and increased winter and spring rainfall.[63] The magnitude and persistence of droughts are also expected to increase,[64] and thus, constrained water resources will be among the most challenging effects of climate change on California agriculture. Therefore, we can expect more extreme droughts to continue into the end of the 21st century, with decreased precipitation frequency from fewer non-atmospheric river storms and long-term declines in groundwater, which cannot frequently recover from subsequent wet weather conditions. As reported in IPCC 2021 AR6,[65] there is high confidence that groundwater depletion has occurred since at least the start of the 21st century as a consequence of groundwater withdrawals for irrigation in agricultural areas in drylands (e.g., the United States southern High

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[63] *E.g.*, CA Dept. of Water Resources, *Changing Climate, Shift to More Extreme Weather Intensify Risk of Flooding in California* (Dec. 16, 2022), https://water.ca.gov/News/News-Releases/2022/Dec-22/Changing-Climate-Shift-to-More-Extreme-Weather-Intensify-Risk-of-Flooding-in-California; Minxue He, Assessing Changes in 21st Century Mean and Extreme Climate of the Sacramento–San Joaquin Delta in California, *Climate* 2022, *10*, 16, https://doi.org/10.3390/cli10020016.

[64] *E.g.*, California Climate Commons, *Overview of Projected Change in the California Central Valley*, http://climate.calcommons.org/article/central-valley-change.

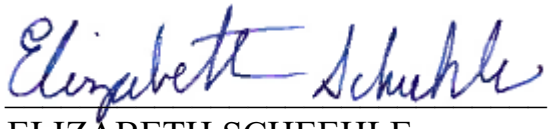
[65] https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

Plains and California Central Valley). In California, where a $50 billion agricultural industry grows more than a third of the country's vegetables and two-thirds of its fruits and nuts, farmers have seen wells dry up, and access to State surface water allocations slashed to zero. If greenhouse gas emissions continue to rise, California's agricultural industry will be increasingly harder hit, with both revenues decreasing and food prices for residents increasing.

31. Increased greenhouse gas emissions from overturning U.S. EPA's emissions standards for model years 2027 through 2032 will worsen these climate impacts throughout California.

I certify under penalty of perjury under the laws of the State of California and the United States of America that the foregoing is true and correct to the best of my knowledge and belief.

Executed on April 22, 2024, at Sacramento, County of Sacramento, California.



ELIZABETH SCHEEHLE

DECLARATION OF SYLVIA VANDERSPEK

I, Sylvia Vanderspek, declare as follows:

Relevant expertise

1. I make this declaration based upon my knowledge and expertise in the matters within, my review of the relevant rulemakings, reports, and other documents discussed below, and (where indicated) information provided by my colleagues at the California Air Resources Board (CARB). I submit this declaration in support of Movant-Intervenor State of California's Motion to Intervene in this challenge.

2. I am the Chief of the Air Quality Planning Branch in the Air Quality Planning & Science Division at CARB. I have held this position since May 2013.

3. I am the lead manager responsible for the federal Clean Air Act (Act) state implementation planning and control strategy planning throughout the State for meeting air quality standards. The State Implementation Plan is required by the Act for areas that do not meet air quality standards and describes how those air quality standards will be met by their attainment deadline. As part of the control strategy planning, I oversaw the development of the 2016 Mobile Source Strategy[1] and 2020 Mobile Source Strategy[2] integrating the technologies for and approaches

[1] Mobile Source Strategy (May 2016), https://ww3.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf.
[2] Mobile Source Strategy (Oct. 2021), 2020 Mobile Source Strategy (ca.gov).

to criteria emission reductions with climate and toxic emission reductions in the mobile source sector. The Mobile Source Strategies build upon past and inform future State Implementation Plans as well as California's Climate Change Scoping Plan and Community Emission Reduction Plans.

4. In fulfilling my responsibilities as the lead manager for Act state implementation planning throughout the State, I routinely review relevant plans and reports, and in doing so rely on my knowledge of: atmospheric modeling of air pollution, atmospheric reactions that contribute to air pollution, air pollution trends and projections, other causes of air pollution, and the health effects of air pollution. My knowledge of atmospheric modeling, including the atmospheric reactions that contribute to air pollution, is critical to my management of State Implementation Plan planning in order to identify the most effective strategies for providing healthy air for the residents of California. I also use my knowledge of air pollution trends and emissions, along with future emission projections, when overseeing the selection of future strategies and their impact on air quality. And as part of the State Implementation Plan planning process, I must analyze the health effects of criteria pollutants and other air pollutants.

5. Prior to this, I was the manager of the Particulate Matter Analysis Section in the Planning and Technical Support Division at CARB from February 2006 until May 2013. In that role, I supervised the development of particulate

matter State Implementation Plans statewide and ozone State Implementation Plans for the San Joaquin Valley air basin. In addition, I oversaw development of the technical support analyses required to address particulate matter pollution and meet air quality standards in California.

6. Prior to that, I was a staff member of the Transportation Strategies Section in the Planning and Technical Support Division from April 2001 until February 2006 working on particulate matter and ozone State Implementation Plans.

7. I have a Bachelor of Science in Agricultural Engineering from California Polytechnic State University, San Luis Obispo.

Clean Air Act planning obligations

8. The Act requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants. The Act also requires states to develop and enforce implementation plans for "nonattainment" areas, i.e., areas of the State that do not meet the NAAQS or contribute to a nearby area that does not meet the NAAQS. Nonattainment areas have air pollution surpassing levels the federal government has deemed requisite to protect public health and the environment.

9. The NAAQS for two of these criteria pollutants—ozone and fine particulate matter ($PM_{2.5}$)—are particularly relevant in California. California

suffers some of the worst air pollution in the nation. The South Coast and San Joaquin Valley air basins are the only two regions in the country classified as 'Extreme'—the worst category—for nonattainment of the federal ozone NAAQS of 70 parts per billion (ppb). These areas also suffer some of the worst levels of $PM_{2.5}$ pollution.

10. For all of the State's nonattainment areas, California must implement all reasonably available pollution control measures as expeditiously as practicable. California's ozone and $PM_{2.5}$ nonattainment areas rely on immediate emission reductions to provide critical health benefits and to demonstrate attainment of the NAAQS in those areas with near-term attainment dates. California also has an interest in reducing harmful pollution across the State—including in areas that have attained the federal NAAQS—both because California must at least maintain attained air quality and because reducing this harmful pollution protects human health and the environment.

11. For the South Coast and San Joaquin Valley air basins, there are impending deadlines to attain various NAAQS: 2024 for 24-hour $PM_{2.5}$, 2025 for annual $PM_{2.5}$, 2031 for 75 ppb ozone, and 2037 for 70 ppb ozone. Attaining these NAAQS, especially for ozone, requires sustained, comprehensive action to reduce emissions from all categories of sources. For instance, to achieve the ozone

NAAQS by 2037, CARB must reduce smog-forming NOx emissions from on-road light-and heavy-duty vehicles by 80% from 2018 levels.[3]

12. Other areas of California also do not meet the NAAQS. For example, the Sacramento ozone nonattainment area is required to attain the 70 ppb 8-hour ozone NAAQS by 2032.

13. If an area attains an air quality NAAQS and is redesignated as attainment, it must develop a maintenance plan with measures and controls ensuring its air quality levels continue to remain below the NAAQS.

14. If an area does not attain an air quality NAAQS by the applicable deadline under the Act, the consequences are substantial. In addition to the public health and environmental consequences, failure to meet a NAAQS in the time required imposes additional obligations on the State to develop and submit a new plan that could lead to increased costs and restrictions on the myriad activities that cause air pollution.

15. California also has its own Clean Air Act, under which CARB has established state ambient air quality standards. These standards are generally more stringent than their federal counterparts, and CARB and the local air districts are mandated to meet and maintain those standards as well.[4]

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[3] *See, e.g.*, CARB, 2022 State Strategy for the State Implementation Plan at 14, 39 (Sept. 22, 2022), 2022 State SIP Strategy (ca.gov).

[4] *E.g.*, Cal. Health & Safety Code §§ 39606, 40910–40930.

EPA's emissions standards for model years 2027-2032 lower criteria pollutant and greenhouse gas emissions.

16. In 2023, EPA proposed to strengthen both its criteria and greenhouse gas emissions standards for light- and medium-duty vehicles for model years 2027-2032.[5] CARB submitted comments generally in support of the proposal, advocating for the most stringent standards feasible, demonstrating the proposed and more stringent alternatives are both achievable, and recommending further protections like anti-backsliding.[6] EPA finalized its emissions standards largely as proposed, though with some adjustments like a slower beginning trajectory for its greenhouse gas emission standards, an extra year phase in on its particulate matter standard, and a slightly higher fleet average emission standard for non-methane organic gases and NOx.[7] These standards are anticipated to reduce annual emissions of $PM_{2.5}$ by 8,700 tons and NOx by 36,000 tons by 2055, and to cumulatively reduce greenhouse gases by 7.2 billion metric tons by 2055.[8] Additionally, EPA projects these standards will avoid up to 2,000 $PM_{2.5}$-related premature deaths and up to 550 ozone-related premature deaths.[9]

[5] 88 Fed. Reg. 29,184 (May 5, 2023).
[6] Analysis in Support of Comments of the California Air Resources Board on Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles (July 5, 2023), Docket. No. EPA-HQ-OAR-2022-0829-0780.
[7] 89 Fed. Reg. 27,842 (April 18, 2024).
[8] *Id.* at 27,858, Tables 5 & 6.
[9] *Id.* at 27,860.

17. EPA's emissions standards for model years 2027-2032 have now been challenged. Should these standards not go into effect, the critical greenhouse gas emissions reductions would not occur, and California would expect to see elevated criteria pollutant emissions increases from out-of-state vehicles traveling in California as well as from oil refining.[10] Additionally, higher greenhouse gas emissions would also aggravate criteria pollution. Such emission increases harm California in a number of ways, as described below.

18. As noted above, CARB already must reduce NOx emissions from on-road vehicles by 80% from 2018 levels in order to achieve federal ozone NAAQS. State Implementation Plans under the Act are required to include all reasonably available control measures,[11] which California's do.[12] Any further increase in criteria pollutant emissions in California, like from higher-emitting out-of-state vehicles driving in California, makes attaining the State and federal ambient air quality standards that much more difficult. There is also substantial cost associated with those additional emissions reductions. For instance, in 2021 CARB updated the base cost-effectiveness threshold for its Carl Moyer Program to $33,000 per ton

[10] California has its own vehicle emissions standards that apply to vehicles sold in California.
[11] Clean Air Act §§ 172(c)(1), 182(a)(2), 42 U.S.C. §§ 7502(c)(1), 7511a(a)(2).
[12] *See, e.g.*, CARB, *Staff Report: CARB Review of the 2022 Air Quality Management Plan for the 70 parts per billion 8-hour Ozone Standard in the South Coast Air Basin and Coachella Valley* at 26 (Dec. 16, 2022), Staff Report (ca.gov); CARB, Resolution 23-4, Final Resolution 23-4 (ca.gov).

of NOx with an optional on-road zero-emission technology cost-effectiveness threshold of $500,000 per ton.[13]

19. In addition, EPA's new standards will reduce greenhouse gas emissions by up to 7.2 billion metric tons by 2055; vacating the standards would mean those reductions are not realized, which will increase the harmful effects of climate change. Several of these climate impacts are making it more difficult for California to attain and maintain State and federal ambient air standards for ozone and particulate matter. For example, the concentrations of both pollutants depend strongly on temperature. Studies indicate that increasing temperatures generally cause increases in ozone concentrations in California's polluted regions due to accelerated chemical reaction rates as well as heighten disparities with and difficulties addressing particulate matter.[14] Additional emission controls will need

[13] CARB, Resolution 21-24 at 8, 15, 16, RESO 21-24 PRO FY21-22 Funding Plan (ca.gov). In other contexts and within certain air districts, prices per ton are even higher. For instance, the South Coast Air Quality Management District's maximum cost-effectiveness value for NOx best available control technology ranged from $38,355–38,706 per ton in 2023. South Coast AQMD, *2023 South Coast Air Quality Management District BACT Maximum Cost Effectiveness Values ($/Ton)*, 2023q4_equipment_cost_index.pdf (aqmd.gov). And the twelve-month rolling average price per ton for South Coast's NOx RECLAIM Trading Credits was $47,864 for January-December 2022 and $17,686 for January-December 2023. South Coast AQMD, Twelve-Month and Three-Month Rolling Average Price of Compliance Years 2023 and 2024 NOx and SOx RTCs (October – December 2023), Summary (aqmd.gov).

[14] For instance, the American Lung Association's *State of the Air: 2018* report found that California's ozone levels rose significantly in 2016 due to extreme

to be implemented to make up for the "climate penalty" that causes higher air pollutant concentrations.[15,16,17]

20. The increased frequency of wildfires and droughts due to climate change will also impede progress toward attainment and maintenance. Decades of air pollution gains within the western United States are being erased by the increasing number and severity of wildfires.[18] Smoke from wildfires contains $PM_{2.5}$, which is the most damaging size of particulate matter for human health. For instance, from August through October 2020, massive wildfires up and down the State blanketed large portions of California with smoke for weeks, turning the skies orange and producing some of the worst air quality in the world. These fires

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temperatures (page 4), and its *State of the Air* reports for 2021, 2022, and 2023 have consistently noted the continuing role warming temperatures play on air quality (respectively, pages 13 & 14, State of the Air 2021 (lung.org); page 11, State of the Air 2022 (lung.org); page 12, State of the Air Report (PDF) (lung.org)). Both the 2022 and 2023 *State of the Air* reports highlight the increasing disparity driven by climate change among western and eastern states with respect to particulate matter: in 2004, most of the states struggling with daily spikes and higher annual concentrations of particulate matter were east of the Rocky Mountains, but now most or all of those states are in the West, with California still having the greatest share of cities with the highest levels.

[15] D.J. Jacob & D.A. Winner, *Effect of Climate Change on Air Quality*, ATMOS. ENVIRON. 43, 51−63 (2009).

[16] S. Wu, et al., *Effects of 2000−2050 Global Change on Ozone Air Quality in the United States*, J. GEOPHYS. RES.-ATMOS., 113 (2008).

[17] A.M. Fiore, et al., *Air Quality and Climate Connections*, J. AIR WASTE MANAGE. ASSOC. 65 (6), 645–685 (2015).

[18] Proc. Nat'l Acad. Sci. (Jul. 16, 2018), https://www.ncbi.nlm.nih.gov/pubmed/30012611.

caused significant increases in $PM_{2.5}$ throughout the State and contributed to an increase in the number of high ozone "bad air" days in the South Coast Air Basin to levels not seen in over two decades.[19] Similarly, climate change is increasing the frequency of droughts, which will increase wind erosion and ambient dust concentration.[20] As soils become increasingly dry during a drought, dust from the ground is more likely to become airborne. Particulate matter suspended in the air from these events or from wildfire smoke can increase the risk for respiratory infections like bronchitis and pneumonia, which will result in greater health costs to the State.[21,22]

21. Should EPA's emissions standards for model years 2027-2032 be vacated, the higher criteria emissions would need to be mitigated by developing additional control measures. But California's implementation plans already include

[19] The Fresno Bee, "California's air quality is the worst in the nation. How to protect yourself" (Sept. 8, 2020), https://www.fresnobee.com/news/california/fires/article245574900.html; Los Angeles Times, "L.A. began 2020 with a clean-air streak, but ended with its worse smog in decades" (Dec. 6, 2020), https://www.latimes.com/california/story/2020-12-06/2020-la-air-quality-southern-california-pollution-analysis.

[20] M.C. Duniway, et al., *Wind Erosion and Dust from US Drylands: A Review of Causes, Consequences, and Solutions in a Changing World*, ECOSPHERE 10(3) (2019).

