No. 18-36082

UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

KELSEY CASCADIA ROSE JULIANA, et al.,
Plaintiffs-Appellees,

v.

UNITED STATES OF AMERICA, et al.,
Defendants-Appellants.

On Appeal from the United States District Court
for the District of Oregon (No. 6:15-cv-01517-AA)

EXCERPTS OF RECORD
Volume 2 (Pages 117-382)

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UNITED STATES COURT OF APPEALS

FOR THE NINTH CIRCUIT

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Quality; SHAUN DONOVAN, in his official capacity as Director of the Office of Management and the Budget; JOHN HOLDREN, Dr., in his official capacity as Director of the Office of Science and Technology Policy; ERNEST MONIZ, Dr., in his official capacity as Secretary of Energy; U.S. DEPARTMENT OF THE INTERIOR; SALLY JEWELL, in her official capacity as Secretary of Interior; U.S. DEPARTMENT OF TRANSPORTATION; ANTHONY FOXX, in his official capacity as Secretary of Transportation; UNITED STATES DEPARTMENT OF AGRICULTURE; THOMAS J. VILSACK, in his official capacity as Secretary of Agriculture; UNITED STATES DEPARTMENT OF COMMERCE; PENNY PRITZKER, in her official capacity as Secretary of Commerce; UNITED STATES DEPARTMENT OF DEFENSE; ASHTON CARTER, in his official capacity as Secretary of Defense; UNITED STATES DEPARTMENT OF STATE; JOHN F. KERRY, in his official capacity as Secretary of State; GINA MCCARTHY, in her official capacity as Administrator of the EPA; OFFICE OF THE PRESIDENT OF THE UNITED STATES; U.S. ENVIRONMENTAL PROTECTION AGENCY; U.S. DEPARTMENT OF ENERGY; DONALD J. TRUMP, in his official capacity as President of the United States,

Defendants-Petitioners.

BEFORE: THOMAS, Chief Judge, and BERZON and FRIEDLAND, Circuit Judges.

The district court certified this case for interlocutory appeal pursuant to 28 U.S.C. § 1292(b), finding "that each of the factors outlined in § 1292(b) have been met . . . ." Thus, the district court "exercise[d] its discretion" in certifying the case for interlocutory appeal, noting that it did "not make this decision lightly."

An interlocutory appeal under 28 U.S.C. § 1292(b) is authorized when a district court order "'involves a controlling question of law as to which there is substantial ground for difference of opinion' and where 'an immediate appeal from the order may materially advance the ultimate termination of the litigation.'" *Reese v. BP Expl. (Alaska) Inc.*, 643 F.3d 681, 687–88 (9th Cir. 2011) (quoting 28 U.S.C. § 1292(b)). The district court properly concluded that the issues presented by this case satisfied the standard set forth in § 1292(b) and properly exercised its discretion in certifying this case for interlocutory appeal.

The petition for permission to appeal pursuant to 28 U.S.C. § 1292(b) is granted. Within 14 days after the date of this order, petitioners shall perfect the appeal in accordance with Federal Rule of Appellate Procedure 5(d). All pending motions are denied as moot.

Juliana v. United States, No. 18-80176

FRIEDLAND, Circuit Judge, dissenting:

In the process of granting certification, the district court expressed that it does not actually think that the criteria for certification are satisfied. Because I read 28 U.S.C. § 1292(b) to give discretion to district judges to determine whether an immediate appeal will promote judicial efficiency—and to authorize only those interlocutory appeals that the district judge believes will do so—I think the district court's statements prevent us from permitting this appeal.

Appellate review is ordinarily available only after a district court has entered a final judgment. 28 U.S.C. § 1291. As the Supreme Court has explained, this foundational default rule serves "important purposes," including "emphasiz[ing] the deference that appellate courts owe to the trial judge as the individual initially called upon to decide the many questions of law and fact that occur in the course of a trial," "avoid[ing] the obstruction to just claims that would come from permitting the harassment and cost of a succession of separate appeals," and "promoting efficient judicial administration." *Firestone Tire & Rubber Co. v. Risjord*, 449 U.S. 368, 374 (1981) (internal quotation marks and citations omitted). And while § 1292(b) allows departures from that rule in limited instances, certification of interlocutory appeals should be granted only in "exceptional circumstances." *Coopers & Lybrand v. Livesay*, 437 U.S. 463, 475 (1978).

A district court may certify an order for interlocutory appeal under § 1292(b) only if it is "of the opinion" that (1) the "order involves a controlling question of law as to which there is substantial ground for difference of opinion," and (2) "an immediate appeal from the order may materially advance the ultimate termination of the litigation." 28 U.S.C. § 1292(b). The Supreme Court indicated that it believes this case involves controlling questions as to which there are substantial grounds for difference of opinion. *United States v. U.S. District Court*, 139 S. Ct. 1 (July 30, 2018) (mem) ("The breadth of

respondents' claims is striking, however, and the justiciability of those claims presents substantial grounds for difference of opinion."); *see also United States v. U.S. District Court*, — S. Ct. —, 2018 WL 5778259, at *1 (Nov. 2, 2018) (mem) (referencing the Court's July 30th order as "noting that the 'striking' breadth of plaintiffs' claims 'presents substantial grounds for difference of opinion'"). We referenced that assessment in our own order granting Petitioners' motion for a temporary stay to allow time for consideration of pending motions. Order, *United States v. U.S. District Court*, No. 18-73014, Dkt. 3 (9th Cir. Nov. 8, 2018).

Apparently in response, the district court certified its motion to dismiss, judgment on the pleadings, and summary judgment orders for immediate appeal. Reading the certification order as a whole, however, I do not believe that the district court was actually "of the opinion" that "an immediate appeal from [these orders] [would] materially advance the ultimate termination of the litigation"—nor did it meaningfully "so state." 28 U.S.C. § 1292(b). The district court emphasized that "[t]rial courts across the country address complex cases involving similar jurisdictional, evidentiary, and legal questions as those presented here without resorting to certifying for interlocutory appeal," and the court said that it stood "by its prior rulings on jurisdictional and merits issues, as well as its belief that this case would be better served by further factual development at trial." *Juliana v. United States*, No. 6:15-CV-01517-AA, 2018 WL 6303774, at *3 (D. Or. Nov. 21, 2018). But the court then suggested that, because of the Supreme Court's statements and our repetition thereof in what the court called an "extraordinary Order," it was "find[ing] that each of the factors outlined in § 1292(b) [were] met." *Id.*

Although the district court's statement that the § 1292(b) factors were met would ordinarily support certification, here it appears that the court felt compelled to make that declaration even though—as the rest of its order suggests—the court did not believe that to be true. This is very concerning, because § 1292(b) reserves for the district court the threshold determination whether its

two factors are met. The statutory scheme makes particular sense with respect to the second factor, because although we and the Supreme Court may be as well-positioned as the district court to consider whether § 1292(b)'s purely legal first requirement is satisfied, the district court—having, among other things, direct experience with the parties, knowledge of the status of discovery, and the ability to sequence issues for trial—is far better positioned to assess how to resolve the litigation most efficiently. Neither we nor the Supreme Court had expressed a view on that second requirement, but it seems the district court interpreted our orders as mandating certification anyway.[1]

Section 1292(b) respects the district court's superior vantage point and its particular, critical role in the judicial process by allowing an interlocutory appeal only when the district court is "of the opinion"

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[1] It is also concerning that allowing this appeal now effectively rewards the Government for its repeated efforts to bypass normal litigation procedures by seeking mandamus relief in our court and the Supreme Court. If anything has wasted judicial resources in this case, it was those efforts. *See* Petition for Writ of Mandamus to the United States District Court for the District of Oregon and Request for Stay of Proceedings in District Court, *United States v. U.S. District Court*, No. 17-71692, Dkt. 1 (9th Cir. June 9, 2017) (requesting a stay of district court proceedings and relief from the Ninth Circuit); Petition for a Writ of Mandamus and Emergency Motion for a Stay of Discovery and Trial Under Circuit Rule 27-3, *United States v. U.S. District Court*, No. 18-71928, Dkt. 1 (9th Cir. July 5, 2018) (same); Application for a Stay Pending Disposition by the United States Court of Appeals for the Ninth Circuit of a Petition for a Writ of Mandamus to the United States District Court for the District of Oregon and Any Further Proceedings in This Court and Request for an Administrative Stay, *United States v. U.S. District Court*, No. 18A65 (U.S. July 17, 2018) (requesting a stay from the Supreme Court pending Ninth Circuit review of mandamus petition); Petition for a Writ of Mandamus Requesting a Stay of District Court Proceedings Pending Supreme Court Review, Emergency Motion Under Circuit Rule 27-3, *United States v. U.S. District Court*, No. 18-72776, Dkt. 1 (9th Cir. Oct. 12, 2018) (requesting a stay of district court proceedings from the Ninth Circuit pending Supreme Court review of mandamus petition); Application for a Stay Pending Disposition of a Petition for a Writ of Mandamus to the United States District Court for the District of Oregon and any Further Proceedings in this Court and Request for an Administrative Stay, *In re United States, Applicants*, No. 18A410 (U.S. Oct. 18, 2018) (bypassing the Ninth Circuit and requesting mandamus relief from the Supreme Court); Petition for a Writ of Mandamus and Emergency Motion Under Circuit Rule 27-3, *United States v. U.S. District Court*, No. 18-73014, Dkt. 1 (9th Cir. Nov. 5, 2018) (requesting a stay of district court proceedings and relief from the Ninth Circuit).

that both of the section's requirements are met. 28 U.S.C. § 1292(b). We have accordingly held that we lack jurisdiction when a district court grants certification but simultaneously expresses that it does not think the requirements of § 1292(b) are satisfied. *See Couch v. Telescope, Inc.*, 611 F.3d 629, 632 (9th Cir. 2010). Because that is the situation we face here, I believe we should allow the case to proceed to trial.[2] We could then resolve any novel legal questions if and when they are presented to us after final judgment.

For these reasons, I respectfully dissent.

[2] In *Couch*, after explaining that interlocutory appeal was precluded by the district court's assessment of the § 1292(b) requirements, we went on to also discuss why we believed the district court was correct in that assessment. 611 F.3d at 633-34. That further discussion, which related to § 1292(b)'s first requirement, seems to have been unnecessary to our holding regarding application of § 1292(b), which turns solely on the *district judge's* opinion whether the two factors are satisfied. But, in any event, I do not think the district court's conclusion here that "this case would be better served by further factual development at trial" than by immediate appeal represents an abuse of discretion. *Juliana*, 2018 WL 6303774, at *3; *cf. United States v. W.R. Grace*, 526 F.3d 499, 509, 516 (9th Cir. 2008) (en banc) (emphasizing that "district courts have inherent power to control their dockets" and that we review pretrial case management and discovery orders for abuse of discretion); *Gen. Signal Corp. v. MCI Telecommc'ns Corp.*, 66 F.3d 1500, 1507 (9th Cir. 1995) ("This court reviews issues relating to the management of trial for an abuse of discretion.").

Case No. 18-80176

IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

KELSEY CASCADIA ROSE JULIANA, *et al*.,
Plaintiffs-Appellees,
v.
UNITED STATES OF AMERICA, *et al*.,
Defendants-Appellants.

On Petition For Permission to Appeal from the United States District Court for the District of Oregon (No. 6:15-cv-01517-AA)

ANSWER IN OPPOSITION TO DEFENDANTS' PETITION FOR PERMISSION TO APPEAL (28 U.S.C. § 1292(b))

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CORPORATE DISCLOSURE STATEMENT

Pursuant to Rule 26.1 of the Federal Rules of Appellate Procedure, Plaintiff Earth Guardians states that it does not have a parent corporation and that no publicly-held companies hold 10% or more of its stock.

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INTRODUCTION

Granting this Petition and endorsing Defendants' delay tactics on the eve of trial in this constitutional case will contribute to a miscarriage of justice. The uncontradicted evidence is that every passing day is crucial for the ability of these young Plaintiffs to protect their fundamental rights to life, liberty, and property from the "direct existential threat"[1] of climate change.[2] Defendants' ongoing systemic conduct in controlling and perpetuating a fossil fuel energy system has led to the accumulation of carbon dioxide and heat in an already dangerous climate system. Granting interlocutory appeal will continue the present path of burdensome, layered, inefficient, and lengthy appellate review before the facts have been presented to the court charged with reviewing the evidence in the first instance. Interlocutory appeal will not serve the interests of justice and has the undisputed likelihood of denying a remedy for these youth Plaintiffs if trial remains stayed.[3] This Court's decision will

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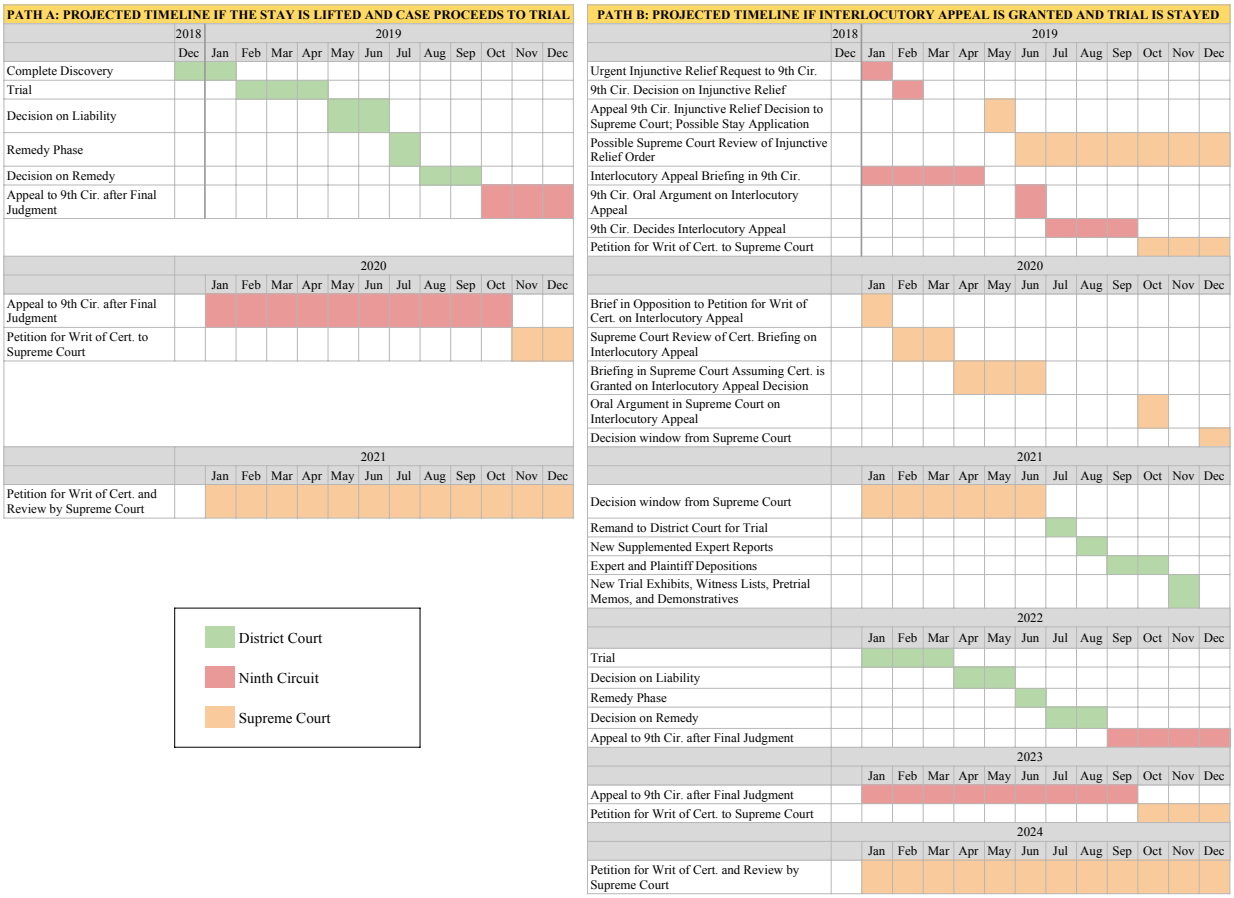
[1] Plaintiffs-Appendix 96 (UN Secretary General's September 2018 statement on climate change).

[2] Plaintiffs reference the instant Petition as "Pet."; Defendants' Appendix as "Appendix"; Plaintiffs' Appendix as "Plaintiffs-Appendix"; the District Court docket, *Juliana v. United States*, No. 6:15-cv-0157-AA (D. Or.), as "ECF"; the docket for Defendants' First Petition, *In re United States*, No. 17-71692 (9th Cir.), as "Ct. App. I Doc."; and the docket for Defendants' Fourth Petition, *In re United States*, No. 18-73014 (9th Cir.), as "Ct. App. IV Doc."

[3] *See, e.g.*, Plaintiffs-Appendix 6 (Expert Report of James E. Hansen, Ph.D.) ("There is no time left for further delay in taking actions to address the atmospheric burden that endangers our climate system and threatens our children."); Plaintiffs-Appendix 85 (Expert Report of Harold R. Wanless, Ph.D.) ("[A]ny delay in a judicial remedy for Plaintiff Levi poses clear and irreversible harm to his interests and his future").

affect whether "we risk missing the point where we can avoid runaway climate change." Plaintiffs-Appendix 96. If this Court grants interlocutory appeal and maintains the stay, these children will have no choice but to seek injunctive relief pending appeal to prevent the worsening of their status quo.

The clearest presentation of how interlocutory appellate review in this case thwarts efficiency and justice is by illustration:



Plaintiffs-Appendix 90-91.

Path A illustrates the "rule that a party is entitled to a single appeal, to be deferred until final judgment." *Mohawk Indus. v. Carpenter*, 558 U.S. 100, 106

(2009). Path B demonstrates the three levels of appellate review in both this Court and the Supreme Court that would ensue with interlocutory appeal, adding further premature review onto the four prior instances of review by this Court and two instances by the Supreme Court. Interlocutory review will likely delay trial and final judgment by at least two years, whereas review after final judgment without interlocutory review would likely occur in 2019, "materially advanc[ing] the ***ultimate*** termination of the litigation." 28 U.S.C. § 1292(b) (emphasis added). To preserve the integrity and the reputation of the judicial process, there is only one path to efficient judicial resolution of Plaintiffs' claims and the material advancement of the termination of this litigation. As this Court previously held: "There is enduring value in the orderly administration of litigation by the trial courts, free of needless appellate interference. In turn, appellate review is aided by a developed record and full consideration of the issues by the trial courts." *In re United States*, 884 F.3d 830, 837 (9th Cir. 2018). That wisdom holds true here. This Petition should be denied.

STATEMENT OF THE CASE

As Plaintiffs have recently set forth a procedural history of this case in their response to Defendants' Fourth Petition, Plaintiffs streamline their response to this

Fifth Petition by correcting Defendants' misstatements of the case and highlighting the most pertinent matters.

In August 2015, Plaintiffs filed this action to stop their federal government from infringing their substantive due process rights to life, liberty, and property and their right to equal protection of the law. ECF 7. Contrary to Defendants' characterization, Plaintiffs did not assert that the Constitution "conferred on them a substantive right to *particular* climate conditions." *Cf.* Pet. 3 (emphasis added). Rather, Plaintiffs claim the state of climate conditions, substantially created by Defendants' systemic conduct, is dangerous, injurious to these Plaintiffs, and must be redressed. *See, e.g.*, ECF 7, ¶¶ 5, 7-8, 10-12, 19, 28, 66-67, 70, 83-85, 214-215, 220-221, 231-232, 237, 241, 279-289.

On November 10, 2016, Judge Aiken denied Defendants' motion to dismiss Plaintiffs' claims. Appendix 74-127. Contrary to Defendants' characterization, the district court did not rule "Plaintiffs had established Article III standing," Pet. 4, but Plaintiffs "adequately alleged they have standing to sue." Appendix 101. The district court detailed the allegations of Plaintiff Jayden, whose home was destroyed by climate flooding, as one of Plaintiffs' particularized, actual injuries-in-fact, Appendix 92-93, and that Plaintiffs adequately alleged a causal chain to Defendants' conduct. Appendix 99. The district court found "[r]edressability in this case is scientifically complex, particularly in light of the specter of 'irreversible climate

change,' wherein greenhouse gas emissions above a certain level push the planet past 'points of no return, beyond which irreversible consequences become inevitable, out of humanity's control.'" Appendix 100-101.

The district court's order denying the motion to dismiss did not address all of Plaintiffs' due process or equal protection claims because Defendants did not move to specifically dismiss each claim. However, the district court expressly recognized a new liberty right, Appendix 105, recognized the federal public trust doctrine claim as "cognizable in federal court," Appendix 121, and held that the danger creation claim was adequately pled. Appendix 109; *cf.* Pet. 4-5.

On November 28, 2016, Plaintiffs notified the district court that any delay in starting trial would necessitate a motion for preliminary injunction in light of the ongoing and irreparable harms Plaintiffs are suffering. ECF 100, 10:22-13:17. The district court advised Plaintiffs to wait: "The goal would be to set the discovery deadline and the motion practice, dispositive motions, *et cetera*, within a time period where a trial can be held by the middle or toward the fall of [2017]." *Id.* 12:2-5. Plaintiffs heeded the district court's advice.

In response to Defendants' First Petition for mandamus, filed six months after the district court denied Defendants' motion to dismiss, the district court wrote this Court that "permitting this case to proceed to trial will produce better results on appeal by distilling the legal and factual questions that can only emerge from a fully

developed record." Ct. App. I Doc. 12, 2. After a seven-and-a-half month delay of pretrial proceedings, this Court denied the First Petition on March 7, 2018, holding that denial of the motion to dismiss did not present the possibility that the issues raised would evade appellate review and that mandamus is not to be "used as a substitute for appeal even though hardship may result from delay and perhaps unnecessary trial." *In re United States*, 884 F.3d at 834. This Court also was "not persuaded" that "holding a trial on the plaintiffs' claims and allowing the district court potentially to grant relief would threaten separation of powers." *Id*. at 836.

Thereafter, Defendants moved for partial summary judgment, again arguing standing, the two newly recognized fundamental rights fail on the merits, Plaintiffs' claims must be pled under the Administrative Procedure Act ("APA"), and separation of powers concerns bar Plaintiffs' claims and requested relief. ECF 207, i, 1-2. Defendants did not move for summary judgment on Plaintiffs' other constitutional claims.[4] They also moved for judgment on the pleadings. ECF 195. As to all issues other than standing, Defendants asserted entitlement to judgment purely as a matter of law and engaged in no factual, scientific, or historical analysis.

[4] Defendants claim they moved for summary judgment on all of Plaintiffs' claims, Pet., 13-14, n.3, but the motion made no reference to Plaintiffs' claims respecting their substantive due process rights to life and property, their recognized liberty rights to personal security and family autonomy, or rights of equal protection even where no suspect class exists. *See* ECF 207, i (III.B.1-2 in table of contents). Defendants' motion to dismiss similarly did not address all of Plaintiffs' substantive due process claims. ECF 27-1.

In opposing summary judgment, Plaintiffs submitted 18 expert declarations, 21 plaintiff declarations, and hundreds of government documents into the record, totaling over 36,000 pages. ECF 255-299; Plaintiffs-Appendix 91-92. Much of this evidence was offered to contest denials Defendants made in their Answer. ECF 98. Defendants submitted no evidence. ECF 207; ECF 315. At oral argument, ***Defendants conceded that Plaintiffs have established injury-in-fact***:

> [W]e now look beyond the complaint. We look at the evidence. At the pleading stage on the Rule 12 motion, Your Honor held that the allegations of certain specific injuries, loss of homes, flooding were sufficient to trigger injury in fact under Article III of the Constitution. And plaintiffs have submitted declarations in support of those allegations. And so those -- ***there has been a prima facie case made for those injuries. . . . But be that as it may because there are specific injuries, the question moves to causation.***

ECF 329, 25:5-13, 19-20 (emphasis added).

In denying Defendants' intervening Second Petition for mandamus on July 20, 2018, this Court again ruled it "remains the case that the issues the government raises . . . are better addressed through the ordinary course of litigation." *In re United States*, 895 F.3d 1101, 1106 (9th Cir. 2018). This Court reiterated that "allowing the usual legal processes to go forward will not threaten the separation of powers in any way not correctable on appeal." *Id.*

In its October 15 order on summary judgment and judgment on the pleadings, the district court narrowed Plaintiffs' case. The district court determined "[d]ue respect for separation of powers . . . requires dismissal of President Trump as a

defendant." Appendix 25. Although Defendants did not so move, the district court, *sua sponte*, granted summary judgment on Plaintiffs' claim under the Ninth Amendment, Appendix 65, and, rejected Plaintiffs' claim that children are a suspect class under the Equal Protection Clause. Appendix 65-67.

The district court otherwise denied Defendants' motions. Regarding separation of powers, the district court noted Defendants "offer[ed] no new evidence or controlling authority on this issue . . . [n]or do they offer a rationale as to why the outcome should be different under the summary judgment standard." Appendix 55. The district court noted it is entirely speculative at this stage, in a bifurcated trial, as to whether any remedy would transgress separation of powers when a full factual record is needed, when no decision has been made on liability, and when the court will take great care not to tread on the policy-making authority of the other branches. Appendix 53, 55-56, 56 n.16, 63, 64. The district court also rejected Defendants' APA argument, citing precedent of this Court and the Supreme Court. Appendix 29-34. As to the newly recognized liberty interest, the district court found Plaintiffs had submitted significant evidence, Defendants had submitted none, and held "further factual development of the record will help this Court and other reviewing courts better reach a final conclusion as to plaintiffs' claims under this theory." Appendix 58. The district court concluded genuine issues of material fact existed with respect to all issues raised at summary judgment, including standing, and found "[t]o allow

a summary judgment decision without cultivating the most exhaustive record possible during a trial would be a disservice to this case, which is certainly a complex case of 'public importance.'" Appendix 63. The district court declined to certify its order for interlocutory appeal. Appendix 68-70.

On November 5, Defendants moved the district court to reconsider its denials of Defendants' requests to certify the case for interlocutory appeal under 28 U.S.C. § 1292(b) and stay the litigation. ECF 418; ECF 419.

On November 8, this Court issued a partial stay pending consideration of Defendants' Fourth Petition for mandamus, staying only trial. Ct. App. IV. Doc. 3. Therein, this Court "invited [the district court] to revisit its decision to deny interlocutory review." Appendix 3.

On November 21, in response to this Court's request, the district court certified four orders for interlocutory appeal and stayed proceedings, but set forth the many reasons why it believed interlocutory appeal was ***not*** appropriate. Appendix 1-6. The district court reiterated "[t]he function of trial courts in our judicial system is to initially consider the myriad evidence and legal issues offered by the parties and then refine them to their most essential form, rendering judgment and relief as the law allows." Appendix 4-5.

> The Court notes again that this three-year-old case has proceeded through discovery and dispositive motion practice with only trial remaining to be completed.

> This Court stands by its prior rulings on jurisdictional and merits issues, as well as its belief that this case would be better served by further factual development at trial.

Appendix 5. Contrary to Defendants' misrepresentation, Pet. 10, the district court did not grant Defendants' motion for reconsideration, but denied their motion as moot in a minute order. Plaintiffs-Appendix 88 (ECF 445).

On November 30, Defendants petitioned this Court for interlocutory review of the order on motions to dismiss, Appendix 74-127, and the order on motions for judgment on the pleadings and summary judgment, Appendix 10-71.

On December 5, due to the dire urgency of their claims and in light of two new climate change reports issued by Defendants[5] confirming Plaintiffs' allegations of harm, and the short window left to stop climate change, Plaintiffs moved the district court for reconsideration of its November 21 stay order so that they may complete the limited discovery and pre-trial proceedings remaining and be prepared to commence trial when this Court lifts the stay of trial. ECF 446, 447; *see also* Ct. App. IV Doc. 12 (demonstrating that Defendants have suffered, and will suffer, no cognizable harm in finalizing discovery and the remaining pre-trial matters). That motion is pending before the district court.

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[5] Plaintiffs-Appendix 94.

STANDARD OF REVIEW

The issue before this Court is whether Defendants should be permitted to appeal *now*, on the eve of trial. Interlocutory appeal is a narrow exception to the final judgment rule set forth in 28 U.S.C. § 1291, which preserves judicial resources by preventing piecemeal appeals without adequate development of the record. *Coopers & Lybrand v. Livesay*, 437 U.S. 463, 475 (1978). Interlocutory appeal is only allowed when an order involves: (1) "a controlling question of law"; (2) for which "there is substantial ground for difference of opinion"; and (3) "an immediate appeal from the order may materially advance the ultimate termination of the litigation." 28 U.S.C. § 1292(b). "Because the requirements of § 1292(b) are jurisdictional, if this appeal does not present circumstances satisfying the statutory prerequisites for granting certification, this court cannot allow the appeal." *Couch v. Telescope Inc.*, 611 F.3d 629, 633 (9th Cir. 2010) (quotations omitted). "Even where the district court makes such a certification, the court of appeals nevertheless has discretion to reject the interlocutory appeal[] and does so quite frequently." *James v. Price Stern Sloan. Inc.*, 283 F.3d 1064, 1068 (9th Cir. 2002) (citing 16 Wright, Miller & Cooper § 3929, at 363).

This Court's Appellate Practice Guide states:

> Interlocutory or 'piecemeal' appeals run very much against the grain of modern federal appellate jurisprudence. Therefore, possibly the most critical aspect of your petition is your demonstration that (a) the matter you want reviewed is not appealable right now; and (b) ***some***

> ***significant loss will be suffered before a post-judgment appeal that cannot be remedied on post-judgment appeal. You may safely assume that the expense, delay, and annoyance of enduring the litigation through final judgment will not qualify as such a loss***, unless petitioner has an immunity or similar right to avoid the litigation altogether.[6]

To carry the heavy burden of avoiding the general rule against interlocutory appeal, Defendants must show all three elements of section 1292(b) have been met and show evidence of irremediable harm without interlocutory appeal. Defendants fail these criteria.

REASONS FOR DENYING DEFENDANTS' PETITION

This Court can, and should, summarily deny Defendants' Fifth Petition. *First*, interlocutory appeal will extend the ultimate termination of the litigation, not hasten it, with delay resulting in extreme prejudice to Plaintiffs. Only a merits decision that Plaintiffs lack standing can stop their case from proceeding to trial, and standing is not a proper question for this Court to determine in the first instance on interlocutory appeal given its fact-intensive nature. *Second*, the two constitutional questions posed – whether Plaintiffs have liberty rights to a climate system that sustains life or public trust resources – are not controlling questions of law because Plaintiffs also pled other due process violations of express and already-recognized rights that do not turn

[6] The Appellate Lawyer Representatives' Guide To Practice in the United States Court of Appeals for The Ninth Circuit (June 2017 ed.), *available at* https://cdn.ca9.uscourts.gov/datastore/uploads/guides/AppellatePracticeGuide.pdf (emphasis added).

on the answers to those new constitutional questions. There is no rush to validate or eliminate those two claims, and no efficiency gained, because the same body of evidence will be presented to establish Article III standing as will be introduced to prove Plaintiffs' claims. Plaintiffs-Appendix 92. *Third*, there is no substantial ground for difference of opinion as to Defendants' APA argument. Nor is there substantial ground for difference of opinion that our federal government cannot affirmatively act to deprive citizens of their fundamental rights without due process of law. These questions of standing and whether rights have been infringed are unequivocally mixed questions of law and fact yet to be decided by the district court on the merits. For this Court to take those issues up on interlocutory appeal after a denial of summary judgment would improperly place this Court in the shoes of the trier of fact.

Requiring the appealing party to bring all claims of error in a single appeal following a final judgment prevents "the debilitating effect on judicial administration caused by piecemeal appellate disposition of what is, in practical consequence, but a single controversy." *Eisen v. Carlisle & Jacquelin*, 417 U.S. 156, 170 (1974). This debilitating effect is already occurring here, where this Fifth Petition, like Defendants' four prior attempts for early appeals, seeks to upset the judgment of Congress and the independence of the three levels of the federal judiciary in exercising jurisdiction and rendering decisions in an orderly manner.

Firestone Tire & Rubber Co. v. Risjord, 449 U.S. 368, 374 (1981). This Court should reject these tactics once and for all.

I. INTERLOCUTORY APPEAL WILL EXTEND, NOT ADVANCE, THE ULTIMATE TERMINATION OF THE LITIGATION.

None of the issues raised by this Fifth Petition will evade appellate review after final judgment, which could occur as early as mid-2019 if the stay is lifted. *See* Appendix 2; *supra*, 2. This case is over three years old. Discovery and pre-trial proceedings can be completed in a matter of days, and the case is ready for trial. An appeal now can hardly "advance the ultimate termination of this case." *Caldwell v. Seaboard Coastline R.*, 435 F. Supp. 310, 312 (W.D. N.C. 1977).

On standing, Defendants fail to comply with Federal Rule of Appellate Procedure 5(b) to state "the facts necessary to understand the question presented." Their petition lacks any reference to "facts" or the extensive evidence in the record below. *See Clark-Dietz & Assocs.-Eng'rs, Inc. v. Basic Constr. Co.*, 702 F.2d 67, 68 (5th Cir. 1983) (court of appeals must rely upon would-be appellant to supply in the petition an adequate presentation of facts). Defendants are obliged to contend with the extensive body of evidence in the record supporting Plaintiffs' standing in their Petition, but instead they ignore it. While Defendants disputed the causation and redressability of Plaintiffs' standing on summary judgment, they have not yet presented their counter evidence to the district court, including their eight expert witnesses who contest causation and redressability. *See* Ct. App. IV. Doc. 12, 2-3;

Appendix 37, n.6. Thus, only their denials of those facts in their Answer were before the district court. ECF 98. The only judicial review that will materially advance the ultimate termination of the litigation is a final decision on Plaintiffs' standing after both sides present evidence at trial. Indeed, Plaintiffs' standing arguments run parallel to their merits claims. This is precisely why appellate courts do not review decisions on standing involving mixed questions of law and fact until there is a final judgment. Defendants cite no case, and Plaintiffs can find none, where a court of appeals addressed standing on interlocutory appeal when there was a dispute as to the facts between the parties.[7]

Far from materially advancing the litigation, interlocutory appeal will actually extend this litigation with unnecessary premature, piecemeal appellate review and additional motion practice, and lead to additional discovery and a much-delayed trial, potentially extending this litigation well into 2024. *Supra*, 2. The absence of conclusive findings of fact and of rigorous presentation of evidence at trial, evidence

[7] Standing only presents a controlling question of law for purposes of interlocutory appeal, if ever, where it involves a pure question of law, as opposed to the mixed questions of law and fact presented here. *See, e.g.*, *Edwards v. First Am. Corp.,* 610 F.3d 514 (9th Cir. 2010) (controlling question of statutory interpretation as to standing), *cert. dismissed*, 567 U.S. 756 (2012); *see also In re Anchorage Nautical Tours, Inc.*, 145 B.R. 637, 641 (9th Cir. 1992) ("The issue of standing is a mixed question of fact and law."); *Kreisler v. Second Ave. Diner Corp.*, 731 F.3d 184, 187 n.3 (2d Cir. 2013).

that is prepared and ready for trial to commence, would hamstring this Court's review. Appendix 5.

At this late date, should this Court keep the current stay in place on interlocutory appeal, Plaintiffs would be forced to seek relief under Federal Rule of Appellate Procedure 8(a)(2) because, as the uncontested evidence below establishes, absent a prompt trial or injunctive relief, irreversible climate harms will become locked-in. Plaintiffs would be entitled to an injunction pending appeal because serious questions are raised and the balance of hardships tips sharply in favor of Plaintiffs due to the grave and imminent possibility of irreparable harm. *See, e.g., Lopez v. Heckler*, 713 F.2d 1432, 1436, 1437 (9th Cir. 1983); *Barahona-Gomez v. Reno*, 167 F.3d 1228, 1234-35 (9th Cir. 1999); *Goldie's Bookstore, Inc. v. Superior Court of Cal.*, 739 F.2d 466, 472 (9th Cir. 1984); *Amoco Prod. Co. v. Vill. of Gambell*, 480 U.S. 531, 545 (1987). This Court would face a motion for injunctive relief pending appeal at the same time interlocutory appeal was unfolding – something the district court has tried to avoid since late 2016 (ECF 100, 10-13) – leading to another evidentiary proceeding in the absence of trial.

Ultimately, interlocutory appeal will lead to potentially three levels of appellate review by this Court and the Supreme Court. *Supra*, 2. Once the case is finally cleared for trial after interlocutory appeal, the parties would have to reopen

discovery, particularly as to experts, given the passage of time and the new evidence that is constantly developing. Plaintiffs-Appendix 92-93.

Trial will proceed on Plaintiffs' Fifth Amendment claims even if the newly recognized climate right or public trust rights, on which Defendants moved for summary judgment and now seek interlocutory appeal, were found not to fall within the liberty prong of the substantive due process clause.[8] "When litigation will be conducted in substantially the same manner regardless of [the court's] decision, the appeal cannot be said to materially advance the ultimate termination of the litigation." *In re City of Memphis*, 293 F.3d 345, 351 (6th Cir. 2002) (quoting *White v. Nix*, 43 F.3d 374, 378-79 (8th Cir. 1994) (alteration in original)).[9] The clear choice is to allow trial to commence in early 2019 and reserve appeal after final judgment. Defendants have submitted no evidence of harm other than the time and money it takes to participate in trial, which is a fraction of the resources already spent over the past three years on the multiple motions and petitions to stay litigation and for

[8] Those constitutional questions are mixed questions of law and fact and would benefit from factual findings at trial. However, if this Court accepted interlocutory appeal on those questions, trial should still proceed because the same body of evidence pertains to all claims and would not be altered by this Court's decision as to those two asserted rights.

[9] *See, e.g., McFarlin v. Conseco Servs., LLC*, 381 F.3d 1251, 1262 (11th Cir. 2004) ("Resolution of one claim out of seven would do too little, if anything, to 'materially advance the ultimate termination of the litigation'"); *Isra Fruit Ltd. v. Agrexco Agric. Exp. Co.*, 804 F.2d 24, 25-26 (2d Cir. 1986); *Syufy Enters. v. American Multi-Cinema, Inc.*, 694 F. Supp. 725, 729 (N.D. Cal. 1988).

mandamus, in nearly completing discovery, added to what will be spent in the next five years if this Court chooses Path B. *Supra*, 2.

II. DEFENDANTS HAVE NOT SHOWN THE SUMMARY JUDGMENT ORDER INVOLVES A "CONTROLLING QUESTION OF LAW" ON WHICH THERE IS "SUBSTANTIAL GROUND FOR DIFFERENCE OF OPINION."

A. The Only "Controlling Question of Law" Presented Is Whether Constitutional Claims Can Be Pled Apart from the APA.

A "question of law" is "controlling" under section 1292(b) if "resolution of the issue on appeal could materially affect the outcome of litigation in the district court." *In re Cement Antitrust Litig.*, 673 F.2d 1020, 1026 (9th Cir. 1982). A "question of law" means a "pure" question of law, not a mixed question of law and fact or an application of law to a particular set of facts. *See Ahrenholz v. Bd. of Trs. of the Univ. of Ill.*, 219 F.3d 674, 676-77 (7th Cir. 2000). A controlling question of law is one the appellate court can decide "quickly and cleanly without having to study the record" and "without having to wait till the end of the case." *Id.* at 677; *see McFarlin*, 381 F.3d at 1259. A "controlling question of law" is a legal consideration, not one that necessitates factual development. *Chehalem Physical Therapy, Inc. v. Coventry Health Care, Inc.*, 2010 WL 952273, at *3 (D. Or. Mar. 10, 2010) (collecting cases).

The standing question cannot be deemed a "controlling question of law" because it is not a pure legal question, but a mixed question of law and fact, which

the district court has not yet decided, and which would require this Court to make a merits decision in the first instance before trial. *See Steering Comm. v. United States*, 6 F.3d 572, 575 (9th Cir. 1993) ("a mixed question of law and fact" is not appropriate for permissive interlocutory review). That is the purpose of trial, not interlocutory appeal.

Further, a question of law is not controlling if additional claims would remain with the trial court after appeal, particularly if those claims involve similar evidence. *See, e.g.*, *U.S. Rubber Co. v. Wright*, 359 F.2d 784, 785 (9th Cir. 1966). Despite portending to seek review of all of Plaintiffs' due process claims,[10] Defendants did not move for dismissal, summary judgment, or judgment on the pleadings on Plaintiffs' substantive due process rights to life, property, or their recognized liberty rights to personal security and family autonomy. There is no order yet of the district court as to those specific rights for this Court to review. *See, e.g.*, *Burke v. Warner & Swasey Co.*, 868 F.2d 1008, 1010 (8th Cir. 1989) (remanding claims not addressed on summary judgment). The questions of the existence of a climate right or the public trust right do not qualify as controlling questions, simply because Plaintiffs have other substantive due process claims, and because in the absence of controlling precedent, those questions will involve an empirical analysis under *Washington v.*

[10] Defendants mention three of Plaintiffs' due process claims as controlling issues of law, Pet. 13, but only argue two claims (climate right and public trust) meet the section 1292(b) test. Pet. 17-18.

Glucksberg, 521 U.S. 702 (1997), which is best informed by expert testimony at trial on the history and traditions of our nation. *See* Appendix 58, 63.

B. For the Single Controlling Issue of Law Presented Regarding the APA, There is No Substantial Ground for Difference of Opinion.

Whether the APA overrides the Constitution is a controlling issue of law, but one that is soundly resolved. Under section 1292(b), this Court "must examine to what extent the controlling law is unclear." *Couch*, 611 F.3d at 633.

This Court definitively addressed the APA question as recently as November when it held that judicial review foreclosed under the APA "does not affect a plaintiff's ability to bring freestanding constitutional claims." *Regents of the Univ. of Cal. v. U.S. Dep't of Homeland Sec.*, 908 F.3d 476, 494 n.8 (9th Cir. 2018); *see also* Appendix 28-34. Defendants irresponsibly ignore *Regents*, as well as decisions such as *Navajo Nation v. Dep't of the Interior*, 876 F.3d 1144, 1171 (9th Cir. 2017); *The Presbyterian Church (U.S.A.) v. United States*, 870 F.2d 518, 525 n. 9 (9th Cir. 1989); *Webster v. Doe*, 486 U.S. 592, 603 (1988); *Franklin v. Massachusetts*, 505 U.S. 788, 801 (1992); and *Ziglar v. Abbasi*, 137 S. Ct. 1843, 1862 (2017). There is no difference of opinion on this question of law except as between Defendants and the courts.

While the Supreme Court opined that "the justiciability of [Plaintiffs'] claims presents substantial grounds for difference of opinion," Appendix 73, 8, none of the

three courts reviewing this case has found the other two requirements satisfied. Thus, interlocutory review is still inappropriate. Moreover, as discussed above, the justiciability of this case lies in Plaintiffs' Article III standing and, in particular, whether on the merits Plaintiffs can establish causation and redressability within the bounds of the separation of powers.[11] Standing, including the formulation of a remedy that would redress the injuries, is quintessentially a fact-laden question. *See Lujan v. Defs. of Wildlife*, 504 U.S. 555, 561 (1992). Here, causation (not raised in Defendants' Fifth Petition) and redressability will involve complex expert testimony. Appendix 50, 52-54. Defendants submitted no evidence to support their argument that Plaintiffs' claims cannot be redressed without the district court taking over the energy policy of the Nation. *See* Pet. 20. That notion is fundamentally at odds with what Plaintiffs seek, the availability of declaratory relief, and with the evidence to be presented at trial. This Court should not pre-judge the merits of Plaintiffs' case, nor a hypothetical remedy concocted by Defendants. *See* Plaintiffs-Appendix 93-94.

[11] While Defendants bluster about generalized grievances, Pet. 15, they conceded Plaintiffs made a prima facie case of injury-in-fact. ECF 329, 25. A single dissenting opinion by Chief Justice Roberts does not provide substantial ground for difference of opinion as to Plaintiffs' injuries. Pet. 15 (citing only *Massachusetts v. EPA*, 549 U.S. 497, 541 (2007) (Roberts, C.J., dissenting)).

Defendants contend "[n]o federal court has ever purported to use the 'judicial Power' to perform such a sweeping policy review,"[12] Pet. 16, but no federal defendants have ever before knowingly and systematically destroyed Plaintiffs' lives, liberties, and property so profoundly. Defendants conflate policy-*review* under the Constitution with policy-*making* by the political branches. Courts are free to engage in the former and order the political branches to bring the latter into constitutional compliance. *See, e.g.*, *Holder v. Humanitarian Law Proj.*, 561 U.S. 1, 34 (2010) ("Our precedents . . . make clear that national security and foreign relations do not warrant abdication of the judicial role."); *East Bay Sanctuary Covenant v. Trump*, No. 18-17274, 2018 WL 6428204, at *3 (9th Cir. Dec. 7, 2018). To accept Defendants' arguments on interlocutory appeal, *without a shred of evidence*, that when our government engages in systemic deprivation of life, liberty, and property, discriminates against young American citizens, and destroys the foundation of our Nation, there is no remedy under the Constitution, and no right for our youth to be heard at trial, would signal the demise of our constitutional democracy and the demise of our third branch of government as a bulwark against abuses of power by the majoritarian political branches. Any appellate review on Plaintiffs' standing must await a full factual record and a final decision by the district court.

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[12] Plaintiffs do not seek judicial review of any treaties or seek the enactment of treaties as relief, as implied by Defendants. Pet. 16.

CONCLUSION

In 2019, this Court can comprehensively review this case after final judgment, on a thorough factual record with findings of fact and conclusions of law honed for judicial review, and avoid a motion for injunctive relief. Defendants suffer no cognizable harm in "simply allowing the usual legal process to go forward." *In re United States*, 884 F.3d at 836. Interlocutory appeal will achieve only delay and extend this litigation into piecemeal reviews of fact-intensive questions and questions of law that will not dispose of the case. The projected timeline, *supra*, 2, clearly shows that interlocutory appeal will likely double the time it takes to resolve this case and triple the number of appellate reviews by this Court and the Supreme Court leading to gross judicial inefficiencies. The lengthy delay of trial court proceedings pending interlocutory appeal and the probability that interlocutory appeal will require lengthy appellate consideration on an incomplete record counsel against interlocutory review at this stage.

As the district court has oft and sagely recommended, Defendants' Petition should be denied so the parties can make their best case at trial and, if Plaintiffs prevail, our government can move on to saving our Nation for our children, rather than continue wasting resources fighting them. Plaintiffs do not state lightly that this decision will be a lasting legacy of this panel and this Court.

DATED this 10th day of December, 2018, at Eugene, OR.

Respectfully submitted,

s/ Julia A. Olson

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STATEMENT OF RELATED CASES

This case was previously before this Court and is a related case within the meaning of Circuit Rule 28-2.6: Defendants' four prior petitions for writs of mandamus: *In re United States*, 884 F.3d 830 (9th Cir. 2018) (No. 17-71692); *In re United States*, 895 F.3d 1102 (9th Cir. 2018) (No. 18-71928); *In re United States*, No. 18-72776 (denied as moot Nov. 2, 2018); and *In re United States*, No. 18-73014 (9th Cir. Nov. 5, 2018) (pending).

CERTIFICATE OF COMPLIANCE

I certify that this Answer to Petition contains 5,600 words, excluding the portions exempted by Federal Rules of Appellate Procedure 5(c) and 32(f) and Circuit Rule 5-2(b), which is equal to the limit of 5,600 words established by Circuit Rules 5-2(b) and 32-3(2). The petition's type size and type face comply with Federal Rule of Appellate Procedure 32(a)(5) and (6).

s/ Julia A. Olson
Julia A. Olson

No. 18-_____

UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

KELSEY CASCADIA ROSE JULIANA, et al.,
Plaintiffs-Appellees,

v.

UNITED STATES OF AMERICA, et al.,
Defendants-Appellants.

On Petition for Permission to Appeal from the United States District Court for the District of Oregon (No. 6:15-cv-01517-AA)

PETITION FOR PERMISSION TO APPEAL PURSUANT TO 28 U.S.C. § 1292(b)

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INTRODUCTION

Pursuant to 28 U.S.C. § 1292(b) and Federal Rule of Appellate Procedure 5, Defendants-Appellants the United States of America, et al. (the government) respectfully petition this Court for permission to appeal two orders of the United States District Court for the District of Oregon denying the government's dispositive motions. Appendix 74-127 (order denying motion to dismiss); Appendix 10-71 (order largely denying motions for judgment on the pleadings and for summary judgment). The district court certified the orders for interlocutory appeal on November 21, 2018. Appendix 1-6.[1]

Plaintiffs claim that "creating, controlling, and perpetuating a national fossil fuel-based energy system" violates their substantive due process and equal protection rights, and that a single district judge is empowered to order virtually the entire Executive Branch to "prepare and implement an enforceable national remedial plan to cease and rectify the constitutional violations by phasing out fossil fuel emissions and drawing down excess atmospheric CO_2." *In re United States*, 9th Cir. No. 18-73014, ECF No. 5, at 2, 3 (Nov. 18, 2018) (Plaintiffs' answer to the government's most recent mandamus petition). In the district court, the government

[1] The cited Appendix, filed concurrently herewith in a separate volume, contains all of the documents required by Federal Rule Appellate Procedure 5(a)(1)(E). Like an Excerpts of Record, it is consecutively paginated beginning with Page 1.

filed dispositive motions arguing that Plaintiffs lacked standing and that this action is not otherwise justiciable under Article III and the equitable authority of the courts; that the action should be dismissed for failure to comply with the requirements of the Administrative Procedure Act (APA), 5 U.S.C. §§ 551 et seq.; and that Plaintiffs have failed to state any claim — under the Due Process Clause or a public trust doctrine or otherwise — upon which relief can be granted.

In denying the government's dispositive motions, the district court's orders undeniably decided "controlling question[s] of law as to which there is substantial ground for difference of opinion," and "an immediate appeal from the order[s] may materially advance the ultimate termination of the litigation." 28 U.S.C. § 1292(b). Questions about the justiciability of Plaintiffs' claims and the existence of their asserted rights are plainly "controlling" because their resolution in the government's favor would end the case, and the Supreme Court of the United States has already indicated that Plaintiffs' claims present "substantial grounds for difference of opinion." Appendix 8, 73. Moreover, the resolution of these controlling questions by this Court would "materially advance the ultimate termination of the litigation" because, if resolved in the government's favor, they would dispose of the claims or at least narrow the action.

QUESTIONS PRESENTED FOR APPEAL

1. Whether this action is justiciable under Article III and the equitable authority of the courts.

2. Whether Plaintiffs' challenges to agency action must proceed, if at all, under the APA.

3. Whether Plaintiffs have stated any claim — under the Due Process Clause or a public trust doctrine or otherwise — upon which relief can be granted.

STATEMENT OF THE CASE

This action was filed in August 2015 by a group of minor children, a public interest organization, and "future generations" represented by Dr. James Hansen. Plaintiffs brought the action against President Obama (for whom President Trump was later substituted), the Executive Office of the President, three sub-components within that office, eight Cabinet departments and agencies, and various federal officials for allegedly violating their rights under the Constitution and a purported federal public trust that assertedly conferred on them a substantive right to particular climate conditions. *See generally* ECF No. 7 (operative complaint). Plaintiffs asked the district court to order the President and other officials and agencies named as defendants to "prepare and implement an enforceable national remedial plan to phase out fossil fuel emissions and draw down excess atmospheric CO_2." *Id*. at 94.

The government moved to dismiss Plaintiffs' claims on several grounds, including lack of standing and failure to state a cognizable claim. ECF No. 27. In November 2016, the district court denied that motion, Appendix 74-127, and it later declined to certify its order for interlocutory appeal, ECF No. 172 (June 8, 2017). The court ruled that Plaintiffs had established Article III standing by alleging that they had been harmed by the effects of climate change through increased droughts, wildfires, and flooding; and that the government's regulation of (and failure to further regulate) fossil fuels had caused Plaintiffs' injuries. Appendix 91-99. The court determined that it could redress those injuries by ordering

> Defendants to cease their permitting, authorizing, and subsidizing of fossil fuels and, instead, move to swiftly phase out CO_2 emissions, as well as take such other action necessary to ensure that atmospheric CO_2 is no more concentrated than 350 ppm by 2100, including to develop a national plan to restore Earth's energy balance, and implement that national plan so as to stabilize the climate system.

Appendix 101 (quoting complaint); *see generally* Appendix 91-101.

On the merits, the district court held that Plaintiffs had stated a claim under the Fifth Amendment's Due Process Clause. Appendix 101-24. The court found in the Fifth Amendment's protection against the deprivation of "life, liberty, or property, without due process of law," a previously unrecognized fundamental right to a "climate system capable of sustaining human life," and the court determined that Plaintiffs had adequately alleged infringement of that right. Appendix 105. The court concluded that the Plaintiffs had stated a claim that the government's "failure

to adequately regulate CO_2 emissions" supported a "danger-creation due process claim." Appendix 109.

The court also held that Plaintiffs had adequately stated a claim under a federal public trust doctrine, which it held imposes a judicially enforceable prohibition on the government against "depriving a future legislature of the natural resources necessary to provide for the well-being and survival of its citizens." Appendix 110 (quoting amicus brief in support of Plaintiffs). Plaintiffs' claims under this public trust rationale, the court concluded, are also "properly categorized as substantive due process claims." Appendix 124.

The government petitioned this Court for a writ of mandamus to halt these deeply flawed proceedings. This Court stayed the litigation for seven-and-a-half months but ultimately denied the petition without prejudice. *In re United States*, 884 F.3d 830, 838 (9th Cir. 2018). The Court explained, however, that "[c]laims and remedies often are vastly narrowed as litigation proceeds," and that it had "no reason to assume this case will be any different." *Id*. The Court observed that the government could continue to "raise and litigate any legal objections [it may] have," *id*. at 837, and the Court added that the government remains free to "seek[] mandamus in the future," *id*. at 838.

Consistent with this Court's opinion, the government moved for judgment on the pleadings, arguing that Plaintiffs' claims should be dismissed in their entirety,

ECF No. 195; and for summary judgment, arguing that the district court should enter judgment in favor of the government on all of Plaintiffs' claims, ECF No. 207. The government also moved for a protective order precluding all discovery. ECF No. 196. On June 29, 2018, the district court denied the government's motion for a protective order. ECF No. 300. On July 18, 2018, the district court held argument on the dispositive motions and took them under advisement.

While the two dispositive motions were still pending and after the district court had denied the government's motion for a protective order barring discovery, the government sought relief from both this Court and the Supreme Court. ECF No. 308-1; ECF No. 321-1. Both courts denied the requested relief without prejudice. On July 20, this Court determined that "[a]bsent a specific discovery order, mandamus relief remains premature." *In re United States*, 895 F.3d 1101, 1105 (9th Cir. 2018). On July 30, the Supreme Court denied the government's application "without prejudice" because it was "premature." Appendix 73. The Court also stated that the "breadth of [Plaintiffs'] claims is striking, however, and the justiciability of those claims presents substantial grounds for difference of opinion." *Id.* It instructed the district court to "take these concerns into account in assessing the burdens of discovery and trial, as well as the desirability of a prompt ruling on the Government's pending dispositive motions." *Id.*

Two months later, on October 15, the district court issued an opinion largely denying the motions. Appendix 10-71. The court granted two narrow aspects of the government's motions. First, the court dismissed the President from the action, but only "without prejudice" and while warning that it "is not possible to know how developments to the record in the course of the litigation may change the analysis," such that the court could "not conclude with certainty that President Trump will never become essential to affording complete relief." Appendix 27-28. Second, the court granted summary judgment to the government on Plaintiffs' "freestanding claim under the Ninth Amendment," which the court held "not viable as a matter of law." Appendix 65.