[21] C. Stanke, et al., *Health Effects of Drought: A Systematic Review of the Evidence*, PLOS CURRENTS, 5 (2013).

[22] *See, e.g.*, C.G. Jones, et al., *Out-of-Hospital Cardiac Arrests and Wildfire-Related Particulate Matter During 2015-2017 California Wildfires*, J. AM. HEART ASSOC. 9(8) (2020).

all reasonably available control measures and other measures necessary to attain the federal NAAQS by the Act's deadlines. Section 182(e)(5) of the Act allows Extreme ozone nonattainment areas to anticipate development of new control techniques or improvement of existing control technologies and rely on those to demonstrate attainment in the implementation plan. CARB has worked with the South Coast air district to include these new or improved technologies expectations into the existing implementation plan.[23] Developing additional control measures to grapple with the additional criteria pollutant emissions from vacating the emissions standards for model years 2027-2032 would be onerous and costly in all nonattainment areas, but will be particularly so in the South Coast and San Joaquin Valley air basins.

I certify under penalty of perjury under the laws of the State of California and the United States of America that the foregoing is true and correct.

Executed on April 22, 2024, at Sacramento, County of Sacramento, California.

Sylvia Vanderspek

SYLVIA VANDERSPEK

[23] *See* 84 Fed. Reg. 52,005 (Oct. 1, 2019) for EPA's approval of California's comprehensive plan for the South Coast air basin to meet multiple ozone NAAQS that relies on new technologies under Section 182(e)(5) of the Clean Air Act, and additional commitments from the District to reduce emissions.

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

COMMONWEALTH OF KENTUCKY, *et al.*, Petitioners, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, Respondent.	No. 24-1087

DECLARATION OF TYLER SOLEAU

I, Tyler Soleau, declare of my personal knowledge as follows:

1. I am currently employed by the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) as Acting Director and Assistant Director of the Office of Coastal Zone Management (CZM). CZM is the lead policy, technical assistance, and planning agency on coastal and ocean issues in Massachusetts. I have held this position for over four years. I have been employed by CZM since 2019. Prior to joining CZM, I held positions at Sungage Financial, the Acadia Center, and the Massachusetts Legislature.

2. I have extensive professional knowledge and experience regarding the impacts of climate change on coastal resources and communities in Massachusetts,

as well as Massachusetts' efforts to plan and prepare for such impacts. My job duties include providing oversight and administration for CZM and directing policy development, planning efforts, and technical approaches for CZM program areas. I supervise a team of 30 plus multidisciplinary professionals working in a range of program areas, including climate change adaptation and coastal resilience administered as CZM's StormSmart Coasts Program. Many of the staff I oversee have significant professional experience in coastal and environmental management, planning, science, policy, and other related fields. I routinely engage and partner with scientific and technical subject matter experts in federal agencies and academia. As part of my management responsibilities, I oversee CZM's work to provide information, strategies, tools, and financial resources to support communities and people working and living on the Massachusetts coast to address the challenges of erosion, flooding, storms, sea level rise, and other climate-change impacts. For instance, I oversee the development of sea level rise decision-support tools and services including inundation maps and guidance documents. I also direct CZM's work to provide policy and planning support and technical assistance to other state agencies, local communities, and private entities regarding adapting and increasing resilience to current and future impacts of climate change on our coast. For example, I oversee CZM's StormSmart Coasts Program that offers competitive grants, hands-on technical and planning assistance, and decision-support tools to

Massachusetts cities and towns and non-profit organizations for the purposes of planning for and adapting to sea level rise and other climate-change-related coastal hazards.

3. In my role with CZM, I chair and participate in various legislative and executive branch groups, including the Massachusetts Ocean Advisory Commission and Science Advisory Council and associated work groups and the Seaport Economic Council. I also represent the Commonwealth of Massachusetts (Commonwealth) on several multi-state organizations, including the Coastal States Organization, Northeast Regional Ocean Council, the Gulf of Maine Council on the Marine Environment and Bureau of Ocean Energy Management's Gulf of Maine Intergovernmental Renewable Energy Task Force.

4. I have a bachelor's degree in Government from Hamilton College and a Juris Doctor degree from Vermont Law School.

5. I am aware of and familiar with the science related to global and local climate change. My knowledge comes from my review of scientific peer-reviewed literature and consensus assessment reports, attendance at professional conferences and workshops, and professional exposure to other research and material. As a result of my professional experience and my knowledge of the peer-reviewed literature and reports, as well as my knowledge of the Massachusetts coastal resources and policies and planning related thereto, I can attest to the following.

6. The purposes of this declaration are to: (i) briefly describe the serious harms that climate change, caused in part by greenhouse gas pollutant emissions from vehicles, including light-duty and medium-duty vehicles, is causing and will continue to cause to Massachusetts' coastal resources, infrastructure, and communities; and (ii) briefly summarize extensive state and local initiatives, programs, and plans to respond to and prepare for such impacts.

7. I am submitting this declaration in support of the States' motion to intervene in *Kentucky v. EPA*, No. 24-1087, in support of the U.S. Environmental Protection Agency's (EPA) final rule entitled *Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles*, 89 Fed. Reg. 27,842 (April 18, 2024) ("Final Rule")

Climate Change Threatens Massachusetts' Coastal Resources and Communities

8. The accelerated rate of global sea level rise and the severity and timing of coastal impacts due to this rise in sea level are largely dependent on current and future global greenhouse gas emissions, including from vehicle emissions, and reduction measures. Climate scientists have high confidence that anthropogenic drivers have been the dominant cause of global mean sea level rise since 1970.[1] Continued emissions of greenhouse gases, including vehicle emissions, will result in increases in global temperature, yielding additional contributions to global sea level rise (*i.e.*, increased contributions from thermal expansion of warmer waters and melting of land-based ice sheets).[2]

9. According to the U.S. Global Change Research Program, human-caused climate change has led to a rise in average sea level along the continental U.S. coastline of about 11 inches, which is higher than the rise in global mean sea levels of 7 inches since 1900, and a rate of rise (1.8 inches per decade) greater than

[1] Oppenheimer, M., B.C. Glavovic et al., *Chapter 4: Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities*, *in* IPCC SPECIAL REPORT ON THE OCEAN AND CRYOSPHERE IN A CHANGING CLIMATE (H.-O. Pörtner et al. eds., 2019).

[2] *See generally* U.S. GLOBAL CHANGE RESEARCH PROGRAM, FIFTH NATIONAL CLIMATE ASSESSMENT (Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Steward, and T.K. Maycock, Eds., 2023), https://doi.org/10.7930/NCA5.2023.

global rates of rise (1.3 inches per decade) over the period of 1993-2020. Over this same time period, both the global and continental U.S. rates of sea level rise have accelerated.[3] Global average sea levels will continue to rise by 1 to 6.5 feet by 2100 (compared to the baseline year 2000).[4] Due to the relationship of the East Coast to the Gulf Stream and melting Antarctic ice sheets, sea level rise will be higher than the global average on the East Coast of the United States.[5]

10. A March 2018 report entitled *Massachusetts Climate Change Projections* (2018 Projections Report), informed by a team of scientists from the U.S. Department of the Interior's Northeast Climate Adaptation Science Center at the University of Massachusetts Amherst, presents the best available, peer-reviewed science on climate change downscaled, or localized, for Massachusetts through the end of this century.[6] A key component of the 2018 Projections Report is sea level rise projections for the state's coastline. The analysis for Massachusetts consisted of a probabilistic assessment of future relative mean sea level rise at tide

[3] *Id.* at 10.

[4] *Id.*

[5] *Id.*

[6] MASSACHUSETTS CLIMATE CHANGE PROJECTIONS (2018), https://eea-nescaum-dataservices-assets-prd.s3.us-east-1.amazonaws.com/resources/production/MA%20Statewide%20and%20MajorBasins%20Climate%20Projections_Guidebook%20Supplement_March2018.pdf.

gauge stations with long-term records at Boston Harbor, MA, Nantucket, MA, Woods Hole, MA, and Newport, RI.[7] The sea level projections are based on a methodology that provides complete probability distributions for different greenhouse gas emissions scenarios.[8] Working with the principal investigators (Dr. Robert DeConto and Dr. Robert Kopp) and a team of external peer reviewers, CZM reviewed and synthesized the downscaled projections, which are made available by the Commonwealth, to set forth a standard set of sea level rise projections to be used by municipalities, state government, industry, the private sector, and others to assess vulnerability and identify and prioritize actions to reduce risk. Given a high emissions pathway (Representative Concentration Pathway 8.5), compared to a baseline year of 2000, Massachusetts is projected to experience approximately 4.0 to 7.6 feet of sea level rise over the twenty-first century (extremely unlikely to be exceeded, 99.5% probability), with as much as 10.2 feet possible when accounting for higher ice sheet contributions (exceptionally unlikely to be exceeded, 99.9% probability).

[7] *See id.* at 11 (citing Robert M. DeConto & Robert E. Kopp, *Massachusetts Sea Level Assessment and Projections*, Technical Memorandum (2017)).

[8] *See id.* (citing Robert E. Kopp et al., *Probabilistic 21st and 22nd century sea level projections at a global network of tide gauge sites*, 2 EARTH'S FUTURE 383–406 (2014)).

11. Massachusetts has 2,819 miles of tidal coastline, and a coastal zone (land areas from the shoreline to 100 feet inland of major roads or railways from New Hampshire to Rhode Island) that encompasses 886 square miles. Approximately 5.1 million people or 75% of the Commonwealth's population reside in coastal counties. According to the 2023 ResilientMass Plan (the state's hazard mitigation and climate adaptation plan), over 500,000 people across Massachusetts coastal communities (as of the 2020 U.S. census, ~10% statewide population) are exposed to the Federal Emergency Management Agency (FEMA) 1% annual chance flood zone (current risk, not accounting for climate change).[9] An additional approximately 165,000 people are susceptible to FEMA's mapped 0.2 percent annual chance flood event. Accelerated sea level rise will lead to more regular flooding of developed and natural coastal areas due to an increase in the extent of tidal inundation, and will also exacerbate erosion along beaches, dunes, and coastal banks.

12. In addition, there is very high confidence that climate change and sea level rise will increase the frequency and extent of flooding associated with coastal storms, such as hurricanes and nor'easters.[10] Moderate to major coastal storm

[9] ResilientMass Plan: 2023 State Hazard Mitigation and Climate Adaptation Plan https://www.mass.gov/info-details/2023-resilientmass-plan

[10] *See* U.S GLOBAL CHANGE RESEARCH PROGRAM, *supra*, at 27.

events will cause inundation of larger areas, and will occur more frequently, damaging or destroying coastal engineering structures such as seawalls; critical infrastructure such as pump stations, wastewater treatment plants, and transportation systems; and businesses and private property.

13. More frequent severe storm surges will create serious risks for public safety and health, especially where roads, sewer mains, and pump stations are impacted. Frequent tidal flooding from sea level rise may also lead to increases in respiratory diseases due to mold from dampness in homes.[11] Saltwater intrusion—or the increased penetration of salt water into sources of fresh water—from sea level rise will impact water resources (such as drinking water) by contaminating freshwater sources with salt water and also through the corrosion of water supply infrastructure.

14. The Massachusetts coast includes a diverse array of marine and estuarine ecosystems including, among others, sandy beaches, rocky shores, barrier beaches, islands, and salt marshes. These ecosystems offer immense commercial, recreational, cultural, and aesthetic values to the residents of and visitors to the

[11] *See generally* CENTERS FOR DISEASE CONTROL & PREVENTION, U.S. DEP'T OF HEALTH & HUMAN SERVS., COASTAL FLOODING, CLIMATE CHANGE, AND YOUR HEALTH: WHAT YOU CAN DO TO PREPARE (2017), www.cdc.gov/climateandhealth/pubs/CoastalFloodingClimateChangeandYourHealth-508.pdf.

Commonwealth, while also serving important ecological functions. For instance, natural coastal resources, especially beaches and salt marshes, provide valuable coastal resilience services to the Commonwealth by buffering inland coastal communities and the built environment from waves and storm surges. Salt water will also impact natural coastal resources, as saltwater intrusion into salt marshes and freshwater wetlands will alter the composition of plant species and affect wildlife that depend on these ecosystems.

Massachusetts is Experiencing Economic Impacts from Climate Change and is Expending Significant Resources to Adapt and Prepare for Impacts of Climate Change on Our Coastal Areas

15. The Commonwealth is already experiencing impacts of climate change. The relative sea level trend at the Boston tide station is (+) 2.89 millimeters per year based on monthly mean sea level data from 1921 to 2022, which is equivalent to a change of 0.95 feet over 100 years.[12]

16. These impacts are directly harming the welfare of Massachusetts residents and causing significant economic losses. Coastal storms currently result in flooding with extensive damages to public infrastructure (as well as to private

[12] *See* Nat'l Oceanic & Atmospheric Admin., *Relative Sea Level Trend 8443970 Boston, Massachusetts*, TIDES & CURRENTS, https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8443970.

homes and businesses), and a significant demand for emergency response and recovery services, including services funded and provided by the State. For example, a nor'easter on March 2–3, 2018, which reached the third-highest water level recorded at the Boston Harbor tide gauge, resulted in major flooding, damages, and expenditures for response and recovery. On April 30, 2018, Massachusetts Governor Charles Baker requested a federal disaster declaration, which the Trump Administration approved on June 25, 2018. The disaster declaration authorized FEMA Public Assistance funding for eligible applicants (FEMA DR-4372-MA), and as of March 2023, FEMA has disbursed $15.6 million to coastal communities for public storm-related costs related to the event.[13]

17. Rising sea levels increase the frequency, depth, and duration of coastal flooding events; and the associated magnitude of damage costs, including costs associated with the increased demand on first responders, will escalate accordingly.

18. Sea level rise and other impacts of a changing climate pose major risks to communities in Massachusetts' coastal zone. Estimates of the projected direct flood damage to commercial and industrial structures in the Commonwealth's coastal areas are expected to more than double by 2030 (up to

[13] ResilientMass Plan: 2023 State Hazard Mitigation and Climate Adaptation Plan https://www.mass.gov/info-details/2023-resilientmass-plan

$56 million) and the incremental cost could reach as high as $270 million annually by 2090, more than ten times higher than current levels. These values are conservative and assume no change in adaptation strategies along the coast. These direct impacts of flooding are largest and grow most rapidly in the Boston Harbor region, where a large portion of the Commonwealth's commercial economic base is located.[14]

19. Development along the Massachusetts coast is afforded protection from coastal buffers such as beaches and dunes, and from engineered coastal infrastructure such as revetments and seawalls. These coastal engineered structures will experience greater impacts from flooding and wave energy from the anticipated increase in frequency and intensity of coastal storm events associated with accelerated sea level rise and climate change. With these greater impacts will come more frequent need for maintenance and replacement of coastal engineered structures as well as beaches in the form of sediment nourishment at significant costs. For example, the Town of Winthrop needed additional protection from storm surge and flooding impacts for a suburban neighborhood with existing engineered

[14] 2022 Massachusetts Climate Change Assessment: Volume II, Appendix A: Full Statewide Impact Rankings and Scores by Sector. https://www.mass.gov/doc/2022-massachusetts-climate-change-assessment-december-2022-volume-ii-appendix-a/download . 2030 damages ($56 million) is equal to the sum of increase in damages from 2008 to "Current" ($22 million) and the increase in damages from "Current" to 2030 ($34 million).

shoreline structures (*i.e.*, seawalls, groins, and breakwaters) and an eroding beach. At a cost of approximately $25 million in state funding, 460,000 cubic yards of sand, gravel, and cobble were placed along 4,200 linear feet of shoreline in 2013–2014. The community gained approximately 150 feet of beach width at high tide and increased protection against wave energy and coastal storms. Other communities across Massachusetts have worked to design (e.g., Chatham, Provincetown, Nahant, New Bedford, and Rockport) and construct (e.g., Duxbury, Edgartown, Hull, Marshfield, Plymouth, and Scituate) a variety of nourishment projects (e.g., cobble berms, beach and dune nourishment) to address erosion and failing coastal engineered structures that will be exacerbated by accelerated sea level rise and increased flooding from coastal storms. As described below, the Commonwealth provides substantial funding for these projects to protect coastal communities and their residents and businesses.

20. Coastal engineered structures, such as seawalls and revetments, have been constructed along over a quarter of the Commonwealth's ocean-facing shoreline to protect public and private infrastructure and assets from flooding and erosion. The Commonwealth and its municipalities own approximately 92 miles of such structures along the coastline. As a result of wave forces on the coastal structures and lowered beach elevations, the Commonwealth and local governments routinely invest millions of dollars to repair and reinforce these

structures so they can adequately protect coastal communities. For example, in 2018 a seawall reconstruction project was completed in the Town of Marshfield to address coastal flooding and public safety issues. The Commonwealth provided a $1.85 million grant and loan award to the town, which was matched with roughly $620,000 in local funds. The approximately 600-foot section of seawall sustained damages during a coastal storm in January 2015, and the state-funded project increased the height of the seawall by two to three feet to better protect a public road, utilities, and homes. The Town of Marshfield has 32 coastal engineered structures along 12 miles of exposed shoreline, totaling over 20,000 feet (3.9 miles), that have been identified as needing repairs and retrofits to address the current and future threats of sea level rise and coastal storms. With higher flood levels and greater storm surges, significantly more investments will be required to achieve the current flood-design protections afforded by these engineered structures across the coast.

21. The Commonwealth owns a substantial portion of the state's coastal property and infrastructure. The Commonwealth owns, operates, and maintains approximately 177 coastal state parks, beaches, reservations, and wildlife refuges located within the Massachusetts coastal zone. The Commonwealth also owns, operates, and maintains numerous properties, facilities, and infrastructure in the coastal zone, including roads, parkways, piers, and dams. Rising sea levels along

the Massachusetts coast will result in either the permanent or temporary loss of the Commonwealth's coastal property through inundation, storm surge, flooding, and erosion events. These projected increases in sea levels will likely destroy or damage many of the state-owned facilities and infrastructure described above. The Commonwealth likely will be required to expend significant resources to protect, repair, rebuild, or possibly relocate the affected properties, facilities, and infrastructure. According to the Commonwealth's *2022 Massachusetts Climate Change Assessment*,[15] annual expected coastal flood damage to state- and state-authority owned properties is expected to increase relative to current risks of about $8 million statewide in the near term (2030s) to about $17 million and to $52 million annually by the 2070s.

22. The Massachusetts coastal zone is home to several major ports including the Port of Boston and New Bedford/Fairhaven Harbor. Recent economic studies indicate the income generated from the Massachusetts maritime economy supports 2.6% of the state's direct employment and 1.3% of gross domestic product.[16] In 2018, New Bedford/Fairhaven Harbor alone generated $3.7

[15] Available at: https://www.mass.gov/info-details/massachusetts-climate-change-assessment.

[16] *See* DAVID R. BORGES ET AL., UMASS DARTMOUTH PUBLIC POLICY CTR., NAVIGATING THE GLOBAL ECONOMY: A COMPREHENSIVE ANALYSIS OF THE

billion in direct business revenue from seafood processing and fleet operation businesses.[17] By nature of their purpose, the state's ports and harbors are generally low-lying, coastal-dependent areas of high density-built environment and are susceptible to service interruption and associated revenue loss when flooded or otherwise impacted by coastal events. Additionally, coastal dependent businesses, maritime schools, and public facilities and departments will face disruptions in service in post-storm conditions. Acknowledging the cultural and economic importance of the developed port areas in the Commonwealth, in 2020, CZM undertook a study to assess climate vulnerabilities and adaptation opportunities in these areas. The study provides tailored resilience strategies (e.g., flood preparedness/business continuity planning, relocation and/or elevation of critical assests and infrastructure, floodproofing, etc.) that could be implemented to address flood risks while continuing to support the operational needs of water-dependent industrial users in port areas, which must remain in vulnerable locations directly adjacent to the water to maintain operations.[18]

MASSACHUSETTS MARITIME ECONOMY 11 (2018), www.mass.gov/files/documents/2018/01/24/Maritime_Economy.pdf.

[17] MARTIN ASSOCIATES & FOTH-CLE ENG'G GROUP, ECONOMIC IMPACT STUDY OF THE NEW BEDFORD/FAIRHAVEN HARBOR 5 (2019), https://www.fairhaven-ma.gov/system/files/uploads/economic_impact_study_nbfh_harbor_2019-martin-report_0.pdf.

[18] https://www.mass.gov/files/documents/2022/03/29/building-resilience-in-massachusetts-designated-port-areas.pdf

23. The Commonwealth is committed to protecting public safety, human health, the environment, and public resources through programs and policies that address sea level rise and other climate-change-related coastal hazards. EEA and CZM provide information, strategies, and tools to help other state agencies and communities plan for and address the challenges of erosion, flooding, storms, sea level rise, and other climate change impacts. In November of 2023, to address the impacts of climate change along the entire coastline of Massachusetts, EEA launched the CZM-led ResilientCoasts initiative[19], a holistic strategy that in collaboration with the state's 78 coastal communities, will pursue a multipronged approach to identify regulatory, policy, and funding mechanisms to develop focused long-term solutions.

24. EEA and CZM climate grant programs have been able to address about half of the need requested by communities. Since 2014, CZM has awarded approximately $46 million (of $78 million requested) in state-funded grants to local communities and non-profit organizations to support sea level rise adaptation planning and implementation through the Coastal Resilience Grant Program. Local governments and non-profit organizations have matched these state funds with roughly $17 million in local funds and in-kind services. Since 2017, EEA has awarded over $44 million of $98 million requested in municipal grants for climate

[19] https://www.mass.gov/info-details/resilientcoasts-initiative

vulnerability planning and implementation coastwide through the Municipal Vulnerability Preparedness (MVP) Program. Since the start of the MVP Program, local coastal governments have matched MVP grants with over $18 million in local funds and staff time. EEA and CZM see a significant and growing need for funding support at the local level.

25. Municipalities, private entities, and other partners are also supporting planning and implementation of adaptation measures to address the impacts of sea level rise and other climate change impacts in Massachusetts. Adaptation planning efforts include vulnerability assessments to determine areas and infrastructure susceptible to coastal impacts, prioritization of vulnerable assets and areas, and development of adaptation alternatives to mitigate climate risks in the near and long term. One example is the City of Boston's "Climate Ready Boston" initiative, which has been developing neighborhood/district-level adaptation plans to address near-term (2030-2050) and long-term (2050-2070) actions for addressing future coastal flooding risks created by sea level rise. The City of Boston's report estimates the costs for these actions range from $202 million to $342 million for East Boston and Charlestown alone.[20] With the completion of coastal resilience

[20] *See* COASTAL RESILIENCE SOLUTIONS FOR EAST BOSTON AND CHARLESTOWN: FINAL REPORT (2017),

plans for East Boston and Charlestown in 2022, the City of Boston has now developed strategies for all neighborhoods/districts along the City's 47-miles of coastline.[21] Another example of regional planning for the impacts of coastal climate change is the *Great Marsh Coastal Adaptation Plan* led by the National Wildlife Federation in partnership with the Ipswich River Watershed Association.[22] The plan assesses climate impacts and vulnerability for the Great Marsh region and each of its six communities (Salisbury, Newburyport, Newbury, Rowley, Ipswich, and Essex), examining the risk and exposure of critical infrastructure and natural resources, and identifies areas of special concern. The plan states that in Newburyport, estimated one-time damages to buildings and structures (not contents) from a 1% annual exceedance probability storm (also known as the 100-year storm) under 1.09 feet of sea level rise would be $18.3 million, and under 3.45 feet of sea level rise the damages would increase to $32.4 million.[23]

26. In conclusion, any increase in the rate of sea level rise and the frequency, magnitude, and severity of coastal flooding, erosion, and storms related

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https://www.boston.gov/sites/default/files/embed/c/climatereadyeastbostoncharlestown_finalreport_web.pdf.

[21] https://www.boston.gov/news/new-strategies-enhance-coastal-resilience-east-boston-and-charlestown

[22] *See* TAJ SCHOTTLAND ET AL., GREAT MARSH COASTAL ADAPTATION PLAN (2017), www.nwf.org/-/media/Documents/PDFs/NWF-Reports/NWF-Report_Great-Marsh-Coastal-Adaptation-Plan_2017.ashx.

[23] *Id.* at 49, tbl.3.3-3.

to greenhouse gas emissions, including from light-duty and medium duty vehicle emissions, will adversely impact the Commonwealth and its residents and will require the Commonwealth to expend additional resources and incur additional costs.

I declare under penalty of perjury that the foregoing is true and correct.

Executed in Boston, Massachusetts on April 19, 2024.

Tyler Soleau
Acting Director / Assistant Director
Massachusetts Office of Coastal Zone Management

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

COMMONWEALTH OF KENTUCKY, et al., *Petitioners* v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, et al., *Respondents*.	No. 24-1087

DECLARATION OF FRANK KOHLASCH

I, Frank Kohlasch, declare as follows:

1. I am the Assistant Commissioner for Air and Climate Policy at the Minnesota Pollution Control Agency (MPCA). In my role as Climate Director, I am responsible for MPCA's policies to mitigate and adapt to climate change in Minnesota, as well as Minnesota's greenhouse gas (GHG) emissions inventory and MPCA's implementation of the Clean Air Act in Minnesota. I have personal knowledge and experience with Minnesota's efforts to prepare for and mitigate climate change, reduce the impacts of air pollution, and state and regional scale analyses of policies and strategies to reduce GHG emissions from all sources in Minnesota, including transportation.

2. I submit this declaration in support of the State Petitioners' standing to intervene in all challenges to the final action of the United States Environmental Protection Agency ("EPA"), "Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles," published at 89 Fed. Reg. 27,842 (April 18, 2024) (Final Rule).

PERSONAL BACKGROUND AND QUALIFICATIONS

3. My educational background includes a Juris Doctorate from Hamline University School of Law, a Bachelor's of Science in Chemistry from Fort Hays State University, and graduate level coursework in environmental chemistry, environmental toxicology, environmental health, and advanced analytical chemistry. I have worked in environmental analysis, environmental data, and climate change programs for the Minnesota Pollution Control Agency for 27 years. For the last 10 years, I have been directly responsible for the development and implementation of GHG reduction policies for the State of Minnesota, as well as GHG emissions inventory development, reporting, and analysis. I have experience and interest in the formation of fine particles and ozone, mercury emissions, air monitoring, environmental justice, regional haze control, air modeling, risk and science communication, and carbon regulations.

CLIMATE CHANGE HARMS THREATENING MINNESOTA

4. I am aware of and familiar with the science related to global climate change through my educational background, professional training and 27 years of service with the Minnesota Pollution Control Agency.

5. Minnesota's climate is already changing; the 10 warmest and wettest years on record have all occurred in the past 20 years.[1] Minnesota has warmed 3° Fahrenheit since 1895, with most of that warming occurring after 1985. Average annual rainfall has increased 3.4 inches over the same time span. Heavy rains are now more common in Minnesota and more intense than at any time on record. Long-term observation sites have seen dramatic increases in 1-inch rains, 3-inch rains, and the size of the heaviest rainfall of the year. Since 2000, Minnesota has seen a significant uptick in devastating, large-area extreme rainstorms as well. Rains that historically would have been in the 98th percentile annually (the largest 2%) have become more common. Climate projections indicate these extreme rain storms will continue increasing into the future.[2] These changes mean more flooding in Minnesota communities, damage to publicly and privately owned

[1] Climate Change Factsheet, Climate Change Factsheet. (n.d.). Retrieved from https://files.dnr.state.mn.us/natural_resources/climate/change/climatechange-factsheet.pdf

[2] More damaging rains. (n.d.). Retrieved from https://www.dnr.state.mn.us/climate/climate_change_info/climate-trends.html

infrastructure, farmers with fields too wet to plant or harvest, and shorter ice fishing and maple syrup seasons. The cumulative impact of climate change is having real effects on Minnesotans and our economy by forcing early and costly repairs to infrastructure, increasing home and crop insurance rates, and contributing to upheaval in our native ecosystems.[3]

6. In addition to increases in the frequency and magnitude of heavy rain, Minnesota has also seen a dramatic increase in large-coverage flash flood events in recent years. Between 2000 and 2021, the state had 11 catastrophic "mega-rain events" — when at least six inches of rain falls on an area greater than 1,000 square miles. The 27 years from 1973 through 1999 saw only five such storms, and 2016 became the first year on record with more than one. In addition, the mega-rains since 2000 have included the largest, earliest, and latest on record, suggesting that we are seeing not just an intensification, but also a lengthening of our heavy and extreme rainfall season.[4] Flooding in March and April 2019 caused approximately $32 million in state costs for infrastructure repair and disaster

[3] Effects of climate change in Minnesota. (n.d.). Retrieved from https://www.pca.state.mn.us/air/effects-climate-change-minnesota

[4] Historic mega-rain events in Minnesota. (n.d.). Retrieved from https://www.dnr.state.mn.us/climate/summaries_and_publications/mega_rain_events.html

response.[5] More frequent and more severe flooding will create ongoing and worsening state costs.

7. Climate data for the Midwest show observed increases in average temperatures. To date, most of Minnesota's observed warming has been when the state is coldest. 1970 through 2021, average daily winter low temperatures rose more than 15 times faster than average daily summer high temperatures. The frequencies of -35° F readings in northern Minnesota and -25° F readings in the south have fallen by up to 90%.[6] On Minnesota lakes, ice coverage has declined an average of 10-14 days in the last 50 years.[7] These trends are expected to continue. Cold weather warming harms Minnesota industries that rely on winter tourism, such as ice fishing, snowmobiling, and cross country skiing.[8]

[5] Minnesota Request FEMA Preliminary Damage Assessments. (2019, May 3). Retrieved from https://dps.mn.gov/divisions/ooc/news-releases/Pages/minnesota-requests-fema-preliminary-damage-assessments.aspx

[6] Climate trends. (n.d.). Retrieved from https://www.dnr.state.mn.us/climate/climate_change_info/climate-trends.html

[7] Climate impacts on the environment (n.d.). Retrieved from https://www.pca.state.mn.us/air-water-land-climate/climate-impacts-on-the-environment

[8] Recreation, tourism threatened by winter warming (n.d.). Retrieved from https://climate.state.mn.us/recreation-tourism-threatened-winter-warming

8. Temperatures are expected to rise significantly by mid-century, including an increase in particularly hot days.[9] Climate change is anticipated to result in more trips to the hospital for heat-related illness. Extreme heat events are linked to a range of illnesses, even death, and can exacerbate pre-existing chronic conditions such as cardiovascular, respiratory, liver, and neurological diseases, endocrine disorders, and renal disease or failure. Populations who are most vulnerable to extreme heat include persons over 65 or under five years old; living alone; living in a building or institution without air conditioning, or residing on the topmost floor of a building; and with an income at or below the poverty line. People who are exposed to heat because of recreational activities or job-related activities also are more vulnerable, including athletes, construction workers, and landscape/agricultural workers.[10]

9. Increasing temperatures also impact Minnesota's agricultural industry.[11] Agriculture is highly dependent on specific climate conditions. As a result of increasing temperature, crop production areas may shift to new regions of

[9] University of Minnesota Climate Adaptation Partnership, extreme events. (n.d.). Retrieved from https://climate.umn.edu/our-changing-climate/extreme-events

[10] Extreme heat events. (n.d.) Retrieved from https://www.health.state.mn.us/communities/environment/climate/extremeheat.html

[11] Climate impacts on agriculture. (n.d.). Retrieved from https://www.pca.state.mn.us/air-water-land-climate/climate-impacts-on-agriculture

the state where the temperature range for growth and yield of those crops is more suitable unless new climate-adapted varieties are developed and used. According to the Fourth National Climate Assessment, the Midwest growing season has lengthened by almost two weeks since 1950 due in large part to earlier timing of the last spring freeze.[12] This trend is expected to continue. While a longer growing season may increase total crop production, other climate changes, such as increased crop losses and soil erosion from more frequent and intense storms, and increases in pests and invasive species, could outweigh this benefit. Summer heat waves are projected to be hotter and more frequent by midcentury.[13] This difference could result in significant failure of corn crops. There may also be higher livestock losses during periods of extreme heat and humidity.[14]

10. According to the Fifth National Climate Assessment, climate change is contributing to the increased likelihood of wildfires.[15] Smoke from wildfires in the Western United States and Canada can travel thousands of miles and impact air

[12] Fifth National Climate Assessment, Ch. 24: Midwest. (2023). Retrieved from https://nca2023.globalchange.gov/downloads/NCA5_Ch24_Midwest.pdf

[13] Minnesota CliMAT – Climate Mapping and Analysis Tool (CMIP6). (n.d.). Retrieved from https://climate.umn.edu/MN-CliMAT

[14] Climate impacts on agriculture. (n.d.) Retrieved from https://www.pca.state.mn.us/air-water-land-climate/climate-impacts-on-agriculture

[15] Fifth National Climate Assessment, Ch. 14: air quality. (2023). Retrieved from https://nca2023.globalchange.gov/downloads/NCA5_Ch14_Air-Quality.pdf

quality in Minnesota. The MPCA has issued 46 air quality alerts since 2015 and 34 of those were due to wildfire smoke.[16]

11. These declarations are high-level examples of how Minnesota is being impacted by climate change and do not include all of the impacts of climate change to Minnesotans.