The district court otherwise denied the government's motions. The court rejected the government's argument that Plaintiffs failed to challenge only discrete, identified agency actions or alleged failures to act, as the Administrative Procedure Act requires, concluding that the "APA does not govern" claims seeking equitable relief for alleged constitutional violations based on "aggregate action by multiple agencies." Appendix 34. The court also rejected the government's argument that Plaintiffs had failed to establish standing at the summary-judgment stage, largely by reiterating its analysis from the motion-to-dismiss stage. Appendix 38-54. The court likewise reiterated its earlier holdings on the government's other central arguments. Appendix 34-36, 54-57, 63-64.

The court then directly addressed Plaintiffs' equal protection claim for the first time. It rejected their argument based on the idea of "posterity" or "minor children" as a suspect class because "[a]pplying strict scrutiny to every governmental decision that treats young people differently from others is unworkable and unsupported by precedent." Appendix 67. Yet the court allowed the equal protection claim to proceed because "strict scrutiny is also triggered by alleged infringement of a fundamental right," and the claim "rests on alleged interference with a climate system capable of sustaining human life — a right the Court has already held to be fundamental." Appendix 67. The court held that application of strict scrutiny to the evaluation of the equal protection and due process claims "would be aided by further development of the factual record." Appendix 68. The district court again declined to certify its order for interlocutory appeal under 28 U.S.C. § 1292(b). Appendix 68-70.

With less than two weeks remaining before a scheduled 10-week trial, the government again sought relief from both this Court and the Supreme Court. ECF No. 390; ECF No. 391. The Chief Justice promptly issued an administrative stay of all litigation in the district court while the full Court considered the government's application for a stay. ECF No. 399. On November 2, the Supreme Court again denied the government's stay application "without prejudice," this time on the ground that "adequate relief may be available in the United States Court of Appeals for the Ninth Circuit." Appendix 8. The Supreme Court explained:

> Although the Ninth Circuit has twice denied the Government's request for mandamus relief, it did so without prejudice. And the court's basis for denying relief rested, in large part, on the early stage of the litigation, the likelihood that plaintiffs' claims would narrow as the case progressed, and the possibility of attaining relief through ordinary dispositive motions. Those reasons are, to a large extent, no longer pertinent. The 50-day trial was scheduled to begin on October 29, 2018, and is being held in abeyance only because of the current administrative stay.

Appendix 9. Once again, the Court invoked the standard of Section 1292(b) — this time expressly citing the provision and describing its earlier order as "noting that the 'striking' breadth of plaintiffs' claims 'presents substantial grounds for difference of opinion.'" Appendix 8.

The government then filed a motion asking the district court to reconsider its denials of the government's requests to certify the court's orders for interlocutory appeal under 28 U.S.C. § 1292(b), and an accompanying request for a stay pending consideration of that motion. ECF Nos. 418-419. In this Court, the government filed a mandamus petition on November 5, asking the Court either to dismiss the action or to direct the district court to certify its decisions for interlocutory appeal under Section 1292(b). *In re United States*, No. 18-73014, ECF No. 1. The petition noted that mandamus would not be necessary if the district court granted certification and stayed proceedings. *Id*. at 1. The government also asked for a stay of litigation in district court, which this Court granted in part on November 8, staying trial pending consideration of the petition. *In re United States*, No. 18-73014, ECF No. 3.

In the stay order, this Court requested that the district court "promptly resolve petitioners' motion to reconsider the denial of the request to certify orders for interlocutory review." *Id.* at 2. The Court also cited the Supreme Court's orders that had used the language of Section 1292(b) in describing the justiciability and merits of Plaintiffs' claims. *Id.*; *see also* Appendix 8, 73.

On November 21, the district court granted the government's motion for reconsideration and certified its orders for interlocutory appeal pursuant to Section 1292(b). Appendix 1-6. While the court noted "its belief that this case would be better served by further factual development at trial," it took "particular note" of the Supreme Court's orders and this Court's November 2 order. Appendix 5. The district court concluded that "each of the factors outlined in § 1292(b) have been met regarding the previously mentioned orders," Appendix 6, which appears to be a reference to ECF "docs. 83, 172, 238, and 369," Appendix 5. Those orders include the district court's opinion denying the government's motion to dismiss, Appendix 74-127, and the opinion and order resolving the government's motion for judgment on the pleadings and for summary judgment, Appendix 10-71.[2]

[2] The district court also listed its opinion denying the government's initial request for certification, ECF No. 172, and its order denying the government's motion for stay pending resolution of discovery objections, ECF No. 238. The government's motion for reconsideration did not ask the district court to certify ECF Nos. 172 and 238 for appeal, and we accordingly are not asking this Court for permission to appeal of those orders, which do not address the questions presented on Page 3 above.

The district court "exercise[d] its discretion and immediately certifie[d] this case for interlocutory appeal" and stayed proceedings pending a decision by this Court. Appendix 6.

REASONS FOR GRANTING PERMISSION TO APPEAL

An interlocutory appeal under 28 U.S.C. § 1292(b) is authorized when a district court "order involves a controlling question of law as to which there is substantial ground for difference of opinion and [when] an immediate appeal from the order may materially advance the ultimate termination of the litigation." If an order presents just one such question, this Court may accept certification and "may address any issue fairly included within the certified order." *Rivera v. NIBCO, Inc.*, 364 F.3d 1057, 1063 (9th Cir. 2004) (internal quotation marks omitted). The standard is clearly met here with respect to at least *three* questions: whether Plaintiffs' claims are justiciable under Article III and the court's equitable authority, whether Plaintiffs' claims must be brought pursuant to the APA, and whether Plaintiffs' claims have any merit. Particularly in light of the Supreme Court's multiple orders contemplating interlocutory appellate review, this Court should exercise its discretion to review the district court's orders.

I. The district court's orders involve controlling questions of law.

A question of law is "controlling" if "its incorrect disposition would require reversal of a final judgment." 16 Charles Alan Wright et al., *Federal Practice and*

Procedure § 3930 (3d ed. 2005 & Supp. 2018). Here, the two orders at issue address the three controlling questions of law set forth on Page 3 above.

Both orders addressed the governments' controlling justiciability arguments. Specifically, the dismissal order rejected the government's standing arguments. Appendix 91-101. The order denying judgment on the pleadings and summary judgment again rejected the standing arguments, Appendix 38-54, and it rejected the government's broader Article III argument as well, Appendix 35-36, 54-57. These justiciability questions are plainly controlling because, if Plaintiffs lack standing or their suit is not justiciable as a "Case" or "Controversy" under Article III and under the court's equitable authority, then it is beyond the "judicial Power" and must not proceed. *Steel Co. v. Citizens for a Better Environment*, 523 U.S. 83, 102 (1998).

The APA issue is also a controlling question of law. The district court's second order rejected the government's argument that the APA provides the mechanism for challenging the federal administrative actions that underlie Plaintiffs' claims, but that Plaintiffs fail to challenge discrete, identified agency actions or alleged failures to act, as the APA requires. The district court concluded that the "APA does not govern" claims seeking equitable relief for alleged constitutional violations based on "aggregate action by multiple agencies." Appendix 34. But there is no dispute that if the APA governs, then Plaintiffs' claims would have to be dismissed. Therefore, this question is controlling as well.

The merits of Plaintiffs' claims are also controlling questions of law. The government moved to dismiss (and later moved for summary judgment on) based on Plaintiffs' failure to state any claim based on due process, equal protection, a public trust doctrine, or any other ground. The district court's dismissal order held that Plaintiffs had stated a claim based on due process theories: a previously unrecognized fundamental right to a "climate system capable of sustaining human life," Appendix 105; a "danger-creation due process claim," Appendix 109; and claims under a federal public trust doctrine, which the court concluded are also "properly categorized as substantive due process claims," Appendix 124. The court's second order reiterated its earlier holdings, Appendix 57-64, and also recognized an equal protection claim based on an "alleged infringement of a fundamental right" — namely, the same right to "a climate system capable of sustaining human life," Appendix 67. Whether these rulings are correct are controlling questions of law: if due process, equal protection, and a public trust do not provide Plaintiffs with these rights, then the claims fail.[3]

[3] Reversing the district court's orders on the merits would not allow Plaintiffs to continue to pursue claims based on other unenumerated substantive due process rights, such as "their substantive due process rights to life, liberty, and property, including recognized unenumerated rights to personal security and family autonomy." *In re United States*, 9th Cir. No. 18-73014, ECF No. 5, at 2 (Plaintiffs' answer to mandamus petition). The government first moved to dismiss (and later moved for summary judgment on) *all* of Plaintiffs' claims, most of which are derivative of their asserted fundamental "right to a climate system capable of

II. There are substantial grounds for difference of opinion on the controlling questions of law.

The second requirement for certification under 28 U.S.C. § 1292(b) is that the controlling questions of law decided by the district court must present "substantial grounds for difference of opinion" with the district court's rulings. "A substantial ground for difference of opinion exists where reasonable jurists might disagree on an issue's resolution." *Reese v. BP Exploration (Alaska) Inc.*, 643 F.3d 681, 688 (9th Cir. 2011). And "a novel issue may be certified for interlocutory appeal without first awaiting development of contradictory precedent." *Id.*

The previous orders from the Supreme Court and this Court make crystal clear that this requirement is satisfied here. That Court's July 30 Order stated that "the justiciability of [Plaintiffs'] claims presents substantial grounds for difference of opinion." Appendix 73. The Court's November 2 Order quoted the standard in Section 1292(b) and then, in the next sentence, further stated that "the 'striking' breadth of plaintiffs' claims 'presents substantial grounds for difference of opinion.'" Appendix 8 (quoting Appendix 73). This Court cited both of those orders

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sustaining human life." Appendix 67; *see also id.* (explaining that Plaintiffs' equal protection claim "rests on" their asserted fundamental right). In response to the government's motions in the district court, Plaintiffs identified no legal support for their claim that the government's policy actions concerning energy and the environment can violate substantive due process rights concerning life, liberty, property, or personal security and family autonomy. No claims or theories lurk unaddressed in the district court.

in its order requiring a response to the government's mandamus petition and in staying trial. *See In re United States*, No. 18-73014, ECF No. 3, at 2. The observations of both courts are well-founded.

First, as to justiciability, reasonable jurists might disagree with the district court's conclusion that Plaintiffs have Article III standing and that a federal court may otherwise entertain this action consistent with the Constitution's limitations on "judicial Power." To the contrary, Plaintiffs lack standing because they assert "generalized grievance[s]," not the invasion of a "legally protected" interest that is "concrete and particularized." *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560, 575 (1992). As the Chief Justice has cogently observed, the "very concept of global warming seems inconsistent with" the "particularization requirement," because "[g]lobal warming is a phenomenon harmful to humanity at large." *Massachusetts v. EPA*, 549 U.S. 497, 541 (2007) (Roberts, C.J., dissenting) (internal quotation marks omitted). Plaintiffs also lack standing because they cannot establish that their asserted injuries likely could be redressed by an order of a federal court: they have not even begun to articulate a remedy within a federal court's authority to award that could move the needle on the complex phenomenon of global climate change, much less likely redress their alleged injuries.

Moreover, quite aside from these fatal flaws with respect to standing, this action is not a case or controversy cognizable under Article III. Plaintiffs ask the

district court to review and assess the entirety of Congress's and the Executive Branch's programs and regulatory decisions relating to climate change and then to undertake to pass upon the comprehensive constitutionality of all of those policies, programs, and inaction in the aggregate. No federal court has ever purported to use the "judicial Power" to perform such a sweeping policy review — and for good reason. The Constitution commits not to the courts but rather to Congress the power to enact comprehensive government-wide measures of the sort sought by Plaintiffs. And the Constitution commits not to the courts but rather to the President the power to oversee the Executive Branch in its administration of existing law and to draw on its expertise and formulate policy proposals for changing that law. The Constitution also assigns to the President the principal role in negotiating treaties — including, as he may see fit, treaties to reduce greenhouse gas emissions — and in otherwise conducting the foreign policy of the United States. U.S. Const. art. II, § 2, cl. 2.

Second, reasonable jurists might disagree with the district court's conclusion that Plaintiffs' claims need not proceed under the APA, targeted at specifically identified agency actions or alleged failures to act and based on the administrative record for those actions. 5 U.S.C. §§ 702, 706(1), 706(2)(A)-(B). As this Court has recognized, the APA provides a "comprehensive remedial scheme" for a "person 'adversely affected . . .' by agency action" or alleged failure to act with respect to regulatory requirements and standards, permitting, and other administrative

measures. *Western Radio Services Co. v. U.S. Forest Service*, 578 F.3d 1116, 1122-23 (9th Cir. 2009) (citation omitted); *see also, e.g.*, *Wilkie v. Robbins*, 551 U.S. 537, 551-554 (2007) (describing the APA as the remedial scheme for vindicating complaints against "unfavorable agency actions").

Those are precisely the sorts of measures Plaintiffs are challenging here, and the district court was wrong to conclude that Plaintiffs need not comply with the APA because the Constitution itself provides a right of action. The Supreme Court recently concluded that the Supremacy Clause does not "confer a right of action," a conclusion that conflicts with the inherent cause of action for constitutional claims envisioned by Plaintiffs. *Armstrong v. Exceptional Child Center, Inc.*, 135 S. Ct. 1378, 1384 (2015). *Armstrong* also emphasized that any equitable authority to consider alleged constitutional claims or otherwise is "subject to express and implied statutory limitations." *Id.*; *see also Seminole Tribe of Florida v. Florida*, 517 U.S. 44, 74 (1996). Thus, even if the equitable authority of an Article III court could otherwise extend to an action like the one pursued by Plaintiffs, Congress already created in the APA a remedial scheme for unconstitutional agency actions, 5 U.S.C. § 706(2)(b), which the courts may not ignore or supplement.

Third, reasonable jurists might disagree with the district court's conclusion that Plaintiffs' claims have merit, particularly that there is a substantive due process "right to a climate system capable of sustaining human life," Appendix 105, and that

a federal public trust doctrine imposes judicially enforceable obligations on the government, Appendix 110. As the district court itself acknowledged, "recognizing a federal public trust and a fundamental right to climate system capable of sustaining human life would be unprecedented." Appendix 125. As to the novel due process right, the Supreme Court has repeatedly instructed lower courts to "exercise the utmost care whenever . . . asked to break new ground in this field, lest the liberty protected by the Due Process Clause be subtly transformed" into judicial policy preferences. *Washington v. Glucksberg*, 521 U.S. 702, 720 (1997) (internal quotation marks and citation omitted). As to the public trust doctrine, the D.C. Circuit correctly observed that the Supreme Court has "categorically rejected any federal constitutional foundation for that doctrine, without qualification or reservation." *Alec L. ex rel. Loorz v. McCarthy*, 561 Fed. Appx. 7, 8 (per curiam), *cert. denied*, 135 S. Ct. 774 (2014).

Accordingly, there are substantial grounds for difference of opinion on one or more controlling questions of law.

III. Immediate appeal will advance the termination of the litigation.

An "immediate appeal from" the district court's orders would "materially advance the ultimate termination of the litigation." 28 U.S.C. § 1292(b); *see also Reese*, 643 F.3d at 688 (holding that "neither § 1292(b)'s literal text nor controlling precedent requires that the interlocutory appeal have a final, dispositive effect on the

litigation, only that it 'may materially advance' the litigation"). A successful appeal on either the government's justiciability or APA issues would end the case entirely, clearly exceeding the requirement that an appeal "materially advance the termination of the litigation." If the Court were to conclude that Plaintiffs had no constitutional or public trust rights or claims, moreover, that conclusion would likewise end the case in its entirety.

Interlocutory appeal would also potentially avoid the time and expense of a 10-week merits trial, followed by an additional potential remedy trial, that would be inappropriate even apart from the viability of this action. As elaborated in the government's previous filings, such trials would likely require federal agencies to take official positions on factual assessments and questions of policy concerning the climate through the civil litigation process — and then, if liability is found, to participate in further judicial proceedings to impose on them an "enforceable national remedial plan to phase out fossil fuel emissions and draw down excess atmospheric CO_2." ECF No. 7, at 94. Such participation would impermissibly conflict with the comprehensive procedures for agency decisionmaking prescribed by the APA, *see Wong Yang Sung* v. *McGrath*, 339 U.S. 33, 36 (1950), and deprive other interested parties and the public of the opportunity mandated by Congress or agency procedures to provide input. In a similar fashion, by seeking to leverage the civil litigation process to direct the agencies' decisions outside the congressionally

prescribed statutory framework, Plaintiffs' anticipated trial would pose substantial separation-of-powers concerns.

Despite these concerns, the district court expressed the view that "this case would be better served by further factual development at trial." Appendix 5. Of course, the court recognized on reconsideration that that view did not outweigh the other concerns with proceeding to trial without interlocutory review. Appendix 6. But the court's view was misguided in any event: no further factual development is necessary to consider the controlling questions presented here. As to standing, there are no disputed facts concerning the government's contention that climate change is a global phenomenon that affects everyone in the world. Nor are the facts disputed that climate change stems from a complicated, world-spanning web of actions across every field of human endeavor, including the energy and transportation choices of everyone on the planet. The government's redressability argument is purely legal as well: Plaintiffs' alleged injuries cannot be redressed in the district court because a single district judge may not assume authority over the regulation of the Nation's energy production, energy consumption, and transportation policy (let alone authority over the same spheres of action by all of the major economies of the world) — as the district court would need to do in order to give Plaintiffs their demanded remedy. Likewise, there are no factual issues concerning the lack of "judicial Power" under Article III for a federal court to adjudicate this action.

Finally, no factual development is required to consider the APA question or the underlying merits of Plaintiffs' claims. As to the APA, because Plaintiffs' claims seek review of agency actions and inactions, they must proceed under the APA, not the district court's equitable authority, as explained above, regardless of any possible factual dispute. As to the merits, Plaintiffs contend that the government's actions and inaction violate Plaintiffs' substantive due process and equal protection rights, as well as a public trust doctrine. Because Plaintiffs' claims are completely without support in the law, this Court should assess whether the claims have any legal basis before allowing this action to proceed.

CONCLUSION

For the foregoing reasons, the Court should grant the government's petition for interlocutory appeal under 28 U.S.C. § 1292(b).

Dated: November 30, 2018.

Respectfully submitted,

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STATEMENT OF RELATED CASES

There are four related cases within the meaning of Circuit Rule 28-2.6, namely, the government's four petitions for writs of mandamus: *In re United States*, 884 F.3d 830 (9th Cir. 2018) (No. 17-71692); *In re United States*, 895 F.3d 1102 (9th Cir. 2018) (No. 18-71928); *In re United States*, No. 18-72776 (denied as moot Nov. 2, 2018); and *In re United States*, No. 18-73014 (pending).

CERTIFICATE OF COMPLIANCE

I certify that this petition is 4,972 words, excluding the portions exempted by Federal Rules of Appellate Procedure 5(c) and 32(f) and Circuit Rule 5-2(b), which is less than the limit of 5,600 words established by Circuit Rules 5-2(b) and 32-3(2). The petition's type size and type face comply with Federal Rule of Appellate Procedure 32(a)(5) and (6).

s/ Eric Grant
Eric Grant

CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the Ninth Circuit by using the appellate CM/ECF system on November 30, 2018.

I further certify that on this date, an electronic copy of the foregoing has been provided via e-mail to the following counsel for Plaintiffs, who have consented in writing to such service pursuant to Federal Rule of Appellate Procedure 25(c)(1)(D):

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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF OREGON

EUGENE DIVISION

KELSEY CASCADIA ROSE JULIANA, et al.,

Plaintiffs,

v.

THE UNITED STATES OF AMERICA, et al.,

Defendants.

No. 6:15-cv-01517-AA

ORDER

AIKEN, District Judge.

This case was originally filed in August 2015. After a protracted period of discovery disputes, dispositive motions, and mandamus petitions, this case was set for trial beginning on October 29, 2018, with a pretrial conference to be held on October 23, 2018. On October 19, 2018, the United States Supreme Court issued an administrative Order staying trial and all discovery in response to a petition for a writ of mandamus and application for stay filed with the Court by federal defendants. (doc. 399) Pursuant to that Order, this Court vacated the trial date and all related deadlines. On November 2, 2018, the Supreme Court denied federal defendants' application for stay pending disposition of their petition for a writ of mandamus without prejudice, specifically noting the impropriety of seeking review from the Supreme Court without first filing a petition with the relevant circuit court. (doc. 416)

On November 5, 2018, pursuant to the Supreme Court's Order vacating the administrative stay, this Court scheduled a status conference for November 8, 2018 at 3:30 p.m. to confer with the parties concerning the status of this litigation. (doc. 417) Over the course of these proceedings, this Court has been aware of federal defendants' concerns and their interest in pursuing an interlocutory appeal. Given the sheer volume of evidence submitted by the parties, however, this Court believed that a bifurcated trial might present the most efficient course for both the parties and the judiciary. The Court has discussed on the record dividing the trial into a liability phase and a remedy phase pursuant to Federal Rule of Civil Procedure 42(b). The Court would then be able to reserve the question of interlocutory appeal by either party until the close of the liability phase once all the evidence and testimony could be distilled into a more cohesive and accessible record. Should the liability phase of the trial have resulted in a finding for plaintiffs, for example, federal defendants would have been able to pursue an appeal of that determination before the Court proceeded to the remedy phase of this case. The Court believed that such a course would allow reviewing courts to consider the parties' arguments on appeal with the benefit of a fully developed factual record.

Apart from the possibility of resetting the trial date at the November 8, 2018 status conference, there were several pending motions, discovery disputes, and evidentiary matters that required the Court's consideration. Given the number of attorneys and expert witnesses involved in the case and the scheduling issues inherent in the upcoming holiday season, the Court anticipated that any new beginning trial date would be set, at the earliest, in January or February of 2019.

Later on November 5, 2018, federal defendants belatedly filed a petition for a writ of mandamus with the United States Court of Appeals for the Ninth Circuit in *United States v. USDC-*

ORE, Case No. 18-73014, in which they also sought an emergency stay of proceedings in this Court pending the disposition of their petition.

On November 8, 2018 at 1:25 p.m., the Ninth Circuit issued an Order in Case No. 18-73014, staying trial in this case pending that court's consideration of defendants' mandamus petition. At 3:30 p.m. that same day, the Court held its telephonic status conference, during which it notified the parties of the Ninth Circuit's order staying trial. During the status conference, the parties reported that they had met earlier that morning to confer on the pending evidentiary motions and had reached tentative resolutions on some outstanding discovery issues. Consistent with the Ninth Circuit's Order, no new trial or pretrial conference dates were set.

In its November 8 Order, the Ninth Circuit also invited this Court to revisit its decision to deny interlocutory review. "'As long as a district court has jurisdiction over the case, then it possesses the inherent procedural power to reconsider, rescind, or modify an interlocutory order for cause seen by it to be sufficient.'" *City of Los Angeles, Harbor Div. v. Santa Monica Baykeeper*, 254 F.3d 882, 885 (9th Cir. 2001) (quoting *Melancon v. Texaco, Inc.*, 659 F.2d 551, 553 (5th Cir. 1981)). "[W]hen a district court issues 'an interlocutory order, the district court has plenary power over it and this power to reconsider, revise, alter or amend the interlocutory order is not subject to the limitations of Rule 59.'" *Id.* (quoting *Toole v. Baxter Healthcare Corp.*, 235 F.3d 1307, 1315 (11th Cir. 2000)).

With respect to the question of interlocutory appeal, appellate review is generally available only after a final judgment has been entered by a district court. 28 U.S.C. § 1291. The Interlocutory Appeals Act, 28 U.S.C. § 1292(b), provides a limited exception to that requirement: "When a district judge, in making in a civil action an order not otherwise appealable under this section, shall be of the opinion that such order involves a controlling question of law as to which

there is substantial ground for difference of opinion and that an immediate appeal from the order may materially advance the ultimate termination of the litigation, [s]he shall so state in writing in such order." 28 U.S.C § 1292(b). "Even where the district court makes such a certification, the court of appeals nevertheless has discretion to reject the interlocutory appeal[] and does so quite frequently." *James v. Price Stern Sloan, Inc.*, 283 F.3d 1064, 1068 (9th Cir. 2002) (citing to 16 Wright, Miller & Cooper § 3929, at 363).

Congress did not intend district courts to certify interlocutory appeals "merely to provide review of difficult rulings in hard cases." *US. Rubber Co. v. Wright*, 359 F.2d 784, 785 (9th Cir. 1966). Rather such certification should be granted only "in extraordinary cases where decision of an interlocutory appeal might avoid protracted and expensive litigation." *Id.*

Thus, interlocutory certification is certainly the exception rather than the rule in applellate review. Reserving appellate review of a district court's decisions for after trial or a final judgment serves several important purposes. Crucially, it "emphasizes the deference that appellate courts owe to the trial judge as the individual initially called upon to decide the many questions of law and fact that occur in the course of a trial." *Firestone Tire & Rubber Co. v. Risjord*, 49 U.S. 368, 374 (1981). The importance of this concept was recognized by Congress when, in drafting 28 U.S.C. § 1292, it granted district courts the sole discretion to decide in the first instance whether a case or order is appropriate for interlocutory review.[1]

The function of trial courts in our judicial system is to initially consider the myriad evidence and legal issues offered by the parties and then refine them to their most essential form,

[1] "The legislative history of the Act clearly shows that in passing this legislation Congress did not intend that the courts abandon the final judgment doctrine and embrace the principle of piecemeal appeals." *United States v. Woodbury*, 263 F.2d 784, 788 (9th Cir. 1959).

rendering judgment and relief as the law allows. Our judicial system affords district courts the respect of operating under an assumption that such courts do not "insulate hotly contested decisions from [] review simply by fast-tracking those decisions and excluding them from its published determination." *Indep. Producers Group v. Librarian of Cong.*, 792 F.3d 132, 138 (D.C. Cir. 2015). Here, the Court has deliberately considered all motions brought by the parties, and its decisions are accessible for appellate scrutiny. (docs. 83, 172, 238, and 369) Trial courts across the country address complex cases involving similar jurisdictional, evidentiary, and legal questions as those presented here without resorting to certifying for interlocutory appeal. As Justice Stewart noted, "the proper place for the trial is in the trial court, not here." *Baker v. Carr*, 369 U.S. 186, 266 (1962) (Stewart, J., concurring.)

Importantly, the Supreme Court has recognized that "[p]ermitting piecemeal appeals would undermine the independence of the district judge[.]" *Id.* Additionally, ordinary adherence to the final judgment rule is in accordance with the sensible policy of "avoid[ing] the obstruction to just claims that would come from permitting the harassment and cost of a succession of separate appeals from the various rulings to which a litigation may give rise, from its initiation to entry of judgment." *Id.* (quoting *Cobbledick v. United States*, 309 U.S. 323, 325 (1940)). The Court notes again that this three-year-old case has proceeded through discovery and dispositive motion practice with only trial remaining to be completed.

This Court stands by its prior rulings on jurisdictional and merits issues, as well as its belief that this case would be better served by further factual development at trial. The Court has, however, reviewed the record and takes particular note of the recent orders issued by the United States Supreme Court on July 30, 2018, and November 2, 2018, as well as the extraordinary Order of the United States Court of Appeals for the Ninth Circuit in *United States v. USDC-ORE*, Case

No. 18-73014 issued on November 8, 2018. At this time, the Court finds sufficient cause to revisit the question of interlocutory appeal as to its previous orders, and upon reconsideration, the Court finds that each of the factors outlined in § 1292(b) have been met regarding the previously mentioned orders. Thus, this Court now exercises its discretion and immediately certifies this case for interlocutory appeal. The Court does not make this decision lightly. Accordingly, this case is STAYED pending a decision by the Ninth Circuit Court of Appeals.

IT IS SO ORDERED.

DATED this 21st day of November, 2018.

ANN AIKEN
United States District Judge

(ORDER LIST: 586 U.S.)

FRIDAY, NOVEMBER 2, 2018

ORDER IN PENDING CASE

18A410 IN RE UNITED STATES, ET AL.

The Government seeks a stay of proceedings in the District Court pending disposition of a petition for a writ of mandamus, No. 18-505, ordering dismissal of the suit. In such circumstances, a stay is warranted if there is (1) "a fair prospect that a majority of the Court will vote to grant mandamus," and (2) "a likelihood that irreparable harm will result from the denial of a stay." *Hollingsworth* v. *Perry*, 558 U. S. 183, 190 (2010) (*per curiam*). Mandamus may issue when "(1) 'no other adequate means [exist] to attain the relief [the party] desires,' (2) the party's 'right to issuance of the writ is clear and indisputable,' and (3) 'the writ is appropriate under the circumstances.' " *Ibid.* (quoting *Cheney* v. *United States Dist. Court for D. C.*, 542 U. S. 367, 380-381 (2004)). "The traditional use of the writ in aid of appellate jurisdiction . . . has been to confine [the court against which mandamus is sought] to a lawful exercise of its prescribed jurisdiction." *Id.* at 380 (quoting *Roche* v. *Evaporated Milk Assn.*, 319 U. S. 21, 26 (1943)).

The Government contends that these standards are satisfied here because the litigation is beyond the limits of Article III. The Government notes that the suit is based on an assortment of

unprecedented legal theories, such as a substantive due process right to certain climate conditions, and an equal protection right to live in the same climate as enjoyed by prior generations. The Government further points out that plaintiffs ask the District Court to create a "national remedial plan" to stabilize the climate and "restore the Earth's energy balance."

The District Court denied the Government's dispositive motions, stating that "[t]his action is of a different order than the typical environmental case. It alleges that defendants' actions and inactions—whether or not they violate any specific statutory duty—have so profoundly damaged our home planet that they threaten plaintiffs' fundamental constitutional rights to life and liberty." *Juliana* v. *United States*, 217 F. Supp. 3d 1224, 1261 (Ore. 2016). The District Court declined to certify its orders for interlocutory review under 28 U. S. C. §1292(b) (permitting such review when the district court certifies that its order "involves a controlling question of law as to which there is substantial ground for difference of opinion and that an immediate appeal . . . may materially advance the ultimate termination of the litigation"). See this Court's order of July 30, 2018, No. 18A65 (noting that the "striking" breadth of plaintiffs' claims "presents substantial grounds for difference of opinion").

At this time, however, the Government's petition for a writ of mandamus does not have a "fair prospect" of success in this Court because adequate relief may be available in the United States Court of Appeals for the Ninth Circuit. When mandamus relief is available in the court of appeals, pursuit of that

option is ordinarily required. See S. Ct. Rule 20.1 (petitioners seeking extraordinary writ must show "that adequate relief cannot be obtained in any other form *or from any other court*" (emphasis added)); S. Ct. Rule 20.3 (mandamus petition must "set out with particularity why the relief sought is not available in any other court"); see also *Ex parte Peru*, 318 U. S. 578, 585 (1943) (mandamus petition "ordinarily must be made to the intermediate appellate court").

Although the Ninth Circuit has twice denied the Government's request for mandamus relief, it did so without prejudice. And the court's basis for denying relief rested, in large part, on the early stage of the litigation, the likelihood that plaintiffs' claims would narrow as the case progressed, and the possibility of attaining relief through ordinary dispositive motions. Those reasons are, to a large extent, no longer pertinent. The 50-day trial was scheduled to begin on October 29, 2018, and is being held in abeyance only because of the current administrative stay.

In light of the foregoing, the application for stay, presented to The Chief Justice and by him referred to the Court, is denied without prejudice. The order heretofore entered by The Chief Justice is vacated.

Justice Thomas and Justice Gorsuch would grant the application.

(ORDER LIST: 585 U.S.)

MONDAY, JULY 30, 2018

ORDER IN PENDING CASE

18A65 UNITED STATES, ET AL. V. USDC OR

The application for stay presented to Justice Kennedy and by him referred to the Court is denied.

The Government's request for relief is premature and is denied without prejudice. The breadth of respondents' claims is striking, however, and the justiciability of those claims presents substantial grounds for difference of opinion. The District Court should take these concerns into account in assessing the burdens of discovery and trial, as well as the desirability of a prompt ruling on the Government's pending dispositive motions.

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UNITED STATES DISTRICT COURT
DISTRICT OF OREGON
EUGENE DIVISION

KELSEY CASCADIA ROSE JULIANA, *et al.*,

Plaintiffs,

v.

UNITED STATES OF AMERICA, *et al.*,

Defendants.

Case No. 6:15-CV-01517-TC

DEFENDANTS' REPLY MEMORANDUM OF LAW IN SUPPORT OF MOTION FOR SUMMARY JUDGMENT

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Website

I. INTRODUCTION

Plaintiffs have attempted to bury the Court in exhibits in an effort to convince it that their claims raise genuine disputes of fact that must be resolved at trial. But quantity is no substitute for relevance, and none of Plaintiffs' expert declarations and numerous attachments change the fact that their claims fail as a matter of law. Even if this Court accepts every exhibit submitted by Plaintiffs as true, Plaintiffs' claims nonetheless fail at the threshold. Plaintiffs' own experts confirm that Plaintiffs' alleged climate-related injuries are shared in common by every human being on this planet. Injuries common to all of humanity, and no more traceable to the U.S. government than to any other nation or private entity, are insufficient to support standing as a matter of law. Likewise, Plaintiffs' failure to bring their claims pursuant to the right of action expressly provided by Congress cannot be papered over by alleged factual disputes. Since the beginning of this case, Plaintiffs have clearly framed their lawsuit as a challenge to "aggregate" government actions. *See* Am. Compl. ¶ 1, ECF No. 7. As a matter of law, a plaintiff cannot opt out of Congress's "comprehensive remedial scheme" for challenging agency action simply by aggregating those actions and labeling them "systemic." Nor can this Court take on the role of the Executive branch in setting national energy and environmental policy merely because Plaintiffs invoke the Constitution.

Even putting aside these threshold defects, Plaintiffs' claims fail as a matter of law on the merits. A fundamental due process right must be grounded in the Nation's history and tradition. It cannot be created whole cloth out of abstract concepts not recognized in any other case. Similarly, as a matter of law, a longstanding policy disagreement with the government cannot support a state-created danger claim. And, per clear precedent, the Public Trust Doctrine simply does not apply to the federal government.

Plaintiffs have tried to turn every aspect of this case into a referendum on climate change. But their decision to challenge a major issue of the day does not exempt them from the law. No amount of expert reports and exhibits can make legally insufficient claims sufficient. Because Plaintiffs' claims fail as a matter of law, the Court should grant judgment for Defendants. If the Court denies summary judgment, it should certify its order for appeal. Where other courts have rejected very similar arguments, the Court itself characterizes these claims as "unprecedented," and the Ninth Circuit expressly contemplated future certifications of interlocutory appeal in this case, certification is appropriate.

II. ARGUMENT

The Court should grant summary judgment because there are no material facts in genuine dispute. Under the legal standard that applies at the summary judgment stage, Plaintiffs do not have standing, have not invoked a valid right of action, and ask this Court to exceed its authority under Article III of the Constitution. Even setting aside those threshold defects, Plaintiffs' claims on the merits fail as a matter of law. For any or all of these reasons, the Court should end this fundamentally flawed case by entering judgment for Defendants.

A. Plaintiffs cannot make the threshold showings that they have standing, a viable right of action, and a case consistent with this Court's Article III authority.

1. Plaintiffs lack Article III standing.

Plaintiffs lack Article III standing because they have identified only generalized grievances shared by every other human being which are not traceable to any particular federal agency action and which this Court lacks the authority to redress.[1]

[1] Plaintiffs accuse Defendants of "mistakenly invok[ing]" a "heightened barrier to standing" by citing *Clapper v. Amnesty International USA*, 568 U.S. 398 (2013), because the "rigor outlined in *Clapper*" applies only when "the Judiciary has been requested to review actions of the political branches in the fields of intelligence gathering and foreign affairs . . . ."

a) Plaintiffs have generalized grievances, not particularized harm.

The declarations attached by Plaintiffs fail to show that their injuries are concrete and particularized as required for Article III standing. The injuries alleged by Plaintiffs are not unique to them. Flooding, wildfires, drought, extreme heat, snow and ice melt, and ocean acidification—to name but a few of the alleged injuries identified by Plaintiffs tied vaguely to climate change writ large—are widespread environmental phenomena confronted daily by people around the globe. Plaintiffs are in the same position as the rest of humanity when it comes to these injuries. Therefore, the alleged injuries do not affect them "in a personal and individual way" as required by Article III. *Spokeo, Inc. v. Robins*, 136 S. Ct. 1540, 1548 (2016) (citation omitted).

To hold otherwise would be to find that every human being can assert an injury-in-fact flowing from climate change due to that individual's experience of changing weather patterns and a changing environment. Such a finding conflicts with the Supreme Court's statement that an injury sufficient to support standing cannot be "undifferentiated and 'common to all members

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Pls.' Resp. in Opp'n to Defs.' Mot. for Summ. J. 3 n.4, ECF No. 255 ("Pls.' Resp."). In fact, nowhere in *Clapper* does the Court state that its analysis is limited to "the fields of intelligence gathering and foreign affairs." Read in context, it is clear that the Court in *Clapper* was broadly concerned with the separation of powers—the same concern that Defendants have continued to raise in this case:

> The law of Article III standing, which is built on separation-of-powers principles, serves to prevent the judicial process from being used to usurp the powers of the political branches. In keeping with the purpose of this doctrine, [o]ur standing inquiry has been especially rigorous when reaching the merits of the dispute would force us to decide whether an action taken by one of the other two branches of the Federal Government was unconstitutional. Relaxation of standing requirements is directly related to the expansion of judicial power, and we have often found a lack of standing in cases in which the Judiciary has been requested to review actions of the political branches in the fields of intelligence gathering and foreign affairs.

568 U.S. at 408–09 (internal citations and quotation marks omitted).

of the public.'" *United States v. Richardson*, 418 U.S. 166, 177 (1974) (citing *Ex parte Levitt*, 302 U.S. 633, 634 (1937)); *see also Schlesinger v. Reservists Comm. to Stop the War*, 418 U.S. 208, 221-22 (1974) ("[S]tanding to sue may not be predicated upon an interest of the kind alleged here which is held in common by all members of the public, because of the necessarily abstract nature of the injury all citizens share."). It also undermines the purpose of the injury-in-fact requirement of Article III standing. An individual plaintiff's "personal stake" is what gives the court "factual context" for its evaluation of the case and allows for the "framing of relief no broader than required by the precise facts to which the court's ruling would be applied." *Schlesinger*, 418 U.S. at 221-22. Environmental phenomena experienced worldwide by every human being on the planet provide no specific factual context that would allow a court to frame its consideration of the claims or its evaluation of the proper relief. As the D.C. Circuit put it: "[C]limate change is a harm that is shared by humanity at large, and the redress that Petitioners seek—to prevent an increase in global temperature—is not focused any more on these petitioners than it is on the remainder of the world's population. Therefore Petitioners' alleged injury is too generalized to establish standing." *See Ctr. for Biological Diversity v. U.S. Dep't of the Interior*, 563 F.3d 466, 478 (D.C. Cir. 2009). Absent a specific factual context arising out of a person's unique injury, a court risks exceeding its "proper, limited role in the constitutional framework of Government" by essentially creating policy-solutions to widespread problems rather than remedies for the injuries experienced by specific individuals. *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 581 (1992) (Kennedy, J., concurring).

b) The injuries that Plaintiffs claim cannot be traced to particular government actions.

Plaintiffs cannot show that the Defendants' "systemic affirmative actions" and "distinct failures to use delegated authority"—which Plaintiffs challenge in broad and undifferentiated

terms—caused their asserted injuries. Pls.' Resp. 11. Plaintiffs' theory that they need only establish "systemic" violations or "causation in the aggregate" cannot be reconciled with the Article III standing requirement that a plaintiff identify with particularity the specific government action or inaction that is the cause of the injury alleged, and that it establish standing for each challenged administrative action. *See Lujan*, 504 U.S. at 560. In lieu of this required proof, Plaintiffs submit reams of exhibits and expert reports, but the overwhelming bulk of Plaintiffs' evidentiary submissions concern abstract questions of climate science—questions that are not material to Defendants' motion for summary judgment. Plaintiffs point to various forms of injury—ranging from aesthetic harms and lost recreational opportunities to asthma, allergies, and psychological harms. But even if one or more of these harms are sufficient to satisfy the Article III element of injury-in-fact, Plaintiffs make no competent showing that these injuries were caused by the Defendants. Neither Plaintiffs' catalogue of government conduct nor their expert reports create a genuine issue of material fact as to standing.

As a threshold matter, Plaintiffs offer no evidence that greenhouse gas ("GHG") emissions attributable directly to the United States government are causing their claimed injuries. This is not surprising, since direct emissions of the United States government are but a drop in the bucket relative to the direct emissions of 323 million Americans. Plaintiffs' documents and lay affidavits do not show how their injuries can be traced to the United States' direct emissions, nor do they show that a court-ordered regime forbidding or drastically curtailing those emissions would eliminate or abate the injuries Plaintiffs proffer.

Plaintiffs attempt to circumvent this problem by arguing that any "indirect harm" resulting from the GHG emissions of third parties is directly attributable to Defendants' policies and actions that intentionally entrenched the nation's energy system in fossil fuels. Pls.' Resp.

11, 15-18.[2] Plaintiffs thus principally complain of the government's regulation (or lack thereof) of private parties not before the district court. What Plaintiffs really seek is a court-ordered regulatory regime that prohibits (or at least severely constrains) the emissions of *private* entities within the United States. But when a plaintiff's alleged harms may have been caused directly by the conduct of parties other than the defendants (and only indirectly by the defendants), it is "substantially more difficult to meet the minimum requirement of Art. III: to establish that, in fact, the asserted injury was the consequence of the defendants' actions, or that prospective relief will remove the harm." *Warth v. Seldin*, 422 U.S. 490, 504-05 (1975); *see also Lujan*, 504 U.S. at 562. Plaintiffs have presented no evidence establishing a causal link between the various policy decisions they describe and the specific harms they allege. Plaintiffs do not even attempt to answer the question of whether, in the absence of such policies and subsidization, third parties in the fossil fuel industry would alter their behavior in a manner that would affect the Plaintiffs in a particularized and concrete way. *See, e.g.*, *Simon v. E. Ky. Welfare Rights Org.*, 426 U.S. 26, 40-46 (1976) (holding that plaintiffs challenging tax subsidies for hospitals serving indigent customers lacked standing where they could only speculate on whether a change in policy would "result in [the plaintiffs] receiving the hospital services they desire").

[2] Plaintiffs list twelve categories of alleged government conduct that they contend cause GHG emissions and therefore climate change. Plaintiffs' categories fall into six areas: (1) general policy decisions or initiatives, including research and development; (2) leasing, grazing, timber harvesting and permitting decisions; (3) financial and tax-based incentives; (4) import and export decisions; (5) laws and regulations setting energy, economy and efficiency standards; and (6) emissions arising from the United States' own conduct. Pls.' Resp. 12-18. But this merely proves that there are a multitude of policy decisions the United States makes concerning energy production. It is one thing to say that because of a complex set of policy decisions the United States has not shifted away from fossil fuel as quickly as Plaintiffs demand; but it is quite another to argue that the failure to do so resulted in every climate-related harm, including those asserted by Plaintiffs.

It is for this reason that the Ninth Circuit's decision in *Washington Environmental Council v. Bellon*, 732 F.3d 1131 (9th Cir. 2013), precludes the relief Plaintiffs seek here. Plaintiffs attempt to distinguish *Bellon* on the ground that the Court addressed an alleged failure to regulate private sources, not systemic aggregate acts. Plaintiffs' argument fails for two reasons. First, Plaintiffs here do, in fact, challenge the acts of third parties not before the Court, by alleging and proffering expert opinion that the federal government should compel or incentivize private parties to forgo fossil fuel use. Am. Compl. ¶¶ 5, 7, 12, 164-91, ECF No. 7; *see also* Jacobson Report 5-6, ECF No. 261-1 (listing third-party infrastructure changes needed to meet Dr. Jacobson's fossil-fuel-free economy by 2050); Williams Report 5, ECF No. 268-1 ("All emissions reductions involve the replacement of one kind of infrastructure or equipment with a higher-efficiency and/or lower carbon alternative"); *id.* at 9 ("Anticipatory development of shared institutional structure, both market and regulatory, will be required for efficient coordination of operations, planning, investment, and research."). Second, the *holding* of *Bellon* focused not on the distinction between aggregate government acts and private action, but instead on the fact that "[b]ecause a multitude of independent third parties are responsible for the changes contributing to Plaintiffs' injuries, the causal chain is too tenuous to support standing." 732 F.3d at 1144 (citations omitted).

Also unavailing are Plaintiffs' citations to two cases involving prisoner rights under the Eighth Amendment: *Brown v. Plata*, 563 U.S. 493 (2011), and *Wilson v. Seiter*, 501 U.S. 294 (1991). *Brown* addressed whether the Prison Litigation Reform Act authorized a court to set a population limit to decrease overcrowding in the California prison system. *Brown*, 563 U.S. at 525-26. *Wilson* presented the question of whether a prisoner claiming that conditions of confinement constitute cruel and unusual punishment must show a culpable state of mind on the

part of prison officials. *Wilson*, 501 U.S. at 296. Neither case involved Article III standing. Neither case, therefore, can be plausibly read to support Plaintiffs' theory of "causation in the aggregate," Pls.' Resp. 22, for standing purposes.

Plaintiffs attempt to use expert reports about the global or aggregate effects of climate change to adduce causation as to these Plaintiffs is equally unavailing. Plaintiffs proffer three expert reports to buttress their allegations of physical and psychological injury. Drs. Pacheco and Paulson offer a report opining primarily on physical ailments attending a warmer climate. *See generally* Pacheco Report 1-2, ECF No. 272-1. Dr. Frumkin offers largely duplicative opinions in his report. Frumkin Report 2, ECF No. 259-1 (identifying various health risks attending climate change and opining that, "[w]hile these risks, to some extent, will affect everybody, some groups are especially vulnerable, and children comprise one such group"). Dr. Van Susteren opines on how general phenomena associated with climate change can affect psychological well-being. Van Susteren Report 4-15, ECF No. 271- 1. She further opines on the psychological harm that is posed when "a trusted and powerful institution[,]" here the federal government, "affirmatively causes . . . harm, or when the institution fails to take protective, preventative, or responsive actions." *Id.* at 16. Finally, Dr. Van Susteren opines that Plaintiffs are "struggl[ing] with 'pre-traumatic stress disorder' . . . that impedes their ability to experience joy, to think of anything but the doom that lies ahead." *Id.* at 22.

These expert reports do not make a *prima facie* showing of standing. Tellingly, none of the experts have reviewed Plaintiffs' medical records. And none tether Plaintiffs' alleged physical or psychological injuries to specific emissions of greenhouse gases, nor do they opine on whether Plaintiffs' injuries would exist at all or be mitigated should greenhouse gas emissions in the United States be reduced or even prohibited. These experts instead offer abstract,

conclusory opinions associating physical and psychological harms with *global* threats due to *global* emissions of greenhouse gases. Hence, even if some of Plaintiffs' alleged injuries satisfy the injury-in-fact prong of Article III standing, no adequate proffer of causation is made.

The failure of Drs. Pacheco, Paulson, Frumkin, and Van Susteren to tether Plaintiffs' alleged medical and psychological injuries to greenhouse gases attributable to the federal government is echoed in each of the other reports Plaintiffs proffer. Dr. Hansen, for example, points to his prior peer-reviewed publications to highlight his preferred remedy for the risks of climate change. *See, e.g.*, Hansen Report 24, 27-28, 34, ECF No. 274-1 (citing 2013 PLoS ONE). But those peer-reviewed publications speak to *global* reductions in emissions, not the effect that reductions in the United States alone will have on the *global* effects of climate change. Further, while Dr. Hansen proffers an opinion that "the United States alone is responsible for a 0.15° increase in global temperature[,]" *id.* at 26 (citing Matthews, *et al.* (2014)), he offers no opinion on whether and how that 0.15° increase creates or exacerbates the harms he alleges from *global* concentrations of greenhouse gases, much less the specific physical and psychological injuries Plaintiffs allege.

Plaintiffs' other experts offer more of the same. Several of Plaintiffs' experts elaborate on the *global* effects of *global* greenhouse gas concentrations without any reference to specific U.S. emissions whatsoever. *See, e.g.*, Wanless Report 29-30, ECF No. 275-1); Rignot Report 16-17, ECF No. 262-1); Trenberth Report 20-22, ECF No. 267-1 (associating specific weather events with specific Plaintiffs, but not associating the existence or marginal damage from those storms to greenhouse gases of the United States). Other of Plaintiffs' experts offer lengthy opinions on the effects of *global* greenhouse gas concentrations, coupled with short, conclusory opinions that make passing reference relevant to the issues of causation or traceability. *See, e.g.*,

Hoegh-Guldberg Report 28, ECF No. 260-1 ("Eliminating U.S. emissions and keeping U.S. fossil fuels in the ground alone with have a significant impact in limiting CO_2 absorption by the oceans and will slow the rate of ocean warming, even if other nations' emissions do not similarly decline in the same time frame."); Running Report 29, ECF No. 264-1 ("[M]ost system responses are thought to be proportional. Thus reducing carbon emissions reduces CO_2 in the atmosphere proportionally, which reduces temperature increases and impacts proportionally."); Roberson Report 25-26, ECF No. 263-1 (opining that implementation of his various carbon-capture techniques could result in "more than 20% of the global natural sequestration target needed to bring CO_2 concentrations to 350 ppm[,]" without opining on how that reduction would eliminate or ameliorate Plaintiffs' injuries). The first group of experts do not offer opinions that assist the trier of fact in this case, because this case is *not* about the science of climate change. Nor can opinions on the science of climate change generally answer the question of whether emissions of the United States caused Plaintiffs' particular injuries. The second group of experts do not create genuine issues of fact on the questions of traceability because "[a]n expert's opinions that are without factual basis and are based on speculation or conjecture are . . . inappropriate material for consideration on a motion for summary judgment." *Major League Baseball Props., Inc. v. Salvino, Inc.*, 542 F.3d 290, 311 (2d Cir. 2008) (citation omitted). In short, Plaintiffs fail to identify any genuine issues of fact.

c) Plaintiffs' alleged injuries cannot be redressed by the Court.

The third prong of the standing analysis requires that a plaintiff show "it is likely, as opposed to merely speculative, that the injury will be redressed by a favorable decision." *Ctr. for Biological Diversity v. Exp.-Imp. Bank of the U.S.*, No. 16-15946, 2018 WL 3149770, at *5 (9th Cir. June 28, 2018) (quoting *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs. (TOC), Inc.*, 528 U.S. 167, 180–81 (2000)). A claim "lacks redressability if the plaintiff will nonetheless

suffer the claimed injury if a court rules in its favor." *Id.* at *6 (citation omitted). "In cases where the alleged injury in fact is caused by a third party, a plaintiff must establish that the hoped-for substantive action on the part of the government could alter the third party's conduct in a way that redresses the injury in fact." *Id.* Here, Plaintiffs cannot demonstrate redressability because they cannot show that it is likely that their injuries will be redressed by a favorable decision.

Plaintiffs ask this Court to order Defendants to "prepare and implement a remedial plan to decarbonize the U.S. energy system and protect carbon sinks, thereby substantially reducing GHG emissions, drawing down Defendants' contribution to excess CO_2 in the atmosphere, and redressing Plaintiffs' injuries." Pls.' Resp. 23. This Court, however, lacks authority to order the Executive branch to "prepare and implement a remedial plan to decarbonize the U.S. energy system" because it cannot compel Defendants to take actions beyond the scope of relevant statutory authorities. Defendant agencies may only act in accordance with the limited authority granted by their organic statutes. *La. Pub. Serv. Comm'n v. FCC*, 476 U.S. 355, 374 (1986) ("[A]n agency literally has no power to act . . . unless and until Congress confers power on it"), *superseded by statute on other grounds by Metrophones Telecomms., Inc. v. Global Crossings Telecomms., Inc.*, 423 F.3d 1056 (9th Cir. 2005). Indeed, a court can only compel an agency to take an action that it is "legally required" to take. *Norton v. S. Utah Wilderness All. ("SUWA")*, 542 U.S. 55, 63-64 (2004). This Court thus lacks authority to compel Defendant agencies to implement a "remedial plan," even if the Court leaves the details of that plan up to the agencies. *See id.* (explaining that prohibition on "broad programmatic" attacks on agency action derives from limitation on court's authority to compel discretionary actions).

Plaintiffs argue that *Norton v. SUWA* is inapplicable because "this is not an APA case." Pls.' Resp. 24. They are wrong, for reasons explained at length in Defendants' opening brief and below. Defs.' Mot. 14-19; *infra* 16-20. Plaintiffs cannot avoid the APA simply by failing to invoke it in their Complaint. *See* Defs.' Mot. for J. on the Pleadings, ECF No. 195; Defs.' Mot. for Protective Order, ECF No. 196; Defs.' Mot. for Summ. J., ECF No. 207 ("Defs.' Mot."). Equally important, however, the Supreme Court explained in *Norton* that a Court's inability to compel an agency to take discretionary action flows from "the traditional practice prior to [the APA's] passage, when judicial review was achieved through use of the so-called prerogative writs—principally writs of mandamus under the All Writs Act." 542 U.S. at 63. Thus, the prohibition on compelling discretionary action reflects a traditional limitation on a court's mandamus authority and applies even outside of the APA context. *Id.* (citing pre-APA mandamus cases).

Plaintiffs' redressability arguments also fail because this Court lacks authority to establish the "minimum safe level of atmospheric CO_2 concentrations" as part of its remedy should Plaintiffs prevail. Pls.' Resp. 26. The Supreme Court rejected a similar request in *Am. Elec. Power Co. v. Connecticut ("AEP")*, where the plaintiffs "propose[d] that individual federal judges determine, in the first instance, what amount of carbon-dioxide emissions is 'unreasonable.'" 564 U.S. 410, 428 (2011).[3]

The Northern District of California recently reached the same conclusion in another case seeking to reduce greenhouse gas emissions:

[3] Plaintiffs claim that *AEP* is irrelevant because the case does not address standing. Pls.' Resp. 26. While it is true that the case does not discuss standing, the case does discuss the authority of a court to set a ceiling on emissions, which goes directly to the question of redressability.

> [Q]uestions of how to appropriately balance these worldwide negatives [of fossil fuel emissions] against the worldwide positives of the energy itself, and of how to allocate the pluses and minuses among the nations of the world, demand the expertise of our environmental agencies, our diplomats, our Executive, and at least the Senate. Nuisance suits in various United States judicial districts regarding conduct worldwide are far less likely to solve the problem and, indeed, could interfere with reaching a worldwide consensus.

City of Oakland v. BP P.L.C., No. C 17-06011 WHA, 2018 WL 3109726, at *7 (N.D. Cal. June 25, 2018). Because "[f]ederal judges lack the scientific, economic, and technological resources an agency can utilize in coping with issues of this order," they should not be in the business of setting emissions levels. *AEP*, 564 U.S. at 428 (citation omitted).

Even if this Court had authority to enter the order requested by Plaintiffs, however, Plaintiffs would still fail to demonstrate redressability because there is no evidence that such an order would redress Plaintiffs' injuries. Plaintiffs allege that the flooding, extreme heat, drought, snow melt, glacial retreat, and other environmental phenomena they are experiencing are a result of climate change caused by increasing greenhouse gas emissions. *See, e.g.*, Loznak Decl. ¶¶ 14, 19, 59, ECF No. 277; Avery M. Decl. ¶¶ 10, 14, ECF No. 278; Levi D. Decl. ¶¶ 3, 8, 14, ECF No. 287. But, as Plaintiffs' experts recognize, climate change is a global phenomenon. *See, e.g.*, Rignot Report 1, 3, 9, ECF No. 262-1; Wanless Report 14, ECF No. 275-1; *see also City of Oakland*, 2018 WL 3109726, at *9 ("The dangers [of global warming] are very real. But those dangers are worldwide. Their causes are worldwide. The benefits of fossil fuels are worldwide."). Plaintiffs have the burden to show that an order by this court is "likely" to redress their injuries. But they provide no evidence that if the U.S. government implemented a "remedial plan to decarbonize the U.S. energy system," such a plan would measurably reduce global warming or put a stop to the natural disasters and environmental phenomena that Plaintiffs' complain of. A reduction of emissions from U.S. sources will have no effect on

emissions produced in every other country in the world—emissions which are on the rise in many emerging economies. *See* Hansen Report, Ex. C.3 at 152 of 197, ECF No. 274-1 (graphs of emissions from various countries, including emerging economies like China and India); Hansen Report 26, ECF No. 274-1 ("China is now the largest source of CO_2 from fossil fuels and cement manufacture . . . ."); Hansen Report, Ex. C.3 at 170 of 197, ECF No. 274-1 ("[G]rowth of international ship and air emissions . . . largely offset" reductions achieved by the Kyoto Protocol and "the growth rate of global emissions actually accelerated" after 2000); *id.* at 173 of 197 (questioning whether "top agricultural CH_4 emitters like China, India and Brazil" can regulate methane emissions as effectively as California). And there is no evidence that even an immediate reduction in U.S. emissions would manifest itself in a reduction in flooding, wildfires, snow melt, etc., within the lifetimes of the Plaintiffs. *See* Wanless Decl. ¶ 18, ECF No. 275 (Climate change "is not something that can be stopped in the near term"); Rignot Report 16, ECF No. 262-1 at 15 ("It is not clear how much of this sea level rise can be avoided by slowing down climate warming or even cooling the planet again.").

Plaintiffs' invocation of "structural remedial pathways" like those used in gerrymandering and school desegregation cases misses the point. Pls.' Resp. 28. Those cases involved domestic disputes limited to particular state or school system. What Plaintiffs seek here—a "remedial plan to decarbonize the U.S. energy system"—is of a different magnitude entirely. *Id*. at 23. A "structural" remedy that requires remapping voting districts or integrating a school system does not provide guidance on whether and how a court might require the development and implementation of a nationwide energy policy that conforms to the Court's finding of a "minimum safe level of atmospheric CO_2 concentrations" merely because it uses the word "structural." *Id*. at 26.

Plaintiffs also incorrectly claim that the Supreme Court's decision last month in *Gill v. Whitford*, 138 S. Ct. 1916, 1930 (2018), "reaffirmed that remedies should be linked to the actions that produced the injury, and where a wholesale structural remedy is necessary to redress a constitutional injury, a court may so order it." Pls.' Resp. 27. *Gill*, in fact, rejects the idea of "a wholesale structural remedy." The decision instead says that "a plaintiff's remedy must be 'limited to the inadequacy that produced [his] injury in fact." 138 S. Ct. at 1930 (quoting *Lewis v. Casey*, 518 U.S. 343, 357 (1996)). And the Court in that case ultimately held that the assertions of statewide harm relating to voting were too generalized for standing. Here, Plaintiffs' assertions of harm are even more generalized, as they arise from a *global* phenomenon.

"A plaintiff's remedy must be tailored to redress the plaintiff's particular injury." *Gill*, 138 S. Ct. at 1934 (citation omitted). Where the alleged injuries are environmental phenomena occurring worldwide as a result of global climate change, the only possible remedies are necessarily beyond this Court's authority and its ability. *See City of Oakland*, 2018 WL 3109726, at *9 ("The problem [of global warming] deserves a solution on a more vast scale than can be supplied by a district judge or jury."). For all of these reasons, Plaintiffs lack standing.

2. <u>Plaintiffs may not bring claims in the absence of a statutory right of action</u>.

a) This Court has not yet addressed whether Plaintiffs must proceed under a valid right of action.

Plaintiffs argue that this Court need not address whether the APA provides the sole vehicle for Plaintiffs' claims because it already rejected this argument when it stated in its order on Defendants' motion to dismiss that "it is the Fifth Amendment that provides the right of action." Pls.' Resp. 28-29 (quoting *Juliana v. United States*, 217 F. Supp. 3d 1224, 1261 (D. Or. 2016)). Plaintiffs take this language out of context: the quoted language came in response to the

United States' argument that Plaintiffs do not have a cause of action to enforce a public trust in federal court, *Juliana*, 217 F. Supp. 3d at 1260, and not in response to an argument that the APA provides the sole vehicle for Plaintiffs' claims, as argued here. In fact, the Court's decision does not once refer to the APA. This Court thus did not address the United States' present argument that the APA's express provisions for bringing constitutional claims foreclose Plaintiffs' attempt to bring a constitutional claim by other means. That issue has never been decided by this Court and is ripe for determination.

Plaintiffs also suggest that the quoted statement was "affirmed by the Ninth Circuit under the 'no clear error' standard . . . ." Pls.' Resp. 28. This also is incorrect. The Ninth Circuit did not address the substance of *any* of Plaintiffs' merits arguments in its mandamus decision, let alone take a position on the source of Plaintiffs' right of action. *United States v. U.S. Dist. Court for Dist. of Or.*, 884 F.3d 830, 836-37 (2018). To the contrary, the Ninth Circuit observed that Plaintiffs' claims may well be "too broad to be legally sustainable." *Id.* It stressed that this Court needed to reconsider whether Plaintiffs' claims are too broad or whether "some of the remedies the plaintiffs seek may not be available as redress." *Id.* at 837. And it made clear that it expected that the "[c]laims and remedies" in this case could be "vastly narrowed as litigation proceeds[,]" *id.* at 838, for example, by "focus[ing] the litigation on specific governmental decisions and orders[,]" *id.* at 837. That is precisely what requiring Plaintiffs to bring their claims through the APA, as Congress intended, would accomplish. Thus, contrary to Plaintiffs' assertions, there is no basis for concluding that the Ninth Circuit rejected—even implicitly—that the APA provides the sole vehicle for Plaintiffs' claims.

b) Plaintiffs' claims must proceed, if at all, under the APA.

Plaintiffs have not identified a valid right of action, which is an independent legal requirement. *See, e.g., Alexander v. Sandoval*, 532 U.S. 275, 279 (2001); *Davis v. Passman*, 442

U.S. 228, 239 n.18 (1979); *pre Nation v. Dep't of the Interior*, 876 F.3d 1144, 1168 (9th Cir. 2017). Plaintiffs argue instead that they are not required to identify a right of action, but may rest their claims directly "on the Due Process Clause of the Fifth Amendment." Pls.' Resp. 30 (quoting *Davis*, 442 U.S. at 243-44). This argument ignores relevant Supreme Court instruction.

The Supreme Court has long distanced itself from *Davis* and the other cases in the *Bivens v. Six Unknown Named Agents of Fed. Bureau of Narcotics*, 403 U.S. 388 (1971), line of caselaw, noting that "*Bivens*, *Davis*, and *Carlson v. Green*, 446 U.S. 14 (1980)] represent the only instances in which the Court has approved of an implied damages remedy under the Constitution itself." *Ziglar v. Abbasi*, 137 S. Ct. 1843, 1855 (2017). "[I]t is possible that the analysis in [those] three *Bivens* cases might have been different if they were decided today" because "the Court has made clear that expanding the *Bivens* remedy is now a 'disfavored' judicial activity." *Id.* at 1856-57 (citation omitted); *see id.* at 1857 (citing long line of recent cases declining to imply a right of action under *Bivens*).

Because the implication of rights of action in the Constitution is now "disfavored," the Court has cabined *Davis* and the other cases, holding that if a "case is different in a meaningful way from previous *Bivens* cases decided by this Court, then the context is new" and the reviewing court should conduct additional analysis before finding an implied right of action in the Constitution. *Ziglar*, 137 S. Ct. at 1859. Plaintiffs' claim here is clearly "different in a meaningful way" from *Davis* and any other previous *Bivens* case. *Id.* As this Court has recognized, Plaintiffs' claims are "unprecedented." *Juliana*, 217 F. Supp. 3d at 1262.

Equally important, the Supreme Court has noted that "a *Bivens* action is not 'a proper vehicle for altering an entity's policy.'" *Ziglar*, 137 S. Ct. at 1860 (citation omitted). The right of action created by *Bivens* and its progeny is not intended to "deter[] the conduct of a

policymaking entity" but rather to deter the unconstitutional acts of an individual officer. *Corr. Servs. Corp. v. Malesko*, 534 U.S. 61, 71 (2001). Because Plaintiffs' suit is substantially and meaningfully different from *Davis* and the other *Bivens* cases and is clearly an attempt to change the policy of the government, it is not cognizable under *Davis* and the *Bivens* line of cases.

Plaintiffs argue that the Supreme Court's cabining of *Davis* and the other *Bivens* cases does not apply here because they are seeking equitable relief rather than damages. But as the Supreme Court has explained, a court's equitable authority "to enjoin unlawful executive action" is "subject to express and implied statutory limitations." *Armstrong v. Exceptional Child Ctr., Inc.*, 135 S. Ct. 1378, 1385 (2015). Thus, "[w]here Congress has created a remedial scheme for the enforcement of a particular federal right,"—including constitutional rights—courts "have, in suits against federal officers, refused to supplement that scheme with one created by the judiciary." *Seminole Tribe of Fla. v. Florida*, 517 U.S. 44, 74 (1996) (citation omitted); *see also Schweiker v. Chilicky*, 487 U.S. 412, 423 (1988) ("When the design of a Government program suggests that Congress has provided what it considers adequate remedial mechanisms for constitutional violations that may occur in the course of its administration, we have not created additional *Bivens* remedies." (quotation and citation omitted)). Indeed, the Supreme Court has specifically distinguished later attempts to find an implied right of action in the Constitution from *Davis* on the ground that "[f]or Davis, as for Bivens, 'it [was] damages or nothing,'" whereas in other cases, such as *Wilkie v. Robbins*, the plaintiff had access to alternative statutory remedies such as the APA. 551 U.S. 537, 553, 555 (2007) (quoting *Davis*, 442 U.S. at 245) (refusing to find implied right of action where "Robbins has an administrative, and ultimately a judicial, process for vindicating virtually all of his complaints").

Here, the APA provides "express . . . statutory limitations" that "foreclose" an equitable right of action to enforce Plaintiffs' asserted constitutional claims outside of the provisions for judicial review in the APA itself. *Armstrong*, 135 S. Ct. at 1385. The courts may not supplement it with one of their own creation. *Seminole Tribe*, 517 U.S. at 73-74; *see also Jarita Mesa Livestock Grazing Ass'n v. U.S. Forest Serv.*, 58 F. Supp. 3d 1191, 1220-21 (D.N.M. 2014); *Occupy Eugene v. U.S. Gen. Servs. Admin.*, No. 6:12-CV-02286-MC, 2013 WL 6331013, at *6 (D. Or. Dec. 3, 2013) (dismissing constitutional claims against federal officials because APA provides appropriate remedy).

Plaintiffs' claim that language from the Supreme Court's recent decision in *Ziglar* confirms the "right of every citizen to injunctive relief from ongoing and prospective 'official conduct prohibited' by the Constitution . . . ." Pls.' Resp. 32. Plaintiffs then suggest that the implied cause of action they identify allows courts "[t]o address these kinds of [large-scale] policy decisions" and allow plaintiffs to "seek injunctive relief." *Id.* The issue before the Court in *Ziglar* was whether it should recognize an implied cause of action for damages to challenge the FBI's alleged "hold-until-cleared policy" adopted in the wake of the terrorist attacks on September 11, 2001. 137 S. Ct. at 1852. The Court declined to create an implied right of action, leaving the work of crafting a right of action to Congress. *Id.* at 1864. And although the Court indicated plaintiffs could seek injunctive relief, the Court did not suggest that such a challenge could be raised directly under the Constitution, as opposed to through the APA's right of action. Moreover, while the FBI's alleged policy may have been "large-scale" in the sense that it applied to hundreds of individuals, the plaintiffs' challenge in *Ziglar* targeted one specific agency action—the adoption of that policy—not the unconnected "aggregate actions" of a dozen or more agencies taken over five decades that Plaintiffs attempt to challenge here.

Webster v. Doe, *Franklin v. Massachusetts*, and *Hills v. Gautreux* are equally unavailing. Pls.' Resp. 29. In *Webster*, a former CIA employee challenging termination of his employment brought both statutory and constitutional claims under the APA. 486 U.S. 592, 595, 602 (1988). Although the Court found the statutory claims unreviewable under the APA, it expressly refused to extend that holding to the constitutional claims. *Id.* at 603. In *Franklin*, the Court considered a challenge to the apportionment of overseas federal employees among the States for purposes of allocating seats in the House of Representatives. 505 U.S. 788, 790-91 (1992). Although, after finding no viable APA claim, the Court went on to consider the constitutional claims, *id.* at 803, the case is of no assistance here because the Court expressly limited its holding to claims challenging the apportionment of representatives based on past precedent allowing such claims. *Id.* at 801 ("Constitutional challenges to apportionment are justiciable" (citing *U.S. Dep't of Commerce v. Montana*, 503 U.S. 442 (1992)). Finally, in *Hills*, the Supreme Court affirmed a remedy against the Department of Housing and Urban Development spanning the entire Chicago metropolitan area to address racial discrimination in public housing. 425 U.S. 284, 288 (1976). Though Plaintiffs cite *Hills* as an example of a "structural remedy similar to the relief requested here[,]" Pls.' Resp. 29—with no acknowledgement of the differences between a remedy that covers a single federal agency within a single metropolitan area and one that covers the entire federal government nationwide—in fact, the case illustrates that a remedy that violates the government's statutory and constitutional authority—like the remedy requested in this case, *supra* 16-19 & *infra* 23-28—is "impermissible as a matter of law." *Hills*, 425 U.S. at 306.

Lastly, Plaintiffs suggest that two Ninth Circuit decisions allow them to bring constitutional claims against federal agencies without invoking the APA right of action, when in fact those cases do not address this issue. Pls.' Resp. 30 (citing *Presbyterian Church (U.S.A.) v.*

United States, 870 F.2d 518 (9th Cir. 1989), and *Navajo Nation*, 876 F.3d 1144). As explained in prior briefing, those cases instead address the separate issue of when a plaintiff may avail herself of the APA's waiver of sovereign immunity. *See* Defs.' Reply in Supp. of Mot. to Stay Disc. 2-4, ECF No. 231.

Because the APA provides the sole mechanism for Plaintiffs to bring their claims,[4] they must comply with the APA's requirements for judicial review, including the requirement that a plaintiff direct her challenge to "circumscribed, discrete" final agency action, rather than launching a "broad programmatic attack" on agency policies in general. *Norton*, 542 U.S. at 62, 64; *see Lujan v. Nat'l Wildlife Fed'n*, 497 U.S. 871, 891 (1990); *San Luis Unit Food Producers v. United States*, 709 F.3d 798, 801-06 (9th Cir. 2013). As Plaintiffs have chosen to challenge "aggregate actions" and have not identified discrete, final agency actions as required to assert a valid challenge under the APA, their claims must fail.[5]

c) Judicial review under the APA provides sufficient procedural due process.

Plaintiffs make the extraordinary contention that it would violate procedural due process to require them to channel their claims through the statutory procedures that Congress has provided for challenging the constitutionality of agency action or inaction. The APA explicitly provides for judicial review of constitutional claims. *See* 5 U.S.C. § 706 ("The reviewing court shall . . . hold unlawful and set aside agency action, findings, and conclusions found to be . . . contrary to constitutional right, power, privilege, or immunity[.]"). Thus, the Supreme Court's

[4] Other statutes, such as Section 307 of the Clean Air Act, may also provide relevant rights of action to challenge agency actions that regulate or otherwise relate to greenhouse gas emission. But Plaintiffs do not invoke any such statutory rights of action.

[5] As explained in Defendants' motion for summary judgment, the Court lacks jurisdiction to review the sole discrete agency action identified by Plaintiffs (Department of Energy Order No. 3041). Defs.' Mot. 18 n.7.

concern in *Davis* that a constitutional right may be beyond judicial review is inapplicable here. *See* Pls.' Resp. 33 (citing *Davis*, 442 U.S. at 242). In addition, Plaintiffs' observation, that where Congress intends to preclude judicial review of constitutional claims "its intent to do so must be clear[,]" *id.* at 33 (quoting *Webster*, 486 U.S. at 603), is wholly inapt in the context of the APA. *Cf. Elgin v. Dep't of the Treasury*, 567 U.S. 1, 9 (2012) ("*Webster's* standard does not apply where Congress simply channels judicial review of a constitutional claim to a particular court."). As Plaintiffs correctly observe, the APA nowhere evinces an intent to "preclude [judicial] review of constitutional claims." Pls.' Resp. 34 (quoting *Webster*, 486 U.S. at 598). To the contrary, it expressly provides the vehicle for such claims against federal agencies.

Plaintiffs point to no case holding that the APA's judicial review provisions are constitutionally deficient, either as a general matter, or as applied to plaintiffs who bring constitutional claims. And courts that have considered those procedures have concluded that they pass constitutional muster. *See, e.g., Bos. Redevelopment Auth. v. Nat'l Park Serv.*, 838 F.3d 42, 50 (1st Cir. 2016) ("The APA sets forth no strict procedural regime for informal agency decisionmaking, and a party's procedural due process rights are respected as long as the party is afforded adequate notice and an opportunity to be heard 'at a meaningful time and in a meaningful manner.'" (citation omitted)).

At root, Plaintiffs' are making a facial attack on the APA itself, alleging that the provisions of that statute requiring a plaintiff to challenge final agency actions, 5 U.S.C. §§ 702, 704, violate due process. This is a sweeping claim against a statute that has governed judicial review of agency action for over sixty years. Plaintiffs present nothing to justify a finding that the APA violates their due process rights other than claiming that it would be too hard for them to identify the specific agency actions and inactions that have harmed them. Pls.' Resp. 34-35.

But some additional effort on the part of Plaintiffs to identify the source of their injuries is far outweighed by the prejudice to the government that would result from a court order purporting to evaluate the nation's energy and environmental policies outside of any particular action. The APA's requirement that plaintiffs challenge discrete "agency actions" serves to "protect agencies from undue judicial interference with their lawful discretion, and to avoid judicial entanglement in abstract policy disagreements which courts lack both expertise and information to resolve." *Norton*, 542 U.S. at 66. While Plaintiffs may disagree with Congress's determination that litigants should not be able to "seek wholesale improvement" of a program or policy by court decree, *Lujan*, 497 U.S. at 891, that disagreement is far from sufficient to demonstrate that the statute itself is unconstitutional.

Finally, Plaintiffs' suggestion that this lawsuit, as currently presented, provides their only opportunity for relief is demonstrably incorrect. Plaintiffs are free to challenge particular agency actions or inactions before the agencies or the courts, to petition for rulemakings or for the repeal of certain rules (and to subsequently challenge the agencies' response), to challenge agency conduct under other statutes that provide a right of action, or to petition Congress. There is no basis to conclude that bringing one omnibus action making a litany of vague assertions against more than fifty years of unspecified and unconnected actions (or inactions), policies, and practices, by nearly a dozen different agencies, is consistent with the judicial role, much less that it is required by procedural due process.

3. Plaintiffs ask the Court to exercise authority that exceeds the scope of its power under Article III of the Constitution.

As explained in the government's motion for summary judgment, Plaintiffs' suit itself and the relief sought are broader than this Court can entertain under Article III. Defs.' Mot. 20-24. At its most basic level, Plaintiffs' suit is not a Case or Controversy cognizable under Article

III. It is instead an attempt to make energy and environmental policy through the courts rather than through the political branches to whom the Constitution assigns law-making and policy-making authority.

In response, Plaintiffs deny that they are asking the Court to make policy. Pls.' Resp. 41. But their denial is contradicted by their request that this Court create a national "remedial plan" that sets a "minimum safe level of atmospheric CO_2 concentrations" to "decarbonize the U.S. energy system" in order to "substantially reduc[e] GHG emissions." Pls.' Resp. 23, 26; Am. Compl. 94 & Prayer for Relief ¶ 7. While Plaintiffs may not use the word "policy" to describe their remedy, what they are requesting—a national plan to reduce greenhouse gas emissions—is indisputably policy. This Court's decision to set its own emissions levels based on a limited number of adversarial expert reports would trample on the separation of powers. *Id.* at 428.

It is no response to say, as Plaintiffs attempt to do here, that such concerns can be cast aside because Defendants may have some latitude in how they implement Plaintiffs' proposed plan. Pls.' Resp. 40. Requiring the President and the entire Executive Branch to produce to the Court a national "remedial plan" to combat global warming, end the Nation's reliance on fossil fuels, or ensure that atmospheric CO_2 is no more concentrated than a specific parts-per-million, and retaining jurisdiction to ensure the Executive Branch's compliance with that plan, simply cannot be reconciled with the limited judicial power vested by Article III in the federal courts. And it would put the Court on a collision course with Congress' legislative power and the President's supervisory power over federal agencies as the Nation's Chief Executive. *See Free Enter. Fund v. Pub. Co. Accounting Oversight Bd.*, 561 U.S. 477, 496 (2010); *Clinton v. Jones*, 520 U.S. 681, 711-713 (1997) (Breyer, J., concurring in the judgment) (explaining that Article II "makes a single President responsible for the actions of the Executive Branch"). As a unanimous

Supreme Court recognized in *AEP*, federal courts "lack the scientific, economic, and technological resources an agency can utilize in coping with [such] issues . . . ." 564 U.S. at 428 (citation omitted).

Indeed, as noted above, the Northern District of California (Alsup, J.) reached the same conclusion in dismissing a series of public nuisance claims brought by several cities against oil and gas production companies, alleging that their production and sale of fossil fuels caused climate change and sea level rise that injured the cities. *See City of Oakland*, 2018 WL 3109726, at *9; *supra* 12-13.

Plaintiffs' efforts to analogize this case to other cases in which courts issue "systemic" remedies fail. Plaintiffs have not identified a single case in which a court ordered the government to develop and implement a national plan, let alone a national plan to alter the environment or climate. Instead, they rely on school desegregation and prison reform cases, Pls.' Resp. 38, neither of which even approach a remedy on the scale requested by Plaintiffs here. School desegregation and prison reform are limited to local school districts and state prison systems. The courts' remedies in those cases were directed at local and state governments. *See Brown v. Plata*, 563 U.S. at 499 (affirming remedy directed at California prison system); *Brown v. Bd. of Educ.*, 349 U.S. 294, 299 (1955) (remanding to local courts to oversee remedies for local school districts). Thus, those cases did not involve the same separation of powers concerns at issue here where Plaintiffs have asked this Court to order the federal Executive branch to implement judicially-determined emissions standards. *Brown v. Plata* provides a particularly inapt comparison. There, the remedy—the release of prisoners to reduce overpopulation—was provided by statute. 563 U.S. at 511. Thus, *Brown v. Plata* suggests that a court and plaintiffs

should abide by the specific rights of actions and procedures already provided by Congress—such as the APA—when challenging government conduct under the Constitution.

Plaintiffs also argue that the Court need not address the separation of powers problem yet, suggesting that the Court delay until it decides on a remedy. Pls.' Resp. 40. There are two problems with Plaintiffs' argument. First, the issue is ripe for decision now. Plaintiffs' response confirms that they are deliberately seeking exceptionally broad relief: their "unprecedented" claims seek a "wholesale structural remedy" to address infringement "of a profound and systemic nature" that arises from "aggregate, systemic acts." *Id.* at 1, 22, 27, 37, 41. The issue—whether the claims and relief are consistent with Article III—is purely legal and ready to be decided now. Factual development regarding the scope of Defendants' alleged violations or Plaintiffs' injuries is not relevant to a determination of whether this Court's implementation of Plaintiffs' requested remedy violates Article III of the Constitution. *See id.* at 40. That is, even accepting all of Plaintiffs' allegations regarding Defendants' conduct and Plaintiffs' injuries as true, as a matter of law this Court lacks authority to set emissions standards and require Defendants to implement those standards as part of a national "remedial plan" to "decarbonize the U.S. energy system." For this reason, this case is unlike *Baker v. Carr*, where the Court found that it had "no cause at this stage to doubt the District Court will be able to fashion relief if violations of constitutional rights are found." 369 U.S. 186, 198 (1962). Here, in contrast, it is clear from the outset that the claims and relief sought are inconsistent with the separation of powers.

Second, delaying resolution of Defendants' argument exacerbates the constitutional problem. As Defendants have explained elsewhere, ongoing discovery and trial will themselves violate independent legal requirements and the constitutional separation of powers. *See* Defs.'

Mot. for J. on the Pleadings, ECF No. 195; Defs.' Mot. for Protective Order, ECF No. 196. Plaintiffs seek to probe the views of federal agencies concerning questions of national environmental and energy policy and to require them to make factual and predictive judgments outside the scope of governing procedures and authority. Allowing Plaintiffs to leverage civil litigation to marshal the policy positions of federal agencies would displace the President as the superintendent of the Executive Branch and encroach on his exclusive authority to elicit the views of federal agencies in formulating national policies for addressing important issues of general concern. The Constitution assigns the task of addressing problems like climate change to the Executive and Legislative Branches; the Judicial Branch is assigned the task of resolving cases and controversies. Putting the Executive Branch's "systemic" policy on climate change over the past decades on trial is not consistent with Article III. "There simply are certain things that courts, in order to remain courts, cannot and should not do." *Missouri v. Jenkins*, 515 U.S. 70, 132 (1995) (Thomas, J., concurring); *see also Guar. Trust Co. of N.Y. v. York*, 326 U.S. 99, 105 (1945); *Grupo Mexicano de Desarrollo S.A. v. All. Bond Fund, Inc.*, 527 U.S. 308, 318 (1999).

In response, Plaintiffs offer the platitude that "[j]udicial review of the political branches has been a historic stalwart of separation of powers principles." Pls.' Resp. 41. While this is true, it does nothing to show that the claims and relief sought here are within the authority of the federal courts. They are not, as a judicial injunction or declaration establishing national policy on climate change has no support in the "traditional scope of equity." *Guar. Trust Co.*, 326 U.S. at 105.

Plaintiffs also claim that the limitations on a court's equity jurisdiction set forth in *Guaranty Trust* and *Grupo Mexicano de Desarrollo* "are inapposite to the systemic constitutional

harms alleged here." Pls.' Resp. 41. But those cases do not state that the limits on a federal court's equitable authority go out the window when a claim is constitutional. As the Supreme Court explained in *Grupo Mexicano*, the limitation on equity jurisdiction is based on the type of relief sought—equitable relief—and the limitations are "substantive prerequisites for obtaining an equitable remedy." 527 U.S. at 318 (quoting 11A Wright, Miller, & Kane, Federal Practice and Procedure § 2941, at 31 (2d ed. 1995)); *see also Guaranty Trust*, 326 U.S. at 105 ("Equitable relief in a federal court is of course subject to restrictions: the suit must be within the traditional scope of equity as historically evolved in the English Court of Chancery, a plain, adequate and complete remedy at law must be wanting, explicit Congressional curtailment of equity powers must be respected, [and] the constitutional right to trial by jury cannot be evaded." (citations omitted)).

At bottom, this lawsuit is an effort to use "the judicial process . . . to usurp the powers of the political branches." *Clapper*, 568 U.S. at 408 (citations omitted). The Court should accordingly dismiss the case as not justiciable under separation of powers principles. As the Northern District of California recently recognized in dismissing a far-reaching—but not as far-reaching—effort to use the federal courts to address climate change, the courts "must also respect and defer to the other co-equal branches of government when the problem . . . deserves a solution best addressed by those branches." *City of Oakland*, 2018 WL 3109726, at *9.

B. Plaintiffs' claims fail as a matter of law.

Plaintiffs cannot save their remaining claims—the Fifth Amendment substantive due process claim and the public trust doctrine claim—by advancing the legally unsupported argument that all of their claims require an "empirical scientific and historic" analysis. Pls.' Resp. 42. This Court need not entertain "an empirical scientific and historical analysis" to determine the purely legal questions of whether (1) there is a legally cognizable right under the

Due Process Clause to a climate system capable of sustaining human life; (2) there can be a viable "state-created danger" claim against the federal government under the Due Process Clause; and (3) the Public Trust Doctrine applies to the federal government. Plaintiffs also claim that there are three Fifth Amendment Claims not addressed in Defendants' opening summary judgment brief. But these three claims are not legally distinct from Plaintiffs' claim that there is a right under the Due Process Clause to an environment of a certain quality.

1. A judicially enforceable right to a climate system capable of sustaining human life cannot be found in the Due Process Clause.

Plaintiffs claim that this Court cannot determine whether the Due Process Clause includes a right to a climate system capable of sustaining human life without resolving factual disputes at trial. But whether such a right exists is a purely legal question.

The Supreme Court has cautioned that courts should not readily recognize novel due process claims. *Washington v. Glucksberg*, 521 U.S. 702, 720 (1997). "By extending constitutional protection to an asserted right or liberty interest, we, to a great extent, place the matter outside the arena of public debate and legislative action." *Id.* "We must therefore 'exercise the utmost care whenever we are asked to break new ground in this field,' lest the liberty protected by the Due Process Clause be subtly transformed into the policy preferences of the Members of this Court." *Id.* (quoting *Moore v. City of E. Cleveland*, 431 U.S 494, 502 (1977)).

To protect against the unbounded expansion of the Due Process Clause, the Court has required that a plaintiff demonstrate that the alleged right is "objectively, deeply rooted in this Nation's history and tradition and implicit in the concept of ordered liberty." *Id.* at 720 721 (quotation and citations omitted). It is not enough that a right is "personal and profound" or that it implicate the concepts of personal dignity and autonomy. *Id.* at 725-28.

Plaintiffs cannot meet this high bar here. There is no mention of the environment or the climate in the Constitution. And no other case has ever found a fundamental right arising from the natural environment or climate system. For good reason. The novel right proposed by Plaintiffs is unlike the fundamental rights recognized in other cases. The right to keep and bear arms is expressly discussed in the Second Amendment. *McDonald v. City of Chicago*, 561 U.S. 742, 754 (2010). The right to be free from cruel and unusual punishment is based in the Eighth Amendment. *Atkins v. Virginia*, 536 U.S. 304, 311, 321 (2002); *Roper v. Simmons*, 543 U.S. 551, 568 (2005). The right of adults to engage in private intimate relations grew out of a long line of cases recognizing "the autonomy of the person in making" decisions related to "marriage, procreation, contraception, family relationships, child rearing, and education." *Lawrence v. Texas*, 539 U.S. 558, 574 (2003). And although Plaintiffs have tried to stretch the rights of personal autonomy and dignity recognized in *Obergefell v. Hodges*, 135 S. Ct. 2584 (2015), to reach their proposed right to a particular climate system, Pls.' Resp. 44-45, the caselaw is not that malleable. The right of same-sex couples to marry grew out of the well-recognized right to marry; it "was not simply deduced from abstract concepts of personal autonomy." *Glucksberg*, 521 U.S. at 703; *Obergefell*, 135 S. Ct. at 2598. No such well-recognized right—or line of precedent—underlies Plaintiffs' proposed right to a particular climate system.

The D.C. Circuit recently reached a similar conclusion in *Delaware Riverkeeper Network v. Federal Energy Regulatory Commission ("FERC")*, in which the plaintiffs alleged FERC and its funding structure violated their protected due process right "to clean air, pure water, and preservation of the environment." 2018 WL 3352897, at *1, *3 (D.C. Cir. July 10, 2018). The court held "the right to healthy environment" is not a liberty interest protected by the Due Process Clause because it "bears no relationship to the quintessential liberty interest—'freedom

from bodily restraint'" and it does not "protect activities that have been held to constitute federally protected liberty interests." *Id.* at *3 (quoting *Bd. of Regents of State Colls. v. Roth*, 408 U.S. 564, 572 (1972)).

Although this Court recognized a "right to a climate system capable of sustaining human life" at the motion to the dismiss stage, that finding was totally unsupported. *Juliana*, 217 F. Supp. 3d at 1250. This Court cited no prior caselaw recognizing any related right, but rather reached its conclusion based solely on its own "reasoned judgment." *Id.* Respectfully, the Court's willingness to recognize a new fundamental right based on no more than its own judgment is precisely what the Supreme Court warned of in cautioning that courts should "'exercise the utmost care whenever we are asked to break new ground in this field, lest the liberty protected by the Due Process Clause be subtly transformed into' the policy preferences of the Members of this Court." *Glucksberg*, 521 U.S. at 720 (quoting *Moore*, 431 U.S., at 502). At the summary judgment stage, this Court should find that there is no fundamental right to a particular climate system where there is no legal foundation whatsoever to support that alleged right.

Plaintiffs attempt to make the question of whether there is a fundamental right to a particular climate system a factual matter by relying on the view of their expert, Andrea Wulf. Ms. Wulf's views have no bearing on the purely legal question of whether there is a right to a life-sustaining climate system under the due process clause. The Court does not need an expert to illuminate whether an alleged unenumerated due process right is "deeply rooted" in our Nation's history and tradition. Rights that are deeply rooted are evident in precedent. *See, e.g.*, *Obergefell*, 135 S. Ct. at 2598; *McDonald*, 561 U.S. at 754; *Lawrence*, 539 U.S. at 574; *Atkins*, 536 U.S. at 311; *Roper*, 543 U.S. at 568; *see also Del. Riverkeeper Network*, 2018 WL 3352897,

at *3 (looking to precedent to determine if claimed due process right exists). A judicially enforceable right to a particular climate system is not.

Finally, Plaintiffs attempt to downplay the significance of recognizing a new fundamental right completely divorced from precedent by arguing that such a right would be consistent with the United States' "clear policy of protecting the climate" as illustrated by the its ratification of the UN Framework Convention on Climate Change. Pls.' Resp. 45. Putting aside the oddity of Plaintiffs' acknowledgement of the government's "policy of protecting the climate" in the context of their claims, this argument only underscores that Plaintiffs are asking this Court to render a policy judgment under the mantle of creating a novel "fundamental right." *Id*.

Because the question of whether the Due Process Clause contains a fundamental right to a climate capable of sustaining human life is purely legal question, there is no need for a trial to resolve it. This Court need only look to past precedent to see that there is no support for a finding that such a right is "deeply rooted" in the Nation's history and tradition.

2. Plaintiffs Cannot Establish a State-Created Danger Claim.

Plaintiffs cannot state a due process claim under a state-created danger theory. The Due Process Clause has never been interpreted to allow a challenge to proceed where, as here, Plaintiffs' main complaint centers on an amorphous policy disagreement spanning several decades. The Due Process Clause

> is phrased as a limitation on the state's power to act, not as a guarantee of certain minimal levels of safety and security. It forbids the State itself to deprive individuals of life, liberty, or property without 'due process of law,' but its language cannot fairly be extended to impose an affirmative obligation on the State to ensure that those interests do not come to harm through other means.

DeShaney v. Winnebago Cty. Dep't of Soc. Servs., 489 U.S. 189, 195 (1989). A state actor is generally not liable under the Due Process Clause "for its omissions." *Pauluk v. Savage*, 836 F.3d 1117, 1122 (9th Cir. 2016) (quotation and citation omitted).

The Ninth Circuit has articulated two circumstances where a due process claim might exist based on an omission: "(1) when a 'special relationship' exists between the plaintiff and the state (the special-relationship exception); and (2) when the state affirmatively places the plaintiff in danger by acting with 'deliberate indifference' to a 'known or obvious danger' (the state-created danger exception)." *Id.* (citing *Patel v. Kent Sch. Dist.*, 648 F.3d 965, 971-72 (9th Cir. 2001)). Neither exception plausibly applies here.[6]

First, Plaintiffs do not argue that any special relationship exists between them and the United States. Nor could they. Plaintiffs' contention that the United States' alleged "aggregate actions" foster a fossil-fuel based energy system, Pls.' Resp. at 47, applies to every citizen.

Second, Plaintiffs' general argument that the United States' alleged knowledge of climate change "caused dangers to Plaintiffs" does not rise to the level of "deliberate indifference" under a long line of precedent. *See, e.g.*, *Collins v. Harker Heights*, 503 U.S. 115, 125 (1992) (refusing to find deliberate indifference based on City's alleged failure to provide a safe work environment in part because Due Process Clause does not include such a right and noting that the Supreme Court has "always been reluctant to expand the concept of substantive due process because the guideposts for responsible decisionmaking in this uncharted area are scarce and open-ended" (citation omitted)); *Bd. of Cty. Comm'rs of Bryan Cty. v. Brown*, 520 U.S. 397, 410 (1997) ("'[D]eliberate indifference' is a stringent standard of fault, requiring proof that a municipal

[6] Plaintiffs contend that there is a three-prong test for assessing the state-created danger exception. *DeShaney* itself does not provide for such a three-prong test. 489 U.S. at 196-200. Nor is the United States aware of any precedent — except for this Court's opinion denying the United States' motion to dismiss — that articulates such a three-prong test for the state-created danger exception. Indeed, the Supreme Court in *DeShaney* emphasized the limited nature of the state-created danger exception, noting that this line of precedent "stand[s] only for the proposition that when the State takes a person into its custody and holds him there against his will, the Constitution imposes upon it a corresponding duty to assume some responsibility for his safety and well-being." *Id.* at 199-200 (citation omitted).

actor disregarded a known or obvious consequence of his action."); *Johnson v. City of Seattle*, 474 F.3d 634, 639 (9th Cir. 2007) ("Because the City of Seattle had no constitutional duty to protect the Pioneer Square Plaintiffs against violence from members of the riotous crowd, 'its failure to do so-though calamitous in hindsight-simply does not constitute a violation of the Due Process Clause.'" (quoting *DeShaney*, 489 U.S. at 202)); *Patel*, 648 F.3d at 976 (summarizing case law and requiring stringent proof to find deliberate indifference because "[a]nything less 'is not enough' to constitutionalize a state tort" (quoting *L.W. v. Grubbs*, 92 F.3d 894, 900 (1996)).

The narrow circumstances where the Ninth Circuit has recognized a due process claim under the state-created danger theory accords with this precedent. *See, e.g., Penilla v. City of Huntington Park*, 115 F.3d 707, 710 (9th Cir. 1997) (finding a cause of action for due process violation arose only where officers "took affirmative actions that significantly increased the risk facing Penilla: they cancelled the 9-1-1 call to the paramedics; they dragged Penilla from his porch, where he was in public view, into an empty house; then they locked the door and left him there alone . . . after they had examined him and found him to be in serious medical need"); *Wood v. Ostrander*, 879 F.2d 583, 588 (9th Cir. 1989) (finding due process cause of action only arose where officer arrested a female driver, impounded the car, and left driver by the side of the road at night in a high-crime area). Moreover, the duty of officers recognized in these cases not to affirmatively place an individual in a position of imminent risk with deliberate indifference to his or her safety can be traced to common law roots. But there is no basis in common law or elsewhere for a duty to protect persons (which would presumably include all members of the general population of the United States) against whatever perils are produced by emissions of CO_2.

Plaintiffs counter that the United States' actions in promoting fossil fuels resulted in greater emissions by third parties, causing psychological[7], and to a lesser extent physical, harm to Plaintiffs, and that the United States knew that its actions "caused dangers to Plaintiffs[,]" evincing deliberate indifference. Pls.' Resp. 47-59. Plaintiffs' proof shows that there is a policy disagreement, not deliberate indifference. *Id.* at 49.[8] Specifically, Plaintiffs quote the declaration of Gus Speth who explains that the United States knew about "alternative energy pathways" that would have minimized greenhouse gases but it elected not to pursue these pathways. *Id*. at 48. Speth and Plaintiffs' other experts may believe that the United States' policies are too encouraging of energy production and give too little consideration to climate change. They may not endorse the manner in which the United States has historically managed the energy system. But such official action that is merely inconsistent with Plaintiffs' policy preferences is not remotely the sort of conduct that rises to the kind of deliberate indifference that can support a due process claim. *See, e.g., Lombardi v. Whitman,* 485 F.3d 73, 84 (2d Cir. 2007) (Federal agencies "often must decide whether to regulate particular conduct by taking into account whether the risk to the potentially affected population will be acceptable. Such

[7] Plaintiffs cite the opinion of Dr. Lise Van Susteren to support their claims about the alleged psychological harms arising from climate change and their impacts on "[t]hese youth, not just these Plaintiffs." But as discussed above, there is not a general duty to protect a large class of persons from the effects of climate change because there is no right to a particular climate system. *Supra* 29-32. The state-created danger exception focuses on particularized harms to an individual; it is not a vehicle to bring a claim to vindicate "despair," "ang[er]" or "hopelessness," Pls.' Resp. 48, of a large number of youth wrought by the United States' alleged inaction.

[8] While Plaintiffs acknowledge that that the state-created danger exception imposes "rigorous proof requirements," Pls.' Resp. 47, they argue that their evidence showing that the United States historically promoted fossil fuels is tantamount to deliberate indifference and to hold otherwise would be to impose "an impossibly high factual threshold." *Id.* at 49. This Court should decline Plaintiffs' invitation to relax the stringent proof requirements necessary to invoke this exception. Plaintiffs cite to no case in which a court found deliberate indifference based on, as Speth opines, policy decisions that allegedly left a class of persons vulnerable to danger. *Id*. at 49.

decisions require an exercise of the conscience, but such decisions cannot be deemed egregious, conscience-shocking, and arbitrary in the constitutional sense, merely because they contemplate some likelihood of bodily harm." (quotation and citation omitted)).

3. The Public Trust Doctrine Applies to the States' Ownership of Submerged Lands, Not to the Federal Government's Regulation of the Atmosphere.

Plaintiffs' response fails to overcome the basic problem with their public trust claim: the claim fails as a matter of law because that doctrine does not apply to the federal government.[9] As the Supreme Court stated in *PPL Montana, LLC v. Montana*, "the public trust doctrine remains a matter of state law," and "the contours of that public trust do not depend upon the Constitution." 565 U.S. 576, 603-04 (2012) (citation omitted); *see also United States v. 32.42 Acres of Land*, 683 F.3d 1030, 1038 (9th Cir. 2012) (explaining that that "the contours" of the public trust doctrine, "are determined by the [S]tates").[10] This presents a purely legal question, not a mixed question of law and fact that could be informed by expert opinion or further factual development at trial.

In keeping with that rule, courts have recently and resoundingly rejected public trust claims against federal agencies. For example, in *Alec L. v. Jackson*, 863 F. Supp. 2d 11 (D.D.C. 2012)—a case this Court called "substantially similar to the instant action," *Juliana*, 217 F.

[9] Plaintiffs' assertion that "[u]nder the clear error standard, the Ninth Circuit upheld this Court's order" denying the government's motion to dismiss, Pls.' Resp. 50, is misleading. As explained above, the Ninth Circuit reviewed the Court's order only to determine whether mandamus relief was warranted; the merits of the order were not squarely before the Ninth Circuit. *Supra* 16; *see also United States v. U.S. Dist. of Or.*, 884 F.3d at 837.

[10] That rule is consistent with the Property Clause of the Constitution, which vests Congress with the "Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States." U.S. Const. art. IV, § 3, cl. 2. Congress possesses that power "without limitations." *Kleppe v. New Mexico*, 426 U.S. 529, 539 (1976) (quoting *United States v. San Francisco*, 310 U.S. 16, 29 (1940)).

Supp. 3d. at 1258—the District Court for the District of Columbia reiterated that the public trust doctrine does not "impose duties on the federal government." *Alec L.*, 863 F. Supp. 2d at 13. Because the plaintiffs relied solely on the public trust doctrine, the court properly held that they had failed to identify a federal cause of action and dismissed their suit. *Id.* at 15, 17. The D.C. Circuit summarily affirmed. *Alec L. ex rel Loorz v. McCarthy*, 561 F. App'x 7, 8 (D.C. Cir. 2014) (noting that the "plaintiffs point to no case . . . standing for the proposition that the public trust doctrine—or claims based upon violations of that doctrine—arise under the Constitution or laws of the United States, as would be necessary to establish federal question jurisdiction" (citation omitted)). That result was both grounded in the law and undoubtedly correct.

Plaintiffs identify several sources that refer generally to the federal government as a "trustee" or discuss a duty to hold natural resources "in the public trust," but not one transforms the public trust doctrine into a cause of action available for use against the federal government. Pls.' Resp. 51-52. Instead, Plaintiffs' sources stand only for the unremarkable proposition that the federal government has authority to manage particular natural resources for public benefit. *Id.* The fact that the sources call the federal government a "trustee" does not help Plaintiffs; the government may act as a trustee in any number of contexts without implicating the public trust doctrine. *See, e.g.*, *United States v. White Mountain Apache Tribe*, 537 U.S. 465, 475-76 (2003) (describing the federal government's duty as trustee to manage land held in trust for Indian tribe).

Even assuming for present purposes that the public trust doctrine could apply to federal actors, the doctrine remains unavailable here because the Clean Air Act has displaced it. As the Supreme Court held in *AEP*, "the Clean Air Act and the EPA actions it authorizes displace any federal common law right to seek abatement of carbon-dioxide emissions from fossil-fuel fired

power plants." 564 U.S. at 424; *see also Native Vill. of Kivalina v. ExxonMobil Corp.*, 696 F.3d 849, 853, 856-57 (9th Cir. 2012) (affirming the dismissal of an Alaskan native village's claims against major carbon dioxide emitters on grounds articulated in *AEP*). The fact that Plaintiffs raise public trust claims and the *AEP* plaintiffs raised public nuisance claims makes no difference because the Supreme Court's logic applies with equal force in this case: when Congress designates an expert agency to "serve as primary regulator of greenhouse gas emissions," federal judges should not be able to set limits on those same emissions. *AEP*, 564 U.S. at 427-29. Plaintiffs make no effort to grapple with that logic in their response.

No discovery or expert opinion is necessary for this Court to resolve this claim in the government's favor. The Court need only decide the purely legal question of whether the public trust doctrine provides a cause of action against the federal government, and the law establishes that it does not. Plaintiffs assert that discovery is necessary to evaluate whether "the atmosphere or climate system is part of the federal trust *res*[,]" Pls.' Resp. 50, but they are mistaken. Because the public trust doctrine does not apply to any such res—whether the "atmosphere or climate system" is part of it or not—further fact development will not aid the Court. To put it another way, fact discovery or expert testimony will do nothing to illuminate what the Supreme Court has already made clear: "the public trust doctrine remains a matter of state law," *PPL Mont.*, 565 U.S. at 603-04, and it simply does not apply here.

4. Plaintiffs have not preserved three additional Fifth Amendment claims and, even if they had, the claims are meritless.

Plaintiffs contend that the Defendants have not sought summary judgment on three of Plaintiffs' Fifth Amendment claims. On the contrary, as explained above, regardless of the constitutional theory Plaintiffs advance, they do not have standing, their claims and relief exceed the bounds of Article III, and there is no right of action but for the APA, which Plaintiffs have

refused to use. All of those rationales fully justify rejecting every one of Plaintiffs' constitutional claims. Plaintiffs also ignore the procedural history of this case, which shows that the relevant claims were not credited at the motion to dismiss stage. The government's initial motion to dismiss asked the Court to dismiss Plaintiffs' Due Process claim based on either unenumerated or enumerated rights. *See* ECF No. 27 at 4, 9-14. This Court denied the motion, identifying a sole Due Process right—the right to a livable climate. *Juliana*, 217 F. Supp. 3d at 1248-50. Plaintiffs' belated effort to raise additional "enumerated" rights should thus be rejected.[11]

Plaintiffs are therefore incorrect that they "have preserved three Fifth Amendment Claims that are not at issue in Defendants' motion." Pls.' Resp. 51 (capitalization altered). Plaintiffs have not preserved the claims and, even if they had, the motion for summary judgment explains why the Court should reject them.

C. If the Court denies Defendants' motion, it should certify its decision for interlocutory appeal under 28 U.S.C. § 1292(b).

At a minimum, the Court should certify for interlocutory appeal any denial of Defendants' motion. *See* 28 U.S.C. § 1292(b); *United States v. U.S. Dist. Court for Dist. of Or.*,

[11] The first claim that Plaintiffs identify is a "Fifth Amendment Substantive Due Process claim for government infringement of Plaintiffs' enumerated rights of life and property and already recognized implicit liberties," including the "rights to move freely, to family, and to personal security." Pls.' Resp. 53. The second claim is "the Fifth Amendment Substantive Due Process and Equal Protection Claim for systemic government discrimination against Plaintiffs with respect to the exercise of their fundamental rights." *Id*. The third claim is a "Fifth Amendment Substantive Due Process Equal Protection Claim for government discrimination against Plaintiffs as a class of children, who should have suspect or quasi-suspect classification and some heightened level of constitutional protection against discrimination." *Id*. The government's motion to dismiss explained that rational basis review applies to any Equal Protection claim based on age, and this Court has already held "that defendants' affirmative actions would survive rational basis review." *Juliana*, 217 F. Supp. 3d at 1249; Mot. at 24 n.8.

884 F.3d at 838 (contemplating future certification). Certification is appropriate when a case "involves [] controlling question[s] of law as to which there is substantial ground for difference of opinion," and "an immediate appeal from" an order denying summary judgment would "materially advance the ultimate termination of the litigation." U.S.C. § 1292(b). "Courts traditionally will find that a substantial ground for difference of opinion exists where . . . 'novel and difficult questions of first impression are presented.'" *Couch v. Telescope Inc.*, 611 F.3d 629, 633 (9th Cir. 2010) (quoting 3 Federal Procedure, Lawyers Edition § 3:212 (2010)). This cases raises numerous purely legal issues that have the potential to affect the outcome of the case such as whether Plaintiffs' constitutional claims must proceed under the APA, whether there is a substantive due process right to a climate system capable of supporting life, and whether the public trust doctrine applies to the government's regulation of the atmosphere. Defendants have also identified a range of cases that have considered similar issues and reached different conclusions. In particular, the Supreme Court's decision in *AEP* and the Northern District of California's decision in *City of Oakland* would both conflict with a decision by this Court allowing claims seeking to change government policy on climate change to proceed. *AEP*, 564 U.S. at 428; *City of Oakland*, 2018 WL 3109726, at *9. Similarly, in *Alec L.*, the District Court for the District of Columbia's decision holding that the public trust doctrine does not apply to the federal government would conflict with a decision by this Court finding that such a claim was legally permissible. *Alec L.*, 863 F. Supp. 2d at 13.

Although Section 1292(b) is only to be used "in extraordinary cases where decision of an interlocutory appeal might avoid protracted and expensive litigation," this is such a case. *U. S. Rubber Co. v. Wright*, 359 F.2d 784, 785 (9th Cir. 1966). This Court has itself called this case and Plaintiffs' claims "unprecedented," *Juliana*, 217 F. Supp. 3d at 1262, and Ninth Circuit

anticipated that Defendants might need to "ask[] the district court to certify orders for interlocutory appeal" given the breadth of Plaintiffs' claims. *United States v. U.S. Dist. Court for Dist. of Or.*, 884 F.3d at 838. And there can be no doubt that continued litigation of Plaintiffs' claims via a 50-day trial in which Plaintiffs intend to present 18 experts and at least 21 fact witnesses would be "protracted and expensive."

There is no sound basis for subjecting the United States to burdensome discovery and a 50-day trial, which would itself violate fundamental statutory and constitutional limitations, when so many novel and potentially dispositive legal issues remain in doubt. *See* Oral Arg. Recording at 5:49-5:51, *United States v. U.S. Dist. Court for Dist. of Or.*, No. 17-71692 (9th Cir. Dec. 11, 2017), https://www.ca9.uscourts.gov/media/ (Berzon, J., suggesting that "many judges would have" certified for interlocutory appeal the denial of Defendants' motion to dismiss).

III. CONCLUSION

There are no material factual issues in dispute, and Defendants are therefore entitled to summary judgment on all claims. For the foregoing reasons, the Court should enter summary judgment in favor of Defendants on each of Plaintiffs' claims.

Dated: July 12, 2018

Respectfully submitted,

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EXPERT REPORT
OF
JAMES E. HANSEN, Ph.D.

Director of Climate Science, Awareness and Solutions Program
Earth Institute
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Kelsey Cascadia Rose Juliana; Xiuhtezcatl Tonatiuh M.,
through his Guardian Tamara Roske-Martinez; et al.,
Plaintiffs,

v.

The United States of America; Donald Trump,
in his official capacity as President of the United States; et al.,
Defendants.

IN THE UNITED STATES DISTRICT COURT
DISTRICT OF OREGON

(Case No.: 6:15-cv-01517-TC)

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TABLE OF ACRONYMS AND ABBREVIATIONS

AGU:	American Geophysical Union
AMOC:	Atlantic Meridional Overturning Circulation
BAU:	business as usual
C:	Celsius
CH_4:	methane
CO_2:	carbon dioxide
EPA:	U.S. Environmental Protection Agency
F:	Fahrenheit
GCM:	global climate model
GISS:	Goddard Institute for Space Studies
GHG:	greenhouse gas
GNP:	gross national product
GtC:	gigatonnes of carbon
LDGO:	Lamont-Doherty Geophysical Observatory
IPCC:	United Nations Intergovernmental Panel on Climate Change
MBM:	mass budget method
NAS:	National Academy of Sciences
NASA:	National Aeronautics and Space Administration
NOAA:	National Oceanic and Atmospheric Administration
NRC:	National Research Council
N_2O:	nitrous oxide
PETM:	Paleocene-Eocene Thermal Maximum
ppm:	parts per million
SCEP:	The Study of Critical Environmental Problems
SLR:	sea level rise
SMIRC:	The Study of Man's Impact on Climate
SO_2:	sulfur dioxide
UNFCCC:	United Nations Framework Convention on Climate Change
W/m^2:	Watts per square meter

QUALIFICATIONS

I, James E. Hansen, am a party to this litigation, as a guardian in the above-captioned matter for both my beloved granddaughter Sophie, during the period of the case when she was a legal minor, and for future generations.

Regarding my qualifications: I was trained in the space science program of Prof. James Van Allen at the University of Iowa. I received a Bachelor of Sciences degree with highest distinction with double majors in physics and mathematics in 1963, a Master of Sciences degree in astronomy in 1965, and a Ph.D. in physics in 1967, all from the University of Iowa.

For 32 years, I directed NASA's Goddard Institute for Space Studies (GISS), with a total career at NASA of 46 years. I was the longest serving director in the Institute's history. NASA is one of two primary federal expert agencies tasked with studying the climate system and climate change today. The other is the National Oceanic and Atmospheric Administration (NOAA). Within the federal government today, NASA and NOAA house our federal government's best understanding of the science of climate change.

Since my retirement from NASA, I have worked as an adjunct professor at Columbia University's Earth Institute and Director of the Climate Science, Awareness and Solutions program at the Earth Institute, where I have continued my climate science research, writing and communications.

I received the Rossby Research medal, the highest award of the American Meteorological Society, and the Roger Revelle medal of the American Geophysical Union, the Leo Szilard award of the American Physical Society for Outstanding Promotion & Use of Physics for the Benefit of Society, the American Association for the Advancement of Science Award for Scientific Freedom and Responsibility, the American Association of Physics Teachers Klopsteg Memorial Award for communicating physics to the general public.

I am a member of the National Academy of Sciences.

A true and correct copy of my CV is attached as **Exhibit A** to my expert report in this action.

To the best of my recollection, I have not served as an expert at trial or by deposition in any case in the last four years.