12. EPA's greenhouse gas emissions standards promulgated in the Final Rule are anticipated to reduce greenhouse gas emissions by 7.2 billion metric tons.[17] If the standards adopted in the Final Action do not remain in effect, the projected emission reductions will not be realized.

I declare under penalty of perjury that the foregoing is true and correct.

Executed in Hennepin County on April 22, 2024.

Frank L Kohlasch

Frank L Kohlasch
Assistant Commissioner for Air and Climate Policy,
Minnesota Pollution Control Agency

[16] Are smoky summers the new normal? (n.d.) Retrieved from https://www.pca.state.mn.us/news-and-stories/are-smoky-summers-the-new-normal

[17] "Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles," published at 89 Fed. Reg. 27,842. (April 18, 2024). Retrieved from https://www.govinfo.gov/content/pkg/FR-2024-04-18/pdf/2024-06214.pdf

DECLARATION OF MARGARET HANNA:

I, Margaret Hanna, declare as follows:

1. I am the Director of the Division of Climate Change Mitigation and Monitoring (CCM&M) of the State of New Jersey (State) Department of Environmental Protection (NJDEP). In this capacity, I am responsible for overseeing the development and implementation of Statewide decarbonization initiatives and clean and renewable energy strategies as well as oversight of the operation of the State's ambient air monitoring network.

2. I submit this declaration in support of the Movant-Intervenor States' Motion to Intervene in Support of Respondent United States Environmental Protection Agency (EPA) in *Commonwealth of Kentucky, et al. v. Environmental Protection Agency*, United States Court of Appeals for the District of Columbia Circuit, No. 24-1087. In this case, Petitioners challenge the final action of the EPA entitled *Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles*, 89 Fed. Reg. 27,842 (April 18, 2024) (Final Action). In that rule, the EPA established new standards for light-duty and medium-duty vehicle emissions of greenhouse gases (GHGs) and criteria pollutants for model years 2027-2032 ("Light-Duty standards").

3. Unless otherwise noted, the statements made in this declaration are based on my review of various publicly available records, reports, statements, and data compilations prepared by the NJDEP and other State agencies as well as Federal agencies. I have also reviewed the EPA's rule establishing Light-Duty standards that are subject to Petitioners' challenge in this litigation.

PERSONAL BACKGROUND AND QUALIFICATIONS

4. I have a Bachelor of Science degree in biology from the University of Scranton.

5. I have been the NJDEP CCM&M Director for approximately one year. I have been employed by NJDEP since 1991 and have held positions with increasing responsibility. I was previously the Assistant Director of Air Monitoring and Mobile Sources, during which time I oversaw several rulemakings to reduce emissions from the transportation sector, and developed strategies to decarbonize the transportation sector using a combination of science, collaboration, policy, and incentives. Prior to being Assistant Director, I was the Chief of the Bureau of Mobile Sources for 8 years, where I managed the implementation of Zero Emission Vehicle Regulation, Mandatory Diesel Retrofit regulation, and the State's vehicle inspection and maintenance programs. I also developed strategies and led discussions to reduce emissions from New Jersey ports, including the innovative use of air quality modeling. During this time, I was appointed to several committees and working

groups, including the Port Authority of NY/NJ's Clean Air Strategy Steering Committee (leader), the Ozone Transport Commission Mobile Source Committee (member), the USEPA Mobile Source Technical Review Subcommittee (appointed), the Northeast Diesel Collaborative Steering Committee (member), and various Northeast States for Coordinated Air Use Management (NESCAUM) workgroups (member).

6. I have extensive professional knowledge and experience regarding the impacts of climate change and greenhouse gas emissions, as well as New Jersey's efforts to mitigate such impacts. My job duties include providing oversight and administration for CCM&M and directing policy development, planning efforts, and technical approaches for CCM&M program areas. I supervise a team of 75 multidisciplinary professionals working in a range of program areas, including climate change. Many of the staff I oversee have significant professional experience in environmental management, planning, science, policy, and other related fields. I routinely engage and partner with scientific and technical subject matter experts in federal agencies and academia. As part of my management responsibilities, I work alongside professionals tasked with providing information, strategies, tools, and financial resources to help mitigate climate-change impacts. For instance, I led the development of the State's Priority Climate Action Plan which was submitted to the EPA on March 1, 2024 as required by the Climate Pollution Reduction Grant

program. I also oversaw the proposal and adoption of California's Advanced Clean Cars II and Advanced Clean Trucks rules in New Jersey under 42 U.S.C. § 7507. In my role with CCM&M, I also represent the State on several multistate organizations, including NESCAUM and the Ozone Transport Commission.

CLIMATE CHANGE IS AN ONGOING THREAT TO NEW JERSEY

7. Fossil fuel emissions — especially greenhouse gas emissions ("GHGs") like carbon dioxide ("CO2") — are the dominant driver of climate change and the greenhouse effect.[1] The accelerated rate of global sea level rise and associated coastal impacts from climate change are largely dependent on current and future global greenhouse gas emissions. There is a scientific consensus that anthropogenic drivers have been the dominant cause of global mean sea level rise since the 1970s.[2] According to the U.S. Global Change Research Program, human-caused climate change has led to a rise in global mean sea levels of 8 inches since 1900, and a rate of rise greater than that in any preceding century in the last 2,800

[1] *See* Intergovernmental Panel on Climate Change ("IPCC"), *Summary for Policymakers in Climate Change 2021: The Physical Science Basis. Contribution of Working Group I in the Sixth Assessment Report* (2021), a 4–9, https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf.

[2] Oppenheimer, M., B.C. Glavovic et al., *Chapter 4: Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities*, in IPCC SPECIAL REPORT ON THE OCEAN AND CRYOSPHERE IN A CHANGING CLIMATE (H.-O. Pörtner et al. eds., 2019).

years.[3] Continued emissions of GHGs, including from motor vehicles, will result in increases in global temperature and contribute further to global sea level rise (i.e., increased contributions from the thermal expansion of warmer waters and the melting of land-based ice sheets).[4]

8. In June 2020, NJDEP released a report entitled *2020 New Jersey Scientific Report on Climate Change* ("2020 Climate Report"). The 2020 Climate Report summarized the current state of knowledge regarding the effects of climate change on New Jersey's environment to inform both State and local decision-makers as they seek to understand and respond to the impacts of climate change. The 2020 Climate Report identified and presented the best available science and existing data regarding the current and anticipated environmental effects of climate change globally, nationally, and regionally, as well as summarized 480 scientific research papers and studies to detail how climate change is affecting and will continue to affect New Jersey. The report outlines how climate change-related impacts — such as increases in temperature, shifts in precipitation, and sea-level rise — threaten air

[3] *See generally* U.S. GLOBAL CHANGE RESEARCH PROGRAM, CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT (VOL. I) 10 (D.J. Wuebbles et al. eds., 2017), https://science2017.globalchange.gov/.
[4] *Id.* at 10.

quality, water quality, and the State's natural and built environments.[5] The 2020 Climate Report found:

a. New Jersey has suffered and will continue to suffer harms from sea-level rise. The rate of sea-level rise in New Jersey has exceeded the global rate over the last several decades, and New Jersey will experience significant additional and accelerating sea-level rise over the coming decades.[6] By 2050, there is a 50% chance New Jersey experiences sea-level rise that meets or exceeds 1.4 feet, and a 17% chance that sea-level rise exceeds 2.1 feet.[7] By the end of the century, those numbers rise to 3.3 and 5.1 feet, respectively, under a moderate emissions scenario.[8]

b. As the sea level has risen, the occurrence of high-tide floods has increased in recent years. In Atlantic City, for example, the frequency of tidal flooding events has increased from an average of one per year in the 1950s to an average of eight per year from 2007

[5] *See* N.J. DEP'T OF ENVTL. PROT., 2020 NEW JERSEY SCIENTIFIC REPORT ON CLIMATE CHANGE (2020), https://dep.nj.gov/wp-content/uploads/climatechange/nj-scientific-report-2020.pdf.
[6] *Id.* at 44.
[7] *Id.* at 43.
[8] *Id.*

to 2016.[9] By the year 2100, it is extremely likely (i.e., a greater than 95% chance) that Atlantic City will experience high-tide flooding at least 95 days per year.[10]

c. Sea level rise in New Jersey has also increased the destructive force and flooding potential from storm surges during coastal storms and other weather events. More frequent and severe flooding and storm surges will create serious risks for public safety and health as well as for state-owned and municipal infrastructure, especially where roads, sewer mains, and pump stations are impacted.

d. Climate change is expected to significantly alter the frequency and intensity of precipitation events in New Jersey. Increases in precipitation levels have subjected and will continue to subject New Jersey to more frequent and severe flooding events, such as the major floods that inundated the State in 2000, 2004, 2005, 2006, 2007, 2010, 2011, 2012, and 2016.[11] Additionally, extreme precipitation events will degrade water quality as increased runoff deposits excess sediment and contaminants into the State's surface

[9] *Id.* at 45.
[10] *Id.*
[11] *Id.* at 42.

water, causing eutrophic conditions and increasing the potential for harmful algal blooms.[12] Saltwater intrusion — i.e. the increased penetration of salt water into sources of fresh water — from sea-level rise is also expected to impair water quality in coastal groundwater aquifers, drinking water, and surface water supplies, as well as corrode water supply infrastructure.[13] Water quality will likewise be degraded as rising sea levels submerge sewer discharge points, allowing contaminants to move into waterways and the surrounding environment.[14] Similarly, industrial sites located in coastal areas will be at a greater risk of pollutant discharge into the State's waters.[15]

e. New Jersey's wetlands are already facing, and will continue to face, significant damage due to climate change. Rising sea levels are already inundating freshwater wetlands, creating "ghost forests" —

[12] *Id.*
[13] *Id.* at xi; *See generally* CENTERS FOR DISEASE CONTROL & PREVENTION, U.S. DEP'T OF HEALTH & HUMAN SERVS., COASTAL FLOODING, CLIMATE CHANGE, AND YOUR HEALTH: WHAT YOU CAN DO TO PREPARE (2017), www.cdc.gov/climateandhealth/pubs/CoastalFloodingClimateChangeandYourHealth-508.pdf.
[14] 2020 NEW JERSEY SCIENTIFIC REPORT ON CLIMATE CHANGE at xi.
[15] *Id.*

i.e., stands of dead trees surrounded by transitional marshes.[16] By the end of the century, if flooding, salinity, and sea level rise continue to increase as a result of greenhouse gas emissions, New Jersey is projected to lose 92% of brackish marshes, 32% of tidal swamps, and 6% of tidal fresh marshes in the Delaware Estuary.[17]

f. Oceans are acidifying at an alarming rate due to increased GHG emissions, endangering New Jersey's coastal ecosystems and economy. Acidity levels have already increased by roughly 30% since the Industrial Revolution, and they are expected to rise at a faster rate over time.[18] Acidification risks destabilizing marine ecosystems by altering the behavior, growth, reproduction, and migration patterns of critical aquatic organisms. New Jersey is quite vulnerable to the effects of human-caused ocean acidification, as its identity, industries, and economy are closely intertwined with its coastal waters. Fisheries play an important role in New Jersey's

[16] *Id.* at xii.
[17] *Id.* at xii-xiii.
[18] *Id.* at x.

recreational and commercial opportunities, and acidification threatens the survival of these fisheries.[19]

g. By driving up temperatures and precipitation levels, climate change will have major impacts on agriculture in New Jersey. As winter season temperatures increase, New Jersey may no longer experience the periods of winter chill needed for certain plant species to produce fruit. Blueberries and cranberries — both New Jersey specialty crops that form a substantial portion of the state's agricultural economy — depend on a long winter chill for optimal flowering and fruit development.[20] Increased ground-level ozone caused by rising temperatures will also slow the growth of crops and render them more susceptible to disease.[21] Moreover, changes in the frequency and intensity of precipitation will negatively affect crops by reducing growth, delaying spring planting, washing out planted crops, and increasing root disease through contact with wet soils.[22]

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[19] N.J. DEP'T OF ENVTL. PROT., STATE OF NEW JERSEY CLIMATE CHANGE RESILIENCE STRATEGY (2021), at 36, https://dep.nj.gov/wp-content/uploads/climatechange/docs/nj-climate-resilience-strategy-2021.pdf.
[20] 2020 NEW JERSEY SCIENTIFIC REPORT ON CLIMATE CHANGE at 81.
[21] *Id.* at 82.
[22] *Id.*

h. In terms of livestock, higher temperatures will very likely negatively reduce productivity in summer months, as dairy cows produce less milk when temperatures exceed 75°F.[23] As a result, New Jersey is expected to suffer a $3.3 million loss to its dairy industry per year by the end of the century.[24]

i. New Jersey's forests, which comprise 40% of the State's land area, are vulnerable to the consequences of a warming climate. This includes forest lands owned by the State. Increased instances of drought will likely stress New Jersey's forests, especially moisture tolerant species like maples.[25] Pests and invasive species are also expected to take advantage of warmer temperatures to spread into new areas. Pine forests will be particularly vulnerable to infestation by the southern pine beetle, which has the potential to kill tens of thousands of acres.[26] Southern pine beetle outbreaks have been recorded in New Jersey since 2000, and the pests continue to move steadily northward because of higher winter temperatures.[27] In

[23] *Id.* at 83.
[24] *Id.*
[25] *Id.* at xii.
[26] *Id.*
[27] *Id.* at 91.

addition, rising temperatures and more frequent droughts generally lead to longer and more intense wildfire seasons. The Pinelands area of southern New Jersey is vulnerable to wildfires, as most of the area is classified as a high to extreme fire hazard level[28], and New Jersey already expends resources on its own forest fire service to manage these risks.[29] Approximately 48% of the Pinelands National Reserve is in public ownership, with the vast majority owned by the State of New Jersey.[30]

j. New Jersey is home to 2,100 native plant species, including several globally rare species (e.g., sea-level fens and Atlantic white cedar), over 800 rare or endangered species, and several plant species that are found nowhere else in the world (e.g., Hammond's yellow spring beauty and bog asphodel).[31] Climate change represents a substantial threat to many of these rare or endangered species. At least 50 rare