A true and correct copy of a list of publications I authored within the last ten years is attached as **Exhibit B** to my expert report in this action.

Exhibit C contains three recent peer-reviewed papers of which I am the principal author whose analysis forms the basis of many of the expert opinions I express in this report, and I incorporate their analyses by reference. **Exhibit C.1** is *Assessing ''Dangerous Climate Change'': Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*. PLoS ONE (2013). **Exhibit C.2** is *Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2°C global warming could be dangerous*, Atmos. Chem. Phys. (2016). **Exhibit C.3** is *Young people's burden: requirement*

of negative CO_2 emissions, Earth Syst. Dynam. (2017). I also incorporate by reference my Declarations that have been filed in this litigation.

In preparing this expert report, in addition to relying upon my extensive experience and expertise, I have relied on a number of documents. My expert report contains a list of citations to the documents on which I relied in forming my opinions, listed in **Exhibit D** to my expert report in this action.

Attached hereto are **Exhibits E-U**, which include, in **Exhibits E-R**, maps and video simulations of sea-level rise in regions that are areas of special concern to several Youth Plaintiffs; in **Exhibit S**, early and recent curves depicting CO_2 in the post-industrial era; in **Exhibit T**, a dataset from NOAA of sea level rise projections through 2200; and in **Exhibit U**, an animation from NOAA depicting the record of atmospheric CO_2 over the last 800,000 years, with most recent levels rising nearly off the chart (minute 3:30 of **Exhibit U**). **Exhibit V** is a spreadsheet compiling **Exhibits E-U**. Also attached are **Exhibits W-KK**, which contain various reports or document evidence.

In preparing my expert report and testifying at trial, I am not receiving any compensation and am providing my expertise pro bono to Plaintiffs.

EXECUTIVE SUMMARY

This expert report conveys fundamental considerations that undergird my expert opinion as to the urgent nature of the climate crisis, the special responsibility of the Defendants (and their predecessors) in creating and exacerbating the climate crisis, and the increasingly grave danger faced by the Plaintiffs and future generations if present leadership of the Defendants continues to intensify, rather than solve, the climate crisis.

Dangerous anthropogenic climate change is on our doorstep. For decades, the long-approaching threat was well understood by both the Defendants and the scientific community. Averting carbon pollution's worst impacts and restoring a well-functioning climate system likely still remains within the Defendants' control, should our leaders within the Defendants serve the interests of the nation – including its young people. The present Defendants under the Trump Administration – building upon the actions of prior administrations in allowing, permitting, and subsidizing fossil fuel interests to exploit our reserves and treat the atmosphere as a dumping ground for waste carbon dioxide (CO_2) and other greenhouse gases (GHGs) – has floored the emissions accelerator and thus hurdles Plaintiffs, their progeny, and the natural world as we have come to know it, towards climate points of no return. Plaintiffs are now in jeopardy; their circumstance will not improve absent a major and timely redirection by the Defendants, utilizing their existing authority, of national energy decisions, plans, and policies of the federal government, as well as climate and carbon sequestration decisions, plans, and policies.

In my expert opinion, the Defendants' continuing knowing, elective imposition of untenable and unwarranted risks on Plaintiffs has created an extraordinarily dangerous situation. At this stage, this dangerous situation can be remedied, if at all, only by an order of this Court issued promptly requiring the Defendants to take immediate steps based on climate science.

Continued emissions of CO_2 and other GHGs place Plaintiffs in an unusually serious risk of harm that humanity has never previously faced. There is no time left for further delay in taking actions to address the atmospheric burden that endangers our climate system and threatens our children. The Defendants must commence to phase out our country's carbon emissions and replace these carbon emissions with carbon-free energy sources. For too long, our energy system has been powered by fossil fuels, such that our planet's atmospheric composition has already overshot the safe level of CO_2 and other GHGs, forcing consequences that are highly threatening and that will rise to an unbearable level unless action is taken by these Federal Defendants without delay. In my opinion, based on multiple lines of evidence in climate science, our country must phase out carbon emissions over the next several decades coupled with significant efforts to draw down CO_2 from the atmosphere, so that we can work successfully to return the atmospheric CO_2 concentration to no more than 350 parts per million by the end of the century, with continued work, if necessary, to further reduce CO_2 concentrations according to our best scientific understanding to protect Earth's climate system and its diversity of life, including humanity.

Accordingly, in my report I make the following expert opinions:

- Our government has long permitted, subsidized, allowed, and otherwise encouraged fossil fuel exploitation, processing, transport, and burning – with little or no control on

ensuing emissions of CO_2 and other GHG emissions. At present, the Defendants are doubling down on that pattern and attempting to erase every vestige of even the nascent and insufficient efforts of the prior administration to reduce emissions.

- Over nearly four decades, colleagues and I developed increasingly compelling evidence that ensuing and unconstrained emissions markedly raised the atmospheric CO_2, CH_4, and N_2O concentrations in the atmosphere, enhancing the greenhouse effect and, accordingly, posing an increasingly dire threat to coastal cities, natural systems, essential human services, and human life.
- Based on simple climate models, temperature measurements at weather stations, and limited paleoclimate data, colleagues and I were able, as early as 1981, to anticipate discernible warming for the 1980s and 1990s, and 21st century shifts in climate zones, increasing climate extremes, eroding ice sheets, and accelerated sea level rise. We urged, as an appropriate strategy, a shift to low-carbon and non-carbon energy sources, coupled with conservation, with fossil fuels used only as necessary for a few decades more.
- Our work analyzing paleoclimate data corroborated earlier estimates of climate sensitivity for a doubling of atmospheric concentration of CO_2 and led us to conclude -- and warn the government -- that all fossil fuels could not be burned without untenable consequences for future generations. Those untenable consequences include the aforementioned sea level rise and loss of coastal cities (and present shorelines), species extinctions, increasingly severe heat waves and droughts alongside, at the times and places of rainfall, increasingly extreme flooding and more powerful storms.
- While there was more than enough scientifically-credible evidence to act on climate change in prior decades, by the early 2000s, the reality of global warming had become unequivocal. Progress of the scientific community, including our work estimating the efficacy of different climate forcing mechanisms, including aerosols, CH_4, and CO_2, and have fully established CO_2 as the largest human-made climate forcing.
- Our studies examining the potential impacts of climate change raised questions about the stability of the planet's major ice sheets. In addition, we drew attention to the threat that rapidly shifting isotherms (conceptual lines connecting areas of similar average temperatures) pose to the persistence of other species.
- The enormity of the potential consequences of these two matters, loss of coastal cities and extermination of countless species, demanded reassessment of what constituted "dangerous human-made interference with the climate system," which the global community sought to avoid by ratifying the United Nations Framework Convention on Climate Change in 1992. That reassessment led me and others to conclude in 2008 that the political guardrail of 2°C of warming (corresponding approximately to an atmospheric CO_2 concentration of ~450 ppm) is highly dangerous, and that an initial target of < 350 ppm CO_2 is justified by the relevant science.
- Particularly in light of approaching points of no return, it is, in my expert opinion, essential to commence serious and sustained action to return atmospheric CO_2 to < 350 ppm without further delay; essential, that is, to preserve coastal cities from rising seas and floods (caused in part by melting of Antarctic and Greenland ice) and superstorms, and otherwise to restore a viable climate system on which the life, liberty, and property

prospects of Plaintiffs, young citizens of America, and future generations so thoroughly depend.

- In my opinion, this salvation remains possible if we phase out GHG emissions within several decades and actively draw down excess atmospheric CO_2. Drawdown can be achieved largely via reforestation of marginal lands with improved forestry and agricultural practices, if rapid emission reductions are initiated without further delay.

EXPERT OPINION

1. Introduction

I agreed to serve as the guardian for Plaintiff future generations in this case because I have been working for almost four decades to use my scientific expertise to warn the federal government of the irreversible dangers from climate change caused by burning fossil fuels. Through my repeated recommendations to the Defendants (including their predecessors), I have been laboring to cause the swift decarbonization of our energy system to protect our country's children and future generations. Herein, I provide expert testimony regarding the Defendants' role in causing climate change and how human-caused CO_2 and other GHG emissions are harming Earth's natural systems, human communities, and Plaintiffs themselves.

The opinions expressed in this expert report are my own and are based on the data and facts available to me at the time of writing and my 46-year career in the federal government, and are to a reasonable degree of scientific certainty, unless otherwise specifically stated. Should additional relevant or pertinent information become available, I reserve the right to supplement the discussion and findings in this expert report.

My expert report focuses on development of relevant science during the past half century, which is the period in which human-caused global warming passed from being a validated scientific theory and government concern to full-blown global reality with life and death consequences for humans and many other species on the planet. I have been a witness during this period to the development of scientific understanding of climate change, including the role of humans in causing climate change. Indeed, I have been a participant in that scientific research process, as well as a participant in efforts to bring the increasing urgency of the situation to the attention of federal government officials, who retain authority to do something meaningful about the situation.

My goal in this expert report is to provide the Court with the fundamental bases for my concern as to the emergency nature of the climate situation, as well as an understanding of its continuing, but fading, tractability – including my considered view as to what must be done, and how quickly it must be done. The aims must be to both limit the damage and restore the functioning of the climate system on which Plaintiffs, young persons, and future generations depend.

In describing the development of climate science and general understanding of it, I will focus on the research carried out at NASA (GISS) (www.giss.nasa.gov), especially on work in which I

was involved, which can be accessed at https://pubs.giss.nasa.gov/authors/jhansen.html and http://www.columbia.edu/~jeh1/.

Through a review of NASA's research, and my own personal experience working in the federal government, I am also able to address "what did they know and when did they know it," where "they" refers to both the Defendants and the fossil fuel industry because I participated in providing them this information. Although the fossil fuel representatives, the Intervenor Defendants, have withdrawn from this case, the issue of the long-standing knowledge of the fossil fuel industry and the Federal Defendants about the dangers of human-made climate change was often in concert, as was their joint efforts to perpetuate the danger rather than redress it.

In-depth understanding of climate change comes from using all the tools in the scientific tool kit. A common misconception is that our knowledge of ongoing climate change and projections for the future are a product of climate models. This misconception can lead to the conclusion that we have little understanding, because models are imperfect and incomplete representations of reality. This misconception is fostered by people who want to cast doubt on conclusions about climate change, even though those conclusions are clear to the scientific community.

In reality, understanding of ongoing climate change and expectations for the future depend to comparable degrees on three major sources of information and knowledge: (1) increasingly detailed reconstructions and analyses of Earth's long-term climate history, i.e., paleoclimate studies; (2) increasingly detailed and accurate measurements of modern climate change, climate forcings,[1] and climate processes; and (3) climate models, i.e., numerical simulations of climate change, including models of many contributing physical processes.

Over the past half-century I have witnessed advances in understanding of climate change, advances in understanding of the contribution that humans are making to climate change, and advances in understanding of the degree to which climate change may be harmful (or beneficial). In this expert report, I describe the development of my expert opinion on these topics, as a way to provide the Court with insight about how confidence was developed in the assessment of the climate situation by the scientific community.

This expert report does not include explicit review of all papers published by the research community, which are extensive. I am, however, familiar with the wealth of climate research and assessments carried out by the international research community, as summarized succinctly in references such as the treatises on climate change and human-induced global warming by Pierrehumbert (2010) and the National Research Council report (NRC, 2010) and in more detail by reports of the Intergovernmental Panel on Climate Change (IPCC).

[1] A *climate forcing* is an imposed change in Earth's energy balance, measured in Watts per square meter (W/m^2). For example, Earth absorbs about 240 W/m^2 of solar energy, so if the Sun's brightness increases 1%, it is a forcing of +2.4 W/m^2. The Sun's brightness has been accurately monitored since the late 1970s, the total amplitude of its variations is about 0.1%, and the effect of this small variability is limited because it is oscillatory. In contrast the CO_2 climate forcing is much larger and steadily increasing. CO_2 is the principal climate forcing altering Earth's energy balance, as I will discuss.

The following discussion is organized chronologically.

2. Background Science: Studies Prior to 1981

2.1 Historical CO_2 Studies

It has long been understood that Earth's temperature is determined by the fact that the planet must be hot enough to radiate back to space as heat the same amount of energy that it absorbs from incoming sunlight. As a result, the fundamental processes that can change Earth's temperature are 1) changes in the amount of energy incident on Earth or the fraction of that energy absorbed by Earth; and 2) changes in the amount of heat radiated to space. Heat radiated to space is affected primarily by absorption of infrared radiation by CO_2 and other GHGs.

The scientific roots of understanding of climate change date to the early 19th century when scientists discovered that certain gases trap heat in the atmosphere and thus warm Earth's surface. Atmospheric CO_2 levels were just beginning to rise above 280 ppm at that time. In 1824, Joseph Fourier, a French mathematician and physicist, identified the greenhouse effect, writing: "The temperature [of Earth's surface] can be augmented by the interposition of the atmosphere, because heat in the state of light finds less resistance in penetrating the air, than in re-passing into the air when converted into non-luminous heat."

John Tyndall, an Irish physicist, realized the huge impact of atmospheric water vapor in keeping Earth's surface warmer than it otherwise would be, writing (Tyndall, 1872, p. 423) "This aqueous vapour is a blanket more necessary to the vegetable life of England than clothing is to man. Remove for a single summer-night the aqueous vapor from the air which overspreads this country, and you would assuredly destroy every plant capable of being destroyed by a freezing temperature. The warmth of our fields and gardens would pour itself unrequited into space, and the sun would rise upon an island held fast in the iron grip of frost. The aqueous vapor constitutes a dam, by which the temperature at the earth's surface is deepened: the dam however, finally overflows, and we give to space all that we receive from the sun." Tyndall wrote with elegance, but also with the clarity of a physicist, about the importance of water vapor in keeping Earth's surface warmer than it would be without the presence of that gas, which acts as a "blanket." His other metaphor, that the dam must eventually overflow and "give back to space all that we receive from the sun," refers to the most fundamental concept, conservation of energy: Earth must radiate to space the same amount of energy that it receives from the sun.

Tyndall (1872) also measured in the laboratory the absorption of heat (infrared) radiation by gases. The strongest absorption of heat radiation is by water vapor. However, atmospheric water vapor amount is determined by atmospheric temperature, because the vapor condenses once humidity reaches 100%. Average relative humidity in Earth's lower atmosphere is less than saturation, about 60%, because of atmospheric circulation and weather variability. Water vapor is thus an amplifying climate feedback. For example, if climate forcing increases, say the Sun becomes brighter or the amount of a 'permanent' (i.e., noncondensing) atmospheric gas increases, this forcing causes global temperature to increase. The warmer atmosphere holds more water vapor, whose greenhouse effect amplifies the warming.

Among the gases other than water vapor, CO_2 is the strongest absorber of heat radiation, i.e., the strongest greenhouse gas. The amount of atmospheric CO_2 is naturally variable on long time scales, and Tyndall correctly inferred that climate changes on long time scales, the glacial to interglacial oscillations, are associated with changes of atmospheric CO_2. Indeed, subsequent research confirms that CO_2 acts as a strong 'control knob' on global temperature.

Svante Arrhenius, a Swedish scientist, was the first scientist to estimate quantitatively the impact of rising atmospheric CO_2 amount on Earth's temperature. Arrhenius (1896) used observations by Samuel Langley of heat transmission through Earth's atmosphere, which Langley obtained by measuring heat fluxes from the Moon. Via elaborate energy balance calculations, Arrhenius estimated that a doubling of Earth's atmosphere would cause a global warming between 4.9°C and 6.1°C, depending on latitude and season. This first estimate of 'climate sensitivity' (global mean warming in response to doubled CO_2) suffered from errors in Langley's measurement and other approximations in a complex calculation, with a resulting sensitivity that is somewhat larger than obtained in more realistic calculations and empirical studies today.

Arrhenius himself was able to improve upon his first analysis, providing his later estimate (Arrhenius, 1908) of 4°C for doubled CO_2 and 8°C for quadrupled CO_2. This improved estimate of Arrhenius turned out to be within the range predicted in later studies and today, as I discuss further below. The basic physics, understood for well over 100 years, is that more CO_2 molecules trap more radiation in the lower layers of the atmosphere. As Tyndall aptly stated, more greenhouse gases, are a thicker blanket that makes the surface warmer. By Arrhenius's time, CO_2 levels had risen from ~280 ppm to ~300 ppm.

In 1900 another Swedish scientist, Kunt Angstrom, disputed Arrhenius, arguing that CO_2 absorption bands are 'saturated', i.e., they absorb essentially all of the radiation within narrow spectral (wavelength) regions and negligible energy elsewhere. Therefore, he suggested, additional CO_2 would have little effect. This argument did not take account of the fact that the CO_2 bands become broader as the CO_2 amount increases, nor of the fact that the CO_2 bands are never saturated high in the atmosphere, where their increased absorption still blankets the planet effectively, reducing radiation to space. Angstrom's logic was faulty and it was rigorously and quantitatively disproven when computers made it practical to precisely calculate the transfer of radiation through the atmosphere.

Guy S. Callendar, a British engineer, used records from 147 weather stations around the world to show that the U.S. and the North Atlantic region had warmed significantly on the heels of the Industrial Revolution. The impact of rising CO_2 levels on global temperature was coined "the Callendar effect". In 1938, during FDR's administration and Callendar's early work, CO_2 levels had risen to ~310 ppm.

After World War II, the Office of Naval Research expanded climate science work as an offshoot of the Manhattan Project. By 1955, using a new generation of early computers, U.S. researcher Gilbert Plass analyzed in detail the infrared absorption of various GHGs. Plass explained that, although water vapor is the strongest greenhouse gas absorber, its amount falls off rapidly with height while CO_2 is uniformly mixed through the atmosphere. Thus CO_2 is especially effective in reducing heat radiated from the top of the atmosphere, affecting the planet's energy balance.

He concluded that doubling CO_2 amount would increase temperature by 3-4°C. By 1955, during Eisenhower's administration, CO_2 levels had risen to ~314 ppm.

Uncertainty persisted about exactly how much global temperature would increase in response to a given atmospheric CO_2 concentration. However, a crucial discovery was made in 1957 by U.S. oceanographer Roger Revelle. Until then, it had been thought that the ocean should rapidly take up most of the CO_2 from fossil fuel burning, so it was a bit puzzling why CO_2 seemed to be increasing substantially. During the International Geophysical Year, Revelle and chemist Hans Suess showed that there is a chemical resistance, characterized by what is now called the Revelle factor, that slows the uptake of CO_2 by sea water. Suddenly it was realized that the greenhouse problem was more immediate than had been thought. Revelle wrote: "Human beings are now carrying out a large scale geophysical experiment..." Revelle publicly speculated that in the 21st century the greenhouse effect might exert "a violent effect on the earth's climate" (as quoted by Time magazine in its 28 May 1956 issue). He thought the temperature rise might eventually melt the Greenland and Antarctic ice sheets, which would raise sea levels enough to flood coastlines. In 1957, Revelle told a congressional committee that the greenhouse effect might someday turn Southern California and Texas into real deserts. He also remarked that the Arctic Ocean might become ice free. By 1957, CO_2 levels had risen to almost 315 ppm.

By 1958, using equipment he developed himself, Charles David Keeling began systematic measurements of atmospheric CO_2 at Mauna Loa, Hawaii and in Antarctica, making measurements with a greater precision than prior data. Observations at Mauna Loa observatory revealed a beautifully precise curve for annual variations superimposed on a long-term increase, which would become known as the "Keeling Curve." Through his measurements, Keeling had unequivocal evidence that CO_2 concentrations were increasing and rising to levels not seen in over 20 million years. Based on data for carbon isotopes it was clear that CO_2 was increasing due to fossil fuel combustion. Within four years, the project - which continues today - provided undeniable proof that CO_2 concentrations were rising. The level of CO_2 in 1958 was 315 ppm.

By 1965, when CO_2 levels were 320 ppm, a White House Report signed by President Johnson warned that the greenhouse effect is a matter of "real concern." They reported: "by the year 2000 the increase in atmospheric CO_2 … may be sufficient to produce measurable and perhaps marked changes in climate." The Committee remarked that the resulting changes "could be deleterious from the point of view of human beings." At a meeting in Boulder, Colorado later that year on the causes of climate change, Edward Lorenz and others pointed out the chaotic nature of the climate system and the possibility that climate change could be accompanied by sudden shifts.

In 1967 the International Global Atmospheric Research Program was established, led by the World Meteorological Organization and the International Council of Scientific Unions. Although its objective was primarily to gather data needed to improve weather prediction, climate research was included and benefitted from important field experiments. These field experiments, including the GARP Atlantic Tropical Experiment in 1974 and the Alpine Experiment in 1982, spurred fundamental progress in meteorology, which allowed major improvements in global numerical modeling.

By 1969 Syukuro Manabe and his colleagues had made major advances in modeling and understanding the global ocean-atmosphere system. Manabe, Smagorinsky, and Strickler (1965) presented a comprehensive general circulation model of the atmosphere with a realistic hydrologic cycle. Manabe and Richard Wetherald (1967) used a one-dimensional climate model to explore important processes affecting climate change and climate sensitivity. Manabe and Kirk Bryan (1969) published the first results from a coupled ocean-atmosphere general circulation model.

By 1972 important conferences and studies occurred that are widely cited as the origin of public policy interest in anthropogenic climate change (Study of Critical Environmental Problems, 1970; Study of Man's Impact on Climate, 1971). The first United Nations environment conference (United Nations Conference on the Human Environment) was held in Stockholm in 1972. Although climate change hardly registered on the agenda, which focused on issues such as chemical pollution, atomic bomb testing, and whaling, two important studies were prepared in advance of the conference. "The Study of Critical Environmental Problems" (SCEP) focused on pollution-induced "changes in climate, ocean ecology, or in large terrestrial ecosystems." "The Study of Man's Impact on Climate" (SMIC) endorsed general circulation modeling. Both SCEP and SMIC recommended a major initiative in global data collection, new international measurement standards for environmental data, and the integration of existing programs to form a global monitoring network.

2.2 Planetary Comparisons of Mars, Venus, and Earth

In this section, I note some of the planetary and terrestrial studies of the 1960s and 1970s that provided a basis for understanding of climate systems. I focus on the NASA perspective, especially research in which NASA GISS was involved.

Instrumented exploration of the planets by the space science community in the 1960s and 1970s provided the opportunity to check our understanding for a broad range of planetary conditions, specifically a useful check on how the temperature of a planetary surface depends upon factors such as atmospheric composition and the distance from the sun.

The current conditions on Mars (too cold), Venus (too hot), and Earth (just right for life as we know it to exist) are well explained by the atmospheric compositions and the distance from the sun. The amount of GHGs making up the atmospheric composition, including gases that absorb infrared (heat) radiation and thus act as a blanket that warms the planetary surface, varies dramatically from one planet to another. Greenhouse warming as a global annual average temperature today is about 6°C on Mars, 35°C on Earth, and several hundred degrees on Venus, as a result of successively greater amounts of GHGs on each planet, providing a useful confirmation of understanding of the greenhouse effect (Kasting et al., 1988; Pierrehumbert, 2010).

There is still substantial uncertainty in the detailed history of the evolution of the atmospheric composition of the planets over their full history (Kasting et al., 1988; Pierrehumbert, 2010). However, we know, based on the relative abundances of different hydrogen isotopes in the Venus upper atmosphere, that Venus once had more water vapor and probably an ocean, but most of its water was lost via a runaway greenhouse effect (Ingersoll, 1969; Hansen, 2013).

2.3 Volcanoes Cause Natural Climate Change, Test Climate Models

In 1963, Mount Agung on the island of Bali exploded in a spectacular volcanic eruption, the largest in several decades. The eruption injected a large amount of particles suspended in gas, called *aerosols*, into Earth's stratosphere. My first scientific calculations (Hansen and Matsushima, 1966) were made to help understand the unusual lunar eclipse of 30 December 1963, when the moon became practically invisible as it passed into Earth's shadow. The explanation turned out to be upper atmospheric aerosols formed after a massive injection of SO_2 into the stratosphere by the Agung eruption.

Years later, colleagues and I at NASA GISS used this Agung eruption to test understanding of the global climate response to a short-lived event that temporarily changed the energy balance of the planet (Hansen et al., 1978). We found that the aerosols caused (1) a heating of the stratosphere, by absorbing heat radiation from the lower atmosphere and absorbing a small amount of sunlight; and (2) a cooling of the lower atmosphere and surface of Earth, because the stratospheric aerosols reflected a significant amount of incident sunlight, thus reducing solar heating of Earth's surface.

A simple climate model reproduced stratospheric warming and surface cooling in approximate agreement with observed climate in the few years following the Agung eruption. We concluded in our 1978 article in *Science* that a large volcanic eruption in the future could provide a more valuable test of understanding if observational capabilities were available for prompt measurements after future large volcanic eruptions. The NASA Administrator asked his sciences directorate to support such an instrumentation effort, which aided attainment of observations following eruptions of El Chichon in 1982 and Pinatubo in 1991, as discussed below.

2.4 Charney Study of Climate Sensitivity

Because the federal government was becoming increasingly concerned about the effect of CO_2 emissions on the global climate system, President Carter in 1979 requested the National Academy of Sciences (NAS) to report on the possible climate effect of increasing atmospheric CO_2. The NAS formed a committee chaired by Jule Charney of the Massachusetts Institute of Technology. Charney prepared the report for the Executive Office of Science and Technology Policy, attached here as **Exhibit EE**. Charney focused the study on a specific fundamental question: the eventual (equilibrium) global warming in response to a doubling[2] of atmospheric CO_2. Further, he emphasized study of this question using global climate models (GCMs) that included simulation of three-dimensional atmospheric dynamics using fundamental equations for atmospheric structure and motions.

GISS had conducted GCM simulations for doubled atmospheric CO_2 ($2\times CO_2$). Doubled CO_2 was chosen as a standard forcing because it was about the magnitude of CO_2 increase that could occur in a century if fossil fuel use continued to grow. Syukuro Manabe conducted simulations in 1979 that yielded a 2°C global warming for $2\times CO_2$, while our model produced 4°C warming.

[2] CO_2 doubling refers to doubling the atmospheric CO_2 concentration from preindustrial CO_2 levels.

The models confirmed prior scientific understanding that an increase in CO_2 would increase Earth's temperatures. The large difference between results of the two models for the increase in temperature per CO_2 doubling spurred efforts to understand the physical processes leading to that difference. Charney visited our laboratory to talk about our modeling. One of his study members, Prof. Akio Arakawa, stayed at our laboratory for several days to analyze the climate model simulations. After further analysis, we concluded that the main differences between the models were in climate feedback processes; most likely the simulated changes of sea ice and clouds. Such feedbacks can either amplify or diminish the simulated climate response. For example, the equilibrium sea ice response to doubling atmospheric CO_2 is expected to be a reduction of sea ice area in the warmer world, which is an amplifying feedback because the dark ocean exposed by reduced sea ice absorbs more sunlight than an ice-covered ocean.

The Charney Report concluded that doubling atmospheric CO_2 would be expected to cause a large climate change, with eventual global warming of $3 \pm 1.5°C$. Narrowing the model's range of uncertainty about how much warming should be expected could be achieved via analysis of climate change in response to changing climate forcings during Earth's history, especially changes of atmospheric CO_2, as discussed below. Nonetheless, all of the models conclusively indicated significant warming from CO_2 forcing. In addition to reporting our results to the Charney committee, which was composed of the preeminent experts in climate sciences, I had numerous discussions with the leaders Charney and Arakawa; it was clear that none of these experts had any doubt that significant warming would occur.

A factor about the Charney Report to bear in mind is that the idealized $2\times CO_2$ experiments kept important parts of the climate system fixed, e.g., ice sheets and vegetation. In reality, and as we are seeing today, as climate changes, these features will change. Some of these omitted feedbacks were thought to be important mainly on long time scales, i.e., they can be classified as "slow feedbacks"; but the main reasons these feedbacks were omitted in these early studies were the absence of good models for ice and vegetation processes and a desire to keep the initial assessment manageable.

Slow feedbacks can be either amplifying or diminishing, and some are very complex to simulate. Fortunately, Earth's history provides substantial information about how slow feedbacks have responded to prior climate change, as will be noted below.

Notwithstanding the uncertainty about how quickly temperatures would rise and the omission of certain feedback loops, Charney, et al. still reported to the Executive Office of the President in 1979 that future climate change would cause severe impacts on future generations in the 21st century, referring to their findings about inevitable warming as "disturbing to policymakers." Charney advised the Federal Defendant Executive Office of the President: "A wait-and-see policy may mean waiting until it is too late" and suggested their findings should be a guide to policy makers.

3. 1981 paper in Science: Climate Impact of Increasing Atmospheric CO_2

Beginning in 1978, NASA provided 3-year special project funding for GISS to study the climate effect of increasing CO_2. We published our first major paper on this topic in 1981 in *Science*.

Summary. The global temperature rose by 0.2°C between the middle 1960's and 1980, yielding a warming of 0.4°C in the past century. This temperature increase is consistent with the calculated greenhouse effect due to measured increases of atmospheric carbon dioxide. Variations of volcanic aerosols and possibly solar luminosity appear to be primary causes of observed fluctuations about the mean trend of increasing temperature. It is shown that the anthropogenic carbon dioxide warming should emerge from the noise level of natural climate variability by the end of the century, and there is a high probability of warming in the 1980's. Potential effects on climate in the 21st century include the creation of drought-prone regions in North America and central Asia as part of a shifting of climatic zones, erosion of the West Antarctic ice sheet with a consequent worldwide rise in sea level, and opening of the fabled Northwest Passage.

Chart 1. Abstract of "Climate Impact of Increasing Atmospheric Carbon Dioxide", by J. Hansen, D. Johnson, A. Lacis, S. Lebedeff, P. Lee, D. Rind, and G. Russell, Science, 213, 957-966, 1981.

This study showed what we knew based on tools and data available almost 40 years ago; specifically simple climate models, temperatures measured at weather stations for about a century, and limited paleoclimate data.

We found that the weather station data was sufficient to yield reasonably accurate knowledge of global temperature change, despite limited coverage in the Southern Hemisphere. We showed that observed warming of 0.4°C from 1880 to 1980 was consistent with climate simulations for a *climate sensitivity* (the amount of change expected from any type of forcing) of about 3°C for doubled CO_2, a climate sensitivity in the middle of the range that the Charney Report had estimated.

We were able to make testable predictions: the 1980s were likely to exhibit warming and in the 1990s, the globe would warm beyond the range of natural variability. The 21st century would see shifting of climate zones, increasing climate extremes including stronger droughts, eroding of ice sheets with rising sea levels, and opening of the Northwest Passage. Observations have confirmed all of these predictions.

We calculated the implications for fossil energy use. We concluded, based on available fossil fuel reserves and paleoclimate evidence (for the sensitivity of sea level to global temperature change), that all coal could not be burned if we wished to preserve shorelines and coastal cities.

Specifically, we stated: "However, the degree of warming will depend strongly on the energy growth rate and choice of fuels for the next century. Thus CO_2 effects on climate may make full exploitation of coal resources undesirable. An appropriate strategy may be to encourage energy conservation and develop alternative energy sources while using fossil fuels as necessary during the next few decades."

This paper in Science received widespread attention, including, e.g., front page reporting in the New York Times and lead editorials in the Washington Post and New York Times. The paper also led to my first testimony to Congress, to a Joint Hearing on Carbon Dioxide and the Greenhouse Effect, of the House of Representatives Subcommittee on Natural Resources, Agriculture Research, and Environment, and Subcommittee on Investigations and Oversight of the Committee on Science and Technology, on 25 March 1982.

4. 1982 Ewing Symposium: Climate Sensitivity and Climate Feedbacks

Taro Takahashi and I organized a symposium on "Climate Processes and Climate Sensitivity" held at Lamont-Doherty Geophysical Observatory (LDGO) in Palisades, New York, on 25-27 October 1982.

4.1 Climate Sensitivity and Feedbacks

In one of the symposium papers (Hansen et al., 1984), my colleagues and I showed that the climate change between a glacial period and an interglacial (warm) period could be used to extract an estimate of climate sensitivity that is largely independent of climate models. I briefly describe that matter here, because of its relevance to issues discussed later in my expert report.

Large oscillations of Earth's climate between ice ages and warmer interglacial periods occur naturally, especially on time scales of 20,000 to 400,000 years. These climate changes are associated with (1) changes in the shape of Earth's orbit about the sun (which varies from nearly circular to elliptical with as much as 7% deviation from a perfect circle), and (2) changes of the tilt of Earth's spin axis relative to the orbital plane (the tilt varying by about one degree larger or smaller than the present tilt of about 23.5°) (Hays et al., 1976). These oscillations of Earth's orbit and spin-axis tilt are caused by neighboring planets, mainly Jupiter and Saturn, because they are so heavy, and Venus, because it passes so close to Earth (Berger, 1978).

Earth's slowly changing orbit and spin-axis tilt both alter the seasonal and geographical distribution of solar radiation striking Earth, spurring a transition (called *oscillations*) back and forth between glacial and interglacial conditions. The direct global climate forcing due to the changing *insolation* (the amount of solar exposure striking the Earth) is very small (Fig. S3, Hansen et al., 2008), but large global climate change is induced via two major "slow feedbacks": (1) changes in the amount of stable atmospheric greenhouse gases (CO_2, CH_4, and N_2O) and (2) changes in the size of ice sheets. As Earth becomes warmer: (1) more of these GHGs are released to the atmosphere by the ocean and continents, and (2) ice sheets become smaller. Thus, both of these feedbacks are *amplifying feedbacks* – meaning they are self-reinforcing and they amplify warming. For example, when (bright, reflective) ice sheets shrink, this exposes darker ground, thus causing more solar energy to be absorbed, increased warming, and further shrinking of the ice sheets.

Climate can be reasonably stable for thousands of years during glacial and interglacial periods. In such periods, Earth must be in near energy balance with space, i.e., Earth radiates an amount of infrared (heat) energy to space equal to the amount of solar energy absorbed by Earth. The "forcings" that keep the interglacial period warmer than the glacial period are the larger amount of GHGs and the darker planetary surface, even though these forcings in reality are slow feedbacks. Thus, the equilibrium climate sensitivity to a change of climate forcing, i.e., the eventual global temperature change after waiting long enough for the planet to return to energy balance, can be estimated by dividing the glacial-to-interglacial global temperature change by the GHG plus surface reflectivity forcing.

We compared the depths of the last ice age (about 20,000 years ago) to the current interglacial period (the Holocene) prior to substantial human influence, concluding that the planet will warm

in the range 2.5-5°C for doubled CO_2. This compares to the range 1.5-4.5°C estimated by Charney using climate models. Accepting both of these as valid analyses suggested that climate sensitivity is in the range 2.5-4.5°C for doubled CO_2.

More recent modeling analyses are not able to tighten this range much; the range accounts for the uncertainty. The empirical approach based on Earth's climate history has potential for greater accuracy, but it requires more accurate reconstruction of past global temperatures.

However, even the low extreme in this range of climate sensitivity results in dangerous climate change, if fossil fuel emissions remain high, as discussed in Section 8.

4.2 Energy and CO_2

A keynote talk at the Ewing Symposium mentioned above was given by E.E. David, Jr., President of Exxon Research and Engineering Company on 25 October 1982. David's talk, reproduced in the Ewing volume (Hansen and Takahashi, 1984), includes a remarkably prescient statement: "faith in technologies, markets, and correcting feedback mechanisms is less than satisfying for a situation such as the one you are studying at this year's Ewing Symposium. The critical problem is that the environmental impacts of the CO_2 buildup may be so long delayed. A look at the theory of feedback systems shows that where there is such a long delay the system breaks down unless there is anticipation built into the loop. The question then becomes how to anticipate the future far enough in advance to prepare for it."

This ***delayed response of the climate system*** is the critical factor that gives rise to intergenerational inequities. David correctly concluded that this delayed response demands ***anticipation*** to avoid system breakdown, where, in the climate case, system breakdown would be catastrophic climate change for today's young people and future generations.

E. E. David's Summary and Conclusion begins: "To sum up, the world's best hope for inventing an acceptable energy transition is one that favors multiple technical approaches subject to correction - - feedback from markets, societies, and politics, and <u>scientific</u> feedback about external costs to health and the environment." (Emphasis in original.)

I discuss "the external costs to health and the environment" in detail below. For now, it suffices to say that our 1981 *Science* paper already made clear that all fossil fuels could not be burned without untenable consequences for future generations. Realization of this conclusion and understanding of the impacts of global warming spread rapidly in the following decade, leading to the 1992 United Nations Framework Convention on Climate Change (UNFCCC, 1992).

It was thus clear to 166 nations[3] across the globe by 1992, more than 25 years ago, that the "anticipation" David spoke about would require development of energy sources that did not produce CO_2 and were capable of replacing fossil fuels. Yet, instead, the "anticipation" chosen by the Federal Defendants like the Department of Energy (in collaboration with the fossil fuel industry) was extremely expensive investment in developing technologies such as hydraulic fracturing "fracking," an energy-, chemical-, water-, and resource-intensive process that allows extraction of more and more fossil fuels. The fossil energy approach chosen by Federal

[3] Today there are 197 parties to the UNFCCC.

Defendants resulted in extraction operations in pristine regions such as the Arctic and the deep ocean, and still includes methods of extraction such as mountaintop removal for coal and forest destruction for increasingly low-grade energy resources like tar sands bitumen, that have detrimental effects on human health and the environment. This course was chosen - to double down on fossil fuels, including carbon-intensive, unconventional sources - even though it was scientifically clear by 1981 that existing fossil fuel reserves contained more than enough carbon to create climate change with dramatic and dangerous consequences, including significant sea level rise.

5. 1988/1989 Congressional Testimony: Advanced Modeling and Data

By 1988, when I testified to the United States Senate, it was clear that the 1980s had warmed as we had projected in our 1981 research paper, and it appeared that 1988 would be the warmest year in the period of instrumental data.

In my testimony (Hansen, 1988) to the U. S. Senate on 23 June 1988, I described three conclusions:

1. Earth was warmer in 1988 than at any time in the history of instrumental measurements.
2. Global warming was large enough that we could then ascribe, with a high degree of confidence, a cause and effect relationship between measured warming and human caused greenhouse gas emissions.
3. Our computer simulations indicated that the measured warming was already large enough to begin to affect the probability of extreme events, such as summer heat waves.

In 1989, I took the opportunity to testify to the Senate once more (Hansen, 1989), because of my concern that conclusion (3) of my 1988 testimony was incomplete, which could lead to public confusion. In my 1989 testimony, I wanted to make clear that, in addition to the more extreme heat waves and droughts caused by global warming, we must also expect more extreme heavy rainfall and thus greater flooding. This is because a warmer atmosphere holds more water vapor, leading to more extreme rainfall from moist convection. In times and places where it is dry, such as the Southwest United States and the Mediterranean region, global warming makes the warm seasons hotter and drier, but in the times and places of rainfall, the rainfall and floods can be more extreme. In most cases, the wet get wetter and the dry get drier.

My 1988 testimony to the United States Senate engendered extensive media coverage because of extreme climate anomalies, including strong heat waves and drought in the United States. My 1989 testimony before the United States Senate also resulted in extensive media coverage because of the revelation that my 1989 testimony had been altered by the White House.[4]

After that period in the public spotlight, I decided that other climate scientists could better communicate the issues to the public, and so for the next 15 years I avoided public testimony and the media.

[4] I discuss the political censorship of climate science throughout Storms of My Grandchildren (2009).

6. 1989-2004: Research Progress

By 2004, our ability to understand the mechanisms driving global warming and predict the impacts more precisely had improved dramatically. Warming had risen beyond the range of natural variability and the reality of human-caused global warming had become unequivocal. The examples of GISS research that I show here, which contributed to these advances, are from papers available at https://pubs.giss.nasa.gov/authors/jhansen.html.

6.1 Pinatubo Volcanic Eruption

On 15 June 1991, nature launched a great climate experiment as the explosion of Mt. Pinatubo sent massive amounts of gas and dust into the atmosphere. Several colleagues and I used new NASA satellite data to predict the climate effect of the Pinatubo eruption (Hansen et al., 1992). We projected a temporary global cooling of about 0.4°C during the two years following the eruption and observations confirmed a cooling very close to our projections, thus increasing confidence in the ability of global models to simulate correctly the global response to a climate forcing.

Volcanic aerosols and greenhouse gases affect the climate in similar ways, but in the opposite direction. Volcanic aerosols directly cause planetary cooling by reflecting sunlight back into space. The resulting energy imbalance (less energy absorbed by Earth than emitted to space) causes a planetary cooling. In contrast, greenhouse gases reduce heat loss to space, causing the planet to have a positive energy balance, more energy coming in than going out, thus resulting in planetary warming.

Fortunately, a negative (cooling) forcing (like this volcanic eruption) tests our climate models just as well as a positive (warming) energy imbalance. Accordingly, the natural experiment provided by the Mt. Pinatubo eruption provided a valuable confirmation of scientific understanding and climate modeling capability.

6.2 Black Carbon

Increasing atmospheric CO_2 and volcanic aerosols are only two of many pollutants that act to change the Earth's energy balance, referred to as *forcings*. Understanding of climate forcings has advanced over the last few decades through the combination of field measurements, laboratory data, and theoretical studies. Black carbon is an example of a complex climate forcing, which is different than the forcing caused by sulfates, the predominate aerosols produced by volcanic eruptions. Sulfates are light-colored, reflecting most of the sunlight that strikes them, while black carbon absorbs most of the sunlight striking it.

Hansen and Nazarenko (2004) estimated a significant indirect climate forcing caused by black carbon. Black carbon falls out of the air and darkens snow and ice surfaces, absorbing solar energy and causing ice to melt more rapidly. Substantial black carbon is found in the Arctic (Clarke and Noone, 1985), much of which originates from pollution sources at lower latitudes.

Black carbon aerosols are produced from burning of biofuels as well as fossil fuels. Human-made aerosols affect more than climate: they are the largest component of both outdoor (ambient) and indoor air pollution. Outdoor air pollution causes three to four million deaths per

year (Cohen et al., 2017; World Health Organization, 2016a). Indoor air pollution, mainly from open fires and simple stoves burning coal and biomass (wood, animal dung, and crop waste), causes more than four million deaths per year (World Health Organization, 2016b). Thus, instituting policies regarding fossil fuels that protect the climate system has the co-benefit of protecting human health from air pollution.

Analyzing the climate role of black carbon requires determination of its efficacy as a climate forcing, as discussed in the next section.

6.3 Efficacy of Climate Forcings

A systematic study of the effectiveness of different forcing mechanisms (Hansen et al., 2005a) defined an "efficacy" for each mechanism. We illustrated that CO_2 is easily the largest human-made climate forcing and CH_4 is the second largest (Hansen et al., 2005a, Figure 28b). The net forcing by "soot" aerosols, (soot being the sum of black carbon and the associated organic carbon aerosols) is smaller than CO_2 and CH_4 forcings (Hansen et al., 2005a).

6.4 Earth's Energy Imbalance

Another layer of quantitative verification of our understanding of global climate change came to fruition near the end of the period 1989-2004. It had long been understood that when greenhouse gases such as CO_2 increase, they would cause a planetary energy imbalance by reducing Earth's heat radiation to space: thus the energy in absorbed sunlight would temporarily exceed the energy returned to space. The planet must warm in response to this positive energy imbalance, but full response to the forcing could require a very long time, decades or even centuries, because of the great thermal inertia of the ocean. The question we undertook to study was the extent of such an energy imbalance and whether it was quantitatively consistent with estimates of climate sensitivity. Hansen et al. (1997) showed, on the basis of climate model simulations for the period 1979-1996 with several alternative representations of the ocean, that there should have been a planetary energy imbalance of about +0.5 W/m^2 averaged over the entire planet in 1979, and this would grow to as much as 0.7-1 W/m^2 at the end of the 20^{th} century.

It is the ocean's thermal inertia that slows the planet's response to changing climate forcing, so the planetary energy imbalance (the net incoming energy) is largely flowing into the ocean. Much smaller amounts of energy go into a net melting of ice and a warming of the ground and atmosphere. The energy going into the ocean can be measured by monitoring ocean temperature throughout the ocean. Despite limitations in the coverage of measurements, especially in the deeper parts of the ocean, and despite difficulties caused by changing technologies employed for ocean temperature measurements, it became clear by 2004 that the ocean was accumulating heat and the rate of energy gain was consistent with expectations (Hansen et al., 2005b).

Measurement of Earth's planetary energy imbalance did more than provide additional confirmation of the most fundamental prediction of greenhouse theory, it also proved that more global warming was already "in the pipeline." This is unavoidable warming that will occur in the coming decades, if atmospheric composition stays as it is today. These conclusions were based mainly on observational data, not climate models.

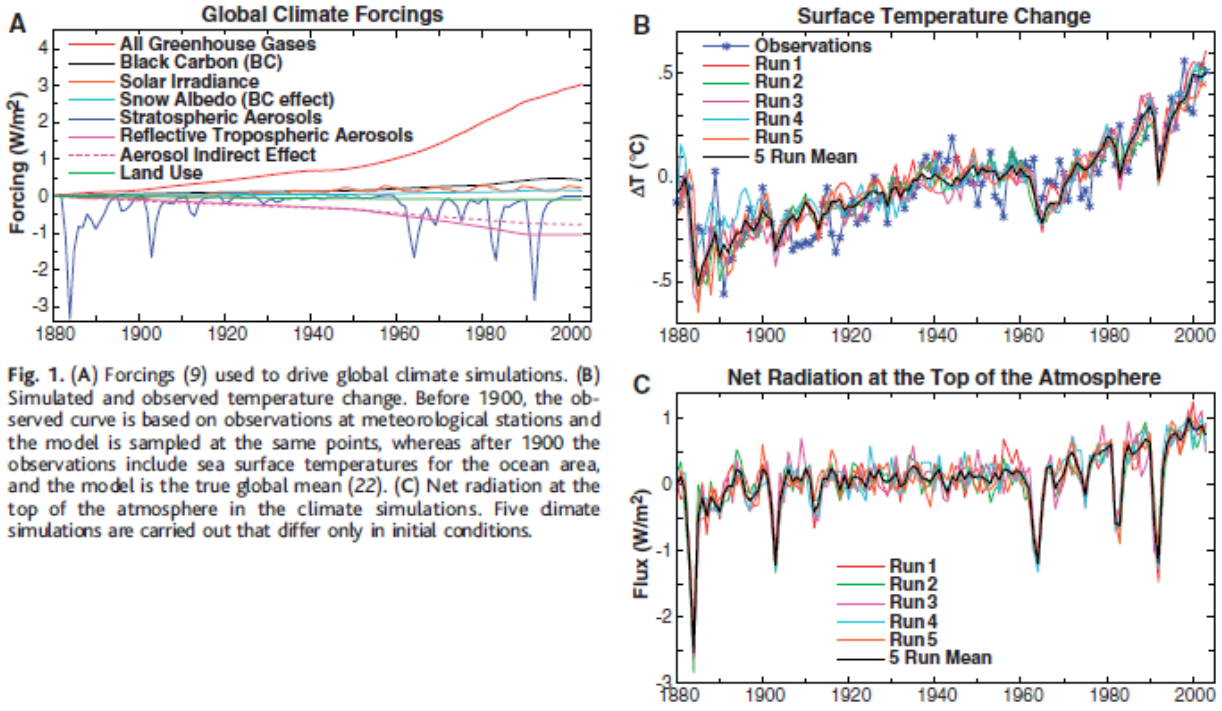

Fig. 1. (A) Forcings (*9*) used to drive global climate simulations. (B) Simulated and observed temperature change. Before 1900, the observed curve is based on observations at meteorological stations and the model is sampled at the same points, whereas after 1900 the observations include sea surface temperatures for the ocean area, and the model is the true global mean (*22*). (C) Net radiation at the top of the atmosphere in the climate simulations. Five climate simulations are carried out that differ only in initial conditions.

Chart 2. This is Fig. 1 in the paper by Hansen et al. (2005b). Global surface temperature (B) and Earth's energy imbalance (C) are computed with the GISS climate model using the climate forcings in (A).

Measurements of ocean heat gain, and smaller heat gains inferred from melting ice and warming land and atmosphere, meant that Earth was substantially out of energy balance by the year 2000, by 0.5 to 1 W/m^2. This large imbalance confirmed our understanding of climate sensitivity. If real world climate sensitivity were much smaller than our climate models suggested (2.7°C for 2×CO_2), the ocean surface temperature response would be much more rapid, and Earth's energy imbalance would be much less than the measured 0.5-1 W/m^2.

These fundamental confirmations of the physics of global warming [summarized in two papers submitted for publication in January 2005 (Hansen et al., 2005a, b)] were unsettling to me, and combined with the federal government's ongoing national energy policies promoting fossil fuels, I became concerned enough to bring this information to federal policymakers and to the public. As a federal government employee, I watched Federal Defendants support even the development of unconventional sources of fossil fuels despite the fact that these "unconventional" fossil fuels are even more carbon-intensive than conventional oil and gas and are thus more harmful to the climate.

7. 2004-2010: From Science to Policy Implications

President George W. Bush appointed a cabinet-level energy and climate task force in 2001. However, by late in his first term, if not sooner, it was obvious that the federal government was not taking actions needed to phase out fossil fuel emissions. While I was giving the (politically appointed) NASA Administrator the first climate science presentation that he heard as Administrator, he told me that I should not talk about "dangerous anthropogenic interference"

with climate because, he claimed, we did not know how much humans were changing climate or that climate change is dangerous.

What he ignored was decades of scientific research and understanding that preceded his political appointment demonstrating a longstanding understanding that humans were causing dangerous anthropogenic climate interference. By the time he took office, we could even approximate the amount of warming attributable to human activities. The green band in **Figure 1** illustrates the global temperature change that would be expected when we model only natural factors like changes in solar radiation and volcanic eruptions. The purple band shows the results when models account for both natural and human-caused forcings. The black line of observed warming aligns with the results from the models that include human factors.

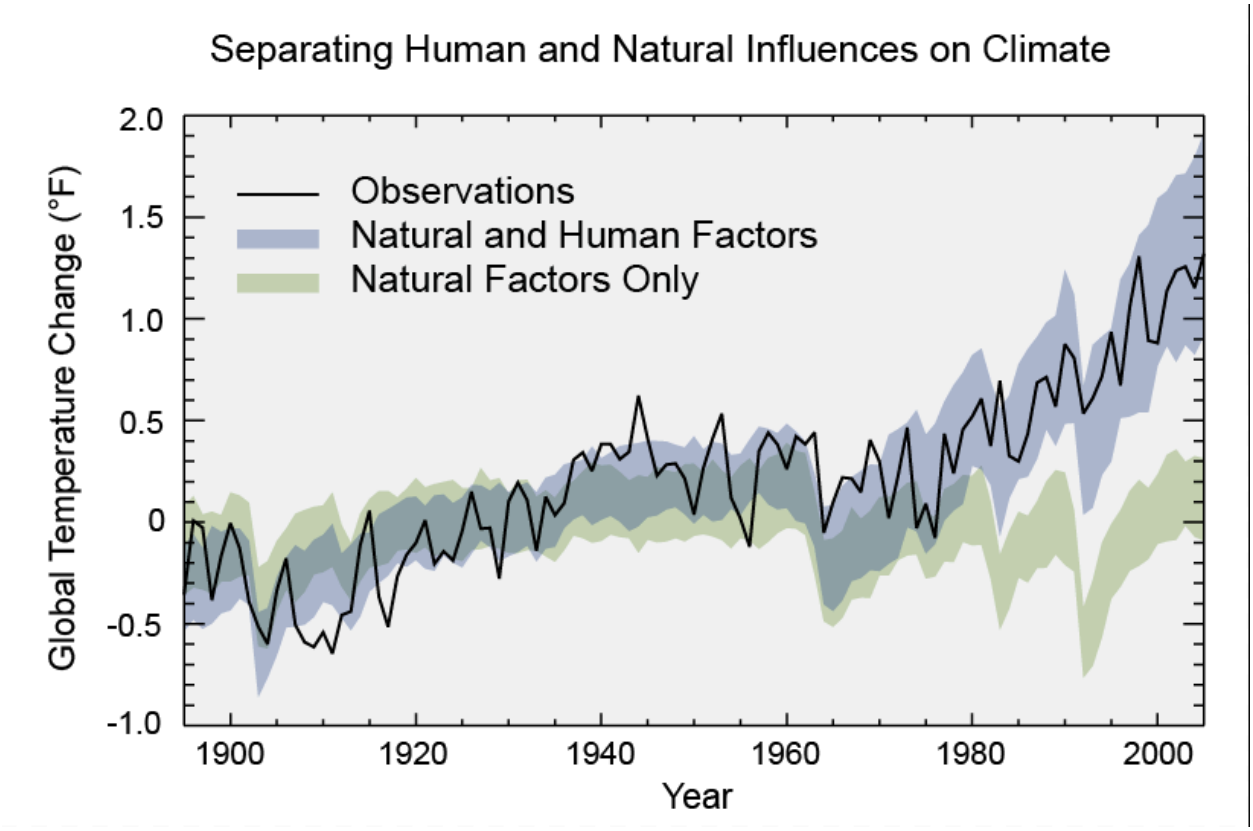

Fig. 1. Human and Natural Influences on Climate. Source: Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, 841 pp. doi:10.7930/J0Z31WJ2.

Unfortunately, top federal agency leaders gave these same admonitions to scientists in other relevant science agencies of the federal government (Bowen, 2008). Thus, the urgency of the climate situation, especially the danger of locking in large future sea level rise, was being kept from the public, in my opinion, and not reflected in energy policies of the federal government.

For that reason, I abandoned my 1989 decision to avoid the media. I believed that if I gave a well-prepared scientific talk it might help clarify the situation, especially because our new

analyses of Earth's energy imbalance provided improved insight. I gave that talk (Hansen, 2004) at the University of Iowa in October 2004 and again a year later I gave an improved version of the talk (Hansen, 2005a) in honor of Charles David Keeling at the annual American Geophysical Union (AGU) meeting in San Francisco.

My talk at AGU resulted in multiple calls from the White House to NASA Headquarters (Bowen, 2008) and the assignment by NASA of a "minder" to monitor my schedule. This allowed NASA to restrict my communications. For example, the White House prevented me from appearing on the National Public Radio program On Point to discuss my AGU talk. After a few such instances, I objected publicly by informing Andy Revkin of the New York Times about the Bush Administration's attempts to silence my exposition on the science of climate change.

At about this time, the focus of my research changed. Instead of focusing only on trying to understand and predict climate change, I began thinking more about impacts of climate change – two potential climate impacts in particular.

The first is the danger that we could lock in large future sea level rise that young people and future generations would be unable to avoid. I described the bases for my concern in a paper: "A slippery slope" (Hansen, 2005b). At the time, the Intergovernmental Panel on Climate Change (IPCC) reports projected a viewpoint that ice sheets were quite stable – that sea level rise this century likely would be no more than a fraction of a meter, even with huge assumed increases of greenhouse gases.

My concern was in part based on paleoclimate evidence. Ice sheet models could reproduce only the long-term glacial-to-interglacial ice sheet changes inferred from sea level change. However, the slow millennial time scale of glacial-to-interglacial ice sheet changes was likely a result of the slow pace of changes of Earth's orbit, not a result of inherently stiff ice sheet physics. I concluded that the extreme forcing resulting from a very short time period of humans rapidly increasing greenhouse gas emissions is not likely to result in a slower glacial-to-interglacial melt. I also argued that the principal mechanism for ice sheet disintegration was probably the effect of a warming ocean on ice shelves, the tongues of ice that extend from the ice sheets into the ocean, a mechanism that was well known but not realistically included in ice sheet models.

I was also concerned about the threat that continued rapid climate change poses to other species. My research group (Hansen et al., 2006) made maps of the rate at which isotherms, lines of a given seasonal average temperature, were shifting in recent decades. Since 1975, isotherms over land have moved poleward at a rate that varies with location and season but is typically 3-6 miles per year (Fig. 6B, Hansen et al., 2006). If such rapid rates are maintained for a century or more it may be deadly for many species, because species must migrate to stay within physical conditions in which they can survive (Parmesan, 2006). The first article that I wrote about this, in New York Review of Books (Hansen, 2006), began: "Animals are on the run."

Climate is always changing, but species have never experienced rapid continuing change comparable to present human-caused climate change. The most rapid large change in the paleoclimate record, the Paleocene-Eocene Thermal Maximum (PETM) was a global warming of

about 5°C that occurred in about 4000 years (Zeebe et al., 2016). The PETM warming[5] was driven by a carbon injection into the atmosphere of a magnitude comparable to the amount that would be injected by burning all available fossil fuels (Zachos et al., 2008), which will happen within another century or two with current rates of fossil fuel use. The current rate of carbon injection and the current rate of global warming are thus each about a factor of 10 larger than occurred during the PETM.

Some species can migrate easily, others are more restricted, and there is an interdependency among species (Parmesan, 2006). Migration today is also hindered by human-made barriers and human-caused stresses on species, such as overharvesting, land use changes, nitrogen fertilization, and introduction of exotic species. As a result, IPCC (2007) estimated that as much as a quarter to half of all species could be committed to extinction by 2100, if rapid CO_2 emissions and climate change continue.

The enormity of the potential consequences of these two matters – loss of coastal cities and loss of a huge number of species – demanded reassessment of what constituted "dangerous human-made interference" with climate. The "burning embers" diagram used by IPCC (2007) as a tool to illustrate risk left the mis-impression that serious risks began with global warming of 2-3°C.

The European Union, in 1996 and again in 2005, chose 2°C as a political guardrail and the United Nations, in the 2009 Copenhagen Agreement to the UNFCCC concurred (Randalls, 2010). The international political decisions to target 2°C as a guardrail did not have a strong scientific basis in 1996 nor in 2009, in contrast to our analyses based on changes of GHGs needed to restore Earth's energy balance and assessment based on past association of sea level rise with warming.

By the early 2000s I was reasonably convinced, mainly on the basis of paleoclimate evidence, that 2°C global warming (equivalent to an atmospheric CO_2 concentration of approximately 450 ppm) would be highly dangerous. Our scientific understanding indicated an initial target of no more than 350 ppm CO_2 to avoid dangerous impacts, but the target must be continually evaluated as the world made progress in turning around CO_2 growth (CO_2 in 2007 was already 385 ppm).

[5] The "sudden" PETM warming, which was a temporary ~4000 year spike in the geologic record, occurred 56 million years ago during a 10 million year-long warming period. The 10 million year warming trend was associated with increasing atmospheric CO_2 (Beerling and Royer, 2011), likely a result of increasing volcanic CO_2 injection into the atmosphere associated with increased rates of seafloor subduction beneath moving continental plates ("continental drift") (Kent and Muttoni, 2008). The carbon source for the PETM spike likely was methane hydrates on continental shelves (Dickens et al., 1995), although a suggested alternative source is Antarctic permafrost and peat (DeConto et al., 2012).

The Open Atmospheric Science Journal, 2008, *2*, 217-231 217

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Target Atmospheric CO_2: Where Should Humanity Aim?

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Abstract: Paleoclimate data show that climate sensitivity is ~3°C for doubled CO_2, including only fast feedback processes. Equilibrium sensitivity, including slower surface albedo feedbacks, is ~6°C for doubled CO_2 for the range of climate states between glacial conditions and ice-free Antarctica. Decreasing CO_2 was the main cause of a cooling trend that began 50 million years ago, the planet being nearly ice-free until CO_2 fell to 450 ± 100 ppm; barring prompt policy changes, that critical level will be passed, in the opposite direction, within decades. If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO_2 will need to be reduced from its current 385 ppm to at most 350 ppm, but likely less than that. The largest uncertainty in the target arises from possible changes of non-CO_2 forcings. An initial 350 ppm CO_2 target may be achievable by phasing out coal use except where CO_2 is captured and adopting agricultural and forestry practices that sequester carbon. If the present overshoot of this target CO_2 is not brief, there is a possibility of seeding irreversible catastrophic effects.

Chart 3. Abstract of Target CO_2 paper published in *The Open Atmospheric Science Journal* in 2008.

In December 2007, I was fortunate to begin work with several of the top relevant paleoclimate researchers, including the godfather of carbon cycle modeling on long time scales, Yale Prof. Robert Berner, on a study ("Target CO_2: Where Should Humanity Aim?"). The study used long-term climate change (including CO_2 amounts much larger than today), glacial-interglacial climate oscillations of the past 800,000 years, Earth's modern energy imbalance, and climate modeling to complete a broad-based assessment. We concluded that 2°C and 450 ppm were extremely dangerous. Such warming would lock in eventual loss of coastal cities, including more than half of the world's large cities. In addition, the tropics in all seasons and subtropics in summer would become uncomfortably hot, limiting outdoor activity and likely causing large scale emigration from those regions. Economic and social effects of such displacements would challenge the ability of governments to maintain order. We concluded that an initial target of 350 ppm was appropriate, but the target must be fine-tuned as progress in reducing atmospheric CO_2 is achieved.

These conclusions, peer-reviewed and, more significantly, coming from some of the best climate scientists in the world, fundamentally altered the global picture for energy policies.

Many governments had been willing, and continue to be willing today, to accept a target to keep global warming from exceeding 2°C even though there was substantial scientific evidence showing such a target was highly dangerous to humanity. Why did they accept this target? I believe it is because they were comfortable with the limited immediate requirements for fossil fuel emissions reduction that a 2°C target placed on them and because the worst impacts would accrue in the future. It was easier to allow CO_2 levels to climb to 450 ppm, rather than restore them to a level that avoided or minimized climate danger. A 2°C target primarily required setting goals for emission reductions in future years, allowing business as usual to continue with minimal efforts to improve energy efficiency and subsidize clean energies (which, however, still

remain a small piece of total energy). This 450 ppm CO_2 target avoided the need to face the task of confronting the powerful fossil fuel industry in the near term.

The Federal Defendants acted as if they could leave the task of confronting the fossil fuel industry to young people. Except that they couldn't--not unless they wanted to consign their children, grandchildren, and future generations to an unlivable planet. Our science-based assessment made crystal clear that the casualty in the convenient 2°C global warming target was the future of young people. The scientific community took notice of our paper, as shown by more than 1000 citations. No contradicting conclusions, that 2°C warming would be safe, have appeared in refereed scientific papers, to my knowledge, and certainly not by any of the scientific unions or academies of science. I was director NASA GISS at the time we published this paper. Its clear recommendations on a target were disseminated to the highest levels of the federal government and Federal Defendants, e.g., to the Science Adviser to the President.

Our conclusion that a target of no more than 350 ppm by the end of the century must be achieved raised a fundamental question: were we asking the Federal Defendants to do something that is possible? Can emissions be phased down substantially faster than in the 2°C scenarios?

The answer to that question is crucial to young people. I suspect that answer is also helpful to the Court's considerations, because Plaintiffs are asking the Court to require the Federal Defendants to have an energy/climate recovery plan that no longer violates the Constitutional rights of the Plaintiffs. Specifically, Plaintiffs are asking the Court to require the Federal Defendants to develop and implement a plan to reduce fossil fuel emissions at a rapid rate, substantially faster than emission scenarios that would be required to achieve the 2°C target.

In addition to consistently drawing the government's attention to dangerous levels of warming and atmospheric CO_2, I have conducted studies presenting ample evidence that the ambitious, necessary target of 350 ppm is achievable (Hansen, 2008a, 2008b, 2009, 2013b). However, as long as fossil fuels are a cheap, federally-permitted and supported source of energy, the public and industry will continue to use them.

Fossil fuels are cheap in part because they receive significant federal public subsidies and because they are not required to pay their costs to society, including costs of air pollution, water pollution, and climate change. Many economists (Mankiw, 2009; Hsu, 2011; Ackerman and Stanton, 2012, to name a few) have written about this flaw in the energy market, offering such strategies as a steadily rising carbon fee or carbon tax, so that the price of fossil fuels reflects their cost. They note that such an approach is beneficial for the national economy, the general principle being that an economy is more efficient if prices are honest.

8. 2010-2017: Increasing Urgency and Need for Judicial Remedy

Despite the 1992 Framework Convention on Climate Change (UNFCCC, 1992) and the resulting 1997 Kyoto Protocol intended to reduce GHG emissions, global fossil fuel emissions actually increased at a faster rate after 1997 than they did in the two decades leading up to 1997 (an annually-updated graph of CO_2 emissions is available at http://www.columbia.edu/~mhs119/CO2Emissions/).

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PLOS | ONE

Review

Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature

James Hansen[1]*, Pushker Kharecha[1,2], Makiko Sato[1], Valerie Masson-Delmotte[3], Frank Ackerman[4], David J. Beerling[5], Paul J. Hearty[6], Ove Hoegh-Guldberg[7], Shi-Ling Hsu[8], Camille Parmesan[9,10], Johan Rockstrom[11], Eelco J. Rohling[12,13], Jeffrey Sachs[1], Pete Smith[14], Konrad Steffen[15], Lise Van Susteren[16], Karina von Schuckmann[17], James C. Zachos[18]

Abstract: We assess climate impacts of global warming using ongoing observations and paleoclimate data. We use Earth's measured energy imbalance, paleoclimate data, and simple representations of the global carbon cycle and temperature to define emission reductions needed to stabilize climate and avoid potentially disastrous impacts on today's young people, future generations, and nature. A cumulative industrial-era limit of ~500 GtC fossil fuel emissions and 100 GtC storage in the biosphere and soil would keep climate close to the Holocene range to which humanity and other species are adapted. Cumulative emissions of ~1000 GtC, sometimes associated with 2 °C global warming, would spur "slow" feedbacks and eventual warming of 3-4 °C with disastrous consequences. Rapid emissions reduction is required to restore Earth's energy balance and avoid ocean heat uptake that would practically guarantee irreversible effects. Continuation of high fossil fuel emissions, given current knowledge of the consequences, would be an act of extraordinary witting intergenerational injustice. Responsible policymaking requires a rising price on carbon emissions that would preclude emissions from most remaining coal and unconventional fossil fuels and phase down emissions from conventional fossil fuels.

Chart 4. Abstract of Assessing "Dangerous Climate Change" paper published in *PLoS ONE* in 2013.

Following our 2008 "Target Atmospheric CO_2" paper, I undertook an analysis with my colleagues to specify the rate at which CO_2 emissions must decline to stabilize climate and return atmospheric CO_2 to 350 ppm by 2100. The "Target CO_2" paper had gone a long way toward achieving that objective, but I decided to do a deeper analysis with the help of international experts in the relevant disciplines.

Thus in late 2010 I contacted a number of experts to begin working on a substantive, quantitative paper (Assessing "Dangerous Climate Change") to define emission reduction requirements.

8.1 Assessing "Dangerous Climate Change": Required Emissions Reduction

Numerous scientists agreed to help produce the paper 'Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature' including experts in climate science and the carbon cycle, but also three economists and experts on the impacts of climate change on human health, species extinctions, and coral reefs.

Paul Epstein of Harvard University, who drafted the portions of the paper on human health and the environment while he was battling late stages of non-Hodgkin's lymphoma, did not live to see completion of the paper, which we dedicated to him. Lise Van Susteren, a psychiatrist, joined the team to help complete the health discussion, bringing attention to the psychological

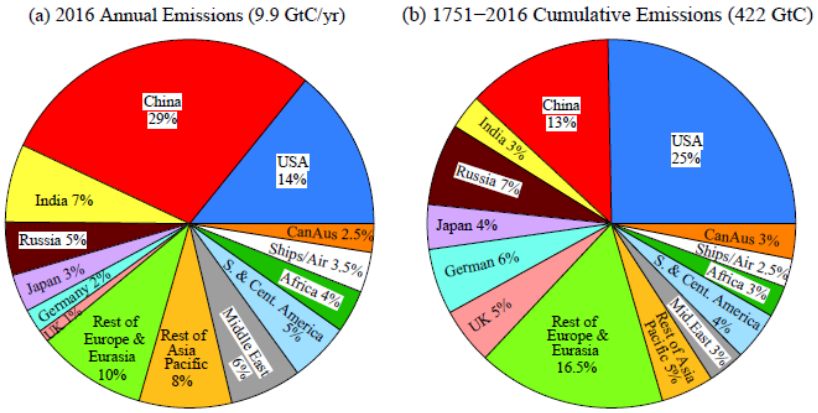

Fig. 2. Fossil fuel CO_2 emissions by source in 2016 and cumulative 1751-2016. Results are an update of Figure 10 of Hansen et al. (2013b) using data of Boden et al. (2017) and BP (2017).

impact of global warming on young people, an issue that will grow if these Federal Defendants do not undertake actions to stabilize climate.

Our paper describes the practical impacts of continued global warming. If ice sheets are allowed to become unstable, shorelines will not be stable at any time in the foreseeable future, instead experiencing continual sea level rise for centuries, a consequence of the slow response time of ocean temperature and ice sheet dynamics. Economic and social implications could be devastating. Because more than half of the largest cities in the world are located on coastlines and the population of coastal regions today continues to grow rapidly, the number of refugees would dwarf anything the world has ever experienced. It is not difficult to imagine a scenario in which the world could become nearly ungovernable.

Rapid shifting of climate zones, already well underway, will be a major contributor to species extinction if global warming continues. Coral reefs, the "rainforests of the ocean," harboring millions of species, are already threatened by the combination of a warming ocean, ocean acidification, rising sea level, and other human-caused stresses. The subtropics in summer and the tropics in all seasons will become dangerously hot, such that it will be difficult to work outdoors (Hansen and Sato, 2016). More than half of the jobs are outdoors (agriculture and construction), so there is a large economic impact that makes those parts of the world less desirable to live in.

Increasing CO_2 is now responsible for about 80 percent of the annual increase in climate forcing by greenhouse gases, the other 20 percent being from the combination of CH_4, N_2O, and other trace gases. China is now the largest source of CO_2 from fossil fuels and cement manufacture, with the United States second (**Fig. 2a**). However, we showed (Hansen et al., 2007) that climate change is proportional to cumulative CO_2 emissions, as discussed in more detail by Matthews et al. (2009). Thus, by contributing a disproportionately large share of cumulative global emissions, (**Fig. 2b**), the United States is, by far, the nation most responsible for the associated increase in global temperatures. Matthews et al. (2014) calculate the United States alone is responsible for a 0.15ºC increase in global temperature. "The United States is an unambiguous leader" in total contributions to global warming, "with a contribution of more than double that of

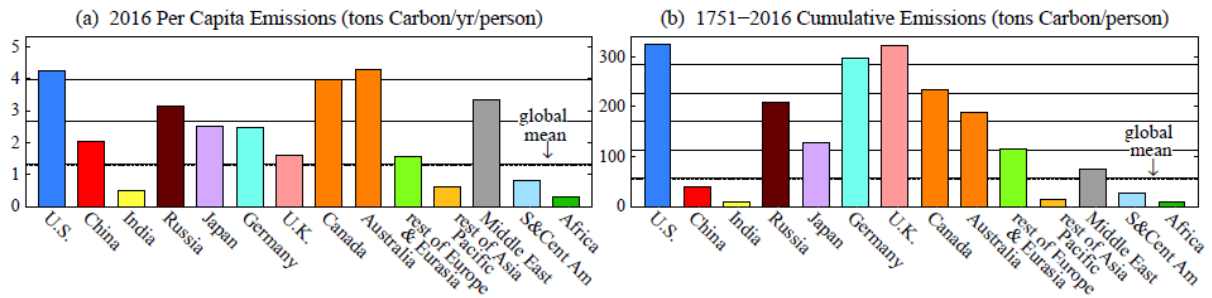

Fig. 3. Per capita fossil fuel CO_2 emissions in 2016 and cumulative 1751-2016. Data sources as in **Fig. 1**. Results for additional individual nations are available at www.columbia.edu/~mhs119/CO2Emissions/

China, which falls second in the ranking." (Matthews et al. 2014). On a per capita basis, the United States, the United Kingdom, and Germany are about equally responsible (**Fig. 3b**).

Nations in the tropics and subtropics, expected to suffer major climate impacts, have little responsibility for climate change. Such nations are located especially in South and Central America, in Africa (including the Mediterranean region), in Southeast Asia, and in Oceania.

Even though China's degree of responsibility will grow in coming years and decades, the outsize responsibility of the United States, and in particular these Federal Defendants, will be a burden for young people to bear if climate change is allowed to grow to the point that major populations are seriously impacted and even displaced. Continued support and authorization for current high fossil fuel emissions by the Federal Defendants, given existing knowledge of the consequences, would continue to exacerbate the danger they created and enhanced.

The measured energy imbalance of Earth indicates that atmospheric CO_2 must be reduced to a level below 350 ppm by the end of the century, which would be expected to restore energy balance and keep global temperature at or below +1°C relative to preindustrial temperature, assuming that the net of other human-made climate forcings remains at today's level. Specification now of a CO_2 target more precise than <350 ppm is difficult due to uncertain future changes of radiative forcing from other gases, aerosols and surface albedo, but greater precision should be feasible during the time that it takes to turn around CO_2 growth and approach the initial 350 ppm target. This warming limit keeps global temperature closer to the range that has existed during the past thousands of years in which civilization developed, but the warming limit too must be reassessed as progress is made in reducing atmospheric CO_2. It is my best expert opinion, based upon my decades of study and research, that these are the maximum levels of CO_2 and temperature increase that avoid dangerous consequences for young people and future generations. The precise limits may indeed be lower than I have specified here, but they surely are not higher.

The quantitative conclusion of the PLoS ONE paper (Hansen et al., 2013b) was that it would be possible to return atmospheric CO_2 to 350 ppm this century and restore Earth's energy balance, keep end-of-centurywarming at no more than 1°C of warming, and reasonably stabilize climate. Achieving that result required reducing fossil fuel emissions several percent per year and extracting some CO_2 from the air via reforestation of marginal lands and improved agricultural

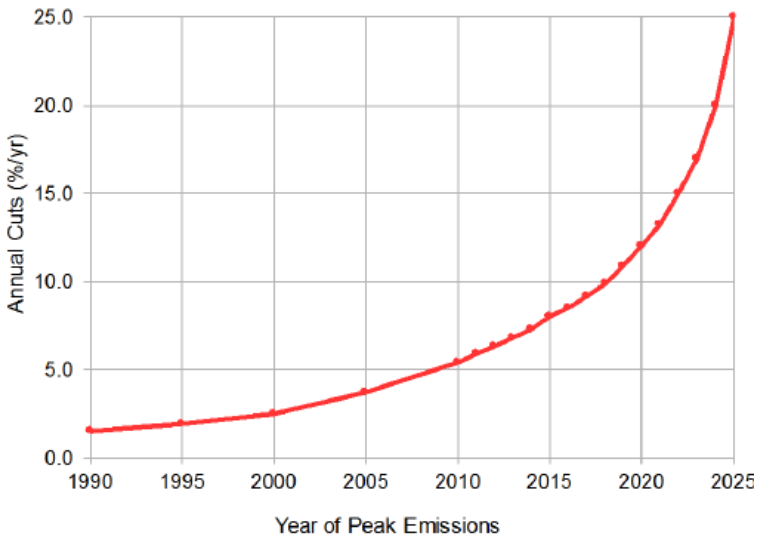

Fig. 4. Annual cut of emissions (in percent of emissions) required to achieve 350 ppm by 2100 as a function of the year at which emissions peak.

and forestry practices. This scenario assumed that emission reductions would begin in 2013 at a global average annual rate of ~6% (exponentially, i.e., the 6% applies to the fossil fuel emissions remaining at that time) per year through 2050 and 100 GtC sequestered globally through improved land management practices and reforestation through 2100.

Consistent with Hansen et al. (2013b), delay of the date at which emission reduction begins causes an increase in the required rate of emissions reduction to meet the requirement of restoring CO_2 to 350 ppm in 2100. **Figure 4** shows that the required rate increases very rapidly if emission reduction does not begin soon. Further, the implausibility of somehow sucking the excess CO_2 from the air, if high emissions are allowed to continue, has been demonstrated quantitatively (Hansen et al., 2017), the implied costs for young people running into the hundreds of trillions of dollars.

One focus of the PLoS ONE paper was on economics, because of the potential concern that actions to stabilize climate might be considered too costly by politicians. The economist co-authors have a comprehensive range of expertise and experience: Frank Ackerman on the social cost of carbon, integrated assessment models and their limitations, and involvement with the IPCC economic studies; Shi-Ling Hsu on the relative merits of cap-and-trade versus a carbon tax or fee and on international regulations and policies; Jeffrey Sachs on sustainable development, developing country issues and United Nations programs.

Those co-authors on the PLoS ONE paper concluded that one important potential underlying policy, albeit not sufficent alone, is for emissions of CO_2 to come with a price that allows these costs to be internalized within the economics of energy use. It was also concluded by these experts that inclusion of fossil fuel costs to society (caused by air pollution, water pollution and climate change) in the price of the fossil fuels would make the economy more efficient, and would thus be an overall benefit to the nation. Quantitative confirmation of this conclusion was obtained in a later economic study for the United States (Nystrom and Luckow, 2014), which showed that a steadily increasing carbon fee with all of the proceeds distributed uniformly to

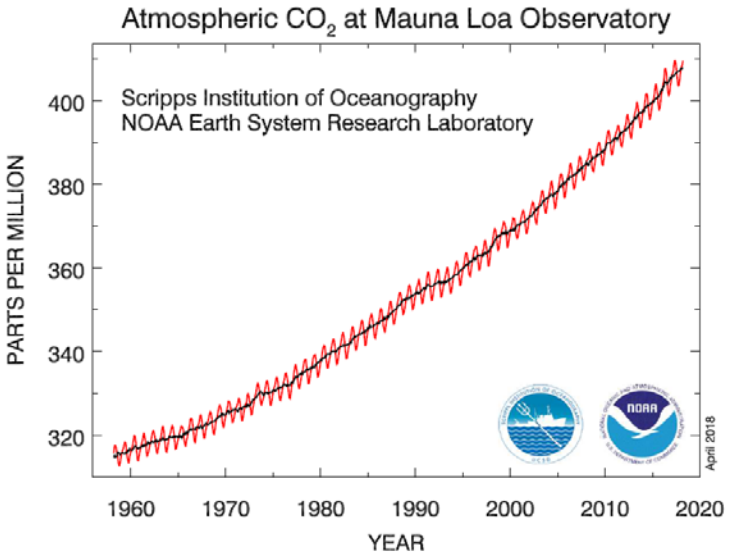

Fig. 5. Atmospheric CO_2 amount measured at Mauna Loa observatory in Hawaii. Measurements in the early decades were made by Charles David Keeling and in recent years by NOAA.

legal residents would increase GNP and create millions of jobs. The most directly relevant conclusion of this latter economic study is that a rising carbon fee would cause United States CO_2 emissions to fall at a significant rate.

The actions decribed above (rapid phasedown of CO_2 emissions and increased carbon storage in the soil and biosphere) are minimally needed to restore Earth's energy balance, preserve the planet's climate system, and avert irretrievable damage to human and natural systems – including agriculture, ocean fisheries, coastlines, and fresh water supply – on which human civilization depends. However, if rapid emissions reductions are delayed until 2030, for instance, then the global temperature will remain more than 1°C higher than preindustrial levels for about 400 years. Were the emissions cessation only to commence after 40 years, then the atmosphere would not return to 350 ppm CO_2 for nearly 1000 years at the earliest – and due to feedbacks described below, it is probable that returning to 350 ppm within that timeframe would become impossible. Overshooting the safe level of atmospheric CO_2 and the safe range of global ambient temperature for anything approaching these periods will consign Plaintiffs and succeeding generations to a vastly different, less hospitable Earth, including conditions in the United States.

8.2 Danger Grows for Young People

Global emission reductions did not begin in 2013. Dangers for young people continued to grow. Atmospheric CO_2 continued to grow. **Figure 5** is an update of the famous "Keeling curve," the amount of atmospheric CO_2 measured in pristine Pacific Ocean air at Mauna Loa, Hawaii. Not only is atmospheric CO_2 continuing to increase, it's annual rate of growth, which averaged less than 1 ppm per year when Keeling began his measurements in the late 1950s, now averages more than 2 ppm per year (**Figure 6**). **Exhibit S** extends the Keeling curve back to 1870 with the help of a curve created by G.S. Callendar in 1957.[6]

[6] G.S. Callendar, *On the Amount of Carbon Dioxide in the Atmosphere*, Tellus X (1958) available at http://www.rescuethatfrog.com/wp-content/uploads/2017/01/Callendar-1958.pdf

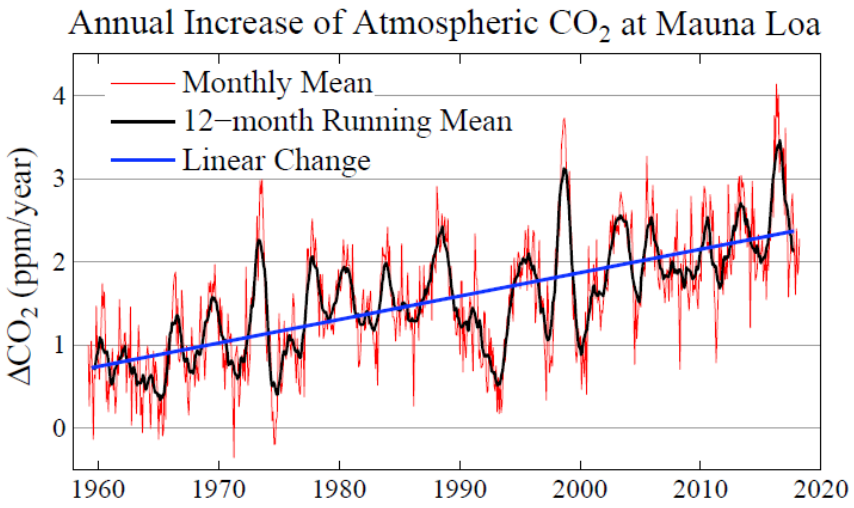

Fig. 6. Annual increase of monthly mean atmospheric CO_2 at Mauna Loa. CO_2 data obtained from P. Tans (www.esrl.noaa.gov/gmd/ccgg/trends) and R. Keeling (www.scrippsco2.ucsd.edu/).

Current high levels of long-lived atmospheric GHGs CO_2, CH_4, and N_2O will have consequences for young people and future generations. Well-understood and confirmed theory, climate models, and empirical data all concur that these GHG levels will cause substantial and highly dangerous global warming for humans and many other species if they are left in place for long.

Paleoclimate data for the past 140,000 years (**Fig. 7**) helps provide some perspective on what can be expected. **Figure 7** here is Fig. 27 from the paper "Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2°C global warming could be dangerous" (Hansen et al., 2016). This figure is a bit technical for the layperson. Here I briefly note key take-away points:

The period covered, from 140 ky ago (1 ky = 1000 years) to the present, includes two interglacial periods: the Eemian, from about 130 ky ago to 116 ky ago, and the Holocene, from about 11,700 years ago to the present. The quantity $\delta^{18}O$ is based on measurements of an oxygen isotope in ice cores from the Greenland (**Fig. 7b**) and Antarctic (**Fig. 7c**) ice sheets and provides a proxy measure of temperature change in the past. The amplitude (or maximum extent) of the glacial-to-interglacial temperature change, say between the depths of the ice age 20 ky ago and the mean Holocene temperature is around 10°C on both of these polar ice sheets (green and blue curves in 5b and 5c), but only about half that amount on global average.

Greenhouse gas amounts are shown in **Fig. 7c** for CO_2 and in **Fig. 7d** for CH_4 and N_2O. Sea level is shown in **Fig. 7f**. Much of this long-term climate change is spurred by insolation changes (changes in the amount of solar radiation reaching Earth's atmosphere) (**Fig. 7a**) associated with changes of Earth's orbit about the Sun and changes of the tilt of Earth's spin axis. However, the climate forcings that maintain the global temperature are changes of the GHGs, which yield a glacial-interglacial climate forcing of about 3 W/m^2 (**Fig. 7e**), and changes in the size of ice sheets. The size of ice sheets and the negative forcing that they cause by reflecting sunlight can be inferred from sea level (**Fig. 7f**). The size of ice sheets, and thus sea level, change almost synchronously with global temperature, but high resolution studies indicate

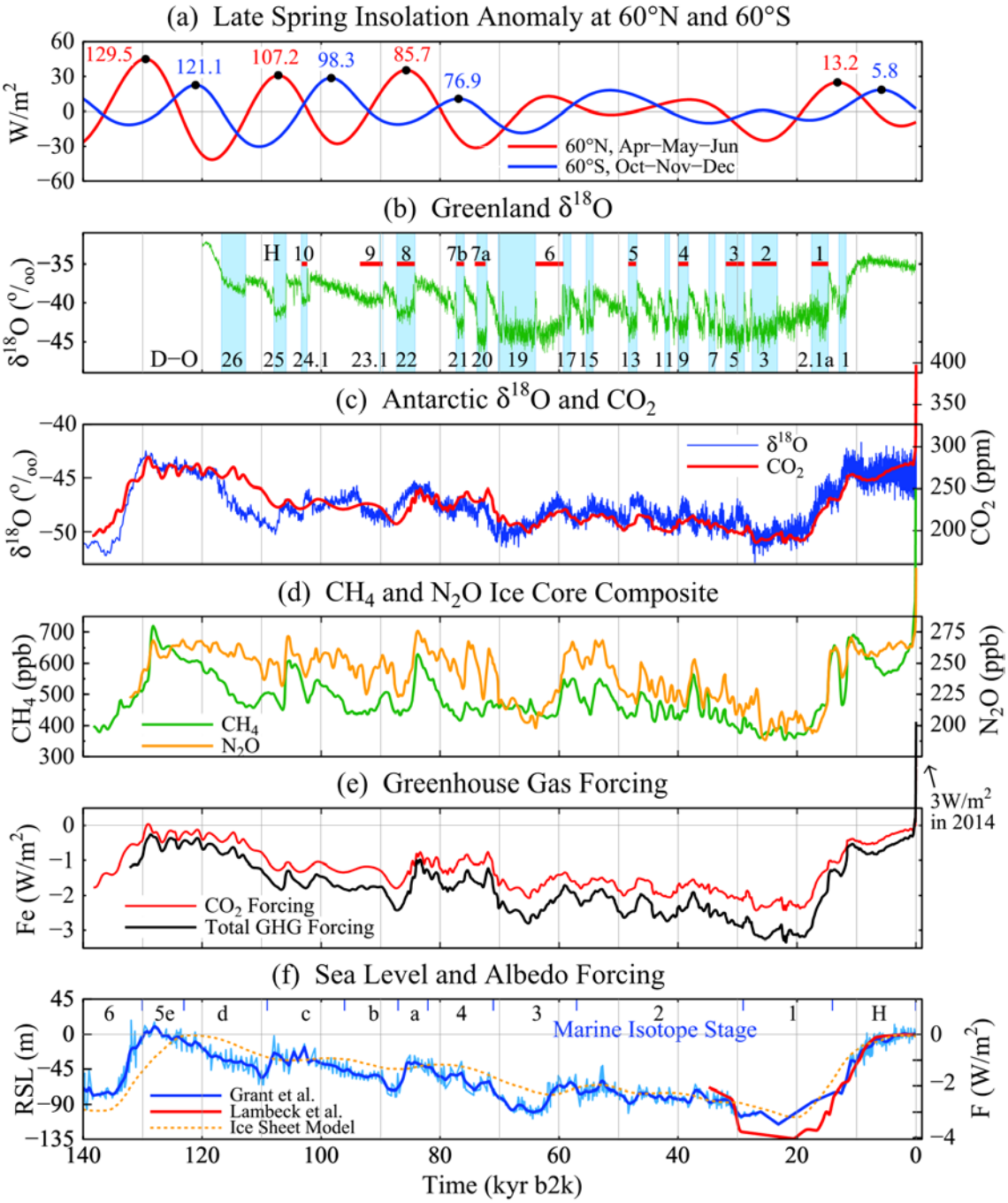

Fig. 7. (a) Late spring insolation anomalies relative to the mean for the past million years, (b) $\delta^{18}O_{ice}$ of composite Greenland ice cores (Rassmussen et al., 2014) with Heinrich events of Guillevic et al. (2014), (c, d) $\delta^{18}O_{ice}$ of EDML Antarctic ice core (Ruth et al., 2007), multi-ice core CO_2, CH_4, and N_2O based on spline fit with 1000-year cut-off (Schilt et al., 2010), scales are such that CO_2 and $\delta^{18}O$ means coincide and standard deviations have the same magnitude, (e) GHG forcings from equations in Table 1 of Hansen et al. (2000), but with the CO_2, CH_4, and N_2O forcings multiplied by factors 1.024, 1.60, and 1.074, to account for each forcing's "efficacy" (Hansen et al., 2005a), with CH_4 including factor 1.4 to account for indirect effect on ozone and stratospheric water vapor, (f) sea level data from Grant et al. (2012) and Lambeck et al. (2014) and ice sheet model results from de Boer et al. (2010). Marine isotope stage boundaries from Lisiecki and Raymo (2005). (b-e) are on AICC2012 time scale (Bazin et al., 2013).

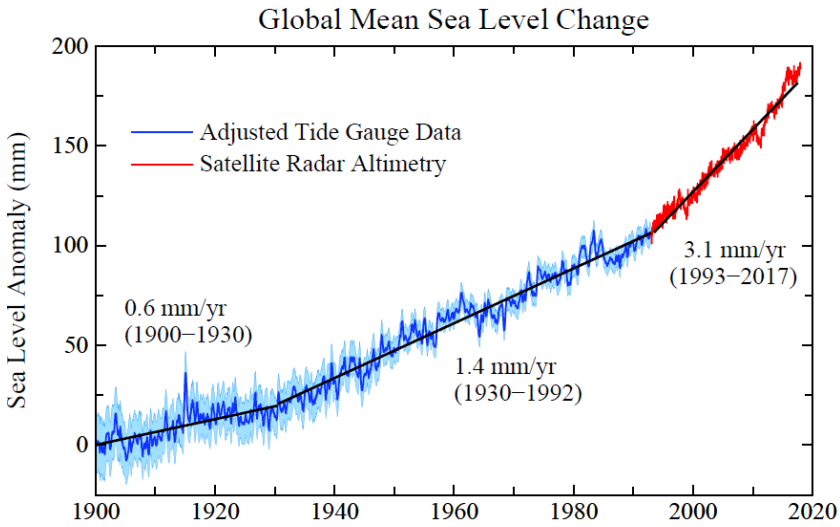

Fig. 8. Sea level change (Hansen et al., 2016) based on satellite altimetry (Cazenave and Le Cozannet https://www.aviso.altimetry.fr/en/data/products/ocean-indicators-products/mean-sea-level/references.html) and tide gauge data (Church and White, 2011) with the latter change rate multiplied by 0.78, so as to yield a mean 1901-1990 change rate 1.2 mm/year (Hay et al., 2015).

that the sea level change lags (follows) the temperature change by 1-4 centuries (Grant et al., 2012). The relationship of gas amounts and temperature can be complex because changes of GHG amounts are induced by climate change, so temperature change sometimes precedes gas changes. However, global temperature responds to the planetary energy imbalance induced by change of GHG amount. Thus, the GHGs control global temperature, and the temperature controls ice sheet size with ice sheet size and sea level lagging 1-4 centuries after temperature change in the paleoclimate record.

CO_2 accounts for about 80 percent of the GHG climate forcing in the paleo climate changes. Indeed, CO_2 is the control knob that tightly controls global temperature as illustrated in Fig. 28 of Hansen et al. (2016) and discussed there and by Lacis et al. (2013).

The right-hand edge of **Fig. 7** shows the CO_2, CH_4, N_2O, and the GHG climate forcing shooting off the scale of the chart, unlike anything we have seen in the paleo record. Temperature change has not yet caught up to the forcing. Earth has not nearly reached its full response to the GHG changes that humans have made. The most rapid response (the fast-feedback response) is only partly complete, as shown by Earth's continuing energy imbalance. The slow-feedback response, the shrinking of ice sheets and release of GHGs by the soil, biosphere, and ocean, has barely begun, and could still be short-circuited if GHG amounts are reduced quickly and sufficiently to restore planetary energy imbalance or achieve a slightly negative imbalance. Indeed, such short-circuiting is what young people must require of their elders, if they wish to avoid continued global warming and climate impacts that are dangerously out of their control. To be clear, the effects of the CO_2 forcing humans have injected into the atmosphere and our climate system is far from being fully realized in terms of warming and sea level rise, *yet*. Because of the slow feedback loops of global warming, there is still a brief period of time today through century's end to reduce the concentrations of atmospheric CO_2, and slow and ultimately reverse global warming, if actions are commenced immediately, thereby avoiding the catastrophic and unprecedented warming that would occur in coming centuries.

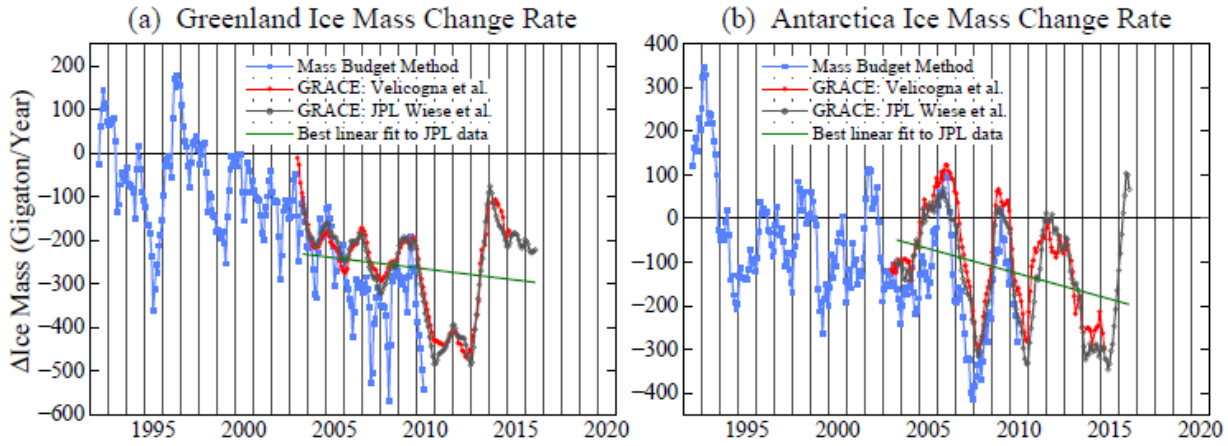

Fig. 9. Greenland and Antarctic ice mass change. GRACE data is extension of Velicogna et al. (2014) gravity data. MBM (mass budget method) data are from Rignot et al. (2011). Red curves are gravity data for Greenland and Antarctica only. This is an update of Fig. 30 of Hansen et al. (2016).

Sea level was reasonably stable for the past several thousand years, prior to the industrial era. Preindustrial sea level changes were less than one meter per millennium, which is less than 10 cm (4 inches) in a century. Even with satellite measurements today, it is difficult to measure the year-to-year change of global average sea level, but **Fig. 8**, from our "Ice Melt" paper, captures the acceleration of the rate of sea level rise. Recent improved analyses of the satellite data suggest that the rate has accelerated within the satellite era (Chen et al., 2017).

Sea level and temperature are highly correlated in the paleo record: as Earth warms, ice melts. Response of ice sheets to warming on the short term can be complex, as it depends on the local weather during the short summer melt season, which accounts for the change in mass loss rate of Greenland between 2012 and 2013 seen by a gravity-measuring satellite (red curve in **Fig. 9**, based on an update of Velicogna et al., 2014). However, the principal factor causing large sea level rise is expected to be ice dynamics and increased ice mass flux to the ocean. A warming ocean melts buttressing ice shelves, increasing the rate of ice sheet discharge to the ocean.

Antarctic ice sheet mass loss is the potential source of large sea level rise. In our "Ice Melt" paper, we present evidence, from modern observations, modeling, and paleoclimate analyses, that the Atlantic Meridional Overturning Circulation (AMOC) is slowing as a result of freshening of the ocean mixed layer in the North Atlantic. Resulting reduced northward heat transport in the ocean will tend to warm the Southern Ocean, increasing the threat of Antarctic ice mass loss. Our paper (Hansen et al., 2016) concludes that continued high fossil fuel emissions this century would produce nonlinearly growing sea level rise reaching multi-meter levels within a time scale of 50-150 years.

The climate system is out of equilibrium. In such a system, in which the ocean and ice sheets have great inertia but are beginning to change, the existence of amplifying feedbacks presents a situation of great concern. There is a real, imminent danger that we are handing young people and future generations a climate system that is practically out of their control.

To further illustrate the danger of a 2°C target, 2°C global warming implies eventual sea level rise of at least 6 meters (20 feet), in accord with recent expert assessment (Dutton et al., 2015).

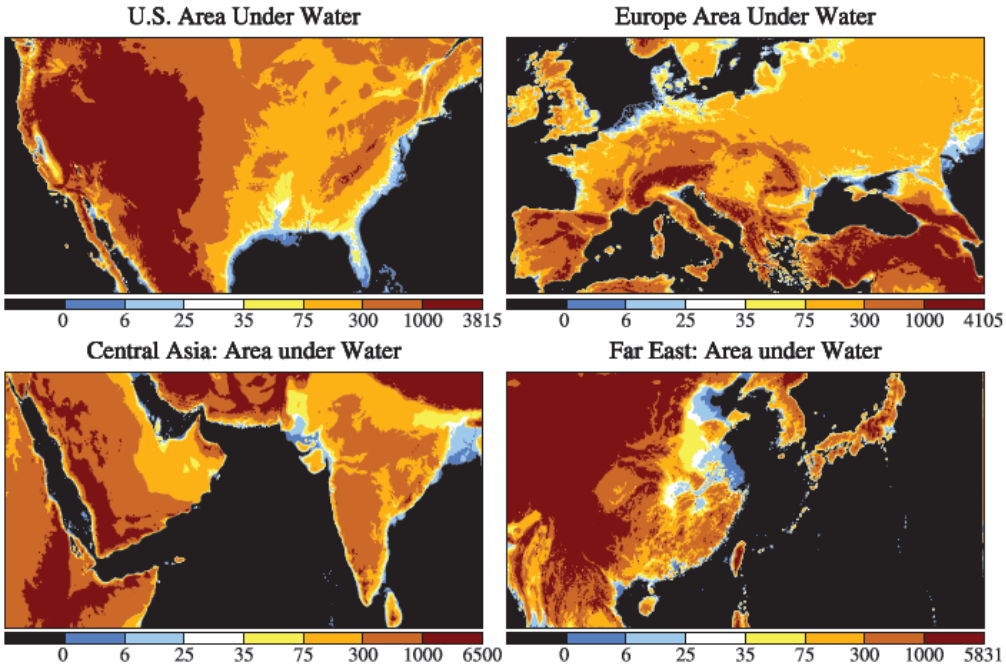

Fig. 10. Areas (light and dark blue) that nominally would be under water for 6 and 25 m sea level rise.

However, scenarios with 2°C warming based on assessments that include only fast feedbacks (as in most studies) imply eventual warming of 3-4°C from the added effects of slow feedbacks. That would make Earth at least as warm as in the Pliocene, suggesting a sea level rise of 15-25 m. **Figure 10** shows areas that would be under water for 6 and 25 m sea level rises. These areas include a majority of the world's largest cities and a total population of hundreds of millions of people (see higher resolution maps for areas affecting individual Plaintiffs in **Exhibits E-K**). Based upon all of this evidence, it is my expert opinion that it is imperative that we stabilize global temperatures at cooler temperatures than we have today and only allow for an overshoot above 1°C for a very short period of time, consistent with our 350 ppm prescription.

8.3 Young People's Burden: Requirement of Negative CO_2 Emissions

Continued actions by these Federal Defendants to perpetuate carbon pollution and not take immediate action to restore our climate system is endangering and limiting the prospects for young people. While our 2013 PLoS ONE paper concluded that the combination of rapid emissions reduction and storage of carbon in the soil and biosphere via reforestation and improved forestry and agricultural practices could keep global temperature close to the Holocene range, continued high emissions and continued global warming are altering that picture. Thus, the levels of required emissions reductions have changed since this case was first filed in 2015, and as stated in the First Amended Complaint.

Global temperature relative to preindustrial time now exceeds 1°C (**Fig. 11**), and fossil fuel emissions continued to increase after 2013, rather than decline. Global temperature is well above the range that has occurred in the Holocene, the last 11,700 years (**Fig. 12**). Note that the 1880-1920 mean temperature serves as our best estimate of the preindustrial level, because the small warming effect of human-made GHGs that had been added by 1880-1920 was approximately offset by greater than average volcanic activity in 1880-1920 (Hansen et al., 2017).

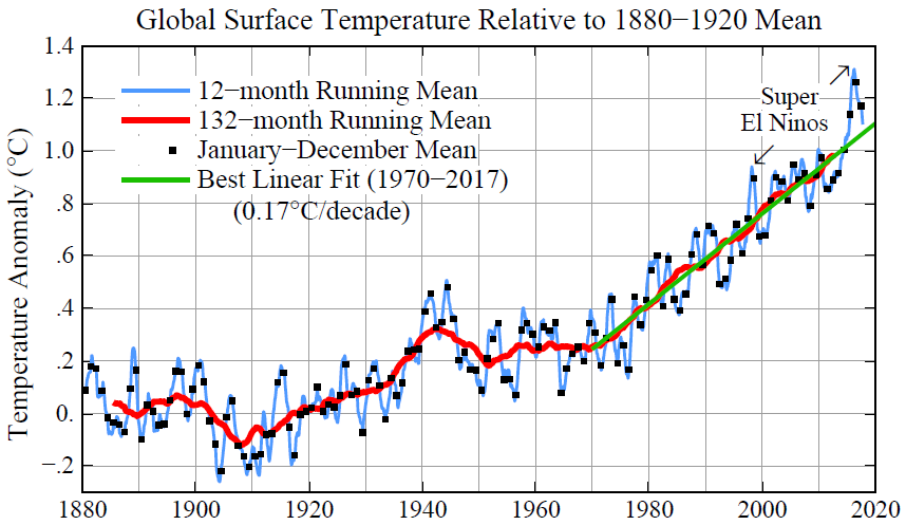

Fig. 11. Global surface temperature relative to 1880-1920, an update of Fig. 2 of Hansen et al. (2017) with the data here extending through June 2017. Black squares are calendar year (Jan-Dec) means.

In the "Young People's Burden" (Hansen et al., 2017) it is further shown that the rapid warming of the past four decades has raised global temperature to a level matching best estimates for the level of warmth in the Eemian period. The Eemian period, the most recent interglacial period prior to the Holocene, lasted from about 130,000 to 116,000 years before present. Global temperature in the Eemian, at about +1°C relative to 1880-1920, was moderately warmer than the Holocene and sea level reached heights as great as 6-9 meters (20-30 feet) above present.

During the past several thousand years during which civilization evolved, cities were built along coastlines at or just above sea level with enormous investment. This has been possible because of stable sea level. Similarly, agricultural regions and other settlements relate to relatively stable Holocene climate patterns. Our coastal cities, agricultural food production on which we depend, and other environment-dependent livelihoods are placed at risk if we allow warming to continue. Because of the inertia of ocean temperature, the long time required to cool once it has warmed, we stand to lock in highly undesirable consequences for young people and future generations if we let warming reach the extraordinary level +2°C, which would exceed Eemian warmth.

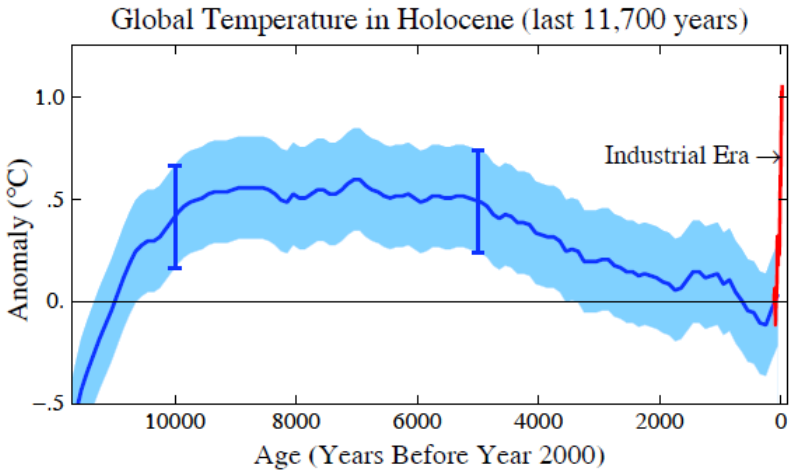

Fig. 12. Estimated centennially-smoothed global-mean Holocene temperature (Marcott et al., 2013) and 11-year mean of modern data (**Fig. 6**), as anomalies relative to 1880-1920 (Hansen et al., 2017).

It is the decades-long research culminating in the "Young People's Burden" paper that leads me to my expert opinion: **we must strive this century to keep global warming from exceeding about 1°C relative to the pre-industrial level. This is fully consistent with our prior conclusion that we must aim to reduce CO_2 to less than 350 ppm.** These conclusions were developed and reached by a cadre of some of the best scientists in the world in relevant disciplines. The appropriate limits for global temperature and atmospheric CO_2 may indeed be lower, but they certainly are not higher. A scientifically-defensible target to aim for this century should be no higher than CO_2 of 350 ppm and 1°C of warming relative to the pre-industrial level.

Achieving those levels now requires "negative emissions," i.e., extraction of CO_2 from the air. If phasedown of fossil fuel emissions begins soon, most, if not all, of this extraction can still be achieved via improved agricultural and forestry practices, including reforestation and steps to improve soil fertility and increase its carbon content. In that case, the magnitude and duration of global temperature excursion above the natural range of the current interglacial (Holocene) could be minimized. In contrast, continued high fossil fuel emissions would place a burden on young people to undertake massive technological CO_2 extraction if they are to limit climate change and its consequences. Estimated costs of such extraction are in the range of tens to hundreds of trillions of U.S. dollars this century, which raises severe questions about their feasibility. Continued high fossil fuel emissions unarguably sentences young people to a massive, implausible cleanup or growing deleterious climate impacts or both.

Figure 13 (from Hansen et al. 2017) illustrates the different emissions trajectories including the dangerous emissions scenarios evaluated by the IPCC and a trajectory of returning to 350 ppm by the end of the century (Hansen, et al. 2017). If emissions were reduced 6% per year beginning in 2013, 350 ppm in 2100 could be achieved with CO_2 sequestration/extraction of 100 GtC. Because of the failure to initiate reduced emissions, the 6% scenario in **Fig. 13** requires that the extraction of CO_2 be increased from 100 GtC (PgC) to 153 GtC (PgC).

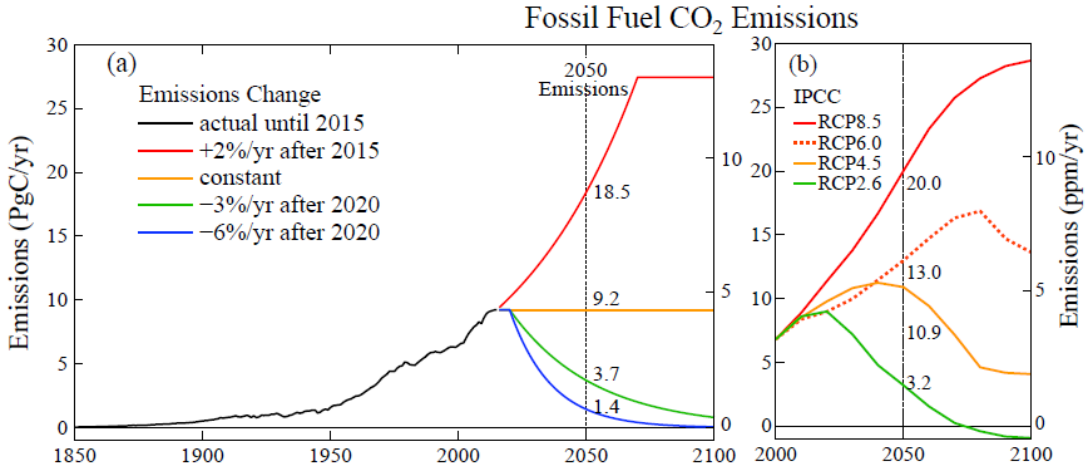

Fig. 13. Fossil fuel emissions scenarios. **(a)** Scenarios with simple specified rates of emission increase or decrease. **(b)** IPCC (2013) RCP scenarios. Note: 1 ppm atmospheric CO_2 is ~ 2.12 GtC.

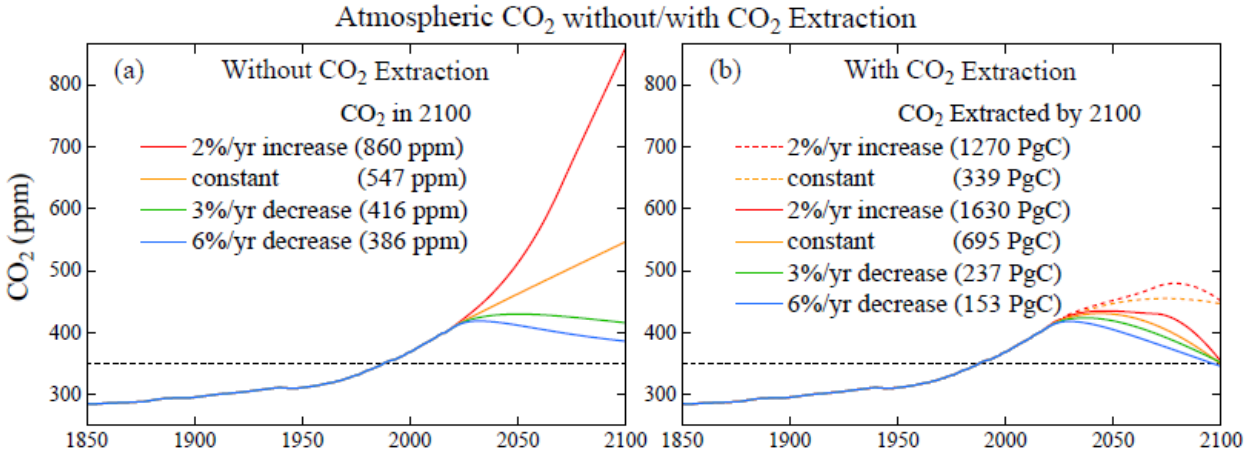

Fig. 14. Atmospheric CO_2 for Fig. 13a emission scenarios. **(a)** Atmospheric CO_2 including effect of CO_2 extraction that increases linearly after 2020 (after 2015 in +2% yr^{-1} case).

Finally, I note that my analysis is based on real-world data for temperature, planetary energy balance, and GHG changes. As such, it differs from the inaccurate (and congratulatory) perception of progress toward stabilizing climate emanating from some politicians. The hard reality of the physics emerges from the continually increasing global surface temperature (**Fig. 11**), the large planetary energy imbalance that guarantees additional warming (see Fig. 5 of Hansen et al., 2017), and from **Fig. 15**. **Figure 15** shows that the GHG climate forcing is not only continuing to grow, its annual growth rate is accelerating!