[28] *Id.*
[29] N.J. DEP'T OF ENVTL. PROT., NEW JERSEY FOREST FIRE SERVICE, https://www.nj.gov/dep/parksandforests/fire/ (last visited April 19, 2024).
[30] N.J. PINELANDS COMMISSION, OWNERSHIP, https://nj.gov/pinelands/reserve/owner/ (last visited April 19, 2024).
[31] 2020 NEW JERSEY SCIENTIFIC REPORT ON CLIMATE CHANGE at 122.

plant species in New Jersey are considered vulnerable to climate change due to shrinking wetlands and increased temperatures.[32]

k. Unique habitats like the maritime forests found on New Jersey's barrier islands and endangered species like the Nantucket serviceberry are particularly vulnerable to sea-level rise, flooding, and erosion caused by climate change.[33] For example, the Atlantic white cedar, a globally rare species, grows in low-lying coastal areas but is completely intolerant of saltwater, making it extremely susceptible to rising seas.[34]

l. New Jersey is an important area to migratory birds, and harms to New Jersey wetlands and coastal areas from sea level rise disrupt the reproductive success of many migratory birds.[35] Moreover, 29% of New Jersey's 248 bird species are vulnerable to climate change, including the American Goldfinch — the state bird of New Jersey.[36] Shorebirds like Common Terns, Red Knots, and Saltmarsh Sparrows are more vulnerable to climate change than other bird

[32] *Id.*
[33] *Id.* at xiv.
[34] *Id.*
[35] *Id.* at 124.
[36] *Id.*

species.[37] Saltmarsh Sparrows, a globally endangered species, may reach quasi-extinction population numbers by 2040 due to habitat loss from sea-level rise.[38]

IMPACTS ON AIR POLLUTION AND AIR QUALITY

9. The average air temperature has increased and will continue to increase in New Jersey due to climate change. New Jersey has already experienced a nearly 4°F (2.22°C) increase in average annual temperature (between 1895 and 2021).[39] The rate of warming in New Jersey has also increased since 1970.[40] By 2050, temperatures in New Jersey are expected to increase by between 4.1°F and 5.7°F (2.3°C to 3.2°C).[41]

10. As temperatures rise, threats to public health and the environment in New Jersey will continue to increase. Warming air temperatures will lead to poorer air quality, with various negative impacts on the State, including: more heat waves, expanded pathogen and pest ranges, disruption to agricultural production, increased need for irrigation for agricultural production, thermal stress for native flora and

[37] *Id.*
[38] *Id.*
[39] *Id.* at vii.
[40] *Id.* at 32.
[41] *Id.*

fauna, increased forest fires (especially in the Pinelands), increased electricity demand from increased air conditioning usage, and threats to human health.

11. Rising air temperatures impact air quality by increasing ground-level concentrations of ozone and particulate matter, which are associated with serious health risks like respiratory distress, cancer, chronic obstructive pulmonary disease ("COPD"), asthma, cardiovascular disease, and adverse reproductive, developmental, and nervous system effects among New Jersey residents.[42] This is borne out by the fact that heat-related hospital admissions during the warm season (May to September) in New Jersey increased approximately 156% between 2004 and 2013.[43] Certain vulnerable populations, such as the disabled, the elderly, those with prior health issues, children, and those in overburdened communities will face increased risks of adverse public health outcomes from worsening air quality.[44] In addition, as pest seasons and ranges expand, vector-borne illnesses will increase in New Jersey's population; the State will continue to bear costs associated with mitigating and responding to these public health threats.[45]

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[42] *Id.* at x; *see also* N.J. DEP'T OF ENVTL. PROT., NEW JERSEY HUMAN HEALTH ADDENDUM at 12–13, 16, 20; Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures, 87 Fed. Reg. 6324,6331 (Feb. 3, 2022).
[43] NEW JERSEY HUMAN HEALTH ADDENDUM at 4.
[44] *Id.* at 40-41.
[45] *Id.* at 22-27.

12. Mobile sources are the largest contributors of air toxics emissions in New Jersey and, in particular, are responsible for over 50% of the state's ambient benzene, which is associated with increased cancer risk.[46] Mobile sources are also the largest contributors of GHGs in New Jersey, with light duty vehicles comprising the majority of those emissions.[47] EPA's Light-Duty Standards will significantly reduce emissions of these air toxics, particulate matter, ozone precursors and GHGs from new motor vehicles nationwide, which is critical to New Jersey's efforts to improve air quality and associated public health impacts within the State. Because traffic and associated emissions are not confined to state borders, strong national standards are needed to truly protect the health of New Jersey's residents. Many of the light-duty and medium-duty vehicles that traverse New Jersey's roads and highways originate in other states and, therefore, are beyond the reach of New Jersey regulations.

13. EPA's Light-Duty Standards will also help New Jersey achieve attainment with the National Ambient Air Quality Standards ("NAAQS"). The entire State is currently classified as moderate nonattainment with the 2015 8-Hour

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[46] N.J. DEP'T OF ENVTL. PROT., 2022 NEW JERSEY AIR QUALITY REPORT (2023), at 10-1, 10-9, https://www.nj.gov/dep/airmon/pdf/2022-nj-aq-report.pdf; 72 Fed. Reg. 8,428, 8,432 (Feb. 26, 2007).

[47] N.J. DEP'T OF ENVTL. PROT., NJ GREENHOUSE GAS EMISSIONS INVENTORY REPORT YEARS 1990-2021 (2024), at 17, https://dep.nj.gov/wp-content/uploads/ghg/2024-ghg-inventory-report.pdf.

Ozone NAAQS; however, the northern New Jersey nonattainment area will likely be reclassified to serious nonattainment.[48] New Jersey has taken action to reduce NOx and other emissions from mobile and stationary sources, including power plants and refineries, in an attempt to attain the NAAQS.[49] But New Jersey's challenges in attaining the NAAQS are due, in part, to pollution from out-of-state upwind sources, including States that have not adopted California's vehicle emission standards. EPA's Light-Duty rule will help reduce emissions from these sources.[50] New Jersey's attainment of the NAAQS is therefore reliant on emissions reductions from other states that would be achieved through the implementation of EPA's Light-Duty Standards.[51]

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[48] EPA, 8-HOUR OZONE (2015) NONATTAINMENT AREA AREA/STATE/COUNTY REPORT, https://www3.epa.gov/airquality/greenbook/jnca.html (last visited April 19, 2024).

[49] *See* N.J. DEP'T OF ENVTL. PROT., STATE IMPLEMENTATION PLAN (SIP) DASHBOARD, https://dep.nj.gov/airplanning/state-implementation-plans-sips/ (last visited April 19, 2024); *see also* EPA, APPROVED AIR QUALITY IMPLEMENTATION PLANS IN REGION 2, https://www.epa.gov/air-quality-implementation-plans/approved-air-quality-implementation-plans-region-2 (last visited April 19, 2024).

[50] EPA NONATTAINMENT AREAS, *supra* note 48; *see also* OZONE TRANSPORT COMMISSION, OTC 2016 BASED MODELING PLATFORM TECHNICAL SUPPORT DOCUMENT (2023), https://otcair.org/upload/Documents/Reports/2016TSD_January2023_withAppendices.pdf.

[51] STATE IMPLEMENTATION PLAN (SIP) DASHBOARD, *supra* note 49.

ADAPTATION AND MITIGATION

14. In October 2021, the State released its first Climate Change Resilience Strategy, which found the following:

a. New Jersey is the most densely populated state in the United States.[52] With approximately 1,800 miles of tidal coastline, New Jersey's coastal zone is home to nearly 7 million year-round residents — approximately 80% of the State's population.[53] Development patterns have resulted in a high density of buildings and infrastructure in vulnerable coastal areas which are subject to routine flooding from high tides, tropical storms and hurricanes, and winter storms like nor'easters. Approximately 73% of all of New Jersey's National Flood Insurance Policy claims come from, and approximately 81% of funding from the Federal Emergency Management Agency (FEMA) goes to, the coastal zone.[54] As sea-level rise continues, the infrastructure along New Jersey's coast will be exposed to more frequent and intense flooding events.[55]

[52] STATE OF NEW JERSEY CLIMATE CHANGE RESILIENCE STRATEGY at 98.
[53] *Id.* at 75.
[54] *Id.* at 98.
[55] *Id.*

b. The tourism industry in New Jersey will also be significantly affected by rising seas, loss of coastland, and increased flooding. Counties in the coastal zone are estimated to contribute $22 billion from tourism alone, which represents more than half of New Jersey's total tourism dollars.[56]

c. New Jersey has planned and is planning — at a significant expense — adaptation and mitigation strategies to address climate change-related impacts in order to mitigate and/or prevent injuries to the State. These efforts include, but are not limited to, implementing partnership initiatives to guide and fund local climate resilience plans across New Jersey, particularly in the coastal zone;[57] allocating funds to the Blue Acres program to buy out homes built on vulnerable floodplains and restore those floodplain ecosystems;[58] developing a risk communication campaign to educate New Jersey residents about the dangers of climate change (including risks and impacts of sea-level rise, tidal flooding, and coastal storms);[59] and

[56] *Id.* at 77.
[57] *Id.* at 18.
[58] *Id.* at 34.
[59] *Id.* at 53.

introducing regulatory reforms to mitigate and adapt to the consequences of climate change.[60]

d. New Jersey has already spent billions of dollars to mitigate and adapt to climate change. The State has incurred approximately $2.5 billion in costs to construct 21 existing and planned coastal and flood protection projects, including the Greenbrook Flood Control Project, Rebuild by Design Hudson River, and shore protection projects in the Meadowlands. Additionally, the Department of Community Affairs has allocated over $19 million to local resilience planning efforts since Superstorm Sandy. The State has also spent a total of $1.2 billion rebuilding the barrier island beach and dune system to protect its coastal communities from rising seas and extreme weather.[61] Since 2018, almost all $25 million from the State's yearly Shore Protection Fund appropriation has been allocated to the State's cost-share responsibility for coastal resilience projects administered by the U.S. Army Corps of Engineers.[62]

[60] *Id.* at 21-22.
[61] *Id.* at 95-96.
[62] *Id.*

15. To protect New Jersey from the continued harms of climate change discussed in this declaration, strong Federal standards, such as *Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles*, 89 Fed. Reg. 27,842 (April 18, 2024) (Final Action), must remain in place. New Jersey's own strategies to combat the effects of climate change are dependent on a strong federal framework to reduce nationwide emissions of GHGs. Any increase in the rate of sea level rise and the frequency, magnitude, and severity of coastal flooding, erosion, and storms related to increases in greenhouse gas emissions due to the standards in the Final Action not remaining in effect will adversely impact New Jersey and will require the State to expend additional resources and incur additional costs.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Margaret Hanna
Director, Division of Climate Change Mitigation and Monitoring
New Jersey Department of Environmental Protection

Date: April 20, 2024

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Commonwealth of Kentucky *et al.*, *Petitioners*, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*, *Respondents.*	No. 24-1087

DECLARATION OF CHRISTOPHER M. LALONE

Pursuant to 28 U.S.C § 1746, I, Christopher M. LaLone, P.E., declare as follows:

1. I am the Director of the Division of Air Resources (DAR) at the New York State Department of Environmental Conservation (NYSDEC), where I have worked since 1993. I provide this declaration in support of the Movant-Intervenor States' motion to intervene in this lawsuit challenging the actions taken by the U.S. Environmental Protection Agency (EPA) titled "Multi-Pollutant Emissions Standards

for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles" 89 Fed. Reg. 27,842 (April 18, 2024) (the "multi-pollutant standards").

2. The State of New York seeks to intervene as a respondent in this case because of our strong interest in the multi-pollutant standards challenged here. These standards will reduce emissions of air pollutants from light and medium duty vehicles traveling on the roads in New York State, and in other states from which air pollution may be transported to New York State. Of particular importance to New York are the reductions these multi-pollutant standards will require in emissions of nitrogen oxides (NOx) (which is a potent precursor to the formation of ground-level ozone pollution), particulate matter, and greenhouse gases (GHGs).

3. Although New York is a state that has adopted California's Advanced Clean Cars II emission standards for the vehicles and model-years in question pursuant to Section 177 of the Clean Air Act, the nature of interstate vehicle travel is such that vehicles from other states travel on the roads in New York State, including vehicles from states that have not adopted California's standards, i.e., non-177 states. In the

absence of EPA's multi-pollutant standards for model years 2027 through 2032 and beyond, vehicles from those non-177 states will be subject to less stringent emissions standards than if the multi-pollutant standards challenged in this case are upheld. Those non-177 state vehicles emit criteria pollutants and GHGs when travelling in New York State. Those non-177 state vehicles also contribute to ozone pollution in states upwind of New York State, and that ozone is transported into New York.

4. As an administrator of New York's air pollution control programs, it is clear to me that New York will suffer harm if the challenged EPA standards are vacated or otherwise invalidated by this Court and EPA is prevented from implementing and/or enforcing the multi-pollutant standards. Specifically, without the protections provided by the multi-pollutant standards for model years 2027 through 2032 and beyond, New York will suffer the effects of increased emissions of NOx and particulate matter pollution, which will impair New York's efforts to meet federal air pollution standards for ozone and particulate matter. Reduction of emissions of those pollutants is vitally important to protecting the health and safety of New York's residents,

including our most vulnerable communities, many of which are situated near roadways and have greater exposure to harmful motor vehicle emissions. Failure to reduce GHG emissions both inside and outside New York's borders will worsen the effects of climate change, which, as a result of increased temperatures, will damage New Yorkers' public health, state industries and ecosystems, and the state's public lands, natural resources, and critical infrastructure.

PERSONAL BACKGROUND AND QUALIFICATIONS

5. I have a Bachelor of Science in Chemical Engineering degree from Clarkson University. I am a licensed Professional Engineer in New York.

6. I have been the Director of the Division of Air Resources for approximately four years. In addition to my current position, I have held the positions of Assistant Director of Air Resources; Regional Environmental Quality Engineer in the Region 9 Buffalo office; Chief of the Permitting and Compliance Section in the Bureau of Stationary Sources; Chief of the Enforcement Section of the Bureau of Stationary Sources; and other engineering positions within NYSDEC and in the private sector.

7. My responsibilities include overseeing DAR's central office in Albany, which carries out the development and implementation of mobile source regulations and technology development, monitoring and research functions, and stationary source permitting. In addition, I work with NYSDEC's nine regional offices, which are responsible for air permitting and enforcement throughout the state.

8. Another of my responsibilities is overseeing NYSDEC's air quality planning efforts. This work includes the development of Clean Air Act-mandated State Implementation Plans (SIPs). SIPs detail how NYSDEC will assure that, among other things, the air quality in New York will come into or maintain compliance with the National Ambient Air Quality Standards (NAAQS) for the "criteria pollutants," including ozone, particulate matter ($PM_{2.5}$) and sulfur dioxide (SO_2), set by EPA under Sections 108 and 109 of the Clean Air Act. States are primarily responsible for ensuring attainment and maintenance of a NAAQS once EPA has established one.

9. I also oversee regulation and mitigation of GHG emissions. Reduction of GHG emissions from vehicles is an important component of New York State's plan to meet its targets under the Climate

Leadership and Community Protection Act (Climate Act). This law requires New York to reduce economy-wide greenhouse gas emissions 40 percent by 2030 and no less than 85 percent by 2050 from 1990 levels. The GHG emission reductions that will come from EPA's implementation of the multipollutant standards are vitally important to these planning and reduction efforts.

POINT I

The Multi-Pollutant Standards' Criteria Pollutant Reductions Are Necessary for Protection of Human Health and the Environment and for Attainment of Federal Air Quality Standards in New York

10. The EPA multi-pollutant standards challenged in this lawsuit will impose criteria pollutant emission limits on light and medium duty vehicles beginning with model year 2027 and increasing in stringency year over year through 2032. Compared to model year 2025, the standards will tighten the fleet average emissions standards for non-methane organic gases (NMOG)+NOx by 50% for light duty vehicles and from 58% to 70% for medium-duty vehicles in 2032. These reductions are crucial for New York State because the transportation

sector accounts for approximately 65% of NOx emissions in New York State.