The accelerating growth of the GHG climate forcing is a result of increasing growth rates of CO_2 and CH_4. (**Fig. 15**, right side) in the atmosphere. Their recent growth may be partly climate feedback, but such feedback is fueled by the initial GHG source, which is primarily fossil fuels.

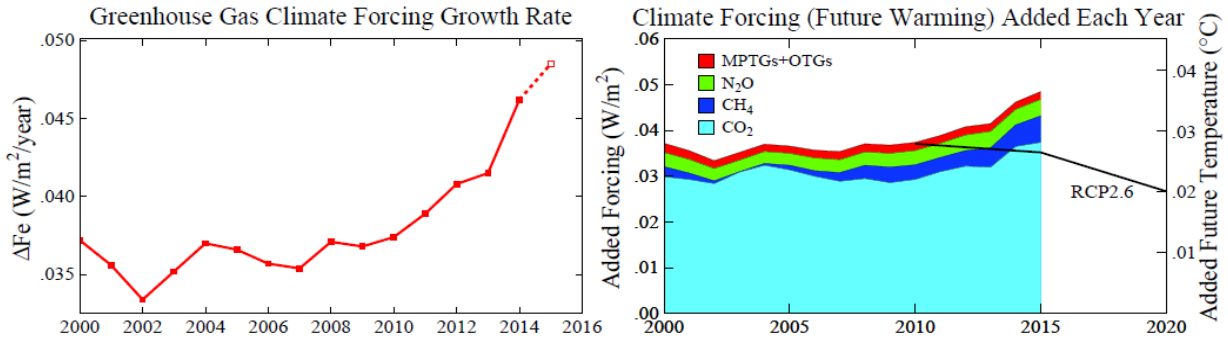

Fig. 15. (a) Recent growth rate of total GHG effective climate forcing; points are 5-year running means, except 2015 point is a 3-year mean. (b) Contribution of individual gases to GHG climate forcing growth rate. RCP2.6 is an IPCC scenario that would keep global warming less than 2°C, but it requires a declining growth rate of climate forcings, which are actually accelerating. The temperature scale on the right is the annual addition to equilibrium warming for climate sensitivity 3°C for doubled CO_2.

9. Summary

I have reviewed, and participated in the creation of, historical progress in the development of our understanding of human-caused climate change. Fossil fuel emissions are responsible for most of the increase in atmospheric CO_2, and increasing CO_2, in turn, is the main cause of Earth's energy imbalance and planetary warming. Accordingly, human decision-making and action are now in control of our planet's thermostat. The Federal Defendants have a heavy hand in how far that control knob is turned due to their historic and continuing support of fossil fuels and the size of U.S. emissions.

However, our ability to turn back the dial will not long persist. In particular, continued high emissions are now pressing the system towards a point of no return, beyond which consequences will proceed without any realistic opportunity for human control. Dialing back Earth's thermostat and stopping short of calamity requires concerted, thoughtful, and timely action.

I have reviewed, as well, the special responsibility of our federal government in creating our nation's present predicament, in light of the fact that the emissions from fossil fuel consumption that the Federal Defendants have authorized, permitted, and subsidized exceed, by far, those of any other nation. The inference that our nation bears a special responsibility to resolve the crisis is also supported by the fact that we retain the requisite expertise and capacity to do so, and that our young persons and our nation's future generations have nowhere else to turn.

9.1 High-level Government Knowledge

Our federal government has long known the fundamental features of this enveloping climate crisis. Beyond my own public attempts to bring the matter to its attention while a government employee, much of the evidence for that long-held knowledge resides in the federal government's own high-level reports.

Since my time working with the federal government, these reports include a 1977 Council on Environmental Quality study that warned that "[a] possible 2-3 degrees C average temperature increase must be looked upon as a major global environmental threat." [7] Similarly, a 1983 EPA report projected sea level rise between five and seven feet by 2100, with a higher than average rise along Atlantic and Gulf Coast states.[8] Another 1983 EPA report anticipated a "2 degree C (3.6 F) increase in temperature . . . by the middle of the next century and a 5 degree C (9 F) increase by 2100," with such temperature increases "likely to be accompanied by dramatic changes in precipitation and storm patterns" with agricultural conditions "significantly altered, environmental and economic systems potentially disrupted, and political institutions stressed."[9]

A 1985 Department of Energy report, moreover, observed that "[i]f increased concentrations of CO_2 and trace gases raise the global mean surface temperature by 1.5°C or more, the resultant

[7] The 8th Annual Report of the Council on Environmental Quality available, as of July 15, 2017, at https://babel.hathitrust.org/cgi/pt?id=mdp.39015021811750;view=1up;seq=230, p. 190.
[8] Projecting Future Sea Level Rise: Methodology, Estimates to the Year 2100, and Research Needs**,** available, as of July 19, 2017, at http://www.biodiversitylibrary.org/item/86886#page/3/mode/1up.
[9] EPA, Can We Delay a Greenhouse Warming? (1983), available, as of July 19, 2017, at https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=9101HEAX.TXT.

average global climatic conditions will be beyond the range of climates that have existed during the historical past and during recent geological times."[10]

These reports suffice to establish that enough was known even four decades ago for the federal government to have begun to act preventatively to arrest and limit the severity of climate change. This is consistent with my understanding of the federal government's knowledge during the years I worked in the federal government at NASA GISS. As discussed *supra* (Section 3) limitations on allowable fossil fuel use and implications for policy were already clear by at least 1981. The failure of the federal government to act to avert avoidable consequences, and indeed to facilitate and support the increased use of fossil fuels since 1981, will place a disproportionate burden on today's young people and future generations.

9.2 Sea Level Rise and Youth Plaintiffs

Earlier I provided graphics (*supra*, **Figure 10**) of several major land regions – the U.S., Europe, Central Asia, and the Far East – with blue highlighting over current land surfaces that would be submerged in events of truly extreme sea level rise ("SLR"). Specifically, I illustrated areas covered by water for sea level rises of 6 m and 25 m. Eventual SLR of those orders would be expected in response to, respectively, +1°C relative to preindustrial (Eemian level of warmth) and +4°C relative to preindustrial, where +4°C is typical of the magnitude of warming projected by IPCC to occur within a century if business-as-usual fossil fuel emissions continue. As discussed above (Section 8.2), the time scale on which such many-meter SLR can occur remains uncertain and is dependent on the speed at which greenhouse gases continue to increase.

These enormous amounts of sea level rise are possible in light of the forgoing discussion. However, I must note two things: first, the large scale of those graphics may not sufficiently convey the impact of anticipated sea level rise on Plaintiffs in the event of continuing high CO_2 emissions; and second, unacceptable impacts in the United States will be induced by far less extreme sea level rise than 25 m.

Accordingly, in **Exhibits E-R**, including accompanying video animations, I illustrate impacts on several U.S. coastal cities and communities from moderate to high SLR, with attention to locations that may be of particular continuing concern to some Youth Plaintiffs. The maps and animations are based on projections published in 2017 by NOAA, the key science agency within the federal Department of Commerce.[11] For my summary of these, see **Box 1**.

Box 1: Sea Level Rise and Impacts on the Homes of Youth Plaintiffs

NOAA's projections account for, among other things, changes in ocean circulation patterns, changes in Earth's gravitation field and rotation due to melting ice sheets, and ground subsidence

[10] Projecting the climatic effects of increasing carbon dioxide, available, as of July 13, 2017, at http://archives.aaas.org/docs/Projecting_Climate_Effects_Increasing_CO2.pdf.

[11] *See* Global and Regional SLR Scenarios for the U.S. and Data: Global and Regional SLR Scenarios for the U.S., from NOAA Technical Report NOS CO-OPS 083, available as of July 20, 2017, from https://tidesandcurrents.noaa.gov/pub.html.

or uplift. Under certain sea level rise scenarios, this yields higher levels of SLR for nearly every state than NOAA's projected global mean sea level rise.[12]

The maps in **Exhibit E** indicate that the home of one Youth Plaintiff, presently situated at 8.6 meters elevation some 50 miles from the Gulf, may become coastal property – again, in the event that NOAA's extreme, but increasingly plausible, SLR scenario is realized for the year 2100. By 2200, under that scenario, this Plaintiff's home would be submerged. *See* also the animation illustrating impacts to Southern Louisiana at **Exhibit L**.

The maps in **Exhibit F** illustrate that under NOAA's projections, the family home of one of the Youth Plaintiffs in this case, situated at ~ 0.8m elevation in Satellite Beach, FL., may be lapped by the rising sea within several decades, fully inundated by 2100, and potentially overtopped by the year 2200, in the event of continued high emissions. *See* also **Exhibit M** for coastal Florida potential SLR animation. Those rising seas for calm waters do not include the already occurring flooding and from increasingly severe storm surges and hurricanes affecting that Youth Plaintiffs' home.

One Youth Plaintiff has expressed hope that her grandmother's home in Yachats, Oregon, at 8.5 m elevation, will remain safe and available for Plaintiff's own children and grandchildren. I too hope for her that will be true, but NOAA's projections include the possibility that rising seas may lap the family home by the year 2200 (again, in the event of business as usual emissions). *See* impacts to Yachats region at **Exhibits G and N**. For potential sea level projections relevant to another Oregon-based Youth Plaintiff's coastal home, namely in Manzanita, Oregon, *see* **Exhibits K and R**.

The homes of two Youth Plaintiffs living in Seattle, at 76-87 m elevation, may be situated above the reach of projected sea level rise. Still, Puget Sound will be substantially reshaped by eroding coastlines in the event of continued high emissions. *See* impacts to the Puget Sound shoreline at **Exhibits H and O**.

Several Plaintiffs have connections to New York City, as do I. Accordingly, I include, as **Exhibits J and Q**, maps and animation showing the potential impact of SLR on New York City, with the Hudson River overtopping its bank at least to 57th Street and the East River to 42nd Street under NOAA's extreme SLR scenario. Much of Battery Park, Tribeca, Soho, East Village, and the Bronx would be submerged. So too would much of Brooklyn and Jersey City be submerged.

I have no doubt that important and fundamental interests of Youth Plaintiffs may be damaged by sea level rise even when they do not presently live at sea level (or even near a coast). One Youth Plaintiff moved recently with his family inland to higher ground in the face of the rising sea on the north shore of Kauai, Hawaii. However, he continues to be adversely impacted by eroding beaches, dying reefs, sea water intrusion into local freshwater ecosystems, etc. Based on this Plaintiff's declaration, ECF 41-5, "[w]atching the beaches erode away and disappear brings me

[12] Alaska's coastline being the sole exception.

deep emotional pain." We should all feel that pain. *See* **Exhibits I and P** indicating the prospective inundation of parts of Kauai's shoreline.

I conclude from these exhibits and other information that the family homes of several Youth Plaintiffs are directly threatened by projected or potential sea level rise due to global warming. These exhibits do not take into account the increased frequency and depth of flooding, storm surges and critical infrastructure failure that will likely precede the direct inundation of Youth Plaintiffs' homes. I understand, as well, that the fundamental interests of many, probably all, of the other Plaintiffs also are severely jeopardized by the likely inundation of coastal regions of the United States, particularly as we account for the lost functioning of major coastal cities and the ensuing economic and social disruption that may cut this nation to its knees.

9.3 Actions of the Government

This lawsuit seeks to establish that the aggregate actions and decisions not to act by our federal government have caused and exacerbated dangerous climate change in unconstitutional deprivation of Plaintiffs' fundamental rights. The Trump Administration's astounding recent efforts to accelerate fossil fuel CO_2 emissions are pressing the world more rapidly towards the climate precipice. However, in my view, the initial focus of Plaintiffs' First Amended Complaint on the continuous and aggregate nature of the Federal Defendants' acts of endangerment, that is, those across multiple administrations, remains proper – as the actions of the present Federal Defendants build upon earlier acts and acts of omission of the Federal Defendants' predecessors.

Thus, for example, in its final year, the Obama Administration imposed a moratorium on new coal leases on public lands, which is now in the process of being lifted.[13] Yet that long overdue move by the Obama Administration followed its 2011 decision to open up hundreds of millions of tons of coal on public lands to new lease sales.[14] Those sales, moreover, were at prices far below market, continuing an over three decade long practice of federal subsidization to coal titans amounting to, through those sales alone,[15] tens of billions of dollars.[16]

Moreover, the Obama Administration failed to follow up its partial moratorium in any substantial way, ignoring calls to end all public lands coal leasing – including a petition from several climate scientists based on the understanding that "the vast majority of known coal in the United States must stay in the ground . . . to be consistent with national climate objectives, public health, welfare, and biodiversity."[17] The Trump Administration's decision to roll back the 2016 Obama

[13] *In Climate Move, Obama Halts New Coal Mining Leases on Public Lands*, New York Times, Jan. 14, 2016.
[14] *See Feds open 758 million tons of Powder River Basin coal to leasing*, Casper Star-Tribune, Mar. 22, 2011.
[15] That is, not accounting for public health costs and climate change costs imposed on the public from the unrestricted burning of the coal mined pursuant to leases secured at far below market price.
[16] *See Report- Almost $30 billion in revenues lost to taxpayers by "giveaway" of federally owned coal in Powder River Basin*, Institute for Energy Economics and Financial Analysis (June 25, 2012) available, on May 1, 2017, at http://ieefa.org/study-almost-30-billion-in-revenues-lost-to-taxpayers-by-giveaway-of-federally-owned-coal-in-powder-river-basin/.
[17] *Scientists Support Ending Coal Leasing on Public Lands to Protect the Climate, Public*

Administration's moratorium,[18] therefore, constitutes a major step down the same dangerous path trod by the Obama Administration, and other prior administrations, during the lion's share of its time in office. The harms caused to our climate system by the Defendants have long been non-partisan, systemic, and in contravention of its long-standing knowledge of the dangers of carbon pollution.

By deciding to abandon the Obama Administration's Clean Power Plan,[19] the Trump Administration is advancing the interests of the coal industry, a key sector of the fossil fuel industry and part of President Trump's campaign base. But in a similar fashion, by its Clean Power Plan, the Obama Administration sought to favor the natural gas sector – a growing and slightly different portion of the fossil fuel industry – while modestly bending down the curve of total power plant emissions. Critically, the Federal Defendants, through the Clean Power Plan, did not seek to commence a phase out of all fossil fuels, even though the need to achieve that objective was widely understood by the time of that Clean Power Plan's effective date[20] to be necessary to restore a viable climate system.[21] In fact, as discussed above, the need to phase out all fossil fuels was well understood long before the Clean Power Plan was developed.

Accordingly, the decision by the Trump Administration to kill or further weaken the Clean Power Plan builds upon the great deference to the fossil fuel industry that kept the Obama Administration from timely committing itself in the battle for a livable planet, and instead adopting an "all of the above" energy strategy, which largely included fossil fuels.[22]

I do not mean by this discussion to suggest an equivalency between the present administration and its predecessor, either as to climate or anything else. However, President Obama clearly recognized that there is "such a thing as being too late" on climate,[23] yet his actions to avert climate change were minimal and he missed opportunities for fundamental progress (see prior footnote). My central point is that the actions of the Federal Defendants in violation of Plaintiffs' underlying right to a viable climate system have not only just begun. The actions (and

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Health, and Biodiversity, available at https://www.biologicaldiversity.org/programs/public_lands/energy/dirty_energy_development/coal/pdfs/16_7_26_Scientist_sign-on_letter_Coal_PEIS.pdf. I was a signatory on this letter.

[18] Executive Order 3348, March 29, 2017, available as of July 1, 2017 at https://www.doi.gov/sites/doi.gov/files/uploads/so_3348_coal_moratorium.pdf.

[19] *See* Executive Order on Promoting Energy Independence and Economic Growth, March 28, 2017, available on June 15, 2017 at https://www.whitehouse.gov/the-press-office/2017/03/28/presidential-executive-order-promoting-energy-independence-and-economi-1.

[20] Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units; Final Rule (Oct. 23, 2015) available at https://www.gpo.gov/fdsys/pkg/FR-2015-10-23/pdf/2015-22842.pdf.

[21] Indeed, the government admits in its answer that the Plan would likely lead to an increase in the use of natural gas for electricity production, and that it did not directly address the extraction, production, and exportation of fossil fuels. ECF 98 at ¶127.

[22] *See also* an account by the Sierra Club's former chief climate counsel, David Bookbinder, *Obama had a chance to really fight climate change. He blew it.* Vox (April 29, 2017) available at https://www.vox.com/the-big-idea/2017/4/28/15472508/obama-climate-change-legacy-overrated-clean-power. *See also* my opinion piece of May 12, 2012, *Game Over for the Climate*, New York Times, available at http://www.nytimes.com/2012/05/10/opinion/game-over-for-the-climate.html.

[23] Obama in Alaska: 'There is such a thing as being too late' on climate change, Chicago Tribune (Sept. 1, 2015) available at http://www.chicagotribune.com/news/nationworld/ct-obama-alaska-20150831-story.html.

inactions) of the Obama Administration in the face of climate science show an intentional disregard for the dangers they created and exacerbated for these Youth Plaintiffs.

9.4 Well-Formed Government Admissions

By their Answer in this case, the Federal Defendants appear to me to have demonstrated a good grasp of the critical features of our present predicament. Thus:

- With respect to CO_2 emissions: the Federal Defendants admit CO_2 emissions are altering the atmospheric composition, Fed. Ans. ECF 98 ¶ 206, and driving it to > 400 ppm for the first time in millions of years, *Id*. at ¶ 208. The Federal Defendants admit that CO_2 emissions can persist in the atmosphere for at least a millennium, *Id*. at ¶206, and will continue to alter the climate for thousands of years. *Id.* The Federal Defendants also admit that other important GHGs, including methane and nitrous oxide, "are at unprecedentedly high levels compared to the past 800,000 years of historical data. *Id*. at ¶5.
- With respect to emissions-induced global warming: the Federal Defendants admit human activity leading to elevated GHG concentrations is likely "the dominant cause of observed warming since the mid-1990s," *Id*. at ¶217; the planet has warmed ~ 0.9°C above pre-industrial temperatures, *Id*. at ¶210, a function of the greenhouse effect, *Id*. at ¶205, and consequential present energy imbalance, *Id*. at ¶202; and, depending on future emissions, global temperatures are projected to increase by 2.5 to 11°F by 2100, with "more warming [] expected on land and at higher latitudes." *Id*. at ¶245.
- With respect to fossil fuels: the Federal Defendants admit the extraction, development and consumption (burning) of fossil fuel is the principle activity by which humans are driving up atmospheric GHG concentrations, including CO_2, *Id*. at ¶7, with the U.S. being responsible for one quarter of cumulative global CO_2 missions. *Id*.
- With respect to the U.S. role: the Federal Defendants admit that they permit, authorize, and subsidize fossil fuel extraction development, consumption, and exportation, *Id*. at ¶7, and that these activities produce CO_2 emissions that, in turn, increase atmospheric CO_2 concentrations, *Id*.; that many activities resulting in CO_2 emissions are undertaken on public lands pursuant to federal permits, *Id*. at ¶112; and that fossil fuel combustion accounting for greater than a third of all national CO_2 emissions derive from the electricity sector whose emission standards have been set by the federal government, *Id*. at ¶125.
- With respect to the ensuing threat: the Federal Defendants admit that current and projected GHG concentrations, driven higher by human activity, "threaten the public health and welfare of current and future generations, and this threat will mount over time as GHGs continue to accumulated in the atmosphere." *Id*. at ¶213; that elevated atmospheric CO_2 has caused ocean acidity to increase at a rate 50 times faster than during the last 100,000 years, *Id*. at ¶231; and that the oceans likely have not experienced this rate of pH change for 100 million years. *Id*. at ¶232. The Federal Defendants have also admitted that elevated atmospheric CO_2 has caused ocean warming and sea level rise, and that sea levels will rise further depending on future emissions, *Id*. at ¶214, 215, presently resulting in increased erosion, *Id*. at ¶243, loss of wetlands, *Id*. at ¶219, inundation of

low-lying lands and beaches and increased salinity of near-coastal estuaries and aquifers, *Id.*, and increased flooding in many communities. *Id*. at ¶218.

- With respect to action required to preserve or restore a viable climate system: the Federal Defendants admit that "stabilizing atmospheric CO_2 concentrations will require deep reductions in CO_2 emissions, *Id*. at ¶208; that "current action by the United States will not achieve global atmospheric CO_2 levels of 350 ppm by the end of the century, *Id*. at ¶261; and that the Clean Power Plan is not intended to preserve a viable climate system nor is it "designed to provide a complete response to all climate change." *Id*. at ¶127.

Viewed in their entirety this set of admissions, it seems to me, quite clearly evince our government's knowing endangerment of Plaintiffs.

9.5 Urgency of Action: No Time for Further Delay

The teams of experts producing "Dangerous Climate Change" (Hansen et al., 2013b) and "Young People's Burden" (Hansen et al., 2017) prescribed fossil fuel emission pathways that would restore Earth's energy balance within a few decades, allowing Earth's surface later in the century to begin to cool back toward the Holocene temperature range (Fig. 9 in 2013 paper and Fig. 12 in 2017 paper). Such emission and temperature scenarios would allow the regional climate extremes and climate impacts, now beginning to emerge, to peak within several decades and then decline. These scenarios also maximize the likelihood that large sea level rise will be averted.

These scenarios define glide paths of steadily declining fossil fuel emissions, by at least several percent per year. In addition, it is assumed that emission reductions will be accompanied by programs to increase carbon storage in the soil and biosphere, especially in forests. It is estimated that as much as 100 GtC can be extracted from the air via improved agricultural and forestry practices, including reforestation of marginal lands not required for food production. Without this biogenic sequestration, even greater and swifter emission reductions would be necessary in order to maintain the glide path back to 350 ppm by 2100.

The two figures mentioned in the first paragraph of this section (9.5) quantitatively reveal the two crucial requirements on future emissions, if the hopes and rights of young people are to be achieved, i.e., if the human-made assault on their world is to be limited such that human-made global warming peaks in their lifetime, within decades, and begins to decline:

First, the emission reductions must begin promptly. In "Young People's Burden," it is shown that delay of initiation of emission reductions by eight years, from 2013 to 2021, places a burden on young people to find a way to extract an additional 53 GtC from the air or accelerate emission reductions in the short term (Figure 10 of Hansen, et al. 2017). Because of limitations on plausible storage in the soil and biosphere, added extraction above 100 GtC may require "technologic extraction," i.e., carbon capture and storage. Optimistic estimates of the cost of extracting and safely storing 53 GtC are in the range of $8 trillion to $18.5 trillion (Section 9.1 of the "Young People's Burden" paper), although the U.S. National Academy of Sciences estimates

substantially higher costs.[24] The experts writing the "Young People's Burden" paper concluded: "if large fossil fuel emissions are allowed to continue, the scale and cost of technological CO_2 extraction, occurring in conjunction with a deteriorating climate and costly dislocations, may become unmanageable. Simply put, the burden placed on young people and future generations may become too heavy to bear." This burden highlights the need for the maximum rate of emission reductions as technically feasible in the coming decades.

Second, the emission reductions must occur at a significant rate on an annual basis, i.e., leisurely reductions of one or two percent per year will not suffice. This is illustrated by the large difference between 2% per year and 5% per year emissions reduction in Fig. 9b of the paper "Assessing 'Dangerous Climate Change'" (Hansen et al., 2013b). The glide path described in that paper had 6% per year emissions reduction. That glide path was appropriate if emissions reduction began in 2013 and was accompanied by large carbon extraction (~100 GtC) via reforestation of marginal lands and improved forestry and agricultural practices. With a delay of commencement of serious emissions reductions, the same glide path to climate safety will require increasingly costly and problematical technological CO_2 extraction. Under the 350 ppm by 2100 prescription, the rate of annual emissions reduction affects the required amount of CO_2 sequestration/extraction.

The critical point remains that a trajectory to restore Earth's energy balance and keep global temperature close to the Holocene, the climate in which civilization developed and is adjusted to, is possible *if plans to reduce emissions and drawdown excess atmospheric CO_2 are commenced without delay, and then adhered to.* As I have indicated, such action is *minimally* needed to restore earth's energy balance, preserve the planet's climate system, and avert *imminent and irretrievable damage* to human and natural systems – including agriculture, ocean fisheries, stable coastlines, and fresh water supply – on which civilization depends.

In contrast, the Defendants' continued permitting, leasing, and other support for fossil fuel exploitation and expansion projects, combined with the absence of any countervailing, coherent, effective government program to rapidly reduce atmospheric CO_2 to a safe level, will consign succeeding generations to a vastly different, less hospitable planet.

In the context of the present global climate crisis, which United States emissions to date have done so much to engender, the additional emissions stemming from fossil fuel projects going forward *right now* under the Trump administration will work only to further <u>increase</u> the atmospheric concentrations of CO_2. This will tend to further increase Earth's energy imbalance – *thereby driving our planet towards and potentially beyond irretrievable points of no return.*

Such a strong statement requires clarification by specific and general examples. As a specific example, let us consider the ocean temperature and the danger that a warming ocean poses to the stability of ice sheets and thus sea level. Evidence from paleoclimate records, from climate models, and from modern observations implies that the crucial process affecting ice sheet disintegration is a warming ocean, which melts the ice shelves, the tongues of ice extending from

[24] NAS (National Academy of Sciences): Climate Intervention: Carbon Dioxide Removal and Reliable Sequestration, Washington, D.C., 154 pp., https://doi.org/10.17226/18805, 2015.

the ice sheets into the ocean. As the ice shelves disappear, ice streams discharge ice to the ocean more and more rapidly, as described in the vast scientific literature compiled in the paper "Ice Melt, Sea Level Rise and Superstorms" (Hansen et al., 2016). Earth's energy imbalance is causing the ocean to warm, the ice sheets to begin to lose mass, and sea level to begin to rise, with the time scale for major sea level rise still substantially uncertain, and indeed very much dependent upon the magnitude and duration of excessive ocean warmth.

It is well agreed by the scientific community, and understandable to the lay person, that the great thermal inertia of the ocean works both ways. The ocean is slow to warm as we add CO_2 to the air. That warming is expected to continue as long as Earth's energy imbalance is positive, i.e., more energy coming in than going out. Today the imbalance is $+0.75 \pm 0.25$ W/m^2, i.e., that much more energy is coming in than going out, most of the excess energy going into the ocean. Such a global energy imbalance is large. For example, it is equal to the amount of energy released by exploding 500,000 Hiroshima atomic bombs per day every day of the year.

Restoration of planetary energy balance, at today's global temperature, requires reduction of atmospheric CO_2 from its present 405 ppm to about 350 ppm. The precise CO_2 reduction needed to restore energy balance depends also, to a lesser degree, on how other gases such as methane (CH_4) change. Once energy balance is restored, the ocean can begin to cool slightly, if CO_2 or other gases are reduced a bit further. However, because of the ocean's great thermal inertia, any cooling will proceed slowly. Thus, it is very dangerous to let ocean temperature rise substantially, because it could become implausible to prevent large sea level rise.

This specific concern applies more generally. By exacerbating and extending Earth's energy imbalance, government actions jeopardize many signal features of the relatively benign and favorable climate system that, over the last 10,000 years, enabled civilization to develop and nature to thrive, as I have discussed. These features included not only rather stable coastlines, but also moderate weather, fertile soils, and dependable hydrological systems – the natural capital on which the lives of Plaintiffs depend no less than did the lives of their parents and *their* forebears.

As well, present and future government action that exacerbates and extends Earth's energy imbalance risks economic collapse, social disintegration, and the loss of essential natural and human services, as I have discussed. The resulting diminution of Plaintiffs' life prospects – their compromised ability to earn a living, to meet their basic human needs, to safely raise families, to maintain property rights, to practice their religious and spiritual beliefs, and otherwise to lead dignified lives – is a predictable if not intended result of the government action.

In addition, where such government action exacerbates and extends Earth's energy imbalance that, in turn, predictably will lead to the climate change-driven inundation, burning, or other destruction of the value of property in which Plaintiffs hold interests. These will include the homes, farms, and other valuable property that their parents or grandparents own and that Plaintiffs will inherit.

Action by the Defendants that allows the continued increase of atmospheric CO_2 levels, and the consequential long-term impacts on Earth's climate system, will disproportionately impose harsh burdens on Plaintiffs and other children. If fossil fuel emissions are not systematically and rapidly abated, as I have discussed above – including in the materials that I have incorporated by

reference – then Youth and Future Generations Plaintiffs will confront what reasonably only can be described as, at best, an inhospitable future. That future will be marked by rising seas, coastal city functionality loss, mass migrations, resource wars, food shortages, heat waves, mega-storms, soil depletion and desiccation, freshwater shortage, public health system collapse, and the extinction of increasing numbers of species. That is to mention only the start of it. While prior generations and, to a certain extent, some in our present generation have benefitted and, even, been enriched by the exploitation of fossil fuels, our children and their progeny will not similarly benefit. Indeed, the impact on Plaintiffs will be nearly completely to the contrary, as I have discussed.

Closely-related to the above, the Defendants' continued permitting and promotion of the fossil fuel enterprise now impairs and increasingly will dismantle the fundamental natural resources on which Plaintiffs will depend. Again, these are the fundamental resources on which the prior and present generations have relied, and on which Plaintiffs now and in the future must rely. They include the air, freshwater, the oceans and stable shores, the soil and its agronomic capacity, the forests and its wildlife, biodiversity on earth, and the planet's climate system in a form conducive to civilization, humanity, and nature as we know it.

Furthermore, it is clear to me that Plaintiffs' right to a government that retains any significant capacity to address the climate crisis adequately is violated by prior and present government actions that exacerbate and extend our planet's energy imbalance. Such action is irretrievably damaging our planet's favorable climate system. Once begun, for example, collapsing and disintegrating ice sheets will not readily be reformulated – certainly not within a timeframe relevant to present and foreseeable generations. The loss of species too is irretrievable. Many species are adapted to specific climate zones, so those species that have adapted to polar and alpine regions will have no place to run. Present and pending actions by our federal government now must be viewed in the context of a climate crisis that the Defendants to date have done so much to bring about. Imminent action is required to preserve and restore the climate system such as we have known it in order for the planet as we have known it to be able to continue adequately to support the lives and prospects of young people and future generations. But that cannot be done effectively by future governments, and other sovereigns, if the Defendants continue to exacerbate the planet's energy imbalance and press our planet towards irretrievable points from which there can be no practical opportunity to return. In short, the Defendants are actually perpetrating irreparable harm on the young and the unborn.

Simply put: The Defendants' persistent permitting and underwriting of fossil fuel projects serves now to further disrupt the favorable climate system that to date enabled human civilization to develop. In order to preserve a viable climate system, our use of fossil fuels must be phased out as rapidly as is feasible. Only government can ensure this will be done. Instead, these Defendants seek to approve permitting of fossil fuel projects that would slam shut the narrowing window of opportunity to stabilize climate and ensure a hospitable climate and planet for young people and future generations. The Defendants' permitting of additional, new, or renewed fossil fuel projects is entirely antithetical to their fundamental responsibility to our children and their posterity. These actions are happening right now and will continue to happen over coming 6 months as our attorneys prepare for trial. Every month of delay exacerbates this

crisis and further endangers these Plaintiffs and all Future Generations. Their fundamental rights now hang in the balance.

Immediate, effective action to restore Earth's energy balance in time to avert wider disintegration of the major ice sheets would achieve multiple benefits, virtually at the same time. These benefits include slowing and eventually stopping sea level rise, averting further acidification of the oceans and consequential disruption of the marine food chain, slowing and in time stemming the loss of terrestrial species, preserving a viable agricultural system, stemming the growth in wildfires, securing essential water resources – the list goes on.[25]

What must be recognized is that atmospheric CO_2 functions now as the control knob for the planet's climate system. Within the remaining period prior to the full manifestation of slow feedbacks and the crossing of climate points of no return, it remains within the power of the Defendants to dial it back so as to secure a viable future for our children and their progeny. At this late stage an order from this federal court is manifestly necessary to turn this thing around. Further delay is nothing short of catastrophic.

10. Appraisal

My expert opinion and conclusion is that, at this late stage, further delay in the commencement of rigorous, systemic, comprehensive, and sustained action to phase out CO_2 emissions and draw down atmospheric CO_2 risks imminent catastrophe – a conclusion shared by most climate scientists.

The present circumstance appears to me to be far worse than grating. Given all that is known to a reasonable or higher level of scientific certainty; notwithstanding that the Defendants have, at their disposal, the relevant information and expertise as to the dangers and the reasonable alternatives to power our energy system in all sectors; and despite their own clearly-expressed understanding of the problem for half a century and its likely consequences: still, the Defendants proceed to expand fossil fuel extraction, development, exportation, and combustion efforts, and, thus, to lock in more CO_2 and other pollution to the detriment of the security and safety of present and future generations, including the Youth Plaintiffs in this case.

Through their actions and inactions, the Defendants have exposed Plaintiffs to a substantial (and unjustified) risk of serious harm that these Plaintiffs would not have otherwise faced. Even after the knowing exposure to this risk of serious harm, and the alternative courses of action, these Defendants have failed and continue to fail to treat what will, to a reasonable or higher scientific certainty, result in significant injury or unnecessary and unjustifiable infliction of pain. These risks are clear and present and obvious. As a result, in part based on my expert opinion, I must conclude that the deliberate indifference of the Defendants to health and safety rights of Plaintiffs is so egregious as to "shock the conscience."

[25] Such action also should avert the feared shutdown of the Atlantic Meridional Overturning Circulation. *See* James Hansen and Makiko Sato, Predictions Implicit in "Ice Melt" Paper and Global Implications, Sept. 21, 2015, available at http://csas.ei.columbia.edu/2015/09/21/predictions-implicit-in-ice-melt-paper-and-global-implications/.

These Defendants should be shielding these young Plaintiffs from harm. Yet, the Defendants have acted in knowing disregard of the science available to policymakers for decades. This science put them on notice that the ongoing acts and omissions of the Defendants is substantially certain to result in serious harm to these Youth Plaintiffs, including increased risk of imminent injury, potentially life-threatening.

We are now, all of us, witness to this flagrant and sustained assault.

In my expert opinion, based on comprehensive analyses carried out by an international cadre of leaders in the relevant scientific fields, as described in the 2013 PLoS ONE and 2017 Earth Systems Dynamics papers discussed *supra*, there is still time to preserve Plaintiffs' rights.

From my standpoint as a climate scientist, a citizen and as guardian of future generations in this case, it is clear to me that these Youth have been handed an incredible burden no previous generation has ever faced, and as a result they are threatened with irreparable harm not known to humanity.

Although interpretation of the Constitution is a function that I leave to the Court, I would invoke the wisdom of Thomas Jefferson, who was a fellow scientist who kept a weather and climate diary, as well as a statesman and a farmer. On 6 September 1789, concerning the proposed Bill of Rights, Jefferson wrote to James Madison: "The question whether one generation of men has a right to bind another . . . is a question of such consequences as not only to merit decision, but place also among the fundamental principles of every government . . . I set out on this ground, which I suppose to be self-evident, 'that the Earth belongs in usufruct to the living'."

Jefferson, in saying that the present generation can enjoy the fruits of the land but with an obligation to leave Earth in as good condition as when we received it from our parents, was especially concerned about the fertility of the soil – it should be maintained for the next generation, not depleted. Today's youth in America face the threat of a depleted Earth, and more. A reasonably stable seashore, I believe our Nation's Founders would agree, is an asset that should not be stolen from young people and future generations.

These Youth Plaintiffs confront an imminent gathering storm. They have at their command considerable determination, a dog-eared copy of our beleaguered Constitution, and rigorously developed science. This Court can decide if that is enough.

Signed this 13th day of April, 2018 in New York, New York.

James E Hansen

Dr. James E. Hansen

EXPERT REPORT
OF
HOWARD FRUMKIN, MD, MPH, DrPH

Professor of Environmental and Occupational Health Sciences
University of Washington School of Public Health

Kelsey Cascadia Rose Juliana; Xiuhtezcatl Tonatiuh M.,
through his Guardian Tamara Roske-Martinez; et al.,
Plaintiffs,

v.

The United States of America; Donald Trump,
in his official capacity as President of the United States; et al.,
Defendants.

IN THE UNITED STATES DISTRICT COURT
DISTRICT OF OREGON

(Case No.: 6:15-cv-01517-TC)

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TABLE OF ACRONYMS AND ABBREVIATIONS

ACE3: *America's Children and the Environment*, Third Edition
CDC: U.S. Centers for Disease Control and Prevention
CO_2: Carbon dioxide
EPA: U.S. Environmental Protection Agency
GHG: Greenhouse gas
HABs: Harmful algal blooms
IPCC: Intergovernmental Panel on Climate Change
OPOH: Our Planet, Our Health
PAM: Primary amebic meningoencephalitis

INTRODUCTION

I, Howard Frumkin, am a physician and epidemiologist specializing in environmental health. I have been retained by the Plaintiffs to give my expert opinion on the health impacts of climate change, with particular emphasis on those impacts affecting children, and on present and future health impacts that will affect today's young people as they reach adulthood at a time of ongoing climate change.

QUALIFICATIONS

My professional training includes a medical degree from the University of Pennsylvania, masters and doctoral degrees in public health from Harvard University, residency training in Internal Medicine at the University of Pennsylvania and Harvard, and residency training in Environmental and Occupational Medicine at Harvard. I held faculty positions at the University of Pennsylvania School of Medicine (1988-90) and at Emory University's Rollins School of Public Health (1990-2005) and served as the Director of the National Center for Environmental Health and Agency for Toxic Substances and Disease Registry at the U.S. Centers for Disease Control and Prevention (2005-2010) and as Special Assistant to the Director for Climate Change and Health (2010) before joining the faculty at the University of Washington as Dean of Public Health, in 2010. I served as Dean through 2016 and subsequently as Professor in the Department of Environmental and Occupational Health Sciences. Commencing in May 2018, I will be heading the "Our Planet, Our Health" ("OPOH") initiative at the Wellcome Trust. OPOH is one of the world's leading research funding initiatives at the intersection of human health, climate change, urbanization, and food systems--the emerging paradigm known as planetary health. OPOH supports research on six continents, using a wide range of methods and perspectives. OPOH is committed to improving the evidence base in planetary health, to communicating that evidence effectively, and to engaging with governments, civil society, and the private sector to translate evidence into action to meet major environmental and health challenges.

Climate change and its impact on health have been one of my principal academic and scientific interests for over 20 years. I have followed the scientific literature closely during that time, and have published numerous research papers and book chapters (see **Exhibit A**). I have participated in writing and reviewing high-level reports on the health impacts of climate change, including reviewing, evaluating, and summarizing the evidence used in those reports. As a member of the Children's Health Protection Advisory Committee at the U.S. Environmental Protection Agency (EPA), I chaired the Committee's Climate Change working group. While working at the CDC, I initiated and oversaw the formation of that Agency's Climate and Health program, and served as the principal advisor to the Director on health aspects of climate change. I represented the CDC to the U.S. Global Climate Research Program. I served on the Advisory Board of the Yale Climate and Energy Institute, and on the American Association for the Advancement of Science Climate Science Panel. Beginning in May 2018, I will head the "Our Planet, Our Health" initiative at the Wellcome Trust in London, one of the world's largest sources of support for research at the intersection of health and climate change. I have spoken to numerous medical, public health, and other audiences on health aspects of climate change, and have taught this subject to undergraduate and graduate students.

This report contains my opinions, conclusions and the reasons therefore. My current curriculum vitae and a list of my relevant publications, is contained in **Exhibit A** to this expert report. My report contains citations to sources I have used or considered in forming my opinions, listed in **Exhibit B**. I am working pro bono to prepare this expert report in this action.

The opinions expressed in this expert report are my own and are based on the data and facts available to me at the time of writing. All opinions expressed herein are to a reasonable degree of scientific certainty, unless otherwise specifically stated. Should additional relevant or pertinent information become available, I reserve the right to supplement the discussion and findings in this report.

EXECUTIVE SUMMARY

Climate change, due in large part to human activity (principally the combustion of fossil fuels, and to a lesser extent land use changes and the release of climate-active air pollutants), threatens human health and well-being through a variety of pathways. The impacts on people can be divided into several categories: temperature-related effects; the effects of severe weather and disasters; the impact of reduced air quality; aggravation of allergies; increased risk of infectious diseases; nutritional effects; population displacement; civil conflict; and mental health impacts. While these risks, to some extent, will affect everybody, some groups are especially vulnerable, and children comprise one such group. The Plaintiffs in this case exemplify these vulnerabilities. Moreover, today's children will be tomorrow's adults, and will bear the risks that unfold over coming decades as the effects of climate change intensify. Climate change poses serious risks to the health and well-being of the Plaintiffs in this lawsuit.

EXPERT OPINION

Overview

Climate change affects human health through a range of pathways, as shown in **Figure 1**. Some of these are direct, such as the injuries that occur in a climate-related disaster. Some are indirect, such as nutritional challenges that result from climate impacts on crops. Still others are mediated through social processes, such as conflicts. The health effects of climate change have been extensively inventoried and reviewed, by the Intergovernmental Panel on Climate Change (IPCC),[1] by the Federal government,[2,3] in academic journals,[4-6] and in books.[7-9] Children represent a particular risk group, and the impacts of climate change on children have been specifically reviewed as well.[10-13] Below, I summarize the major health impacts of climate change, as recognized by the scientific community.

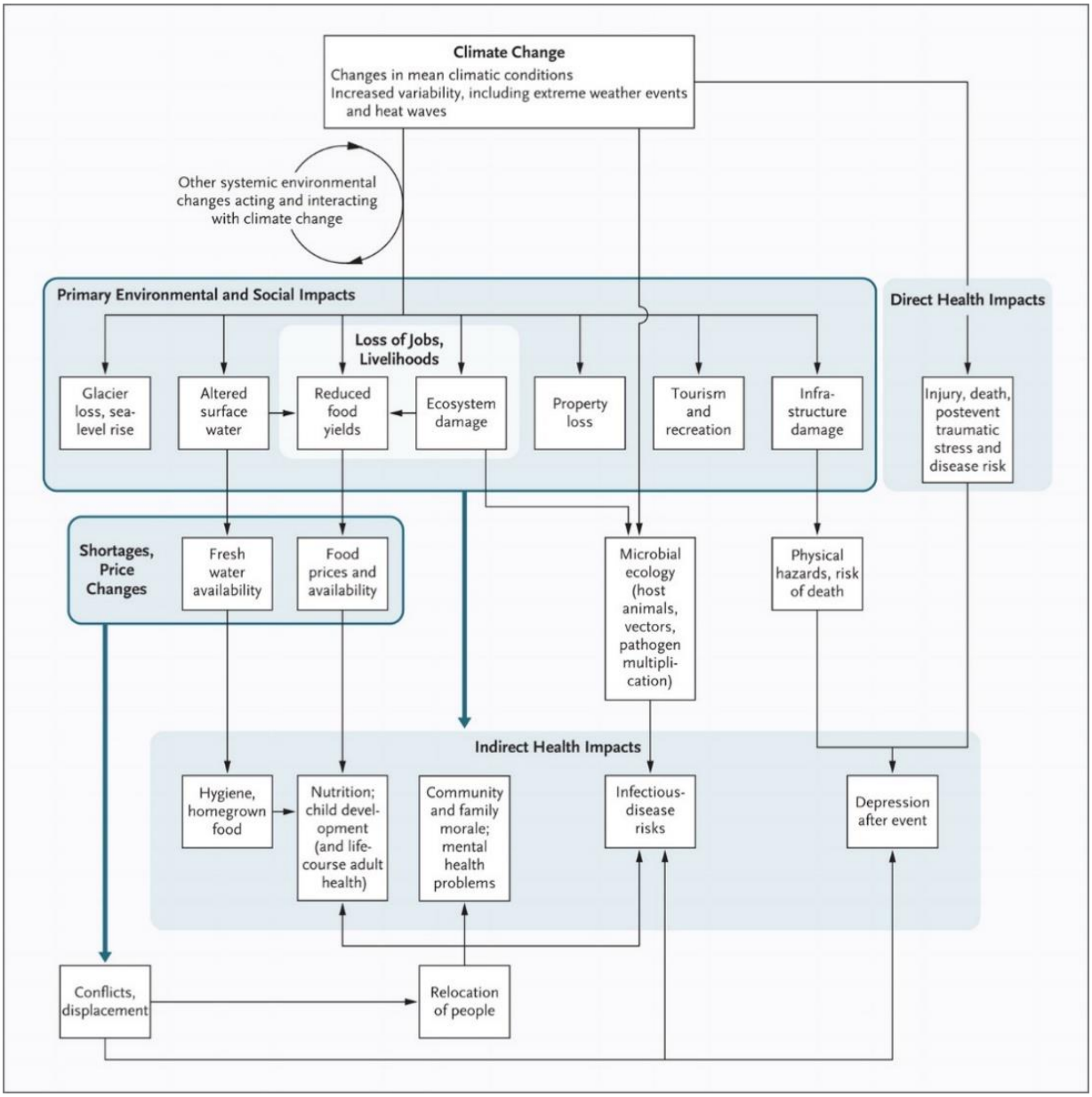

Figure 1: Processes and pathways through which climate change affects human health. Source: [4]

Temperature-related effects

Excessive heat—both during severe heat waves and as a long-term "new normal"—threatens health and well-being in numerous ways. Medical consequences range from relatively minor, self-limited conditions, such as heat rash and cramping, to severe and possibly fatal outcomes, such as heat stroke. More consequentially from a population point of view, mortality rates rise during periods of heat, mostly due to increases in cardiovascular deaths.[14] For example, the 1995 Chicago heat wave caused approximately 700 excess deaths;[15] the 2003 European heat wave had an impact two orders of magnitude higher, at an estimated 70,000 excess deaths;[16] and the 2010 Russian heat wave caused 11,000 excess deaths.[17]

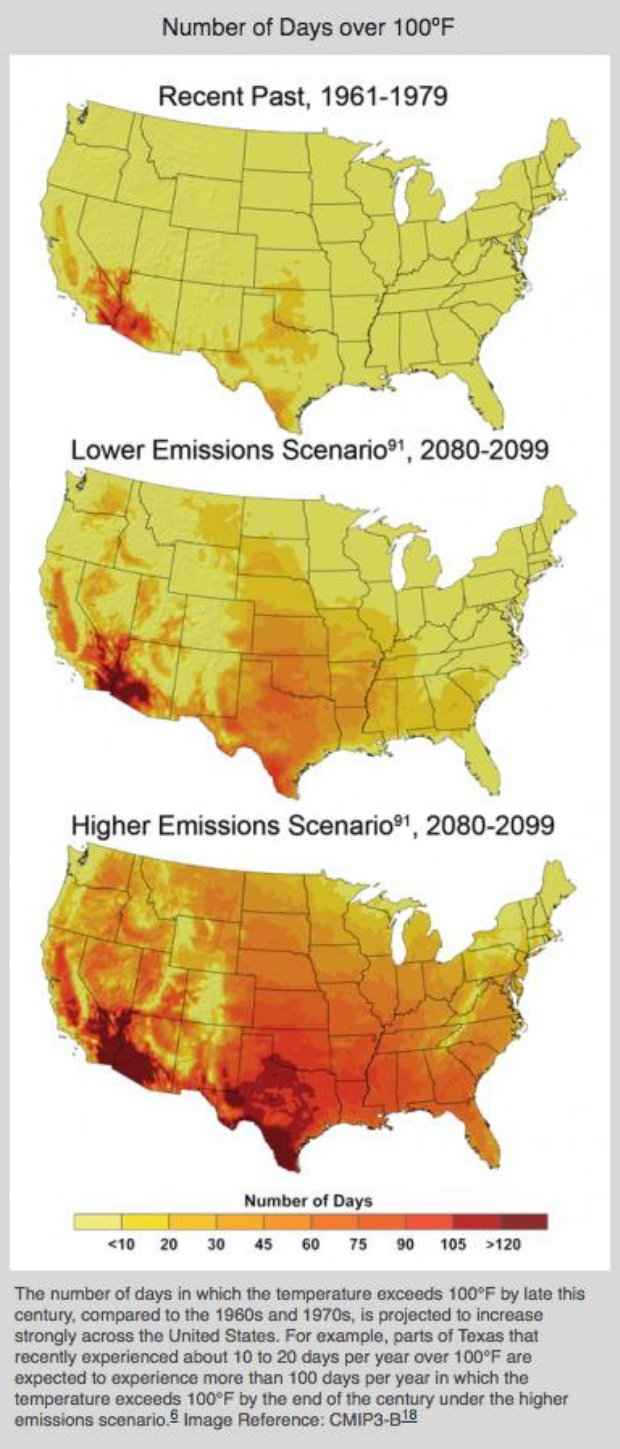

Figure 2. The number of days each year over 100°F later this century. Source: Karl TR, Melillo JM, Peterson TC, eds. *Global Climate Change Impacts in the United States.* Cambridge and New York: Cambridge University Press; 2009.

In addition to these lethal effects, heat is associated with a range of other impacts, from increased risk of kidney stones[18,19] to impaired sleep,[20] from increased violence[21,22] to substantial reductions in work capacity (with serious social and economic consequences).[23,24] Concomitant trends affect the risk posed by heat. For example, urbanization concentrates people in metropolitan areas, where the urban heat island effect amplifies the impact of rising temperatures.[25,26] Similarly, heat not only creates its own risks, but also reduces air quality by driving ozone formation; ozone is a respiratory toxin.[27] Some acclimatization to heat is possible, both physiologically and socially (through such means as air conditioning), but there are limits to adaptability. In coming years, extremely hot days will become more common (**Figure 2**).[28] Warmer weather will reduce the number of cold-related deaths in some areas, but not enough to compensate for projected increases in heat-related deaths.[29] Deprived populations such as the poor, those who are socially isolated, people of color, the very old, people with certain medical conditions, and outdoor workers are at especially high risk from severe heat.[3,30,31] Importantly, so are young people.[32] The risk begins as early as the prenatal period (heat increases the risk of preterm birth[33-35]) and continuing into infancy (a high-risk age group for mortality during heat waves[32]), later childhood (children's visits to physicians and emergency rooms increase disproportionately during heat waves[32,36]), and the teen years (when hot days endanger high school athletes[37]).

Severe weather and disasters

Severe weather events have been rising in frequency in recent decades, and continued increases are predicted.[38,39] For example, a recent analysis considered sea level together with wave, tide, and storm surge models; the authors reported that extreme flooding will become substantially more frequent along the Pacific coast, from California to Washington state, by 2050.[40] Such events are dangerous. Floods, hurricanes, and severe storms can cause traumatic injuries and death at the time of their occurrence. Other health impacts can persist well beyond the acute phase. In the short term, for example, before power is restored, people who utilize propane burners and generators face a risk of carbon monoxide poisoning.[41] Disasters often disrupt medical care, and can destroy clinical facilities, interfering with acute and chronic medical care.[42,43] Following floods, homes can experience extensive mold growth, posing respiratory risks.[44] In contrast to severe storms, droughts unfold more slowly, over months to years, threatening health in a range of ways: infectious disease risks due to reduced water quality and quantity, respiratory risks due to reduced air quality, and mental health risks.[45] In the aftermath of disasters, people's lives may be upended and their livelihoods compromised, and they may be forced to relocate; these outcomes threaten mental health, manifested in elevated rates of anxiety, depression, post-traumatic stress disorder, substance abuse, and domestic violence following disasters.[46] Deprived populations, such as poor and minority communities, and communities located in vulnerable places, are at increased risk from disasters caused or intensified by climate change.[47,48] Again, children face disproportionate risk from extreme events.[49] As noted by the American Academy of Pediatrics, "Extreme weather events place children at risk for injury, loss of or separation from caregivers, exposure to infectious diseases, and a uniquely high risk of mental health consequences, including posttraumatic stress disorder, depression, and adjustment disorder. Disasters can cause irrevocable harm to children through devastation of their homes, schools, and neighborhoods, all of which contribute to their physiologic and cognitive development."[10]

Air quality

Climate and other environmental changes affect the air that people breathe in diverse ways. First, the combustion of fossil fuels—a root cause of climate change—is also a leading source of many air pollutants (https://www.epa.gov/air-emissions-inventories). Air pollutants, including particulate matter, ozone, oxides of sulfur and nitrogen, and others, increase the risk of cardiovascular disease, respiratory disease, cancer, and other illnesses.[50] These impacts are so extensive that they generate billions of dollars in health care costs each year nationally.[51-53]

Climate change affects air quality in at least two other important ways.[54,55] First, warmer temperatures drive the formation of ozone, a respiratory toxin.[54,56] Higher ozone levels are reflected in increases in respiratory symptoms, lost work and school days, hospital and emergency department visits, and premature deaths.

Second, drier, hotter weather and degraded forests (due to such factors as pest infestations) have resulted in more frequent wildfires.[57] Wildfires release large amounts of smoke, a cardiopulmonary risk for those downwind.[58,59] For example, during September 2017 wildfires in

the region caused those Plaintiffs from Washington and Oregon to be exposed to hazardous levels of smoke for several days in a row (**Figure 3**).

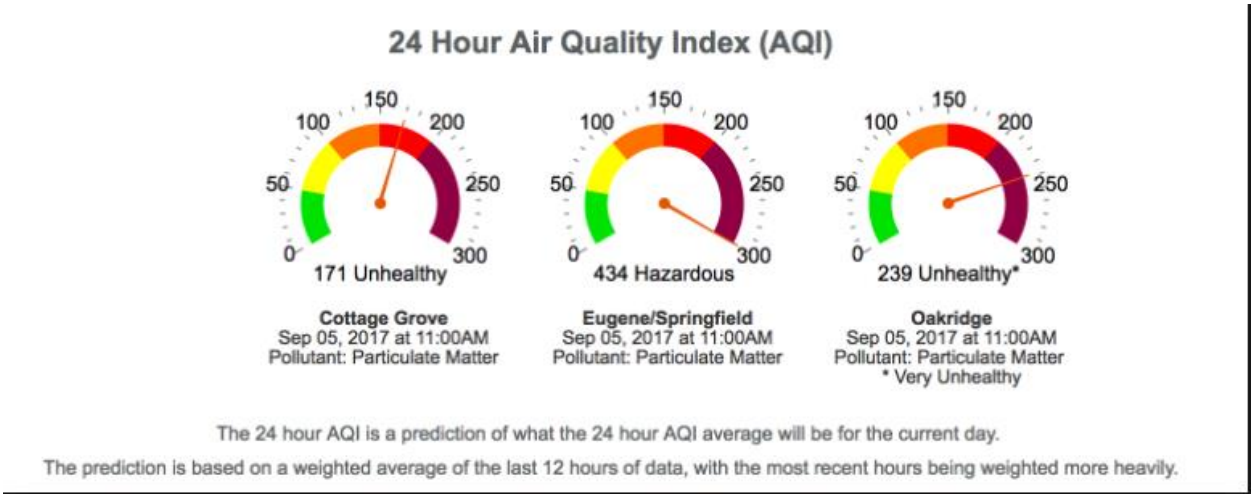

Figure 3: Air quality suffers due to wildfire smoke in Lane County, Oregon. The Air Quality Index for September 5, 2017, as reported by Lane Regional Air Protection Agency.