11. NO_X is a precursor to ozone and can also lead to the secondary formation of particulate matter. Exposure to ozone and particulate matter is associated with adverse effects on human health, including chest pain, coughing, throat irritation, airway inflammation, reduced lung function and damaged lung tissue. Ozone can worsen bronchitis, emphysema and asthma, leading to increased medical costs. Exposure to ozone has also been linked to early deaths. People most at risk from breathing air containing ozone include people with asthma, children, older adults and people who are active outdoors, especially outdoor workers. And people who live, work, or go to school near high-traffic roadways—who tend to be low-income and/or people of color—experience higher rates of these adverse health effects.

12. Ground level ozone also damages terrestrial and aquatic ecosystems. Ozone interferes with the ability of plants and forests to produce and store nutrients, which makes them more susceptible to disease, insects, harsh weather and other pollutants. This harms crop production in New York and throughout the United States, resulting in

significant losses and injury to native vegetation and ecosystems. Furthermore, ozone damages the leaves of trees and other plants, and can also damage certain man-made materials, such as textile fibers, dyes, rubber products and paints.

13. More than 60 percent of New York's population (over 12 million out of about 20 million) live in areas exceeding federal ozone standards. Despite adopting some of the most stringent ozone control programs in the country and including those programs in our ozone SIP, including adoption of California's vehicle emission standards, the New York Metropolitan area (which also includes parts of New Jersey and Connecticut) failed to meet the 2008 NAAQS for ozone by the July 2021 deadline. As a result, EPA reclassified the region from "serious" nonattainment to "severe" nonattainment. One component of NOx emissions in New York that we lack authority to regulate is emissions from out-of-state vehicles, including the emissions that occur in our states as well as those that occur outside our states but may blow into our states. Accordingly, we must rely on federal standards to control those NOx emissions. The reductions that will come from the challenged

EPA multi-pollutant standards are thus crucial to our ability to meet the ozone NAAQS.

POINT II

The Multi-Pollutant Standards' GHG Emission Reductions Are Critical to Protect Human Health and the Environment In New York State from Climate Change Impacts

14. New York's efforts to reduce GHG emissions have recently been formalized into statutory targets. The Climate Leadership and Community Protection Act (CLCPA), which went into effect on January 1, 2020, requires New York to reduce GHG emissions 85% below 1990 levels by 2050 and offset the remaining 15%. Environmental Conservation Law (ECL) § 75-0107.

15. The statewide GHG emission reduction requirements established by statute in the CLCPA are applicable to all sources of GHG emissions, including emissions from light and medium-duty vehicles. ECL § 75-0109. Transportation is the largest sector of GHG emissions in New York, and this sector is growing as a result of increasing vehicle use. New York cannot mitigate the worst impacts of climate change without significant reductions in GHG emissions from the transportation sector. Alongside New York's own actions to reduce

transportation sector GHG emissions under the CLCPA, the EPA standards at issue in this action are critical to the health and welfare of the State. Relative to model year 2026 emission levels, the EPA GHG standards are projected to achieve a 50% reduction in fleet average GHG emissions for light-duty vehicles and a reduction of 44% in fleet average emission for medium duty vehicles.

16. If the EPA standards challenged in this lawsuit are invalidated, non-177 state light and medium duty vehicles will emit higher levels of GHGs, and these higher GHG emissions will substantially worsen the public health, environmental and economic harms from climate change set forth below.

A. Climate Change is Already Harming New Yorkers' Health

17. Demand for health services and the need for public health surveillance and monitoring in New York will increase as the climate continues to change. Heat-related illness and death are projected to increase. Increased coastal and riverine flooding resulting from intense precipitation increases the risk that such flooding could release contaminants or even toxic substances from wastewater treatment facilities, industrial facilities, and superfund sites with multiple

attendant adverse health effects. Such flooding could lead to increased stress and mental health impacts, increased respiratory diseases such as asthma, and increased outbreaks of gastrointestinal diseases—as well impaired ability to deliver public health and medical services. Vector-borne diseases, such as those spread by mosquitoes and ticks (e.g., West Nile virus and Lyme disease), may expand or change their distribution patterns, either of which may adversely affect additional populations. Water- and food-borne diseases are likely to increase without mitigation and adaptation intervention.[1]

18. As discussed above, the New York City metropolitan area has a significant ozone problem. Climate change is likely to worsen the harms New York is already suffering from ozone. As EPA recognized many years ago when making its 2009 Endangerment Determination regarding greenhouse gas emissions under Section 202(a) of the Clean Air Act, "climate change is expected to increase [ground level] ozone

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[1] N.Y. State Energy Research and Dev. Auth., Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation (2011) (Cynthia Rosenzweig, et al., eds.) at 403-04, 421-22 (hereinafter the "ClimAID Report"), https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Environmental/EMEP/climaid/ClimAID-Report.pdf

pollution over broad areas of the U.S., including in the largest metropolitan areas with the worst [] ozone problems, and thereby increase the risk of adverse effects on public health."[2]

B. Climate Change is Already Harming New York's Environment

19. Anthropogenic emissions of the predominant GHG, CO_2, are contributing to the observed warming of the planet.[3] The Earth's lower atmosphere, oceans, and land surfaces are warming; sea level is rising; and snow cover, mountain glaciers, and Greenland and Antarctic ice sheets are shrinking. Extreme heat events are increasing, and intense storms are occurring with greater frequency. These changes are harming, and will continue to harm, New York State's environment, including shorelines, drinking water sources, agriculture, forests, and wildlife diversity.

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[2] 74 Fed. Reg. at 66,525.

[3] Intergovernmental Panel on Climate Change Working Group I Fifth Assessment Report, Climate Change 2013: The Physical Science Basis, 2013, *available at* https://www.ipcc.ch/report/ar5/wg1/

1. Climate Change Has Changed and Continues to Change New York's Weather

20. Temperatures in New York State have risen on average 0.25°F per decade over the past century, with the greatest warming coming in the most recent decades. This warming includes an increase in the number of extreme hot days (days at or above 90°F) and a decrease in the number of cold days (days at or below 32°F).[4] The 2011 New York State ClimAID assessment[5] and the 2014 update to ClimAID[6] present the numerous direct impacts that have already been observed in New York State. These impacts are described in more detail below.

21. New York State is likely to see widespread shifts in species composition in the State's forests and other natural landscapes within the next several decades due to climate change. Losses of spruce-fir forests, alpine tundra and boreal plant communities are expected.

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[4] ClimAID Report at 367, II-10.

[5] ClimAID Report.

[6] N.Y. State Energy Research and Dev. Auth., *Climate Change in New York State: Updating the 2011 ClimAID Climate Risk Information* (2014) (Cynthia Rosenzweig, et al., eds.) (hereinafter the "ClimAID Update"), https://www.nyserda.ny.gov/climaid

Climate change favors the expansion of some invasive species into New York, such as the aggressive weed, kudzu, and the insect pest, hemlock woolly adelgid. Increased CO_2 in the atmosphere due to climate change is likely to preferentially increase the growth rate of fast-growing species, which are often weeds and other invasive species. Lakes, streams, inland wetlands and associated aquatic species will be highly vulnerable to changes in the timing, supply, and intensity of rainfall and snowmelt, groundwater recharge and duration of ice cover. Increasing water temperatures will negatively affect brook trout and other native cold-water fish.[7]

22. New York State's forests and the economy that depends on them will be hurt by climate change. Climate change will affect the forest mix in New York, which could change from the current mixed forest to a temperate deciduous forest. The habitat for existing tree species will decrease as suitable climate conditions shift northward.[8] As forest species change, the resulting decrease in the vibrant display of

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[7] ClimAID Report 172, 196.

[8] ClimAID Report 177.

New York State fall foliage could have a negative impact on regional tourism. New York State's Adirondack Park is the largest forested area east of the Mississippi and consists of six million acres, including 2.6 million acres of state-owned forest preserve.[9] The Adirondack Park, one the most significant hardwood ecosystems in the world, is likely to be threatened by these changes.[10] These changes will also further impact plant and wildlife species in the Adirondack Park and throughout the state, as the forest composition changes.

2. Sea-Level Rise and Increased Flooding Are Already Harming New York State

23. Warming ocean waters contribute to sea level rise, with adverse impacts for New York State. Warmer ocean water, which results in thermal expansion of ocean waters, melting of land ice, and local changes in the height of land relative to the height of the continental land mass, are the major contributors of sea level rise. Warming ocean water has the potential to strengthen the most powerful

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[9] N.Y. State Adirondack Park Agency, "More about the Adirondack Park," https://www.apa.ny.gov/About_Park/more_park.html

[10] ClimAID Report 178-79, III-47.

storms, and combined with sea level rise, will lead to more frequent and extensive coastal flooding. Sea level in the coastal waters of New York State and up the Hudson River has been steadily rising over the 20th century. Tide-gauge observations in New York indicate that rates of relative sea level rise were significantly greater than the global mean, ranging from 0.9 to 1.5 inches per decade.[11]

24. Sea-level rise increases the extent and magnitude of coastal flooding. For example, the twelve inches of sea level rise the New York City area has experienced in the past century exacerbated the flooding caused by Hurricane Sandy by about twenty-five square miles, damaging the homes of an additional 80,000 people in the New York City area alone.[12] That flooding devastated several areas of New York City, including the Brooklyn-Queens Waterfront, the East and South Shores of Staten Island, Southern Queens, Southern Manhattan, and Southern Brooklyn. Some areas lost power and other critical services for

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[11] ClimAID Report at 19, 127, 135.

[12] New York City Panel on Climate Change 2015 Report, Chapter 2: Sea Level Rise and Coastal Storms. Ann. N.Y. Acad. Sci. ISSN 0077-8923, *available at* http://onlinelibrary.wiley.com/doi/10.1111/nyas.12593/full

extended periods. Overall, Hurricane Sandy caused 53 deaths and the estimated costs of response and recovery in New York State exceeded $30 billion.[13]

25. New York State's tidal shoreline, including barrier islands, coastal wetlands, and bays, is expected to be particularly adversely affected by increased sea levels. New York State has 1,850 miles of tidal coastline,[14] and the State owns dozens of state parks within New York State's coastal boundary. Tidal shoreline property in the State held by private landowners is similarly at risk.

26. Climate change will also increase the frequency and magnitude of flood damage and storms. Rising air temperatures associated with climate change intensify the water cycle by driving increased evaporation and precipitation. The resulting altered patterns of precipitation include more rain falling in heavy events, often with

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[13] N.Y. Senate Bipartisan Task Force on Sandy Recovery, *Preliminary Response & Recovery Report* at 1, 26 (Feb. 2013), https://www.nysenate.gov/sites/default/files/articles/attachments/Senate%20Bipartisan%20Task%20Force%20on%20Hurricane%20Sandy%20Report%20FINAL%202-5.pdf

[14] U.S. Bureau of the Census, *Statistical Abstract of the United States 1987* at 187 (107th Ed.).

longer dry periods in between. Heavy downpours have increased in New York State over the past 50 years. By the end of the 21st century, coastal flood levels currently associated with a 100-year flood could occur approximately four times as often under even conservative sea level rise scenarios. This trend will increase localized flash flooding in urban areas and hilly regions.[15]

27. New York State incurs significant costs from damage from flooding. Grants to the State from the Federal Emergency Management Agency (FEMA) Public Assistance Program made in the aftermath of flood disasters almost always require the State to fund a portion of the project. For example, in the aftermath of Hurricane Sandy, FEMA obligated over $14 billion to New York State and local governments.[16] Even in the case of Hurricane Sandy, which was deemed damaging enough that New York State and local governments had to pay only

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[15] ClimAID Report at 35, 103.

[16] Fed. Emergency. Mgmt. Agency, *New York Hurricane Sandy (DR-4085-NY)* (last updated Mar. 20, 2020), https://www.fema.gov/ar/disaster/4085

10% of eligible costs for most projects,[17] these grants entailed significant expenditures.

28. Flooding due to climate change exacerbates harm to public health and the environment in New York State. Flooding increases water pollution by carrying runoff from land areas containing road oils, salts, farm and lawn chemicals, pesticides, metals, and other pollutants into New York's water bodies. Flooding has also inundated and/or overloaded New York wastewater treatment plants, causing raw sewage to enter waterways. Polluted floodwaters can inundate communities and other vulnerable development within floodplains, impairing potable public and private water supplies, and rendering cleanup more hazardous. Contaminated floodwaters can also impede other water uses including swimming, beach-going, and fishing.[18] The U.S. Secretary of Health and Human Services issued Public Health

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[17] Fed. Emergency. Mgmt. Agency, *New York; Amendment No. 9 to Notice of a Major Disaster*, 78 Fed. Reg. 32,413 (May 30, 2013).

[18] ClimAID Report at 422, 444-53.

Emergency Declarations in New York[19] following Hurricane Sandy and Tropical Storm Lee, in large part because of post-flood conditions.

29. Climate change requires an increased commitment of State emergency response resources to protect lives and property in flood prone areas. For example, swift-water or air-rescue teams rescued over one thousand state residents during the flooding caused by Hurricane Irene and Tropical Storm Lee. New York State committed extensive emergency resources in response to the storms, including: deploying 1,700 State Police and 3,200 National Guard members, opening 200 shelters to house 18,000 citizens, and staffing 74 Disaster Recovery Centers to assist citizens during the recovery period.[20] The storms closed 400 road segments and bridges and required repairs at 945 locations on the State highway system.

30. As EPA has previously recognized, "climate change is also expected to cause more intense hurricanes and more frequent and

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[19] U.S. Dep't of Health & Human Serv., "Public Health Emergency Declarations," https://www.phe.gov/emergency/news/healthactions/phe/Pages/default.aspx

[20] N.Y. State Office of the Governor, *New York State Responds – Hurricane Irene and Tropical Storm Lee: One Year Later*. August 2012. Available at: https://cdn.esd.ny.gov/DisasterRecovery/08232012_LeeIreneOneYear.pdf

intense storms of other types, and heavy precipitation."[21] Over 15.5 million people live within coastal counties in New York, the second highest population within the United States (only California has a larger coastal population).[22] According to NOAA's Office of Coastal Management, New York has the most insured coastal properties in the country that are vulnerable to hurricanes ($2.92 trillion in value).[23]

31. New York State and entities it funds maintain or own critical transportation infrastructure in lower Manhattan, including the Hugh L. Carey Tunnel (formerly the Brooklyn-Battery Tunnel),[24] the

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[21] 74 Fed. Reg. at 66,525.

[22] Nat'l Oceanic and Atmospheric Admin., *National Coastal Population Report: Population Trends from 1970 to 2010* (Mar. 2013), available at: https://aambpublicoceanservice.blob.core.windows.net/oceanserviceprod/facts/coastal-population-report.pdf

[23] Nat'l Oceanic and Atmospheric Admin, Office for Coastal Mgmt., "Fast Facts: Hurricane Costs," https://coast.noaa.gov/states/fast-facts/hurricane-costs.html

[24] *See* MTA, *2017 Adopted Budget: February Financial Plan, 2017-2020*, *available at* http://web.mta.info/mta/budget/pdf/MTA%202017%20Adopted%20Budget%20February%20Financial%20Plan%202017-2020.pdf

South Ferry Terminal,[25] and the West Side Highway, all of which are threatened by sea level rise and extreme weather events.[26]

32. New York's Metropolitan Transit Authority (the "MTA") has, especially in the wake of Hurricane Sandy, taken extensive measures to prepare its infrastructure for climate change impacts such as increases in sea-level rise, coastal storm surges, extreme winds, average air temperature and heat waves, and heavy precipitation.[27] In 2016, the MTA identified 46 resiliency projects across its transit system, requiring a total expenditure of just over $750 million, which included both state and federal funding.[28] These projects included:

a. Resiliency measures (e.g., hardening of pump systems, watertight doors, and portal-sealing) designed to improve underground and underwater subway tunnels from

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[25] *Id.* at 106.

[26] N.Y. State Dep't of Transport., Real Estate Division, Notice of Appropriation, "Route 9A Reconstruction Project," *available at* http://a836-acris.nyc.gov/DS/DocumentSearch/DocumentImageView?doc_id=FT_1840006500484

[27] MTA, *MTA Climate Adaptation Task Force Resiliency Report* at 8, *available at* https://new.mta.info/document/10456

[28] *Id.* at 12

flooding from future Category 2 storms, with an additional three-foot safety factor;

b. Redesign of bus depots with interior and exterior flood protections;

c. Elevation of electric substations on the MTA Metro-North Railroad's Hudson Line four feet above projected flood levels; and

d. The installation of flood barriers on each side of the Hugh L. Carey Tunnel.[29]

33. As of 2019, the MTA reported progress or completion of many of these climate resiliency projects, including elevation and replacement of substations across the system, installation of flood and debris protection walls, replacement of critical power and signaling components, flood gates at the Hugh L. Carey Tunnel, and seawall and shoreline repair at the Rockaway bridges.[30]

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[29] *Id.* at 16-27.

[30] MTA, *MTA Climate Adaptation Task Force 2019 Resiliency Report: Update on agency-wide climate resiliency projects*, available at https://new.mta.info/document/10461

34. As climate change continues to worsen, it is expected that the State will be required to develop and pay for additional resiliency projects, as well as bearing the costs of damage from extreme weather incidents associated with climate change. For example, in September 2021, Hurricane Ida caused over one hundred million dollars of damage to New York City alone, including damage to transportation infrastructure.[31] For this reason, it is crucial to New York that the challenged EPA actions be upheld.

C. Climate Change is Harming New York's Economy

35. Climate change is also expected to result in less frequent summer rainfall, increased evaporation, and additional, and possibly longer, summer dry periods, potentially impacting the ability of water supply systems to meet demands. Reduced summer flows on large rivers and lowered groundwater tables could lead to conflicts among competing water users.[32]

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[31] See, https://www.fema.gov/press-release/20211110/279-million-federal-funding-fuels-new-york-two-months-after-hurricane-ida

[32] ClimAID Report at 103.

36. Climate change is expected to hurt agriculture in New York State. Increased summer heat stress will negatively affect cool-season crops, requiring farmers to take adaptive measures such as shifting to more heat-tolerant crop varieties and eventually resulting in a different crop mix for New York's farmers. The loss of long cold winters could limit the productivity of apples and potatoes, as these crops require longer cold dormant periods. New York's maple syrup industry also requires specific temperature conditions for the sugar maples to produce sap. It is projected that sugar maple trees will be displaced to the north as the climate changes and temperatures increase. Increased weed and pest pressure associated with longer growing seasons and warmer winters will be an increasingly important challenge. Water management will be a more serious challenge for New York farmers in the future due to increased frequency of heavy rainfall events, and more frequent and intense summer water deficits by mid-to late-century.[33]

37. Dairy farmers will also be impacted by warmer air temperatures associated with climate change. Milk production is

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[33] ClimAID Report at 236; III-69; 187-88; II-58; 222-23; 241-243.

maximized under cool conditions ranging from 41°F to 68°F.[34] New York is the third largest producer of milk in the United States, behind California and Wisconsin, with 14.8 billion pounds of milk produced in 2016.[35] During the unusually hot summer in 2005, declines in milk production of five to 15 pounds of milk per cow per day (an eight to 20 percent decrease) in many New York dairy herds were reported.[36] In 2019, New York reported approximately $2.5 billion dollars of cash receipts from its dairy industry.[37] A loss of milk production efficiency from heat effects could result in the loss of hundreds of millions of dollars annually for New York's dairy industry, and a consequential negative impact to the State's tax revenues.

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[34] Alvaro Garcia, *Dealing with Heat Stress in Dairy Cows* (South Dakota Cooperative Extension Service, Sep. 2002) at 1.

[35] U.S. Dep't of Agric., *Milk Production, Disposition and Income: 2016 Summary* at 10, available https://www.nass.usda.gov/Publications/Todays_Reports/reports/mlkpdi17.pdf

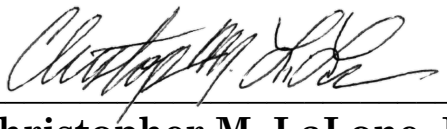
[36] Peter Frumhoff, *Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions*, Northeast Climate Impacts Assessment, July 2007 at 69.

[37] U.S. Dep't of Agric., *Milk Production, Disposition and Income: 2019 Summary* at 9, https://downloads.usda.library.cornell.edu/usda-esmis/files/4b29b5974/5h73qf66r/hd76sk303/mlkpdi20.pdf

38. In sum, the effects of climate change on New York will be deadly, widespread, and extremely expensive.

I declare under penalty of perjury that I believe the foregoing to be true and correct.

Executed on April 20, 2024.



Christopher M. LaLone, P.E.

DECLARATION OF ERICA FLEISHMAN

I, Erica Fleishman, declare as follows:

1. I serve as director of the Oregon Climate Change Research Institute (OCCRI), which is housed at the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University.

2. I submit this declaration in support of the State Petitioners' standing to intervene in all challenges to the final action of the United States Environmental Protection Agency, "Final Rule: Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles published at 89 Fed. Reg. 27842 (April 18, 2024) (Final Rule). I make this declaration on the basis of my own personal knowledge, unless otherwise indicated.

3. In the United States, automobiles are major contributors to emissions of greenhouse gases, especially carbon dioxide. The U.S. Environmental Protection Agency estimated that in 2021, the transportation sector contributed 29% of greenhouse emissions, 58% of which was produced by passenger cars and light-duty trucks and 23% of which was produced by freight trucks (EPA 2023[1]). All else being equal, regulations that reduce emissions from automobiles would contribute to mitigating the effects of anthropogenic climate change discussed below.

PERSONAL BACKGROUND AND QUALIFICATIONS

4. I received a BS and MS in Biological Sciences from Stanford University in 1991 and 1992, respectively, and a PhD in Ecology, Evolution, and Conservation Biology from University of Nevada, Reno in 1997. I have more than 30 years of experience in assessing the effects of

[1] EPA (U.S. Environmental Protection Agency). 2023. Inventory of U.S. greenhouse gas emissions and sinks 1990–2021. EPA 430-R-23-002.

climate and other types of environmental variability, extremes, and change on natural and human-dominated ecosystems in the western United States. Since 2012 I have served as a co-principal investigator of the Southwest Climate Adaptation Science Center, one of eight such regional centers across the United States. These centers develop data and tools to address the climate change-related information needs of managers of species, ecosystems, and the human communities they support.

5. OCCRI was created in 2007 by the Oregon State Legislature under House Bill 3543. Among OCCRI's charges from the Legislature is "assess[ment of]… the state of climate change science, including biological, physical and social science, as it relates to Oregon and the likely effects of climate change on the state." The *Sixth Oregon Climate Assessment* (https://doi.org/10.5399/osu/1161), which was authored by OCCRI scientists and collaborators, was released in January 2023. OCCRI scientists also contributed to the Northwest chapter of the Fifth National Climate Assessment (https://www.globalchange.gov/nca5) and regularly support the Oregon Department of Land Conservation and Development in its production of state- and county-level natural hazard mitigation plans (e.g., https://blogs.oregonstate.edu/occri/projects/dlcd/). These and previous Oregon Climate Assessment reports, other publications in the peer-reviewed literature, and a limited amount of personal communication from agencies of the State of Oregon form the basis for this declaration.

6. I am making this declaration in my personal capacity on the basis of my expertise, experience, and training, and not on behalf of Oregon State University.

CLIMATE CHANGE IN OREGON AND ASSOCIATED RISKS

7. Global increases in concentrations of greenhouse gases are changing the climate in Oregon.

Not only are average values of annual temperature and, in some cases, precipitation and relative humidity changing; but the incidence of extreme heat, precipitation, and other forms of extreme climate is increasing; and climate is becoming less predictable. Anthropogenic climate change also is contributing to sea-level rise. As sea level rises, coastal storms and high tides are likely to increase the frequency and severity of flooding along the Oregon coastline. For example, by the year 2050, relative sea level at Charleston, Oregon, is highly likely to rise by 0.5–1.8 feet, and by the year 2100, at least one flood is likely to exceed 4 feet above mean high tide. Many of the consequences of climate change also directly and indirectly threaten Oregon residents' physical and mental health and their economic and social well-being. As explained further below, because Oregon bears a significant share of health care costs incurred in the state, negative health outcomes for Oregonians translate to negative impacts on state programs and resources. Disasters may result not only from isolated events, but also from recurrent events that individually are not extreme, but degrade a community's infrastructure (Field et al. 2012[2]).

8. The Pacific Northwest has warmed by about 2˚F since 1900. Average temperatures in Oregon are projected to increase by another 5–8.2°F by the 2080s, depending on the global level of greenhouse gas emissions. Hot days and warm nights are becoming more frequent as a result of anthropogenic climate change. A common definition of an extremely warm day in the Pacific Northwest is a day on which the maximum temperature is 90˚F or above. By this definition, the number of extremely warm days increased significantly across

[2] Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Medgley, editors. 2012. Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom.

Oregon since 1951, and the number of such days in 2021 and 2022 was among the greatest on record in the state. Extreme heat poses risk to human health, especially among older adults, those who work or live outdoors, have underlying health conditions, and are economically disadvantaged, and can stress local emergency healthcare systems. Although dangerously warm temperatures are less common in Oregon than in many other parts of the United States, housing units in Oregon are less likely to use air conditioning than housing units in 80% of other states (USEIA 2023[3]), leaving Oregonians at greater risk of negative health outcomes from extreme heat. For example, of the 69 people in Multnomah County, Oregon, whose deaths were directly attributable to heat exposure during 2021 and who died during an extraordinary heat wave in June, a maximum of three had a functional air conditioning unit (Burlotos et al. 2023[4]). As noted below, there also is evidence that the incidence of some infectious diseases, such as Lyme disease, West Nile virus, and salmonella, increase as average temperatures increase or during heat waves.

9. Oregon's annual snowpack is decreasing as the proportion of precipitation falling as rain increases and snowmelt occurs earlier. For example, from 1982–2017, peak snow water equivalent on the east side of the central Cascade Range declined by more than 70%. Snowmelt trended earlier in all mountain regions of the state, with maximum regional changes of 16 days earlier per decade. As a result, autumn and winter runoff is projected to increase across Oregon, increasing the probability of seasonal flooding and landslides that can threaten human lives, private property, and infrastructure such as roads and other

[3] USEIA (U.S. Energy Information Administration). 2023. Highlights for air conditioning in U.S. homes by state, 2020. https://www.eia.gov/consumption/residential/data/2020/state/pdf/State%20Air%20Conditioning.pdf.

[4] Burlotos, A., C. Dresser, and V. Shandas. 2023. Portland's response to the western North American heatwave: a brief report. Disaster Medicine and Public Health Preparedness 17(e522):1–4. doi: 10.1017/dmp.2023.184.

transportation corridors (see below). Additionally, the runoff associated with extreme precipitation may introduce human-made or naturally occurring toxins into the domestic water supply. Spring and summer runoff are likely to decrease, and vulnerability to water shortages to increase, in western and northeastern Oregon. For example, in the Columbia River basin, snowmelt runoff accounts for about 25% of total surface water allocated to irrigation (Qin et al. 2020[5]). Decreases in water availability may decrease the quality and quantity of water available for domestic and public consumption and use, including but not limited to drinking, cooking, washing, and bathing.

10. Projected changes in climate in both the short term and the long term contribute to changes in fire dynamics in Oregon and beyond. Across the United States, changes in fire dynamics are leading to losses of human life and property, and to substantial financial costs. Nationwide, the direct damages associated with wildfires in 2017 and 2018 were greater than $40 billion (Smith 2019[6]). Shifts in fire dynamics often reflect interactions among historic fire suppression; changes in vegetation structure and composition, including the introduction of non-native invasive grasses that are highly flammable (Brooks et al. 2004[7], Fusco et al. 2019[8]), the increasing role of humans in igniting wildfires (Balch et al. 2017[9]), and changes in climate and fire weather.

[5] Qin, Y., J.T. Abatzoglou, S. Siebert, L.S. Huning, A. AghaKouchak, J.S. Makin, C. Hong, D. Tong, S.J. Davis, and N.D. Mueller. 2020. Agricultural risks from changing snowmelt. Nature Climate Change 10:459–465.

[6] Smith, A.B. 2019. 2018's billion dollar disasters in context. https://www.climate.gov/news-features/blogs/beyond-data/2018s-billion-dollar-disasters-context, accessed December 2019.

[7] Brooks, M.L., C.M. D'Antonio, D.M. Richardson, J.B. Grace, J.E. Keeley, J.M. DiTomaso, R.J. Hobbs, M. Pellant, and D. Pyke. 2004. Effects of invasive alien plants on fire regimes. BioScience 54:677–688.

[8] Fusco, E.J., J.T. Finn, J.K. Balch, R.C. Nagy, and B.A. Bradley. 2019. Invasive grasses increase fire occurrence and frequency across US ecoregions. Proceedings of the National Academy of Sciences of the United States 116:23594–23599.

[9] Balch, J.K., B.A. Bradley, J.T. Abatzoglou, R.C. Nagy, E.J. Fusco, and A.L. Mahood. 2017. Human-started wildfires expand the fire niche across the United States. Proceedings of the National Academy of Sciences of the United States 114:2946–2951.

11. In the Pacific Northwest, the duration of the fire season more than quadrupled, from an average of 23 days to an average of 116 days, from the 1970s to the 2000s. Across the western United States, roughly half of the observed increase in fuel aridity and more than 16,000 square miles of burned area from 1984–2015 were attributed to human-caused climate change.

12. As climate, fuel loads, and associated fire dynamics change, the cost of fire suppression in Oregon is increasing. The average number of acres that burned in Oregon increased from 11,600 from 1990–1999 to 41,700 from 2010–2019 (GCWR 2019[10]). Prior to 2013, the Oregon Department of Forestry rarely required state General Fund dollars for fire suppression on lands under its jurisdiction. Since 2013, however, the Department has required General Fund support annually; the annual cost to the General Fund for suppressing large fires has been approximately $20 million.

13. The State of Oregon owns forests in which the frequency and size of wildfires is likely to increase. The Oregon Department of Forestry noted that wildfires in the Santiam State Forest during September 2020, which burned over 16,000 acres, not only had ecological effects but also damaged recreation sites and roads[11]. The area burned in Oregon during 2020 (approximately 1.2 million acres) was among the largest in the reliable historic record.

14. Oregon incurs diverse costs from wildfires. The estimated cost to the state of completed and projected cleanup efforts in the wake of the September 2020 fires, including removal of ash, debris, hazardous materials, and trees that threatened to impede the roadway, is $75.63

[10] [Oregon] Governor's Council on Wildfire Response (GCWR), Report and Recommendations, November 2019. https://www.oregon.gov/gov/policy/Documents/FullWFCReport_2019.pdf.

[11] https://www.oregon.gov/odf/recreation/Pages/santiam-state-forest.aspx

million from the State Highway Fund and $75.75 million from the State General Fund[12]. These direct costs to the State will not be reimbursed by the Federal Emergency Management Agency.