People with respiratory conditions such as asthma are especially susceptible to the effects of air pollutants.[60] So are children, owing to their narrow airways, their relatively high respiratory rates, and other factors;[61] as a result, worsening climate change, and resulting air quality degradation, are projected to pose a particular risk for children.[62]

Allergies

Climate change can exacerbate allergies in several ways. First, some allergenic plants such as ragweed and some allergenic trees experience faster growth and a prolonged growing season—a trend that has been documented in many parts of the United States.[63,64] Second, these plants can produce more pollen (**Figure 4**). Third, the amount of allergenic proteins contained in pollen can increase.[65,66] The result is increased suffering for people with allergies.[67]

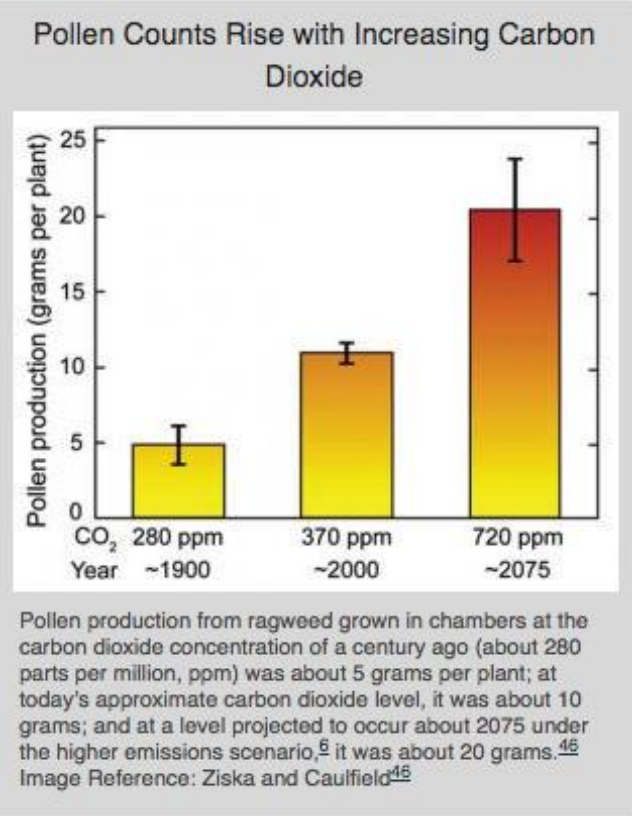

Figure 4. Rising ragweed pollen counts with rising CO_2 levels. Karl TR, Melillo JM, Peterson TC, eds. *Global Climate Change Impacts in the United States*. Cambridge and New York: Cambridge University Press; 2009.

Climate change also is also likely to exacerbate allergy symptoms, as well as asthma, through indirect pathways. For example, climate change worsens air quality—a problem for people with allergies since air pollution potentiates allergic symptoms.[68] Similarly, climate change is associated with more frequent thunderstorms, which are in turn associated with exacerbations of asthma and allergic symptoms.[69-72] As asthma and allergies have become more widespread in recent years, the at-risk population for these impacts has also grown.[73-75] Allergies are highly prevalent among children,[76] and can affect their physical and emotional health by interfering with sleep, play, and school attendance and performance.[77-79]

Harmful algal blooms

Harmful algal blooms (HABs) occur when colonies of algae along seacoasts or in fresh water bodies proliferate, and produce toxic effects on people, pets, aquatic species, and birds. The causes of harmful algal blooms are complex, but growing evidence suggests that climate change contributes to these events.[80-82] Human illnesses from HABs, while not common, can feature severe symptoms ranging from diarrhea to respiratory illness to neurotoxicity, and may even be fatal.[83,84] HABs can harm people in other ways, by limiting recreational opportunities and the ability to eat fish and shellfish. Children are at particular risk from HABs due to their smaller body size, risky behaviors, and developmental stage.[85]

Infectious diseases

Climate change is likely to increase the risk of infectious diseases.[86] Two main categories of disease are especially salient: vector-borne diseases, and water- and foodborne diseases.

Vector-borne diseases are those that are spread by mosquitoes, ticks, and similar organisms.[87] Mosquitoes transmit such diseases as dengue fever,[88] malaria,[89] and West Nile virus;[90] and ticks such diseases as Lyme disease.[91-93] Many features of climate change can promote disease spread: changes in rain patterns that enhance mosquito habitat; changes in temperature that accelerate vector metabolism, breeding, and feeding; changes in vegetation that favor tick proliferation.[94] Some vector-borne diseases, such as Lyme disease, have expanded their geographic range and/or seasonal distribution in recent years (**Figure 5**; www.cdc.gov/lyme/stats/index.html). This trend is expected to continue in coming decades due to ongoing and worsening climate change (**Figure 6**).[91,95]

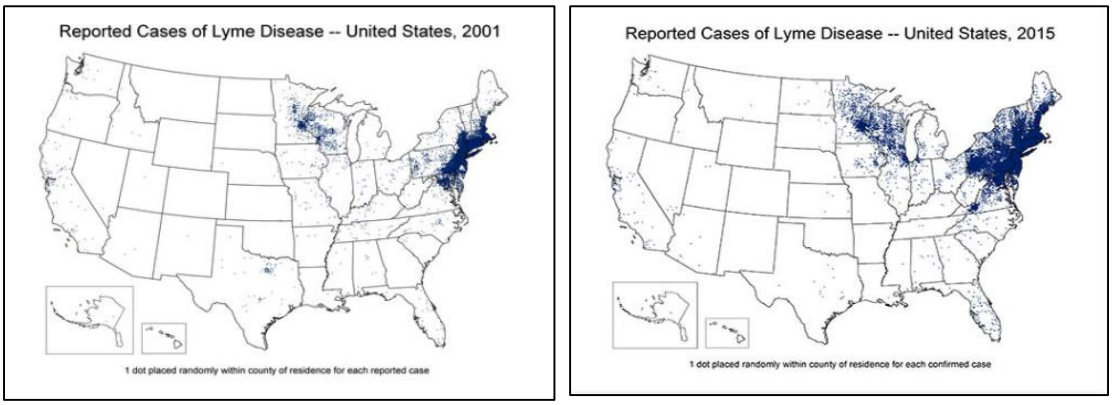

Figure 5: Increase in reported cases of Lyme disease in the US, in 2001 (on left) and 2015 (on right). Source: Centers for Disease Control and Prevention.

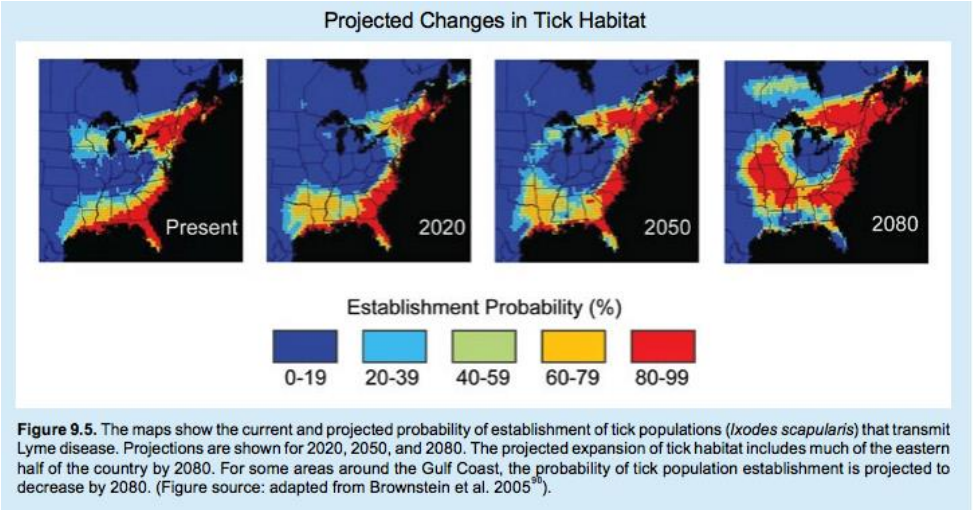

Figure 6: Projected expansion of conditions favorable to ticks that transmit Lyme disease. Source: Melillo JM, Richmond TC, Yohe GW, eds. *Climate Change Impacts in the United States*. U.S. National Climate Assessment. U.S. Global Change Research Program, 2014. https://www.globalchange.gov/browse/multimedia/projected-changes-tick-habitat.

Other vector-borne diseases, such as dengue fever, which were previously rare in the U.S. except in returning travelers, have begun to appear as locally acquired cases in several states during the last decade,[96,97] and the risk of these diseases is expected to grow with advancing climate change.[98] Vector-borne disease spread is complex, and depends on many factors other than climate change, such as land use changes and the use of protective strategies (e.g., window screens, insect repellant). But continued climate change is likely to bring continued increased risk.

Also important are infectious diseases transmitted by water and food, such as cholera,[99] salmonella, and campylobacter.[100] The risk of these conditions may increase due to changes in hydrology, pathogen biology, and other factors. Two cardinal features of climate change are associated with increases in waterborne diarrheal diseases: warm weather[101,102] and severe rainfall events.[103,104] This suggests that continued climate change will increase the risk of waterborne infections. Foodborne diseases and waterborne diseases are closely linked, since food is often contaminated by water, and since the conditions that promote one also promote the other. Accordingly, climate change is expected to increase the risk of foodborne diseases as well.[105]

Evidence links other infectious diseases with climate and/or weather. One example is fungal diseases, because temperature, moisture, and wind conditions affect the growth and dispersal of fungi. Coccidioidomycosis, or "Valley Fever," is a fungal infection found mainly in Arizona and California. The incidence of this disease has risen considerably in recent decades,[106] and it has appeared in previously disease-free locations such as eastern Washington state.[107] There is evidence that changing rainfall patterns have contributed to this increase.[108,109] Another example is *Naegleria fowleri*, an amoeba that causes a devastating brain infection, primary amebic meningoencephalitis (PAM). This disease is acquired by swimming in contaminated water. Because lakes cannot support the *Naegleria* amoeba below a certain temperature, this has been a disease of the southern U.S. However, it recently emerged in Minnesota, where it killed a child. Investigation revealed that lake water where the child had swum and contracted the infection had reached record high temperatures.[110] Such risks—some known, some not yet recognized—will be a feature of continued climate change.

For many infectious diseases, those at greatest risk include the very young, the very old, and people with certain underlying illnesses or who are immunocompromised. Children have immature immune systems, and less resilience than adults to some abnormalities such as dehydration (a result of severe diarrhea).

Nutrition

Climate change threatens agricultural productivity in many parts of the world through complex pathways, including the effects of extreme heat, storms, droughts, and flooding; pests and weeds; and rising ozone levels.[111-113] Compounding these impacts on crops themselves is reduced work capacity among farmers.[24] The quantity of crops produced is not the only concern; quality also suffers. The protein and nutrient content of some grains and legumes, including wheat, rice, corn, and soy, declines with rising atmospheric concentrations of carbon dioxide (CO_2).[114] Fish represent a substantial source of dietary protein for many populations, but global fisheries,

already compromised by overfishing,[115] are threatened by climate change, especially at low to mid-latitudes,[116,117] and aquaculture—potentially an important adaptation—is particularly threatened by ocean acidification.[118] Livestock production, including animal growth and milk production, is depressed with hot weather and other features of climate change.[119] Some regions, such as northern Canada and Russia, will enjoy improved agricultural output, but many more will suffer declines. When food supplies fall short of demand, prices rise, a special hardship for people who are food-insecure—including about one in eight U.S. households.[120] Families that have difficulty making ends meet tend to purchase less costly, less nutritious, calorie-dense foods[121,122]—a contributor to a range of chronic diseases.

Population displacement

In the U.S., as in much of the world, human habitation is concentrated in areas that are vulnerable to climate change—along coasts and rivers, and in warm climates. Some populations may be displaced with climate change, as drought, sea level rise, and severe weather events create shortages of food, water, and habitable land in vulnerable places.[123,124] This may occur relatively acutely, such as after a major disaster, or more deliberately and over a longer time frame, as places become progressively less habitable (or as it becomes prohibitively expensive to keep them habitable).[125,126] Key health risks among displaced populations relate to infectious diseases, nutrition, reproductive health, and mental health and psychosocial stressors.[127,128] Children are especially vulnerable to these impacts, especially those related to psychosocial stressors.[129,130]

Civil conflict

Worsening pressure on increasingly scarce resources, displaced populations, and other destabilizing forces are risk factors for civil conflict.[131-133] Changing weather patterns due to climate change may have contributed to the Darfur conflict in the first decade of the present century,[134] and to the uprisings in Syria and Egypt in the following decade.[135] Accordingly, the U.S. Department of Defense has identified climate change as a serous security threat.[136] The implications for health are both direct, threatening the safety of U.S. service members required to engage in armed conflicts, and indirect, diverting funds from health and other human services. At a more granular scale, warming temperatures are associated with higher levels of interpersonal violence,[21,137] resulting in injuries and fatalities, lasting psychological damage, and other harms.[138] Children are vulnerable to lasting effects from exposure to violence during childhood; such exposure is associated with medical, mental health, social, and behavioral problems both during childhood and during the adult years.[139-141]

Mental health impacts

Climate change and environmental degradation can threaten mental health in several ways. Disasters such as floods and hurricanes, as noted above, often result in large population burdens of depression, anxiety, and other manifestations of post-traumatic stress,[142] with children especially vulnerable.[129,130] The ongoing interruption of place attachment; the loss of accustomed weather patterns, biodiversity and other environmental features; and the insecurity that comes with uncertainty about the future, can trigger grief, distress, anxiety, and other mental

disorders.[143-145] People with mental illnesses are also more susceptible to heat, because of the side effects of certain medications, inappropriate behavioral responses, and/or abnormal physiological homeostatic mechanisms.[146]

Children have specific vulnerabilities

In the context of this litigation, the risks of climate change for children are especially relevant. As noted above, children are particularly vulnerable to many of the health risks posed by climate change.[10,12,147] These include the effects of heat,[32] drought,[148] disasters[149-151] and resulting displacement,[129] air pollution,[152] allergen exposure,[67] and many infectious diseases, from dengue fever[153] to diarrhea.[154] As one recent commentary by a leading researcher noted, children "bear a disproportionate burden of disease and developmental impairment from both environmental pollution and climate change due to the combustion of coal, oil, gasoline, diesel and natural gas."[155] Climate change poses a wide range of risks that directly target children.

The Plaintiffs in this case exemplify the risks discussed here

The Plaintiffs in this case exemplify the health risks discussed above. First, according to the First Amended Complaint and Plaintiff declarations I reviewed, several of the Plaintiffs have medical conditions that place them at risk of one or more of the impacts described above, in particular asthma (Isaac V., Sahara V., Alex Loznak, and Nathan B.) and allergies (Levi D., Victoria B., Kiran Oommen, Jaime B., Zealand B., Sahara V., Avery M., Sophie K., Alex Loznak, and Nathan B.). Second, several of the Plaintiffs live in places where impacts such as wildfires, water scarcity, and coastal ecosystem changes have traumatized them and/or constrained their outdoor recreation opportunities (Xiuhtezcatl M. in Colorado; Kelsey Juliana, Tia Hatton, Kiran Oommen, Zealand B., Sahara V., Hazel V., Avery M., Miko V., Jacob Lebel, and Alex Loznak in various parts of Oregon; Levi D. on the Florida coast; Journey Z. on the Hawaiian coast; Jaime B. in Arizona; Aji P. in Washington; Sophie K. in Pennsylvania; Nicholas V. in Colorado; and Nathan B. in Alaska). Outdoor recreation is an important means of promoting children's health and development,[156-158] and interrupting access to such opportunities compromises health. Few places are immune from the health threats posed by climate change; for example, many of the Plaintiffs reside in Oregon, where climate-related risks to health have been well documented by the Oregon Health Authority.[159] Third, many of the Plaintiffs report sadness, anxiety, and fear regarding the future, reflecting their awareness of the risks of climate change; these reactions undermine mental health and happiness.[160,161] This inventory of specific risks in these individual children is by no means exhaustive; most of the risks discussed in this testimony will operate, to a greater or lesser extent, on most of the Plaintiffs in this case, as climate-related risks will affect all children. However, the broad nature of the health impacts of climate change in no way diminishes the specific risks to these Plaintiffs.

Government awareness of risks posed to youth by climate change

In August 2005, the U.S. EPA's Children's Health Protection Advisory Committee sent a formal letter to then-EPA Administrator Steven Johnson, entitled "Children's Environmental Health and Climate Change" (available at https://www.epa.gov/sites/production/files/2014-

05/documents/8302005.pdf). As Chair of the subcommittee on climate change, I led the preparation of that letter. The letter stated that

> *"Climate change will affect children's environmental health, in some cases disproportionately,"* noting that *"Children are especially vulnerable because of their developing organ systems, their high risks of certain exposures, and other reasons."*

and recommended that

> *"EPA should use all available regulatory authority to reduce greenhouse gases [GHGs] to avoid an irreversible course of global climate change with attendant harm to children."*

Administrator Johnson responded in November 2005 (available at https://www.epa.gov/sites/production/files/2014-05/documents/11182005.pdf) noting that: "The Agency and the Bush Administration agree that climate change is a priority."

In January 2013, the U.S. EPA published *America's Children and the Environment, Third Edition*, EPA 240-R-13-001. Among the important points made by this publication are the following:

> *"America's Children and the Environment, Third Edition ("ACE3") is EPA's report presenting data on children's environmental health. ACE brings together information from a variety of sources…." (p. 6).*

> *"Climate change may increase children's exposure to extreme temperatures, polluted air and water, extreme weather events, wildfires, infectious disease, allergens, pesticides, and other chemicals. These exposures may affect children's health in a number of direct and indirect ways. It is important to note that climate change will likely result in a mix of both positive and negative health impacts. For example, warmer summers may increase the number of heat-related injuries and deaths, while warmer winters may result in fewer cases of cold-related injuries and deaths. (Footnote omitted.) The effects of climate change will also vary from one location to another and will likely change over time as climate change continues. (Footnotes omitted.) Furthermore, the human health risks from climate change may be affected strongly by changes in health care advances and accessibility, public health infrastructure, and technology. (Footnotes omitted)." (p. 105).*

> *"Climate change is likely to change the timing, frequency, and intensity of extreme weather events, including heat waves, hurricanes, heavy rainfall, droughts, high coastal waters, and storm surges. (Footnotes omitted.) These events can cause traumatic injury and death, as well as emotional trauma. Extreme weather events are also associated with increased risk of food- and water-borne illnesses as sanitation, hygiene, and safe food and water supplies are often compromised after these types of events. (Footnotes omitted.) One study found that periods of heavy rainfall were associated with increased emergency*

room visits for gastrointestinal illness among children. (Footnote omitted.) Heavy rainfall may result in flooding, which can lead to contamination of water with dangerous chemicals, heavy metals, or other hazardous substances from storage containers or from preexisting chemical contamination already in the environment. (Footnotes omitted.) Elevated temperatures and low precipitation are also projected to increase the size and severity of wildfires. This can lead to increased eye and respiratory illnesses and injuries, which include burns and smoke inhalation. (Footnote omitted.) Extreme weather events can be especially dangerous for children because they are dependent on adults for care and protection. (Footnote omitted.)" (p. 106).

"Through various indirect pathways, climate change may lead to increasing levels and/or frequencies of childhood exposure to harmful contaminants. (Footnotes omitted.) Changes in temperature, rainfall, and crop practices related to climate change are likely to affect exposure to pathogens, pesticides, and other chemicals in a number of ways. Broader geographic distribution of pests and increased growth of invasive weeds will likely lead to greater use of pesticides. (Footnotes omitted.) Increased precipitation and increased variability in precipitation are likely to increase pathogen and contaminant levels in lakes and other surface waters. (Footnotes omitted.) The distribution of chemicals in the environment is likely to change: for example, an increase in ice melts caused by a warming climate may release some past emissions of globally transported chemicals, such as polychlorinated biphenyls (PCBs) and mercury, that have been trapped in polar ice. (Footnotes omitted.) Increasing concentrations of these chemicals in the atmosphere, and subsequent deposition to land and water, have the potential to increase concentrations of these chemicals in fish and other foods derived from animals. Warmer water temperatures may also increase the release of chemical contaminants from sediments, increasing their uptake in fish. (Footnote omitted.) Climate change may result in children spending more time indoors. Buildings that are tightly sealed in response to adverse weather conditions may result in increased exposure to contaminants from poor ventilation and higher concentrations of indoor pollutants such as radon, environmental tobacco smoke, and formaldehyde. (Footnote omitted.)" (p. 107).

"Children are expected to be especially sensitive to the effects of climate change for a number of reasons. Young children and infants are particularly vulnerable to heat-related illness and death. (Footnote omitted.) Compared with adults, children have higher breathing rates, spend more time outside, and have less developed respiratory tracts—all making children more sensitive to air pollutants. Additionally, children have immature immune systems, meaning that they can experience more serious impacts from infectious diseases. (Footnote omitted.) The greatest impacts are likely to fall on children in poor families, who lack the resources, such as adequate shelter and access to air conditioning, to cope with climate change. (Footnote omitted.)" (p. 107).

Finally, ACE3 cites Chapter 9, the health chapter, of the Third National Climate Assessment.[162] ACE3 does not directly quote from this chapter, but cites the chapter at numerous points, including the following:

> *"Climate change is projected to harm human health in a variety of ways through increases in extreme temperature, increases in extreme weather events, decreases in air quality, and other facts." (p. 25).*
>
> *"There are a variety of other impacts driven by climate change that are expected to pose significant health hazards, including increases in wildfire activity." (p. 25).*
>
> *"Extreme temperatures are projected to rise in many areas across the U.S., bringing more frequent and intense heat waves and increasing the number of heat-related illnesses and deaths." (p. 28).*
>
> *"These physical impacts on water quality will also have potentially substantial economic impacts, since water quality is valued for drinking water and recreational and commercial activities such as boating, swimming, and fishing." (p. 32).*

I have similarly communicated the health risks associated with climate change to Federal governmental bodies in the past. For example, on April 9, 2008, I testified on "Climate Change and Public Health" before the Select Committee on Energy Independence and Global Warming of the United States House of Representatives. At the time, I was Director of the CDC's National Center for Environmental Health and of the U.S. Agency for Toxic Substances and Disease Registry. A true and correct copy of my testimony is attached here as **Exhibit C**. Among the additional points I made during my testimony were the following:

> At p. 3, I noted that, while knowledge of the potential public health impacts of climate change will advance in the coming years and decades, the following are current best estimates of major anticipated health outcomes:
>
> • Direct effects of heat,
> • Health effects related to extreme weather events,
> • Air pollution-related health effects,
> • Water- and food-borne infectious diseases,
> • Vector-borne and zoonotic diseases, and
> • Other pathogens sensitive to weather conditions.
>
> At p. 5, I stated that "climate changes will likely affect air quality by modifying local weather patterns and pollutant concentrations, affecting natural sources of air pollution, and promoting the formation of secondary pollutants. Studies show that higher surface temperatures, especially in urban areas, encourage the formation of ground-level ozone. Ozone can irritate the respiratory system, reduce lung function, aggravate asthma, and inflame and damage cells that line the lungs.

> In addition, it may cause permanent lung damage and aggravate chronic lung diseases."
>
> At p. 7, I observed some demographic groups are more vulnerable to the health effects of climate change than others. Children are at greater risk of worsening asthma, allergies, and certain infectious diseases.

Therefore, the public health risks I describe in this report have been well known by the Federal government for a substantial period of time.

Today's children will be tomorrow's adults

Today's children will not be children forever; they are tomorrow's adults. After that, they will reach old age. The risks of climate change will therefore play out over the course of their lives, threatening today's children with cumulative risks that intensify over coming decades. Some exposures, sustained during childhood, raise the risk of adult diseases. Other risks will continue to operate on them as adults. And given the current trajectory of climate change—steadily rising temperatures, more chaotic weather, and related changes during coming decades—today's children can anticipate a lifetime of worsening risks. Each of the health effects described above poses risks not only to children, but also to adults. And each of these risks is increasing.

CONCLUSION

Based on the foregoing discussion, it is my expert opinion that climate change disproportionately threatens the physical and mental health, and well-being, of children as a class of people. Today's children already bear, and will continue to bear, a substantial climate health burden, both in their youth, and cumulatively as they reach adulthood and mature into old age. At least some of the Plaintiffs in this case, based upon their declarations and their allegations in the First Amended Complaint and my expert opinion, are already suffering health problems of the type that climate change aggravates and/or makes more likely, and such health impacts will worsen as temperatures continue to rise. Government actions that further exacerbate the severity of climate change, as well as the failure to take action to reverse climate change, represent substantial and serious threats to the health of these children.

It is my expert opinion that, while adaptation can offer some protection, it cannot fully counter the health risks of climate change, and that prevention is essential. Prevention, in this context, means prompt and aggressive action to eliminate the human causes of climate change. This will not prevent all of the public health impacts of climate change, since some are inevitable given the "climate commitment" already in place,[163] but it will reduce the risk and limit the cumulative harms experienced over the lifetimes of these children.

Signed this 10th day of April, 2018 in Seattle, Washington.

Howard Frumkin, MD, MPH, DrPH

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UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

KELSEY CASCADIA ROSE JULIANA; **XIUHTEZCATL TONATIUH M.**, through his Guardian Tamara Roske-Martinez; et al.,

Plaintiffs,

v.

The UNITED STATES OF AMERICA; **DONALD TRUMP**, in his official capacity as President of the United States; et al.,

Defendants.

Case No.: 6:15-cv-01517-TC

PLAINTIFFS' RESPONSE IN OPPOSITION TO DEFENDANTS' MOTION FOR SUMMARY JUDGMENT

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I. INTRODUCTION

These young Plaintiffs seek the structural remedy necessary to protect them from Federal Defendants' active historic and ongoing infringements of their Fifth Amendment substantive Due Process rights. The scope of the case is directly proportional to the systemic nature and magnitude of Defendants' constitutionally violative conduct, persisting over decades, in controlling, perpetuating, and promoting a national fossil fuel-based energy system, despite long-standing knowledge of the resulting destruction to our nation and profound harm to future generations, including Plaintiffs. Had Defendants infringed Plaintiffs' fundamental rights through a discrete and isolated action or group of actions, this would be a different case. Plaintiffs cannot be denied justice, their rights, or a remedy simply because Defendants' infringement of these youth's inalienable rights is of a profound and systemic nature. Defendants now find it inconvenient to wrestle with the breadth of factual issues presented in a constitutional concern of their own making. Notwithstanding the position of this Administration, it is axiomatic that the federal government *must be held accountable under the Constitution for deliberate decisions that deprive Plaintiffs of life, liberty, or property* and *should be ordered to come into constitutional compliance* when it wields its power and discretion to betray our children, entire generations, our Founders' vision, and the underlying prerequisites of democracy itself. As the claims in this case are that significant, they must be fully vetted before this Court at trial based on a thorough evidentiary record. As a result, this Motion for Summary Judgment (ECF No. 207) ("MSJ") should be denied.

In an attempt to circumvent the dire facts and dark history of their conduct, Defendants seek summary judgment solely on the law and by ignoring the seventeen expert reports Plaintiffs have served in this litigation and the prior testimony of Plaintiffs. Defendants contend Plaintiffs

cannot establish Article III standing and seek adjudication on only three of Plaintiffs' multiple Fifth Amendment claims. Plaintiffs oppose this MSJ, submitting declarations by the 21 Plaintiffs and 18 experts, along with hundreds of government records that support Plaintiffs' claims.[1] As the underlying facts are highly relevant to each issue presented by Defendants' MSJ, and many material facts remain in dispute, this Court should have a full opportunity to hear from the experts and other witnesses so that its findings on the merits are fully informed. Summary judgment should be denied and this case should proceed to trial beginning October 29, 2018.[2]

II. STANDARD OF REVIEW

Summary judgment may only be granted if "there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). The moving party has the burden of establishing the absence of a genuine issue of material fact. *Id.*; *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). Only once the moving party shows the absence of genuine issues of material fact must the non-moving party go beyond the pleadings and identify facts showing a genuine issue for trial. *Id*. at 324. The court views the evidence, including all reasonable inferences, in favor of the non-moving party. *Cortez v. Skol*, 776 F.3d 1046, 1050 (9th Cir. 2015). "An issue of material fact is genuine if there is sufficient evidence for a reasonable jury to return a verdict for the non-moving party." *Id*. (quoting *Thomas v. Ponder*, 611 F.3d 1144, 1150 (9th Cir. 2010)). Material facts are those necessary to the proof or

[1] Along with this Opposition, Plaintiffs are filing a Motion *in Limine* seeking judicial notice of a number of publicly available, government documents, many of which are referenced herein to

[2] Plaintiffs note that Defendants' stated strategy is to force this Court to issue another order prior to trial so that they can file another "mandamus petition in the Ninth Circuit and seek an immediate stay" of this action without addressing the hard facts. Declaration of J. Olson in Support of Plaintiffs' Response ("Olson Decl. MSJ"), ¶ 2, Ex. 1 at 1. This strategy parallels Defendants' persistent refusal to participate in discovery. Their overarching theme: do whatever it takes to prevent this case from being heard at trial. That would be a travesty of justice.

defense of a claim, determined by referring to substantive law. *Anderson v. Liberty Lobby, Inc*., 477 U.S. 242, 248 (1986). In deciding summary judgment, "[t]he evidence of the nonmovant is to be believed, and all justifiable inferences are to be drawn in his favor." *Id.* at 255.

III. ARGUMENT

This partial MSJ should be denied because Defendants failed to satisfy their burden of establishing the absence of genuine issues of material fact and are not entitled to judgment as a matter of law.[3] In addition, to highlight the inappropriateness of summary judgment, Plaintiffs oppose this MSJ by setting forth evidence showing genuine factual issues for trial regarding (1) standing, and (2) the merits of the subset of their claims that Defendants place at issue in their MSJ. Pursuant to Rule 56(e), these "specific facts" presented are taken as true for purposes of summary judgment. *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 561 (1992).

A. Plaintiffs Present Specific Material Facts Sufficient to Establish Their Article III Standing on Summary Judgment and Create a Triable Issue of Fact.

To establish standing, only one plaintiff need show: (1) an injury in fact; (2) fairly traceable to Defendants' conduct; and (3) likely to be redressed by a favorable decision. *Id.* at 560-61 (1992); *Mass. v. EPA*, 549 U.S. 497, 518 (2007). "[A]t the summary judgment stage the plaintiffs need not establish that they in fact have standing, but only that there is a genuine question of material fact as to the standing elements." *Cent. Delta Water Agency v. United States*, 306 F.3d 938, 947 (9th Cir. 2002).[4] Defendants' Answer (ECF No. 98 ("Answer")) to

[3] Defendants do not move for summary judgment on all of Plaintiffs' claims, as discussed in Section III(D)(4), *infra*. Defendants introduced facts, arguably, only on standing, offering paltry citations to the record. *See* MSJ at 9 (citing FAC at ¶¶ 171–78),11 (citing Decl. of Wanless, ECF No. 206-2 at ¶¶ 1–63), but ignoring all factual evidence proffered by Plaintiffs to date.

[4] Defendants mistakenly invoke *Clapper v. Amnesty Int'l USA* to create a heightened barrier to standing. The rigor outlined in *Clapper* is used when "the Judiciary has been requested to review actions of the political branches in the fields of intelligence gathering and foreign affairs . . . ." *Clapper v. Amnesty Int'l USA*, 568 U.S. 398, 409 (2013). Plaintiffs do not request such review.

Plaintiffs' First Amended Complaint (ECF No. 7 ("FAC")) shows many triable questions regarding standing.[5] Defendants' refusal to meaningfully engage in discovery aimed to resolve these factual disputes has impeded the full development of relevant facts necessary to evaluate Defendants' actions. *Compare* Answer ¶ 27 ("Defendants deny the allegation in the third sentence that climate change is caused by [] Defendants.") *with* ECF 217-1 p. 15 (Defendants filing protective order and refusing to answer RFA that "[o]ver the last decade, leases issued and administered by the Department of the Interior have resulted in the production of over 4.4 billion tons of coal from Federal lands.") The Supreme Court has recognized that, "[w]hile we might be able, on the present record, to reach a conclusion that would decide the case, it might well be found later to be lacking in the thoroughness that should precede judgment of this importance and which it is the purpose of the judicial process to provide." *Kennedy v. Silas Mason Co.*, 334 U.S. 249, 257 (1948); *see also Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255, (1986).

While Plaintiffs herein introduce evidence sufficient to survive summary judgment, further discovery and trial are necessary for full development of the relevant facts regarding Plaintiffs' injuries caused by Defendants' misconduct and their redressability by this Court.

1. Youth Plaintiffs Submit Sufficient Evidence of Their Concrete, Particularized, Actual Harms

[5] *See* Answer at ¶¶ 27-29, 31, 35, 37, 40-42, 46, 52, 54, 55, 64-67, 77, 80, 86, 88, 89 (Defendants deny they cause climate change in response to specific allegations of harm by Plaintiffs); ¶¶ 211, 214, 215, 222, 229, 231, 233, 241, 247, 260 (Defendants claim vagueness or lack of information on scientific projections relevant to Plaintiffs' injury-in-fact); ¶¶ 100, 101, 105, 106, 110, 112, 115, 117, 119, 123, 127, 131, 146, 147, 149, 153, 159, 163, 169, 170-172, 179, 181-183, 185, 186, 188 (Defendants deny information about specific Defendants relevant to causation and redressability); and ¶¶ 10, 129, 164, 208, 211, 212, 213, 258, 259, 276 (Defendants claim vagueness or lack of information on scientific and legal information relevant to redressability); *see also* ECF 217 (Defendants refusing to answer hundreds of requests for admissions of facts extracted from publicly available, government documents). This is a non-exhaustive list of disputed allegations, which demonstrates the breadth of issues still in dispute. Plaintiffs have asked, and Defendants have refused to stipulate to facts they denied in their Answer, or even to stipulate not to dispute the facts. Olson Decl. MSJ, ¶ 3.

In the Declarations submitted herewith, Plaintiffs present specific facts showing the highly personalized ways in which they are concretely affected by Defendants' actions. Coupled with Defendants' denials in their Answer and their arguments in the MSJ, this evidence demonstrates genuine issues of material fact regarding injury. In their Answer, Defendants dispute Plaintiffs' particularized injuries and insist in their MSJ that Plaintiffs' injuries are "generalized grievance[s]" involving "generalized phenomena on a global scale" and, thus, cannot be "concrete and particularized."[6] Answer at ¶¶ 16-90; MSJ at 7. Plaintiffs' Declarations show the unique ways in which Plaintiffs' concrete and actual injuries vary according to their particular locations, interests, and circumstances. *See generally* Declarations of all Plaintiffs filed herewith.

Some Plaintiffs have been and continue to be concretely injured by extreme weather events and flooding to their homes, which harm their personal security, economic security, and physical health. Jayden Decl., ¶¶ 2–26, 28–32, 39–42 (e.g. ¶ 11: "Yet the floodwaters kept pouring in, through doors, toilets, sinks, bathtubs, and even the roof."); Journey Decl., ¶¶ 10, 13,

[6] Defendants' generalized grievance argument is equally mistaken on the law and has been rejected by this Court. *Juliana v. U.S.*, 217 F.Supp.3d 1224, 1243-44 (D.Or. 2016); *See also* ECF No. 146 at 14. Pressing this Court to reverse itself on the law, Defendants turn to old, inapposite, out-of-circuit cases where climate change harms were found insufficient for standing largely because the harm did not particularly touch the individual plaintiffs. That authority is not precedential or persuasive here. *See Ctr. for Biological Diversity v. U.S. Dep't of the Interior,* 563 F.3d 466, 478 (D.C. Cir. 2009) (alleging injuries to the Arctic environment generally); *WildEarth Guardians v. Salazar*, 880 F.Supp.2d 77, 85 (D.D.C. 2012) (no evidence of "demonstrable increase in risk" to plaintiffs' interests from coal mining operations); *Amigos Bravos v. U.S. Bureau of Land Mgmt.*, 816 F.Supp.2d 1118, 1128 (D.N.M. 2011) (plaintiffs' declarations were not supported by experts); *Sierra Club v. U.S. Def. Energy Support Ctr.*, No. 01:11-cv-41, 2011 WL 3321296 at 1-3 (E.D. Va. July 29, 2011) (alleging generalized injuries not connected to the specific contract or plan).

15, 17, 21–27 (e.g. ¶ 21: "In 2012, Kaua'i was flooded from weeks of rain. My family and I were displaced and evacuated to a Red Cross shelter. I could not go to school for the entire week.").[7]

Some Plaintiffs have been and continue to be concretely injured by extreme heat, drought conditions, beetle-killed forests, increased and more dangerous wildfire seasons, and decreased air quality, which harm their homes, economic livelihoods, personal security, physical health, water sources, and ability to recreate safely.[8] Alexander Decl., ¶¶ 12–21, 22–25, 27–31, 33–41, 48 (e.g. ¶ 38: "A massive column of smoke from the Stouts Creek fire was visible from my family's farm. Seeing the columns of smoke caused significant emotional distress for my family and me and it made me fearful of losing my farm."); Kelsey Decl., ¶¶ 3, 6–7, 9, 11–12, 15, 22 (e.g. ¶ 15: "Smoke from . . . wildfires affected my ability to work, which made it more difficult to support myself during college and gain valuable work experience.").[9]

Some Plaintiffs have been and continue to be concretely injured by the lack of snow and ice, and the melting thereof, which impairs their recreational interests and their water sources.

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[7] *See also* Avery Decl., ¶ 20; Hazel Decl., ¶ 4; Isaac Decl., ¶¶ 2, 9, 19; Kelsey Decl., ¶ 16; Levi Decl., ¶¶ 12–16, 18; Nathaniel Decl., ¶ 2; Nicholas Decl., ¶ 14; Sophie Decl., ¶¶ 3–5, 12; Tia Decl., ¶ 9; Victoria Decl., ¶¶ 8–9, 11–12, 15; Xiuhtezcatl Decl., ¶ 16; Trenberth Decl., Ex. 1 at 20-21; Pacheco Decl., Ex. 1 at 14-16, 30; Stiglitz Decl., Ex. 1 at 6-8, 15-17, 19-26; Wanless Decl., Ex. 1 at 18-20, 24-25; Frumkin Decl., Ex. 1 at 5, 11-15.

[8] Climate induced drought and water scarcity forced Plaintiff Jaime to leave her home, separating her from her relatives. Jaime Decl. at ¶ 4; *Hawaii v. Trump*, 585 U.S. __ (2018) (slip op. at 25) (separation from relatives established injury in fact).

[9] *See also* Aji Decl., ¶¶ 2–4, 7–8; Avery Decl., ¶¶ 10–15, 24–25; Hazel Decl., ¶ 12; Isaac Decl., ¶¶ 2–7, 10; Jacob Decl., ¶¶ 4, 7–15, 17; Jaime Decl., ¶¶ 4, 8, 15–20, 23, 25–28, 33; Jayden Decl., ¶¶ 33–36; Journey Decl., ¶ 7; Kiran Decl., ¶¶ 6–8; Miko Decl., ¶¶ 11–14; Nathaniel Decl., ¶ 4; Nicholas Decl., ¶¶ 2–10; Sahara Decl., ¶¶ 3, 6–7; Tia Decl., ¶ 6; Xiuhtezcatl Decl., ¶¶ 7–11, 15, 18; Zealand Decl., ¶¶ 5–7, 9, 14–15, 18; Trenberth Decl., Ex. 1 at 20-22; Pacheco Decl., Ex. 1 at 6-8, 11-17, 19-29; Frumkin Decl., Ex. 1 at 3-7, 11-15; Running Decl., Ex. 1 at 5-9, 12-18, 24-27, 29; Stiglitz Decl., Ex. 1 at 6-8, 12-14, 17-18, 19-26; Olson Decl. Exs. 42, 56 (USDA recognizing "[c]limate change has led to fire seasons that are now on average 78 days longer than in 1970."), 381.

Avery Decl., ¶¶ 18–19 (e.g. ¶ 19: "[My favorite] winter activities were not possible from 2013-2015 due to lack of snow."); Nicholas Decl., ¶¶ 15–16 ("It is a staggering sight for me to see mountains, which used to always have snow, now have no snow at all.").[10]

Some Plaintiffs have been and continue to be concretely injured by ocean warming and acidification and sea level rise, which harm their homes, health, economic livelihood, personal security, and places of recreation and spirituality. Levi Decl., ¶¶ 3, 7–10, 17 (e.g. ¶ 8: "I often swam in the Indian River Lagoon on the west side of the barrier island, but I can no longer swim there because of increasing flesh-eating bacteria, dead fish, and algae blooms."); Dr. Wanless opines that "we are in the danger zone in southern Florida, and any delay in a judicial remedy for Plaintiff Levi poses clear and irreversible harm to his interests and his future," due to the rising seas overtaking Levi's barrier island home. Wanless Decl., Ex. 1 at 30, 24 ("His island is already facing sea level rise and increased inundation during storms. At 90 cm (3 feet) of sea level rise, Levi's home will be in the sea.").[11]

Some Plaintiffs are already suffering from injuries to their physical health from climate change. Alexander Decl., ¶ 48 ("When I am suffering from asthma and allergies, I have difficulty

[10] *See also* Alexander Decl., ¶¶ 42, 46–47; Hazel Decl., ¶¶ 8–10; Isaac Decl., ¶¶ 11–12; Jacob Decl., ¶¶ 4, 18–19; Jaime Decl., ¶¶ 21–22, 24; Kelsey Decl., ¶¶ 6, 11; Kiran Decl., ¶¶ 1–2; Nathaniel Decl., ¶¶ 2, 5; Sahara Decl., ¶ 8; Tia Decl., ¶¶ 2, 4–5, 11–13; Xiuhtezcatl Decl., ¶¶ 7, 12–13; Zealand Decl., ¶¶ 10–12, 16; Running Decl., Ex. 1 at 9-11, 21-23, 29; Rignot Decl., Ex. 1 at 11-13, 18-19.

[11] *See also* Aji Decl., ¶¶ 5–6; Alexander Decl., ¶¶ 43–45; Avery Decl., ¶¶ 21–23; Hazel Decl., ¶¶ 6–7; Jacob Decl., ¶¶ 20–23; Jayden Decl., ¶ 3; Journey Decl., ¶¶ 4–5, 7–20, 26; Kelsey Decl., ¶¶ 4–5, 13–14; Kiran Decl., ¶¶ 3–4, 10–11, 12; Miko Decl., ¶¶ 3–6, 9, 15; Sahara Decl., ¶¶ 4–5; Tia Decl., ¶¶ 8–9; Victoria Decl., ¶¶ 5–7, 9–10; Zealand Decl., ¶ 13; Hoegh-Guldberg Decl., Ex. 1 at 2-30; Hansen Decl., Ex. 1 at 39-41, Ex. 2-8, 26-34; Wanless Decl., Ex. 1 at 5-32; Rignot Decl., Ex. 1 at 1-11, 15-19; Pacheco Decl., Ex. 1 at 10-11, 30; Frumkin Decl., Ex. 1 at 11-15; Stiglitz Decl., Ex. 1 at 14, 18, 19-26.

partaking in outdoor activities. This harms both my ability to work on the farm and my ability to recreate and enjoy the beautiful forests and rivers surrounding my home.").[12]

Some Plaintiffs have suffered direct health impacts and threats to personal security from fossil fuel activities, such as breathing in air filled with coal dust, Victoria Decl., ¶¶ 14–15, and threats to their water resources caused by fossil fuel pipeline projects. Alexander Decl., ¶ 9, 49–58; Jacob Decl., ¶ 24–28 (proposed pipeline in water source a mile from home); *see also* Jayden Decl., ¶¶ 2–4, 25, 27, 36–37, 44–50 (air pollution and water quality; oil spills);; Kelsey Decl., ¶ 22 (air pollution from fossil fuel facilities); Kiran Decl., ¶ 13 (oil trains); Xiuhtezcatl Decl., ¶ 17 (fracking), ¶ 18 (oil fields); Pacheco Decl., Ex. 1 at 19-25.

Some Plaintiffs have been and continue to be concretely injured by impacts to wildlife, domesticated animals, and plants on which they depend for their food, livelihoods, and personal enjoyment. Nicholas Decl., ¶¶ 10–13, 17 (e.g. ¶ 17: "I am afraid that climate change is going to make it impossible to continue some of the traditions I have such as planting a garden, which has been an important part of my life."); Jaime Decl., ¶¶ 4–6, 8–13, 16, 26, 32 (e.g. ¶ 5: "On the reservation we simply stopped farming. . . . nothing would grow."; ¶ 8: "More and more wild animals are dying on the Reservation. . . . This is extremely disturbing to me because I care deeply about animals and their well-being.").[13]

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[12] *See also* Aji Decl., ¶ 2; Avery Decl., ¶ 15; Hazel Decl., ¶¶ 4–5, 11; Isaac Decl., ¶¶ 3–6, 8, 1; Jaime Decl., ¶¶ 27–28; Jayden Decl., ¶¶ 19–21; Journey Decl., ¶¶ 1, 16, 18, 24; Kelsey Decl., ¶ 10; Kiran Decl., ¶¶ 5–6, 9; Levi Decl., ¶ 13; Nathaniel Decl., ¶¶ 3–4; Nicholas Decl., ¶¶ 5, 9; Sahara Decl., ¶ 6; Sophie Decl., ¶ 9; Tia Decl., ¶ 6; Victoria Decl., ¶ 13; Xiuhtezcatl Decl., ¶¶ 14, 17; Zealand Decl., ¶¶ 8–9, 18; Pacheco Decl., Ex. 1; Frumkin Decl., Ex. 1.

[13] *See also* Aji Decl., ¶¶ 5–6; Alexander Decl., ¶¶ 10–35, 44–45; Avery Decl., ¶¶ 5–6, 12, 16–17, 21–23, 25; Hazel Decl., ¶ 7; Isaac Decl., ¶ 2; Jacob Decl., ¶¶ 1–2, 5, 13–17, 20–23, 26, 29; Jayden Decl., ¶¶ 24, 27, 35; Journey Decl., ¶¶ 7, 10, 13, 15–16, 19–20; Kelsey Decl., ¶¶ 4–5, 7–8, 12–13, 16, 18; Kiran Decl., ¶¶ 3–4, 10; Levi Decl., ¶¶ 8–9, 12; Nathaniel Decl., ¶¶ 6–8;

Some Plaintiffs have sustained and increasingly are sustaining particularized and concrete injuries to their spiritual, cultural, and/or indigenous practices and values. Miko Decl., ¶¶ 4, 6–7, 9 ("Without the land, there is no culture [for my people]."); Jaime Decl., ¶¶ 4, 12–14, 33 (e.g. ¶ 14: "Because we can no longer harvest these sacred objects, my people are losing our dignity and our way of life."); Xiuhtezcatl Decl., ¶¶ 6–8 (e.g. ¶ 6: "Protecting the forests, lakes, river, oceans, and wildlife from harm due to climate change is critical to my spiritual and cultural practices and identity. . . . Because I believe that I am a descendant of the land, climate change impacts that harm the land also harm me in a very personal way.").[14]

Each Plaintiff is suffering concrete emotional and mental health injuries to varying individualized degrees, which experts predict will become more severe as climate change worsens, in the absence of strong government action to stop imperiling their lives and meaningfully combatting the dangers of climate change. Victoria Decl., ¶¶ 8–10, 16–18, 19 (e.g. ¶ 18: "I would be a healthier person if I did not have to worry about how climate change is negatively affecting my life."); Jayden Decl., ¶¶ 10, 30, 32, 35, 37–42, 51 (e.g. ¶ 42: "The stress of living in an area that continually floods and is actively drilled in for more fossil fuels that I know will lead to more climate change is taking its toll on me. It affects my mental state and causes me anxiety."); Nicholas Decl., ¶¶ 4, 7, 17 (e.g. ¶ 4: "Seeing all of the beautiful land surrounding my home destroyed made me feel depressed. I thought about how it will take

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Sophie Decl., ¶ 8; Sahara Decl., ¶ 4; Tia Decl., ¶ 13; Zealand Decl., ¶¶ 13, 17; Hoegh-Guldberg Decl., Ex. 1 at 11-28; Running Decl., Ex. 1 at 11, 19-21.

[14] *See also* Isaac Decl., ¶¶ 11, 14–16; Jacob Decl., ¶¶ 3–5, 13; Journey Decl., ¶¶ 1–2; Kelsey Decl., ¶¶ 3, 7–8, 18; Kiran Decl., ¶ 12; Nathaniel Decl., ¶¶ 1, 9; Nicholas Decl., ¶ 1; Tia Decl., ¶ 2; Victoria Decl., ¶¶ 6–7, 17, 19.

hundreds of years for the forest to recover, if ever, and felt hopeless.").[15] Not only have Plaintiffs presented evidence of their actual, concrete and particularized injuries, they also present evidence through expert declarations and government documents of their current and imminently threatened future injuries. Plaintiffs are not required "to demonstrate that it is literally certain that the harms they identify will come about . . . . [S]tanding [has been found] based on a 'substantial risk' that the harm will occur . . . ." *Clapper*, 568 U.S. at 414 n.5. Plaintiffs' experts starkly present reliable evidence that more injuries will undoubtedly befall Plaintiffs because the dangers from CO_2 and other greenhouse gases (collectively "GHGs") are already locked in. Rignot Decl., Ex. 1 at 1 ("Thus between irreversible melting of portions of Greenland's and Antarctica's ice sheets, humanity has already committed itself to a 3-6 m rise in sea level."). Plaintiffs also present reliable evidence of the imminent and substantial risk of injury that projected increasing GHG levels and temperatures will cause Plaintiffs if a remedy is not granted here. Hansen Decl., Exh. 1 at 1. Contrary to Defendants' position, there is no Article III requirement that each claim of injury be connected "to a discrete and specifically identified agency action or failure to act" in violation of federal law. MSJ at 8;[16] *See* Sections III(A)(2), III(B) *infra*. There are unquestionably genuine issues of material fact on injury that preclude summary judgment here.

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[15] *See also* Alexander Decl., ¶¶ 38, 48; Hazel Decl., ¶¶ 3, 12; Isaac Decl., ¶¶ 3, 6, 10, 13, 17, 19–21; Jacob Decl., ¶ 29; Jaime Decl., ¶¶ 4, 20, 26–27, 29–33; Journey Decl., ¶¶ 10, 19, 25, 27–28; Kelsey Decl., ¶¶ 11, 16, 18–19, 22, 24; Levi Decl., ¶¶ 5–6, 11, 15, 19–20; Miko Decl., ¶¶ 5–8, 11, 13–14; Nathaniel Decl., ¶¶ 1, 6, 9; Sahara Decl., ¶¶ 7, 9; Sophie Decl., ¶¶ 6, 10–12; Tia Decl., ¶¶ 14–15; Xiuhtezcatl Decl., ¶¶ 3, 5, 13, 15, 18–21; Zealand Decl., ¶¶ 12–15, 17–19; Van Susteren Decl., Ex. 1 at 1-24, Exhibit C; Pacheco Decl., Ex. 1 at 26-31; Frumkin Decl., Ex. 1 at 10-15.

[16] *Daimler Chrysler Corp. v. Cuno* is inapposite. 547 U.S. 353 (2006). There, where the claimants showed injury with respect to their *municipal* taxes, such injury did not entitle them to seek relief as to the *state* taxes, for which they lacked standing. *Id.* at 353. In contrast, as demonstrated in Section III(A)(2), Plaintiffs' injuries are directly connected to the aggregate acts comprising the systemic nature of Defendants' challenged conduct.

2. Plaintiffs Submit Sufficient Evidence Showing Their Injuries Are Fairly Traceable to Defendants' Misconduct.

Taking Plaintiffs' evidentiary submissions as true, Plaintiffs have presented specific facts that, coupled with Defendants' denials and arguments, demonstrate genuine issues of material fact regarding whether Plaintiffs' injuries are causally linked or "fairly traceable" to Defendants' misconduct, and not the result of absent third parties. *Lujan*, 504 U.S. at 560-61; *Bellon*, 732 F.3d at 1146. At the summary judgment stage, the causal connection between plaintiffs' injuries and defendants' conduct "cannot be too speculative or rely on conjecture about the behavior of other parties, but need not be so airtight at this stage of litigation as to demonstrate that the plaintiffs would succeed on the merits." *Ocean Advocates*, 402 F.3d at 860. Plaintiffs' injuries are fairly traceable to Defendants, even if other parties or factors have also contributed to the harm. *Ocean Advocates*, 402 F.3d at 860. Defendants concede that standing is not precluded by indirect harm to Plaintiffs. MSJ at 9.

In the FAC, Plaintiffs alleged with *significant* specificity particular categories of Defendants' systemic affirmative actions, distinct failures to use delegated authority, and specific examples of the same, delineated by each Defendant, comprising Defendants' systemic conduct which has caused and is causing Plaintiffs' injuries. *See Juliana,* 217 F.Supp.3d 1224 at 1246 ("[P]laintiffs' causation allegations are not vague."). For instance, the FAC describes discrete categories of government policies, practices, and actions, showing how each Defendant permits, licenses, leases, authorizes, and/or incentivizes the extraction, development, processing, combustion, and transportation of fossil fuels, which cause Plaintiffs' injuries. FAC ¶¶ 5, 7, 11, 97, 99, 112, 115, 117, 119, 123, 125, 129-130, 151, 171, 179-181, 183, 186-187. In addition, Plaintiffs provided particular examples of actions, with numeric quantification by category, for particular Defendants. FAC at ¶¶ 160, 161, 164-70, 171-78, 180-84. After delineating specific

actions within each category, Plaintiffs allege that, through each of these categories, "Defendants authorize the combustion of all fossil fuels in the U.S." and that historically, the United States is responsible for emitting 25% of the worlds cumulative CO_2 emissions," thereby establishing Defendants' causal contribution to Plaintiffs' injuries. FAC at ¶¶ 151, 185. Defendants admit the latter in their Answer. ¶ 151 ("[F]rom 1850 to 2012, CO_2 emissions from sources within the United States (including from land use) comprised more than 25% of cumulative global CO_2 emissions."). However, Defendants dispute that they have caused Plaintiffs' injuries.

Supporting their allegations, Plaintiffs have adduced facts showing their injuries are directly attributable to Defendants' creation, operation, perpetuation, and promotion of a national fossil fuel-based energy system that has resulted in dangerous and increasing levels of emissions and concentrations of GHGs.[17] *Lujan,* 504 U.S. at 562; *See* Speth Decl., ¶¶ 8-87; Jacobson Decl., Ex. 1 at 20-21; Erickson Decl., Ex. 1 at 3-20; Hansen Decl., Ex. 1 at 3-6, 15-16, 19-20, 24, 26-27, 34, 38-39, 41-43, 45-49; Van Susteren Decl., Ex. 1 at 15-18.

Specifically, Plaintiffs present evidence that Defendants cause GHG emissions and therefore climate change through their affirmative conduct of:

1. Creating, controlling, perpetuating, and promoting a national fossil fuel-based energy system through planning and policies. Speth Decl., ¶¶ 4-16, 26, 29, 30, 36-37, 39-41, 44, 50-52, 57-60, 62-63, 66-68, 73, 75-87; Hansen Decl., Ex. 1 at 3-6, 15-16, 19-20, 24, 26-27, 34, 38-39, 41-43, 45-49; *See e.g.* Olson Decl., Exs. 94 (National Research Council reporting that a major focus of DOE has been to increase oil and gas production and to expand the resource base in keeping with national energy strategies); 95 (DOE stating in 2014 that "developing

[17] Defendants have had most of the expert reports since Summer 2017 and have had all but one of the expert reports since April 2018. In their MSJ, Defendants completely ignore all this evidence and failed to inform this Court of the existence of and statements within these expert reports.

unconventional domestic oil and gas resources plays an important role in our Nation's energy future."); 100 (Defendant Secretary of Energy Rick Perry stating, "[T]he idea that there's somehow or another this just beautiful, total free market in the power generation business? It's nonsense. I mean, reality is that government affects it every day. I mean, we set regulations, we set rules, and those are out there."); 101; 105; 106; 117 (DOS' Bureau of Energy Resources "promotes an 'all of the above' energy strategy focusing on secure, stable, diversified, and modern global energy systems."); 121; 132 (DOT recognizing the U.S.' "historic approach to transportation and land use has created an energy-intensive system dependent on carbon-base fuels and automobiles."); 201 (Deputy Secretary of the Interior David Bernhardt stating on January 31, 2018: "Oil and gas lease sales on public land directly support domestic energy production and the President's energy dominance and job growth priorities for America."); 228 (President Trump stating that under his Executive Order to Create Energy Independence: "We will unlock job-producing natural gas, oil, and shale energy. We will produce American coal to power American industry. We will transport American energy through American pipelines, made with American steel.").