15. The human costs of wildfires are considerable, and also result in costs to the state. For example, high levels of fine particulate matter are associated with respiratory and cardiovascular illness in humans, especially in individuals with pre-existing medical conditions, and with reductions in outdoor exercise (Evans 2019[13], Chen et al. 2021[14]). To illustrate, on a peak smoke day during the 2017 Eagle Creek fire, the Oregon Health Authority reported a 20% increase in emergency room visits for respiratory symptoms in the Portland metropolitan region (OHA 2017[15]). Short-term exposure to fine particulate matter from smoke also has been linked to increases in violent crime, especially assaults (Burkhardt et al. 2019[16]). The number of days on which the air quality index (AQI) was poor for all groups (AQI categories unhealthy, very unhealthy, or hazardous) in many Oregon municipalities as a result of wildfire smoke increased considerably in recent years (DEQ 2018[17]). For example, the AQI in Medford was poor due to wildfire smoke for a total of 28 days from 1985–2014, primarily in 1987 (16 days). By contrast, from 2015–2018, Medford's AQI was poor due to wildfire smoke for a total of 46 days: 7 in 2015, 14 in 2017,

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[12] F. Reading, Oregon Debris Management Task Force, Oregon Department of Transportation, personal communication, 16 December 2021.

[13] Evans, G.W. 2019. Projected behavioral impacts of global climate change. Annual Review of Psychology 70:449–474.

[14] Chen, H., J.M. Samet, P.A. Bromberg, and H. Tong. 2021. Cardiovascular health impacts of wildfire smoke exposure. Particle and Fibre Toxicology 18:2. DOI: 10.1186/s12989-020-00394-8.

[15] OHA (Oregon Health Authority). 2017. Statewide fire activation surveillance report (090517-090617).

[16] Burkhardt, J., J. Bayham, A. Wilson, J. Berman, K. O'Dell, B. Ford, E.V. Fischer, and J.R. Pierce. 2019. The relationship between air pollution and violent crime across the United States. Journal of Environmental Economics and Policy. https://doi.org/10.1080/21606544.2019.1630014.

[17] State of Oregon Department of Environmental Quality (DEQ). 2018. Wildfire smoke trends and associated health risks, Bend, Klamath Falls, Medford and Portland – 1985 to 2018. https://www.oregon.gov/deq/FilterDocs/smoketrends.pdf, accessed March 2019.

and 25 in 2018. Portland's AQI was not affected by wildfire smoke from 1985–2014, but smoke resulted in a poor AQI in the city on five days from 2015–2018. Similarly, during extreme wildfires in September 2020, the AQI in Portland, Oregon, reached levels higher (indicating high risks to human health) than those in any other major city worldwide (IQAir 2020[18]). The AQI in Portland was considered hazardous for three consecutive days, and unhealthy for seven consecutive days (IQAIR 2020). During that period, levels of fine particulate matter in smaller cities in Oregon, such as Applegate Valley and Cave Junction, sometimes exceeded those in Portland (AirNow 2020[19]). Moreover, smoke-driven reductions in air quality in Oregon are affecting regional economies. For example, *The New York Times* reported that in 2018, the Oregon Shakespeare Festival in Ashland estimated losses of $2 million as a result of cancelled performances and reduced attendance due to wildfire smoke[20]. During the 2020 wildfire season, 62% of Oregon wineries reported not only unhealthy air that delayed harvest, but impacts such as ash on grape skins and reduced sunlight that affected the size of grape clusters. Eighteen percent of Oregon wineries reported smoke damage to their wines, with the majority of red wine grape varieties discarded by producers or not harvested (IPRE 2021[21]).

16. Social vulnerability, as defined by the Centers for Disease Control and Prevention on the basis of social and economic status, household composition and disability, minority status and language, and housing type and transportation (ATSDR 2020[22]), affects the ability of

[18] https://www.iqair.com/us/blog/wildfires/washington-oregon-fires-choke-northwest
[19] https://www.airnow.gov/state/?name=oregon
[20] The New York Times. 24 August 2018. Wildfire smoke disrupts Oregon Shakespeare Festival. https://www.nytimes.com/2018/08/24/theater/oregon-shakespeare-festival-wildfire-smoke.html
[21] IPRE (Institute for Policy Research and Engagement). 2021. Impacts to Oregon's wine industry: Covid-19 and the 2020 wildfires. University of Oregon, Eugene, Oregon. https://industry.oregonwine.org/wp-content/uploads/sites/2/2020-Vineyard-and-Winery-Report-COVID-and-Wildfire-Impacts-09-07-21.pdf.
[22] ATSDR (Agency for Toxic Substances and Disease Registry). 2020. CDC / ATSDR Social Vulnerability Index. https://www.atsdr.cdc.gov/placeandhealth/svi/index.html.

individuals and communities to mitigate and adapt to wildfire. In Oregon from 2000 through 2021, 45.4% of the population within wildfire perimeters was considered highly socially vulnerable, as compared with 23.5% of Oregon's overall population (Rad et al. 2023[23]).

17. The Oregon Health Authority (OHA), drawing on data on air quality, emergency department visits, and hospitalizations in areas affected by wildfire smoke, can estimate certain health care costs for diseases and conditions known to be caused or exacerbated by exposure to particulate matter. Wildfires were estimated to account for up to 50 percent of emissions of fine particulate matter in the western United States during the 2010s (Burke et al. 2021[24]).

18. The OHA estimates that smoke from the Chetco Bar Fire and other wildfires that affected central and southwestern Oregon (1.1 million residents) during two months in late summer 2017 resulted in 207 excess emergency department visits and 18 excess hospitalizations for asthma, at a cost of $556,000.

19. The OHA estimates that smoke from the 2017 Eagle Creek Fire in the Columbia River Gorge (2 million residents in seven counties) resulted in 96 excess emergency department visits and 9 excess hospitalizations for asthma, at a cost of $529,000.

20. Climate change, including the effects of wildfires that are driven in part by climate change, is expected to have continuing negative effects on the health of Oregonians. The cost of those negative effects, in turn, will increase burdens on the state's budget, with negative consequences for state programs. The OHA, relying primarily on the Oregon All Payer Claims Database, estimates that at least 13% of all Oregon health care costs are borne by the

[23] Rad, A.M., J.T. Abatzoglou, E. Fleishman, M.H. Mockrin, V.C. Radeloff, Y. Pourmohamad, M. Cattau, J.M. Johnson, P. Higuera, N.J. Nauslar, and M. Sadegh. 2023. Social vulnerability of the people exposed to wildfires in U.S. West Coast states. Science Advances 9:eadh4615. doi: 10.1126/sciadv.adh4615.

[24] Burke, M., A. Driscoll, S. Heft-Neal, J. Xue, J. Burney, and M. Wara. 2021. The changing risk and burden of wildfire in the United States. Proceedings of the National Academy of Sciences 118:e2011048118. DOI: 10.1073/pnas.2011048118.

state (including, but not limited to, Oregon's state share of Medicaid costs and costs of health care for state employees). In addition to the health effects of wildfire smoke and extreme heat, climate change may increase Oregonians' exposure to vector-borne diseases. For example, above-average temperatures were associated with expansion of West Nile virus from the eastern to the western United States (Reisen et al. 2006[25]). As summer becomes longer and warmer, the incidence of West Nile virus, and other viral infections that cause brain inflammation, may increase (Bethel et al. 2013[26]). Additionally, as water temperatures in oceans and estuaries in the Northwest increase, so may the incidence of *Vibrio parahaemolyticus* infections, which are caused by consuming raw oysters or other shellfish that are infected with the bacterium (Bethel et al. 2013). Exposure to and incidence of other water-borne diseases, especially cryptosporidosis, may increase as precipitation and flooding in Oregon increase (Bethel et al. 2013). High flows can carry cattle feces into recreational waters and sources of drinking water, resulting in cryptosporidosis and other gastrointestinal illnesses in humans.

21. Climate change is likely to reduce many populations' access to sufficient and nutritious food (Bethel et al. 2013), which in turn poses risks to physical and mental health, maternal health, and child development (Schnitter and Berry 2019[27]). Mechanisms by which food security may be affected include droughts and floods within or beyond the region; both can affect agricultural production, and floods and landslides can affect the infrastructure used to

[25] Reisen, W.K., Y. Fang, and V.M. Martinez. 2006. Effects of temperature on the transmission of West Nile virus by *Culex tarsalis* (Diptera: Culicidae). Journal of Medical Entomology 43:309–317.

[26] Bethel, J., S. Ranzoni, and S.M. Capalbo. 2013. Human health: impacts and adaptation. Pages 181–206 in Dalton, M., P.W. Mote, and A.K. Snover. 2013. Climate change in the Northwest: implications for our landscapes, waters, and communities. Island Press, Washington, D.C.

[27] Schnitter, R., and P. Berry. 2019. The climate change, food security, and human health nexus in Canada: a framework to protect population health. International Journal of Environmental Research and Public Health 16:2531. doi:10.3390/ijerph16142531.

transport food. Individuals, populations, and communities that have low incomes, are relatively isolated, or are in poor health may be especially vulnerable to climate change-induced food insecurity. Given the role that certain foods play in tribal communities, not only health but cultural values and identity are threatened by some elements of climate change and related food access (Quaempts et al. 2018[28]).

22. Mental health also is likely to be adversely affected by climate change. For example, extreme events that are caused in part by climate change, such as wildfires or floods, can displace people from their homes either temporarily or permanently and degrade social and economic infrastructure (Bethel et al. 2013). Similar effects on social and economic systems may result from recurrent events even if the individual events are not extreme (Field et al. 2012[29]). Heat waves have been associated with increases in violent criminal activity during the following week in jurisdictions across the United States (Jacob et al. 2007[30]), and increases in larceny and violent crime are projected to increase as maximum monthly temperatures increase (Ranson 2014[31]).

23. Rising sea levels, increases in ocean temperature, coastal erosion, ocean acidification, and an increase in the frequency of harmful algal blooms will continue to threaten private property and subsistence, recreational, and commercial fisheries, including but not limited to shellfish fisheries, along the Pacific Coast of the United States. For example, because

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[28] Quaempts, E.J., K.L. Jones, S.J. O'Daniel, T.J. Beechie, and G.C. Poole. 2018. Aligning environmental management with ecosystem resilience: a First Foods example from the Confederated Tribes of the Umatilla Indian Reservation, Oregon, USA. Ecology and Society 23(2):29. doi:10.5751/ES-10080-23029.

[29] Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Medgley, editors. 2012. Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom.

[30] Jacob, B., L. Lefgren, and E. Moretti. 2007. The dynamics of criminal behavior: evidence from weather shocks. Journal of Human Resources 42:489–527.

[31] Ranson, M. 2014. Crime, weather, and climate change. Journal of Environmental Economics and Management 67:274–302.

warm water holds less oxygen than cold water, increases in water temperature directly reduce the concentration of dissolved oxygen. The number of Dungeness crabs (*Metacarcinus magister*) caught per person-hour of fishing, and the general condition of those crabs, decreases as oxygen concentrations off the coast of west-central Oregon decrease (Keller et al. 2010[32]). Additionally, in 2016, high concentrations of domoic acid from a regional harmful algal bloom led to a prolonged delay in the opening of the West Coast Dungeness crab fishery. Sea level rise could drive saltwater intrusion into coastal aquifers from which water for domestic and agricultural uses is derived. Additionally, extreme winter storms increase storm surge, erosion, and the likelihood of flooding in coastal communities.

24. Transportation systems in Oregon are threatened by extreme precipitation and temperatures, sea level rise, and wildfires, all of which can damage roads to the point that closures are necessary (OLIS 2019[33]). Current levels of funding are not sufficient for the Oregon Department of Transportation to proactively clear drainages (reducing the risk of flood), reshape slopes (reducing the risk of landslides), and maintain roadside vegetation (reducing the risk of flood and ignition or expansion of wildfire) (OLIS 2019).

25. Climate change is likely to have negative effects on transportation infrastructure absent substantial new investments. An assessment conducted by the Oregon Department of Transportation, Federal Highway Administration, and local government authorities in 2014

[32] Keller, A, V. Simon, F. Chan, W.W. Wakefield, M.E. Clarke, D. Kamikawa, E.L. Frush, and J.A. Barth. 2010. Demersal fish and invertebrate biomass in relation to an offshore hypoxic zone along the U.S. West Coast. Fisheries Oceanography 19:76–87.

[33] Oregon State Legislature, Oregon Legislative Information (OLIS). 2019. An adaptation menu of investment options: potential transportation investments to adapt to climate change impacts. Committee meeting document. https://olis.leg.state.or.us/liz/2019R1/Downloads/CommitteeMeetingDocument/165202.

(ODOT 2014[34]) identified vulnerabilities to climate change and extreme weather on highways in the Coast Range, roads in low-elevation areas that increasingly are prone to flooding, and the transportation infrastructure in coastal areas that are exposed to storm surges and inundation, both of which are becoming more frequent as anthropogenic climate change continues. Seismic Lifeline Routes in Oregon, intended to facilitate emergency response and recovery after an earthquake, also were found to be vulnerable. Furthermore, incremental increases in relative sea-level rise can produce exponential increases in flood frequency (Taherkhani et al. 2020[35]). For example, on the west coast of the United States, a rise in sea level of about 2.1 inches doubles the likelihood of exceeding the contemporary 50-year flood (a flood that has a 2% probability of occurring in a given year) (Taherkhani et al. 2020). Global mean sea level rose by nearly 8 inches from 1900 through 2018, and rates of sea level rise accelerated during that time (IPCC 2021[36]). Global mean sea level is likely to continue to rise by about 1–4 feet, relative to the year 2000, by the year 2100 (Sweet et al. 2017[37]). Sea level rise projections vary along the Oregon coast, primarily due to local differences in vertical land motions. To illustrate, median local sea level projections for Astoria, near Fort Stevens State Park, range from 0.1–2.4 feet above a 1992 baseline by

[34] ODOT (Oregon Department of Transportation). 2014. Climate change vulnerability assessment and adaptation options study. www.oregon.gov/ODOT/Programs/TDD%20Documents/ Climate-Change-Vulnerability-Assessment-Adaptation-Options-Study.pdf.

[35] Taherkhani, M., S. Vitousek, P.L. Barnard, N. Frazer, T.R. Anderson, and C.H. Fletcher. 2020. Sea-level rise exponentially increases coastal flood frequency. Scientific Reports 10:6466. DOI: 10.1038/s41598-020-62188-4.

[36] IPCC (Intergovernmental Panel on Climate Change). 2021. Summary for policymakers. Pages 3–32 in V. Masson-Delmotte et al., editors. Climate change 2021: the physical science basis. Contribution of Working Group I to the sixth assessment report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, USA. DOI: 10.1017/9781009157896.001.

[37] Sweet, W.V., R. Horton, R.E. Kopp, A.N. LeGrande, and A. Romanou, 2017. Sea level rise. Pages 333–363 in D.J. Wuebbles, D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock, editors. Climate science special report: fourth National Climate Assessment, volume I. U.S. Global Change Research Program, Washington, D.C. https://science2017.globalchange.gov/.

2050, depending on the emissions scenario. By contrast, median local sea level projections for Newport, near South Beach State Park and Lost Creek State Recreation Site, range from 0.6–2.9 feet above a 1992 baseline by 2050.

26. Native American tribes both on and off reservations generally are among the communities most strongly and adversely affected by climate change. Climate change affects the lands, identity, economies, physical and mental health, and culture of Native American tribes in addition to tribal fisheries and other sources of traditional foods, including but not limited to salmon, shellfish, and berries. In 2015, 15 tribes in the Columbia River Basin and three intertribal organizations identified protection of water quality and quantity; fishes, their habitats, and connectivity among them; preparation for wildfires in forests; and wildlife and their habitat among their highest priorities for climate action plans (Sampson 2015[38]).

I state under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge and belief.

Executed in Corvallis, Oregon on 18 April, 2024

Erica Fleishman

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Director, Oregon Climate Change Research Institute

[38] Sampson, D. 2015. Columbia River Basin tribes climate change capacity assessment. Portland State University, Portland, Oregon. https://www.tribalclimatecamp.org/sites/default/files/ColBasinTribes_CCCassessment.pdf