2. Fostering, perpetuating, and promoting a national fossil fuel-based energy system by leasing public lands for fossil fuel extraction and production. Erickson Decl., Ex. 1 at 12-13, 16-20; Olson Decl., Exs. 73 (more than 5 million acres of National Forest lands are leased for oil, gas, coal, and phosphate development); 74 (in 2010, 16.7 million barrels of oil and 194 million cubic feet of natural gas were produced from 3200 wells on federal lands managed by USDA); 75 (National Forest lands provide 25% of US coal production); 76 (the Forest Service has authorized almost 20,000 active oil and gas wells on National Forest land); (196 (as of Fiscal Year 2014, DOI administered 310 coal leases encompassing over 475,692 acres in ten states on

Federal public lands, which authorize the extraction of an estimated 7.75 billion tons of recoverable coal); *id.* (over the last decade, leases issued and administered by DOI have authorized the production of over 4.4 billion tons of coal from federal public land); 197 (more than 40% of all coal produced in the U.S. is authorized by DOI to be extracted from Federal public lands); 198 (between 80-90% of the coal produced in the U.S. on Federal public lands is used for energy generation within the U.S.); 205 (of the 700 million acres of the federal government's subsurface mineral estate managed by DOI, about 570 million acres are available for coal leasing); 207 (In 2016, 27,207,018 acres of onshore Federal lands were under oil and gas lease, with 12,771,829 acres in production); 208; 209; 210; 212 (in Fiscal Year 2015, fossil fuel energy produced on Federal lands managed by DOI included 782 million barrels of crude oil, five trillion cubic feet of natural gas, and 421 million tons of coal); 213; 214; 215 (as of January 2016, DOI administered more than 5000 active oil and gas leases on nearly 27 million Outer Continental Shelf acres); *id.* (In FY 2015, DOI authorized the extraction of more than 550 million barrels of oil, accounting for 16% of U.S, oil production); 216 (from 2005-2017, DOI authorized the production of 6,322,257,723 barrels of oil and 24,995,060,976 MCF of natural gas from the Outer Continental Shelf); 217-226 (summarizing oil and natural gas DOI authorized to be extracted from public lands from 1947-2016); 382 ("This executive order starts the process of opening offshore areas to job-creating energy exploration. It reverses the previous Administration's Arctic leasing ban."); 229-232; 254 (in 2000, oil and gas was produced on about 8% of National Wildlife Refuge System lands managed by DOI); 255 (As of November 2016, there were over 5000 oil and gas wells on National Wildlife Refuge System lands managed by DOI); 256 (between 2009-2015, DOI allowed oil and gas producers on Federal lands to vent,

flare, and/or leak approximately 462 BCF of natural gas); 257; 258 (until 2010, not a single commercial solar energy project on federal lands).

3. Fostering, perpetuating, and promoting the emission of GHGs, and reducing carbon sequestration capacity, from land use activities by allowing the harvesting of timber and grazing on federal public lands. 36 C.F.R. § 261.6(a), (b), (h) (person may not harvest timber from federal lands without USDA authorization); 36 C.F.R. 223(a) (livestock grazing federal lands must be authorized by a permit); Olson Decl. Ex. 42; 45 (USDA authorized the harvest of 525,484,148 MBF of timber from federal land in FY 1905-2016); 42; 46; 50-55; 52; 70 (livestock grazing is permitted on over 95 million acres of National Forest lands in 29 states); 212; 233 (DOI manages and administers nearly 18,000 livestock grazing permits and leases on 21,000 allotments over 155 million acres of federal public lands); 234-252.

4. Subsidizing and providing financial incentives and business support to fossil fuel energy producers and users in support of a national fossil fuel-based energy system. Stiglitz Decl., Ex. 1 at 7, 12, 15-16; Erickson Decl., Ex. 1 at 13-16; Olson Decl., Exs. 367 (Commerce developed report "to provide market intelligence to U.S. companies" about where "U.S. government resources can make the biggest impact in support of increased U.S. (oil and gas) equipment exports."), 303 (Army Corps of Engineers recommended changes to nationwide permits related to domestic energy production to "reduce burdens on domestic energy producers."), 83; 136 (U.S. gasoline tax is far lower than in other countries).

5. Conducting research and development in support of fossil fuel extraction and energy technologies. Olson Decl., Exs. 97-98 (DOE manages a methane hydrates program to facilitate methane production); 99 (in 2014, DOE, DOI, and EPA issued a strategy for coordinating "high priority research" to develop unconventional oil and gas); 264-266 (DOI funding and studying

the potential for recovering natural gas hydrates on the Alaskan North Slope); 94 (DOE expended nearly $1.5 billion on oil and gas production research from 1978 through 2000, 1/3 of which was to demonstrate shale oil technology at commercial scale).

6. Permitting, authorizing, and promoting the import and export of fossil fuels in support of a national fossil fuel-based energy system. Olson Decl., Exs. 96 (DOE reporting that when Congress lifted the ban on crude oil exports in December 2015, the result was "the rapid rise of crude oil exports thereafter."); 117 (DOS "leads the promotion of U.S. liquid natural gas (LNG) exports globally."); 118; 119 (DOS Deputy Assistant Secretary Sandra Oudkirk saying, "the United States is a brand new LNG exporter. First exports happened in 2016. First permitting began in 2014."); *id*. ("The United States is now the largest gas producer in the world. Admittedly, most of that gas is consumed in the United States."); 120; 189 (no offshore liquefied natural gas or oil import and export facility can legally operated without a license from DOT's MARAD); 190; 361 (millions of barrels of crude oil authorized to be exported from the U.S. between 1990-2017); 363 (U.S. crude oil exports have risen from 10 million barrels in 2007 to over 24 million barrels in 2012, virtually all of which were destined for Canada); *id.* (In 2012, DOC authorized the import of 3.1 billion barrels of crude oil); 364 (millions of barrels of finished petroleum products DOC authorized to be exported from 1990-2017).

7. Permitting the interstate infrastructure and transport of fossil fuels as part of a national fossil fuel-based energy system. Olson Decl., Exs. 168 (DOT develops and enforces regulations for the operation of the U.S.' 2.6 million mile pipeline transportation system for fossil fuels); 170 (no pipeline to transport fossil fuels can begin operation until certified as safe by DOT); 171 (DOT stating: "The nation's more than 2.6 million miles of [pipelines] safely deliver trillions of cubic feet of natural gas and hundreds of billions of ton/miles of liquid petroleum products each

year."); 172 (there are approximately 318,710 miles of natural gas transmission and gathering pipelines in the U.S.); *id.* (there are approximately 2,233, 208 miles of total distribution main and estimated service for gas distribution systems in the U.S.); 175 (billions of cubic feet of natural gas delivered by the U.S. natural gas pipeline transportation network from 2000-2017); 181 (thousands of barrels of crude oil transported by DOT-regulated rail from 2012-2017); 183 (in 2015, 64.9% of domestic coal shipments were transported by DOT-regulated rail in the U.S.); 384 (requiring FERC approval for interstate transport of fossil fuel); 385 (requiring DOT approval for transporting hazardous material like fossil fuels).

8. Permitting the operations of fossil-fuel power plants and fossil fuel refineries, as part of a national fossil fuel-based energy system. Olson Decl., Ex. 383 (requiring permits).

9. Setting energy, economy, and efficiency standards for vehicles, appliances, and buildings that use energy from the national energy system in a manner that fosters, perpetuates, and promotes fossil energy. Olson Decl., Exs. 92 (DOE sets energy conservations standards for more than 60 categories of appliances and equipment, which covers about 90% of home energy use); 93; 143 (DOT did not change fuel efficiency standards for passenger cars for twenty years between model year 1990-2010); 151 (passenger cars and light trucks cannot be sold in the U.S. unless in compliance with fuel economy standards set by DOT); 152 (The U.S. has historically had one of the lowest fuel efficiency standards among developed nations); *id.* (DOT acknowledging that when fuel efficiency standards are raised, automakers respond by creating more fuel-efficient vehicles "which improves our nation's energy security and saves consumers money at the pump, while also reducing greenhouse gas emissions."); 156 (fuel economy set by DOT for long wheelbase light-duty vehicles was 17.4 mpg in 1993 and 17.4 mpg in 2016); 166 (DOT withdrew proposed rule to require manufacturers to rate replacement tires based on fuel

efficiency performance, which would have saved about 1 to 2 billion gallons of fuel per year); 184 (GAO finding that the development and adoption of low-emissions technologies in aviation is dependent in part on "any government policies that price aircraft emissions.").

10. Controlling and permitting all aviation travel and perpetuating the reliance thereof on fossil energy. Olson Decl., Ex. 188 ("Anyone who wants to fly an aircraft – manned or unmanned – in U.S. airspace needs some level of approval from the FAA.").

11. Emitting GHGs through the use of fossil fuel energy in government buildings and activities. Olson Decl., Ex. 77 (80.5% of USDA electricity usage from non-renewable sources); 89, 90 (U.S.' Strategic Petroleum Reserve is the world's largest supply of emergency crude oil, with a design capacity of 713.5 million barrels of oil); 136 (in 2016, federal government has 1,340,000 cars and 1,810,000 trucks in its fleet); *id.* (In 2015, federal fleet consumed 310,416 thousand gallons of gasoline); *id.* (In 2015, the federal fleet consumed 66,736 thousand gallons of diesel); 91 (detailing the millions of barrels of oil released from the Strategic Petroleum Reserve); 217 (DOD uses enough electricity to power 2.6 million average American homes); *id.* (DOD's daily oil use is over 12,000,000 gallons); 272-273 (detailing DOD's energy use); 274 (in FY 2014, DOD fleet vehicles consumed just over 72 million gallons of gasoline equivalent).

12. Utilizing discretionary authority to favor fossil fuels. Olson Decl. Exs. 215 (In 2011, DOI approved 1381 of the 1413 requests (97.7%) received from private entities to extend deepwater Gulf and Alaskan offshore oil leases after the Deepwater Horizon oil spill).

Plaintiffs adduce evidence that Defendants had numerous opportunities to transition the national energy system off fossil fuels and control GHG pollution with technological and economic feasibility and, despite such authority, have not done so. Speth Decl., *passim*; Jacobson Decl., Ex. 1 at 20-21; Olson Decl., Exs. 76; 105; 106; 342. Finally, Plaintiffs show the

present Defendants are going to great lengths to further exacerbate climate danger and Plaintiffs' injuries, even though they have been on notice of Plaintiffs' injuries as stated in their FAC since the day President Trump took office. Speth Decl., ¶¶ 77-80; Olson Decl. Exs. 87 (U.S. coal exports have increased by nearly 60% in the first months of the Trump Administration), 108 (Secretary Perry: "[n]o source of energy is off limits if it can be developed affordably, cleanly [and] bring about greater energy security in the United States."), 110-113, 121, 122-123 (issuing new presidential permits for pipelines), 201, 202 (DOI official stating on January 4, 2018: "By proposing to open up nearly the entire [Outer Continental Shelf] for potential oil and gas exploration, the United States can advance the goal of moving from aspiring for energy independence to attaining energy dominance."), 206; 228 ("My administration is putting an end to the war on coal."), 228a; 229-232; *See also* ECF No. 208 n. 3 (non-exclusive list of President Trump's actions causing and contributing to climate change).[18]

Plaintiffs' evidence shows that any "indirect harm" resulting from the GHG emissions of third parties is directly attributable to Defendants' policies and actions authorizing third parties to engage in emission-causing activities, and indeed setting up an entire nation's energy system intentionally entrenched in fossil fuels.

Defendants' reliance on *Simon v. E. Ky. Welfare Rights Org.* is misplaced for several reasons. First, the *Simon* plaintiffs only challenged the effect of a single revenue ruling by the IRS on nonprofit hospitals' services to indigents. 426 U.S. 26, 28 (1976). Here, Plaintiffs challenge Defendants' systemic affirmative actions and distinct failures to use delegated authorities, which have caused and are causing Plaintiffs' injuries. *See* FAC ¶¶ 172-77. Second,

[18] *See also* Brad Plumer, *Trump Orders a Lifeline for Struggling Coal and Nuclear Plants*, New York Times (June 1, 2018) https://www.nytimes.com/2018/06/01/climate/trump-coal-nuclear-power.html.

the *Simon* plaintiffs failed to demonstrate a "substantial likelihood that victory" against the IRS would remedy the behavior of the independent hospitals. *Id*. at 45. Here, Plaintiffs provide evidence demonstrating Defendants' substantial control over the composition of the national energy system and GHG emissions in the U.S., showing that relief does not depend on speculative third-party behavior. *See* Section III(A)(3*),* infra. Defendants can and do exercise control over the national energy system and third-party behavior and are *the only* parties that can transition that system away from fossil fuels quickly enough to remedy Plaintiffs' injuries. Hansen Decl., Exs. 1 at 44-49; *see, e.g.,* Olson Decl., Exs. 121 (DOS recognizing "the United States has a competitive edge in all segments of the energy sector."); 159 (DOT recognizing that new fuel efficiency standards "can achieve significant reductions in carbon emissions from transportation by decreasing the amount of carbon consumed per mile of travel."; 258 (DOI has considered that a fixed, global carbon budget may require purposefully limiting U.S. oil production); 259 (DOI identifying sites on public land suitable for renewable energy development). Defendants also influence and control third party land managers and can incentivize behavior needed to reduce and sequester GHG emissions. Olson Decl., Exs. 64; 78. Finally, Defendants' speculation about third-party behavior is erroneous. *Bennett v. Spear* rejected a similar argument about causation, noting the government:

> wrongly equates injury "fairly traceable" to the defendant with injury as to which the defendant's actions are the very last step in the chain of causation. While, as we have said, it does not suffice if the injury complained of is "th[e] result [of] the *independent* action of some third party not before the court," . . . that does not exclude injury produced by determinative or coercive effect upon the action of someone else.

520 U.S. 154, 168–69 (1997) (internal citations omitted). Here, Plaintiffs' injuries are fairly traceable to Defendants' conduct because that conduct has a "determinative or coercive effect" on our entire energy system, including the actions of third party producers and consumers of

fossil fuels in the U.S. For example, even though Defendants' authorization of leasing on public lands for fossil fuel development are not the final steps in the causal chain leading to Plaintiffs' injuries, the decision to lease has a "determinative" impact on the available supply and economic viability of fossil fuels in relation to alternative energy sources. Olson Decl., Ex. 295 (major fossil fuel companies stating that federal government decisions "have expanded fossil fuel production and use . . . .").

The causal chain here is nothing like the "series of links strung together by conclusory, generalized statements of 'contribution'" from individual private emission sources that the *Bellon* court found insufficient. 732 F.3d at 1142-43; *compare Mass. v. EPA*, 549 U.S. at 524. In contrast, Defendants' own documents show that their systemic acts in authorizing, permitting, and incentivizing fossil fuel production, consumption, transportation, and combustion have caused atmospheric GHGs to increase to levels causing Plaintiffs harm. *See* Section III(A)(2), *supra*. Defendants admit that "from 1850 to 2012, CO_2 emissions from sources within the United States (including from land use) comprised more than 25 percent of cumulative global CO_2 emissions." Answer at ¶ 151. Plaintiffs have adduced evidence to show the vast majority of these emissions have been and continue to be authorized by Defendants. *See* Section III(A)(2), *supra*.

In *Bellon*, the plaintiffs argued that the state's failure to regulate emissions from five non-parties contributed to their climate harms, but expert evidence in the record indicated the effect of those emissions on global climate change was "scientifically indiscernible." 732 F.3d. at 1142–43. Here, Plaintiffs adduced specific facts showing the affirmative, systemic aggregate acts of Defendants, not their failure to regulate private sources, materially caused and continues to exacerbate climate change. *See generally* Declarations of Speth, Erickson, Frumkin, Hansen, Hoegh-Guldberg, Jacobson, Pacheco, Rignot, Robertson, Running, Stiglitz, Trenberth, Van

Susteren, Wanless, and Williams (expert opinions validating Plaintiffs' ongoing concrete injuries being caused by Defendants). Plaintiffs have presented sufficient evidence demonstrating a material issue as to whether Defendants' conduct is a material cause of Plaintiffs' injuries.

Defendants' contention that aggregated actions making up a systemic pattern of conduct cannot establish causation is directly contrary to Supreme Court precedent. In *Brown v. Plata*, the Supreme Court determined the collective policies and actions of California's state prison officials resulted in a "systemic" violation of prisoners' constitutional rights. 563 U.S. at 551. The Court recognized causation based upon aggregate, systemic acts like those at issue here:

> Because plaintiffs do not base their case on deficiencies in care provided on any one occasion, this Court has no occasion to consider whether these instances of delay–or any other particular deficiency in medical care complained of by the plaintiffs–would violate the Constitution…if considered in isolation. Plaintiffs rely on systemwide deficiencies in the provision of medical and mental health care that, taken as a whole, subject sick and mentally ill prisoners in California to "substantial risk of serious harm . . . ."

Id. at 500 n.3. Similarly, in *Wilson v. Seiter*, discrete elements, which might not in themselves establish causation of a constitutional violation, established causation in the aggregate. 501 U.S. 294, 304 (1991). As in *Plata* and *Wilson*, Defendants' acts in causing and contributing to fossil fuel emissions, viewed in isolation, might not violate the Constitution. However, taken "in combination" and on a "systemwide" basis, this conduct has a "mutually enforcing effect" in violation of Plaintiffs' rights. *Plata*, 563 U.S. at 500 n.3; *Wilson*, 501 U.S. at 304.

Defendants cite only two cases in their ongoing attempt to invent a new "particular causation" requirement in the Article III standing analysis. Contrary to Defendants' implication, MSJ at 11, the Court in *Lewis v. Casey* merely reiterated the uncontroversial principle that a plaintiff "who has been subject to injurious conduct of one kind" does not have standing to challenge *unrelated* harms "to which he has not been subject." 518 U.S. 343, 358 n.6 (1996).

This principle is irrelevant here, where Plaintiffs are subject to GHG emissions resulting from each of Defendants' actions and omissions that, taken together, accumulate in the atmosphere and the oceans, thereby causing climate change, ocean acidification, and Plaintiffs' injuries. Because of the spatial character (i.e., dispersal throughout the atmosphere) and long-lived nature (i.e., persisting for hundreds of years) of GHG emissions, Plaintiffs are subject to the harms from all of Defendants' decisions allowing those accumulated emissions, obviating the need for Plaintiffs to specifically demonstrate connectivity to each of the myriad individual sources of emissions attributable to Defendants. Hansen Decl., Ex. 1 at 14-15; Hoegh-Guldberg Decl., Ex. 1 at 2-30. Plaintiffs' evidence demonstrates genuine issues of material fact as to whether Defendants are a fairly traceable cause of Plaintiffs' injuries.

3. Plaintiffs Submit Sufficient Evidence Showing Their Injuries Can Be Redressed.

The redressability element of standing does not require certainty but "only a substantial likelihood that the injury will be redressed by a favorable judicial decision." *Bellon*, 732 F.3d at 1146; *see Lujan*, 504 U.S. at 560–61. For standing, Plaintiffs need not establish that a favorable decision will redress every injury. *See Larson v. Valente*, 456 U.S. 228, 244 n.15 (1982).

Plaintiffs presented facts demonstrate material issues of fact precluding summary judgment as to whether, if Defendants are so ordered, they can prepare and implement a remedial plan to decarbonize the U.S. energy system and protect carbon sinks, thereby substantially reducing GHG emissions, drawing down Defendants' contribution to excess CO_2 in the atmosphere, and redressing Plaintiffs' injuries. *See* Speth Decl.; Williams Decl., Ex. 1, Jacobson Decl., Ex. 1, Robertson Decl., Ex. 1; Stiglitz Decl., Ex. 1; Hansen Decl., Ex. 1 at 25-38, 44-49. The requested reductions in U.S. emissions with improved carbon sequestration efforts will, at minimum, slow the rising temperatures and carbon accumulation in Earth's sinks, and put the

U.S. on a pathway to return atmospheric CO_2 concentrations to levels that avoid dangerous anthropogenic climate change, all of which will reduce and minimize projected injuries to Plaintiffs, children as a class, and future generations. These expert declarations provide the basis for a remedy that could "move the needle on the complex phenomenon of global climate change," MSJ at 12, creating a dispute of fact; Answer ¶ 129 (Denying that "Defendant's retain authority to limit or to deny…extraction, production, transportation, and utilization of fossil fuels, and otherwise to limit or prohibit their emissions").

Defendants' reliance on *Norton v. Southern Utah Wilderness Alliance* for the proposition that the Court may only compel ministerial action is misplaced. *Norton* alleged violations of statutory law through the Administrative Procedure Act ("APA"). 542 U.S. 55, 57–58 (2004). As Plaintiffs and this Court have oft-repeated, this is not an APA case. *See* Section III(B), *infra*. Defendants' invocation of *Louisiana Public Service Commission v. FCC*, 476 U.S. 355 (1986), is similarly unavailing because Plaintiffs are not seeking remedial action beyond Defendants' existing authority or requiring Congressional enactments. MSJ at 12. Rather, Plaintiffs seek relief that is frequently granted by and firmly within the competence of the federal judiciary: a declaration that Plaintiffs' constitutional rights have been violated and an order for the government to bring its conduct into constitutional compliance through a plan of Defendants' own devising. *See, e.g.*, *Brown v. Bd of Educ.*, 347 U.S. 483 (1954); *Plata*, 563 U.S. 493. Much of the same authority Defendants used to create and promote a national fossil fuel energy system can be employed to undo that system and create a clean, decarbonized energy system.

Additional to their broad authority to control pollution and protect public trust resources, Defendants have authority to design and implement components of a comprehensive remedial plan to transition the energy system to one that protects Plaintiffs' fundamental rights. *See, e.g.,*

42 U.S.C. § 7321 (Presidential authority and obligation to develop and propose to Congress a National Energy Policy Plan every two years); 50 U.S.C. § 4502 (Presidential authority under the Defense Production Act to "prepare for and respond" to "natural or man-caused disasters . . . ."); 42 U.S.C. § 7112 (DOE authority to coordinate and administer federal energy policy and programs to promote the general welfare and public interest); 42 U.S.C. §§ 6291-6296 (DOE also can set efficiency standards for "consumer products" other than automobiles); 42 U.S.C. §§ 7401-7431 (EPA can redress air pollution (including from CO_2) from stationary and mobile sources through a variety of mechanisms authorized by the Clean Air Act); 42 U.S.C. § 7408 (establishing air quality criteria); 42 U.S.C. § 7409 (defining National Ambient Air Quality Standards); 49 U.S.C. § 32902 (DOT can prescribe average fuel economy standards for new model years of automobiles); 43 U.S.C. §§ 1334, 1337; 30 U.S.C §§ 181-287; 30 U.S.C §§ 351-359 (DOI can discontinue leasing of federal property for the extraction of fossil fuels); 43 U.S.C. §§ 1701-84 (DOI can adopt management practices that increase carbon sequestration and storage); 16 U.S.C §§ 1600-1611 (USDA can ensure that GHG emissions from land use practices are reduced and carbon sequestration and storage is enhanced); 16 U.S.C. §§ 551, 576 (USDA has authority to protect national forests from destruction and to reforest those forests); 15 U.S.C. § 2901-04 (Commerce can broadly coordinate interagency assessments of the impacts of climate change and development of appropriate recommendations for action); 33 U.S.C. § 403; 33 U.S.C. § 1344 (DOD can deny permits necessary for the transport of coal, oil, and natural gas); Exec. Order No. 13,337, 69 Fed. Reg. 25,299 (DOS has authority to deny permits for the "construction, connection, operation, or maintenance, at the borders of the United States, of facilities for the exportation or importation…" of fossil fuels). In addition, the President may issue Executive Orders directing agencies to act.

Further, courts retain broad authority "to fashion practical remedies when faced with complex and intractable constitutional violations." *Plata*, 363 U.S. at 526. "Once a right and a violation have been shown, the scope of a district court's equitable powers to remedy past wrongs is broad, for breadth and flexibility are inherent in equitable remedies." *Swann v. Charlotte-Mecklenburg Bd. Of Educ.*, 402 U.S. 1, 15 (1971); *see also Florida v. Georgia*, No. 220142, 2018 WL 3129786 at 15 (S. Ct. June 27, 2018) (in addressing redressability of an injury in a state-to-state water apportionment dispute, the Supreme Court made clear that redressability need not be proven with clear and convincing evidence as a threshold matter, and that the court can use flexibility and approximation in remedying the injury). Plaintiffs' request for further relief also allows this Court to fashion an equitable remedy consistent with the role of the judiciary. Plaintiffs do not seek for the Court to specify the step-by-step plan for Defendants to remedy their unconstitutional behavior. As in *Plata*, this Court can set the constitutional floor necessary for preserving Plaintiffs' rights—the minimum safe level of atmospheric CO_2 concentrations and the timeframe in which that level must be achieved—and leave to Defendants the specifics of developing and implementing a compliant plan using their existing statutory authorities. 563 U.S. at 533; *Juliana*, 217 F. Supp. 3d at 1241-42; ECF No. 146 at 8.

Defendants' argument that Plaintiffs' proposed remedy would collide with the Clean Air Act ("CAA") misstates Plaintiffs' desired relief and attempts to revive the political question and displacement arguments already rejected by this Court. *See, e.g.*, *Juliana*, 217 F.Supp.3d at 1235-42, 1259-60. Also, Defendants' reliance on *AEP v. Connecticut* for standing is misguided because the Supreme Court did not address standing or redressability; instead relief was foreclosed because the federal common law nuisance claims at issue had been displaced by the

CAA.[19] 564 U.S. 410, 424 (2011). Finally, even assuming the EPA regulations cited by Defendants could adequately redress Plaintiffs' injuries (they cannot),[20] several of the rules cited are either stayed or in the process of being repealed by Defendants, mooting the argument.[21]

In sum, Defendants' arguments that this Court lacks the authority to craft a remedy to redress Plaintiffs' injuries are unpersuasive. The Supreme Court recently reaffirmed that remedies should be linked to the actions that produced the injury, and where a wholesale structural remedy is necessary to redress a constitutional injury, a court may so order it. *Gill v. Whitford*, 138 S. Ct. 1916, 1930 (2018) (quoting *Lewis v. Casey*, 518 U.S. 343, 357 (1996)). The Court explained: "The plaintiffs' mistaken insistence that the claims in *Baker* and *Reynolds* were 'statewide in nature' rests on a failure to distinguish injury from remedy. In those malapportionment cases, the only way to vindicate an individual plaintiff 's right to an equally

[19] Plaintiffs' requested relief is consistent with *City of Oakland v. B.P.*, an otherwise inapposite non-constitutional public nuisance case seeking monetary damages, wherein Judge Alsup clarified that "federal courts have authority to fashion…remedies for claims based on global warming" but "must also defer to the other co-equal branches of government when the problem…deserves a solution best addressed by those branches." Order Granting Motion to Dismiss, No. 3:17-cv-06011-WHA (N.D. Cal. June 25, 2018) Doc. No. 283 at 16, Olson Decl. MSJ, ¶ 4, Ex. 2. This is precisely the relief Plaintiffs request here. Plaintiffs ask the Court to assess the constitutionality of Defendants' systemic conduct, declare that conduct violates Plaintiffs' fundamental rights, and order Defendants to come into constitutional compliance while appropriately deferring to Defendants' judgment as to the best way to develop and implement a plan of their own devising.

[20] Defendants' disingenuous insistence that they are "responding to many of the concerns asserted by Plaintiffs," MSJ at 13, is belied, for example, by their averment that "the Clean Power Plan is not intended to 'preserve a habitable climate system.'" Answer ¶ 127, and the conduct of this Administration in exacerbating the climate crisis. Olson Decl. Ex. 368 (Secretary of Commerce Wilbur Ross stating: "Our oil and gas sector has already seen tremendous growth due to [the Trum[] Administration's deregulatory agenda, with more than 56 million feet drilled in the second quarter, up more than 38 percent since the fourth quarter of 2016.").

[21] *See* Review of the Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Generating Units, 82 Fed. Reg. 16,330 (April 4, 2017) ("The Executive Order specifically directs EPA to review and, if appropriate, initiate reconsideration proceedings to suspend, revise or rescind the New Source Rule.").

weighted vote was through a wholesale 'restructuring of the geographical distribution of seats in a state legislature.'" *Gill*, 138 S. Ct. at 1930 (quoting *Reynolds v. Sims*, 377 U.S. 533, 561 (1964)). Justice Kagan, in her concurrence, also explained that an appropriate remedy will depend upon what it takes "to cure all the packing and cracking," which caused the constitutional infringement. *Gill*, 138 S. Ct. at 1937 (Kagan, J., concurring).[22] Here, this Court should allow Plaintiffs to develop a full record on the structural remedial pathways that would vindicate their inalienable rights and redress their constitutional injuries from the climate "packing and cracking" perpetrated by Defendants. Plaintiffs have adduced evidence sufficient to create material disputes of fact as to their standing. This MSJ should be denied and this matter ordered to trial beginning October 29, 2018.

B. Plaintiffs' Constitutional Claims Are Not Governed by the APA

1. This Court Has Already Determined That the Fifth Amendment Provides Plaintiffs' Right of Action.

Equally unavailing is Defendants' argument that the APA "provides the sole mechanism" for Plaintiffs' challenge to the constitutionality of agency conduct. MSJ at 18.[23] This Court, affirmed by the Ninth Circuit under the "no clear error" standard, already rejected those arguments and held "it is the Fifth Amendment that provides the right of action" for Plaintiffs'

[22] "But with enough plaintiffs joined together—attacking all the packed and cracked districts in a statewide gerrymander—those obligatory revisions could amount to a wholesale restructuring of the State's districting plan. The Court recognizes as much. It states that a proper remedy in a vote dilution case 'does not *necessarily* require restructuring all of the State's legislative districts.' *Ibid*. (emphasis added). Not necessarily—but possibly. It all depends on how much redistricting is needed to cure all the packing and cracking that the mapmakers have done." *Id.*

[23] The APA unquestionably does not apply to or limit Plaintiffs' constitutional claims against the President. 5 U.S.C. § 702 (limiting APA's applicability to claims against "agency action").

claims. *Juliana*, 217 F.Supp.3d at 1261.[24] Judge Coffin confirmed disposition of this issue and there is no need for the Court to revisit it.[25] ECF No. 212 at 2.

2. Supreme Court and Ninth Circuit Precedent Establish That the APA is Not the Sole Means of Review for Constitutional Challenges to Agency Conduct

Even if this Court had not already decided the issue, Defendants' argument is foreclosed by clear precedent. The Supreme Court has ruled on several occasions that constitutional claims are not subject to the APA and may be brought independently. In *Franklin*, a case "rais[ing] claims under both the APA and the Constitution," the Court reached the merits of the constitutional claims against the Secretary of Commerce separately from its analysis of the APA claims, which the Court found were not viable for lack of "final agency action." 505 U.S. at 796–801, 803–06.[26] Similarly, in *Webster v. Doe*, the Supreme Court held a constitutional claim against an agency official was judicially reviewable even though not viable as an APA claim. 486 U.S. 592, 601, 603–05 (1998). Likewise, in *Hills v. Gautreuax*, a non-APA Fifth Amendment case, the Court approved a structural remedy similar to the relief requested here.

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[24] *See* ECF No. 208 at 5-14 (Excerpting and explaining the numerous instances in which the Parties have addressed Defendants' argument and this Court's and the Ninth Circuit's resolution of the same); ECF No. 195 at 10-22. In their recent application to the Supreme Court for an extension of time, Defendants conceded they argued this APA issue to the Ninth Circuit. ECF No. 211-1 at ¶ 3 ("The government petitioned the Ninth Circuit for a writ of mandamus ordering dismissal, contending that the district court's order contravened fundamental limitations on judicial review imposed by . . . the Administrative Procedure Act.").

[25] In their Writ Petition, Defendants presented substantially similar arguments to those on page 18, footnote 7 of the MSJ regarding Plaintiffs' challenge to Section 201 of the Energy Policy Act and DOE Order No. 3041, which was mandatorily issued thereunder. *See* Pet. for Writ of Mandamus, 4 n.1, *In re United States*, No. 17-71692 (9th Cir. June 9, 2017), Dkt. No. 1. As Plaintiffs showed in answering Defendants' Petition, ECF 241-1 at 13–18, Plaintiffs' challenge is properly before this Court. If Section 201 of the Energy Policy Act is unconstitutional, all orders issued under it, including still operational DOE/FE Order No. 3041, are also unconstitutional. Rather than restate those arguments here, they are incorporated by reference.

[26] As Defendants concede, the Court in *Franklin* found that "the President's actions may still be reviewed for constitutionality" outside of the APA. ECF No. 231 at 3.

425 U.S. 284, 205 ("The order would have the same effect…as a discretionary decision by HUD to use its statutory powers to provide the respondents with alternatives to the racially segregated Chicago public housing system created by…HUD.")[27]

Ninth Circuit precedent is also dispositive on this issue. *Presbyterian Church (U.S.A.) v. U.S.* makes clear that "§ 702 [of the APA] waives sovereign immunity not only for suits brought under § 702 itself, but for constitutional claims brought under the general federal question jurisdiction statute, 28 U.S.C. § 1331." 870 F.2d 518, 525 n.9 (9th Cir. 1989). The Ninth Circuit recently confirmed that constitutional challenges to agency conduct need not be brought under the APA in *Navajo Nation v. Dept. of the Interior*: "Claims not grounded in the APA, like . . . constitutional claims . . . 'do[ ] not depend on the cause of action found in the first sentence of § 702' and thus § 704's limitation [to 'final agency action'] does not apply to them." 876 F.3d 1144, 1170 (9th Cir. 2017) (citations omitted). The Ninth Circuit would have had no need to distinguish between Section 704 claims and other constitutional claims not brought pursuant to Section 704 if Congress had foreclosed such claims.

Defendants' statement that "the Supremacy Clause does not confer a cause of action" is entirely irrelevant. MSJ at 16. Irrespective of whether any other constitutional provision creates a right of action, it is well established that Plaintiffs may rest their claims "directly on the Due Process Clause of the Fifth Amendment." *Davis v. Passman*, 442 U.S. 228, 243–44 (1979); *see*

[27] Defendants' reliance on *Jarita Mesa Livestock Grazing Ass'n v. U.S. Gen. Serv.*, 58 F. Supp. 3d 1191 (D.N.M. 2014) is misplaced. Besides being a non-binding out-of-circuit district court opinion, *Jarita* relied solely, and erroneously, on Justice Scalia's dissent in *Webster* for its conclusion. *Id.* at 1237. Further, *Jarita* is factually distinguishable in that plaintiffs challenged singular agency actions and brought an APA challenge to the same final agency action challenged as unconstitutional. *Jarita* did not, as here, involve aggregate, systemic, and unconstitutional conduct of multiple federal agencies and individual officials, a challenge not suited to the narrow strictures of the APA.

also Bolling v. Sharp, 347 U.S. 497 (1954) (remanding for grant of equitable relief in school desegregation case resting directly on the Fifth Amendment).

While correctly noting the distinction between constitutional claims seeking equitable relief and cases[28] where courts have considered extending a claim in *damages* for constitutional violations, Defendants misunderstand the reason the Supreme Court developed the distinction in the first place. MSJ at 15–16. In *Davis* and its progeny, the Supreme Court explained the distinction between equitable and monetary relief is of primary importance to the availability of a claim for violation of fundamental constitutional rights. The *Davis* Court recognized a private right of action for damages under the Fifth Amendment. 442 U.S. 228. In doing so, the Court first asked whether the Fifth Amendment provides a right of action, irrespective of the remedy sought, concluding a party may "rest[] her claim directly on the Due Process Clause . . . ." *Id.* at 243–44. Only then did the Court "consider whether a damages remedy is an appropriate form of relief." *Id.* at 244. The Court's subsequent jurisprudence on this issue focuses entirely on whether *damages* are available, absent statutory authorization, as a remedy for constitutional violations. *See, e.g.*, *Carlson v. Green*, 446 U.S. 14 (1980); *Bush v. Lucas*, 462 U.S. 367 (1983).

Courts need not conduct a comparable inquiry into the availability of a cause of action seeking equitable relief for fundamental rights violations because it is a central precept of constitutional law that such actions are and always have been available:

> [I]t is established practice for this Court to sustain the jurisdiction of federal courts to issue injunctions to protect rights safeguarded by the Constitution . . . . Moreover, where federally protected rights have been invaded, it has been the rule

[28] *Bivens v. Six Unknown Named Agents of Fed. Bureau of Narcotics*, 403 U.S. 388 (1971); *Davis v. Passman* (1979), 442 U.S. 228; *Carlson v. Green*, 446 U.S. 14 (1980); *Ziglar v. Abassi*, 137 S. Ct. 1843 (2017); *Occupy Eugene v. U.S. Gen. Serv. Admin.*, No. 6:12-CV-02286-MC, 2013 WL 6331013 (D. Or. Dec. 3, 2013); *W. Radio Servs. Co. v. U.S. Forest Serv.*, 578 F.3d 1116 (9th Cir. 2009).

> from the beginning that courts will be alert to adjust their remedies so as to grant the necessary relief.

Bell v. Hood, 327 U.S. 678 (1946). Contrary to Defendants' position, the right of every citizen to injunctive relief from ongoing and prospective "official conduct prohibited" by the Constitution does not "depend on a decision by" the legislature "to afford him a remedy. Such a position would be incompatible with the presumed availability of federal equitable relief . . . ." *Bivens*, 403 U.S. at 400 (Harlan, J., concurring). The Court confirmed this reasoning in *Ziglar v. Abbasi*, where plaintiffs sought damages against "high executive officers," challenging "large-scale policy decisions" as violative of their Fifth Amendment substantive due process rights. 137 S. Ct. 1843, 1851–52, 1862 (2017). In response, the Court stated "[t]o address these kinds of [large-scale] policy decisions, detainees may seek injunctive relief." *Id*. at 1862; *see also Laird v. Tatum*, 408 U.S. 1, 14 (1972) (where there is "actual present or immediately threatened injury resulting from unlawful government action," systemwide relief may be appropriate).

Defendants' reliance on inapposite cases concerning the power of Congress to limit the authority of courts to redress violations of statutorily created rights[29] and cases concerning the limitations on actions brought under the APA[30] is wholly misplaced. As this Court acknowledged, Plaintiffs' challenge "rests directly on the Due Process Clause of the Fifth Amendment," *Juliana*, 217 F.Supp.3d at 1261 (citation omitted), and "it is the Fifth Amendment that provides the right of action." *Id.* Defendants' argument that the APA provides the sole

[29] *Armstrong v. Exceptional Child Ctr., Inc.*, 135 S. Ct. 1378 (2015); *Seminole Tribe of Fla. v. Florida*, 517 U.S. 44 (1996).
[30] *Norton v. S. Utah Wilderness All.*, 542 U.S. 55 (2004); *Lujan v. Nat'l Wildlife Fed'n*, 497 U.S. 871 (1990); *San Luis Unit Food Producers v. United States*, 709 F.3d 798 (9th Cir. 2013); *Sierra Club v. Peterson*, 228 F.3d 559 (5th Cir. 2000). Defendants' reliance on these cases is further misplaced as each challenged the violation of statutory law through the APA.

means to challenge the constitutionality of agency conduct has been rejected by this Court, is contrary to established Ninth Circuit and Supreme Court precedent, and lacks merit.

3. Limiting Plaintiffs' Constitutional Claims to the Strictures of the APA Would Violate Their Right to Procedural Due Process

Limiting Plaintiffs to the strictures of the APA would violate Plaintiffs' procedural due process right to meaningful review of their constitutional claims. *McNary v. Haitian Refugee Ctr., Inc.*, 498 U.S. 479, 496 (1991) (limited judicial review procedures established by statute did not apply where they would foreclose "meaningful judicial review" of challenge to agency's pattern of unconstitutional conduct). As observed in *Marbury v. Madison*, "[t]he very essence of civil liberty certainly consists in the right of every individual to claim the protection of the laws, whenever he receives an injury." 5 (U.S. 1 Cranch) 137, 163 (1803). Courts "presume constitutional rights are to be enforced through the courts." *Davis*, 442 U.S. at 242. This presumption is rebutted only by a "textually demonstrable *constitutional* commitment of [an] issue to a coordinate political department." *Id.* (citation omitted). Indeed, as stated in *Armstrong v. Exceptional Child Center*, constitutional rights are "congressionally unalterable." 135 S. Ct. at 1383. Even assuming *arguendo* Congress could alter the judiciary's authority over constitutional rights, "where Congress intends to preclude judicial review of constitutional claims, its intent to do so must be clear." *Webster*, 486 U.S. at 603. This heightened showing "is required in part to avoid the 'serious constitutional questions' that would arise if a federal statute were construed to deny any judicial forum for a colorable constitutional claim." *Id.* (citations omitted).[31]

[31] The *Webster* majority clearly rejected Justice Scalia's reasoning in his dissent, which Defendants resurrect here, and allowed the plaintiff's constitutional claims (not his separate APA claims) to proceed to discovery. 486 U.S. 592.

Here, the APA contains no clear statement of intent to "preclude review of constitutional claims." *Id.* Even if the APA did contain such a statement, it would raise serious questions as to the constitutionality of such a restriction. As Defendants' systemic actions threaten these young Plaintiffs' constitutional rights, precluding Plaintiffs' claims by or limiting them through the strictures of the APA would violate their procedural due process right to "meaningful judicial review." *McNary*, 498 U.S. at 496; *Webster*, 486 U.S. 592, 599-605 (APA's limitations do not apply where they would preclude review of a constitutional claim).

Determining whether procedural limitations, like those governing review of agency conduct in the APA, effectuate a violation of due process, requires consideration of three factors:

> First, the private interest that will be affected by the official action; second, the risk of erroneous deprivation of such interest through the procedures used, and the probable value, if any of additional or substitute procedural safeguards; and finally, the Government's interest, including the function involved and the fiscal and administrative burdens that the additional or substitute procedural requirements would entail.

Matthews v. Eldridge, 424 U.S. 319, 335 (1976). Each of these factors favors Plaintiffs.

First, the private interest at stake is unquestionably of the highest constitutional importance because, as this Court has determined, "Plaintiffs have adequately alleged infringement" of their fundamental constitutional rights. *Juliana*, 217 F. Supp. 3d at 1250.

Second, there is an absolute risk of erroneous deprivation of Plaintiffs' fundamental rights if Plaintiffs must plead their claims under and subject to the strictures of the APA. Defendants argue that Plaintiffs must individually challenge "thousands of discrete agency actions" rather than Defendants' systemic conduct. MSJ at 16 (citations omitted); *see* ECF No. 195 at 16-22. Any law that required Plaintiffs to individually challenge each of the "thousands" of agency actions which have contributed to Plaintiffs' injuries, including those dating from before these youth were born, would be a herculean, if not impossible, task, and would avoid

presenting the true case and controversy of Defendant's affirmative and unconstitutional systemic conduct, which is the cause of Plaintiffs' injuries. FAC ¶ 129 ("The vastness of our nation's fossil fuel enterprise renders it infeasible for Plaintiffs to challenge every instance of Defendants' violations, and, even if feasible, challenging each of Defendants' actions would overwhelm the Court."); *see McNary*, 498 U.S. at 496 (Limiting review of agency's pattern of unconstitutional violations to administrative records would preclude meaningful review); *see Armstrong v. Manzo*, 380 U.S. 545, 552 (1965) (Procedural safeguards must be offered "at a meaningful time and in a meaningful manner."). It is not isolated individual agency action that has caused Plaintiffs' systemic injuries. As the Supreme Court just ruled in *Gill v. Whitford*, a remedy should be tied to the government action that caused the injury, not more expansive, nor less. 138 S. Ct. 1916, 1930 (2018). While the APA may not permit challenges to "broad programmatic" or systemic agency action (*see Norton*, 542 U.S. at 64), such challenges can undoubtedly proceed directly under the Fifth Amendment. *See, e.g. Ziglar*, 137 S. Ct. at 1862; *McNary*, 498 U.S. 479. To hold otherwise would subject Plaintiffs to more than a mere risk of erroneous deprivation of their rights, it would render such deprivation inevitable.

Third, the government's interest in administrative efficiency favors litigating Plaintiffs' claims as a single systemic challenge rather than a myriad of challenges to a vast multitude of individual agency actions, which would undoubtedly prove costly, inefficient, and unduly burdensome for all parties involved, as well as the courts.

Thus, every *Eldridge* factor strongly favors proceeding with Plaintiffs' claims as pleaded in order to avoid a procedural due process violation. It is unimaginable in our divided system of government that the systemic, catastrophic constitutional violations at issue here could be placed beyond the Court's basic power and duty to safeguard individual fundamental rights. Even if

Defendants were not completely wrong on the law, there would be genuine issues of material fact in dispute as to whether limiting Plaintiffs' claims to the strictures of the APA would violate their substantive and procedural due process rights. In their Answer, Defendants dispute that the systemic nature of their conduct has caused and is causing the profound harms underlying Plaintiffs' claims.[32] Plaintiffs submit evidence demonstrating genuine issues of material fact as to standing (Section III(A), *supra*) and the merits of their constitutional claims (Section III(D), *infra*). Because limiting Plaintiffs' claims to the APA would render inevitable a deprivation of their fundamental rights, as explained *supra*, this evidence also demonstrates genuine issues of disputed material fact as to whether so limiting Plaintiffs' claims would result in a violation of their substantive and procedural constitutional rights. In addition to Defendants' APA arguments being wholly without merit, summary judgment on this issue could easily be denied for the further reason of the existence of genuine issues of material fact.

C. Plaintiffs' Claims and Requested Relief Do Not Violate Separation of Powers Principles.

Defendants recycle their separation of powers argument, which is rooted in their fundamental mischaracterization of Plaintiffs' requested relief and advances a dangerously narrow construction of the Due Process Clause. This Court has already analyzed and found Plaintiffs' claims fall within those "cases" or "controversies" amenable to judicial resolution, and the Ninth Circuit found no clear error with that analysis. *Juliana*, 217 F. Supp. 3d at 1235-42; *In re United States*, 884 F.3d 830 (9th Cir. 2018). Here, Plaintiffs' again address the argument showing disputed issues of material fact pertinent to any separation of powers consideration on the merits. Whether "governmental action is affirmatively and substantially damaging the climate system" is eminently suitable for judicial resolution without implicating separation of

[32] *See* n.5, *supra.*

powers concerns. *Juliana*, 217 F. Supp. 3d at 1250; *Bowsher v. Synar*, 478 U.S. 714, 721 (1986); *Marbury*, 5 U.S. (1 Cranch) at 163. The judiciary has consistently served as a bastion of protection from systemic infringements of constitutional rights and can craft a remedy consonant with separation of powers after a thorough examination of Plaintiffs' claims, injuries, and evidence at trial. The stakes of the climate crisis effectively leave the judiciary as Plaintiffs' "last resort" and exercise of judicial jurisdiction is a "necessity." *Allen*, 468 U.S. at 752.

1. Courts have the authority and obligation to address claims of constitutional infringements and public trust violations.

This Court has the authority and obligation to address Plaintiffs' claims of constitutional infringements and public trust violations. U.S. Const., art. III, § 2 ("The judicial power shall extend to all cases, in law and equity, arising under the Constitution . . . ."); *Obergefell v. Hodges*, 135 S. Ct. 2584, 2598 (2015) ("The identification and protection of fundamental rights is an enduring part of the judicial duty to interpret the Constitution."). Defendants make much of the unprecedented nature of Plaintiffs' claims, yet these claims simply mirror the unprecedented magnitude of harm from Defendants' misconduct. As the Supreme Court recently explained, our Constitution was built to adapt to evolving notions of liberty:

> The nature of injustice is that we may not always see it in our own times. The generations that wrote and ratified the Bill of Rights and the Fourteenth Amendment did not presume to know the extent of freedom in all of its dimensions, and so they entrusted to future generations a charter protecting the right of all persons to enjoy liberty as we learn its meaning.

Obergefell, 135 S. Ct. at 2598.

That Plaintiffs allege pervasive and systemic harms only reinforces the vital role of the judiciary here. Defendants misconstrue the Due Process Clause as inapt for resolving matters "affecting every person in the country." MSJ at 22. To the contrary, the Due Process Clause has consistently been moved our nation towards evolving notions of justice and liberty *for everyone*.

See, e.g., *Baker v. Carr*, 369 U.S. 186 (1962) (preservation of democratic process by addressing malapportionment); *Gomillion v. Lightfoot*, 364 U.S. 339 (1960) (racial discrimination in elections); *Brown v. Bd. of Ed. of Topeka, Shawnee Cty., Kan.*, 347 U.S. 483 (1954) (desegregation); *Obergefell*, 135 S. Ct. at 2608 (the right of same-sex couples to "exercise the fundamental right to marry in all States."); *Glasser v. U.S.*, 315 U.S. 60 (1942); *Taylor v. Louisiana*, 419 U.S. 552 (1975) (remedying systematic exclusion of women from jury service); *Griswold v. Connecticut*, 381 U.S. 479 (1965) (limits on contraception conflict with fundamental rights of married people); *Eisenstadt v. Baird*, 405 U.S. 438, 443 (1972) (extending right of privacy to contraception for non-married people). Federal courts routinely address systemic harms and are equipped to do so when the infringements emanate systemically from another branch of government—that is how our tripartite system is intended to function. *Brown v. Plata*, 563 U.S. 493 (2011) (challenge to systemic conditions across state prison system); *Brown v. Bd. of Educ.*, 349 U.S. 294 (1955) (systemic racial injustice in school systems).

Our carefully constructed system of checks and balances was designed to protect individuals from "the unlawful exercise of governmental power" by the other branches of government. *Obergefell*, 135 S. Ct. at 2605 (internal quotation marks and citation omitted). When the legislative or executive branches violate individual rights, courts have a duty to provide redress even if doing so "affects issues of the utmost importance and sensitivity." *Obergefell*, 135 S. Ct. at 2605; *Brown*, 349 U.S. 298 ("All provisions of federal, state, or local law requiring or permitting such discrimination must yield to [the principle that racial discrimination in public education is unconstitutional]."). Consequently, "[a]n individual can invoke a right to constitutional protection when he or she is harmed, even if . . . the legislature refuses to act" on that issue. *Obergefell*, 135 S. Ct. at 2605; *see also Clinton*, 520 U.S. at 682

("[T]he Judiciary may severely burden the Executive Branch by reviewing the legality of the President's official conduct."). To deprive Plaintiffs of their day in court would be to skew the balance of power towards a legislature and executive that have not only refused to act, but that have systemically and affirmatively infringed Plaintiffs' constitutional and public trust rights.

The longevity and magnitude of Defendants' harms alongside separation of powers principles not only allow, but *demand* this case be heard. *See Allen*, 468 U.S. at 760, *abrogated on other grounds by Lexmark Int'l, Inc. v. Static Control Components, Inc.*, 134 S. Ct. 1377 (2014) (the judiciary must monitor "wisdom and soundness of Executive action" in the event of "actual present or immediately threatened injury resulting from unlawful government action") (citation and internal quotation marks omitted). "The declared purpose of separating and dividing the powers of government, of course, was to diffuse power, the better to secure liberty" not to better protect the executive and legislature when they wield power to infringe inalienable rights. *Bowsher v. Synar*, 478 U.S. 714, 721 (1986). For at least four decades, Defendants have knowingly administered a dangerous fossil fuel-based system that presents an "actual present or immediately threatened injury," *Allen*, 468 U.S. at 760, upon which Plaintiffs' claims are founded. *See* Section III(A)(1), (2) *supra*. Separation of powers principles are properly invoked here, not as a reason to disregard Plaintiffs' claims, but rather as the reason to consider them.

Defendants' tactic to suggest Plaintiffs pursue piecemeal action has previously been rejected for addressing systemic constitutional harms. The *Obergefell* court, for example, declined to permit "slower, case-by-case determination[s]" of the rights of same-sex couples because doing so would permit ongoing violations of fundamental rights. 135 S. Ct. at 2606; *Brown v. Bd. of Educ. of Topeka, Kan.*, 349 U.S. 249, 299 (1955) (holding courts of equity can eliminate obstacles to desegregation in a systemic manner to abide the constitutional principles).

2. Plaintiffs properly request declaratory and injunctive relief for their injuries.

Defendants' perpetual mischaracterization of Plaintiffs' claims and requests for relief does not warrant summary judgment. *See, e.g.*, ECF No. 27-1 at 17–18 (describing the remedy as "transform[ing] the district court into a super-regulator setting national climate policy"); ECF No. 74 at 33 ("Such an order would place the judiciary in the position of a *de facto* superagency . . . and it would raise profound separation of powers problems"); Plaintiffs have not requested, and this Court need not order, specific regulatory action by Defendants. FAC, Prayer for Relief. Rather, Plaintiffs seek to have their rights vindicated through declaratory and injunctive relief, a well-worn pathway for rectifying constitutional violations. *See Juliana*, 217 F. Supp. 3d at 1241.

This Court has the judicial powers and expertise to delineate the scope of Plaintiffs' rights, examine the extent of Defendants' violations, and fashion relief based on those findings. *See Milliken v. Bradley*, 433 U.S. 267, 280 (1977) ("[T]he nature of the . . . remedy is to be determined by the nature and scope of the constitutional violation."). Summary judgment is inappropriate on separation of powers grounds where this Court has not yet determined the scope of Defendants' violations or Plaintiffs' injuries. *Baker*, 369 U.S. at 198 ("Beyond noting that we have no cause at this stage to doubt the District Court will be able to fashion relief if violations of constitutional rights are found, it is improper now to consider what remedy would be most appropriate if appellants prevail at trial."); *see also Ruiz v. Estelle,* 679 F.2d 1115, 1155 (5th Cir. 1982) ("Injunctive relief need not be confined to an order to cease an illegal practice. Once a constitutional violation has been proved, the court may, if necessary, exert its equitable power to prevent repetition of the violation, not only by the force of the contempt sanction but also by commanding measures that safeguard against recurrence."). This case should continue with

discovery to allow the "discriminating inquiry into the precise facts and posture of the particular case" necessary before dismissal case on separation of powers grounds. *Baker*, 369 U.S. at 199.

Nor are the inherent factual and scientific complexities of this case grounds for summary judgment. Plaintiffs do not ask this Court to make "energy and environmental policy," MSJ at 20, but to weigh the relevant facts and evidence on climate change and Plaintiffs' injuries and set constitutional standards. *See* ECF 146 at 9. Nor is political tension surrounding climate change grounds for summary judgment; "federal courts regularly adjudicate claims that arise in connection with politically charged issues." *Juliana*, 217 F.Supp.3d at 1236; *See also Brown*, 349 U.S. at 299 ("School authorities have the primary responsibility for elucidating, assessing, and solving these problems; courts will have to consider whether the action of school authorities constitutes good faith implementation of the governing constitutional principles."). Defendants cite no convincing reason why this Court cannot take a similar approach here.

Finally, Defendants make the untenable argument that this Court cannot grant relief because such relief is not within traditional notions of equity. MSJ at 21. Judicial review of the political branches has been a historic stalwart of separation of powers principles. *Nixon v. Fitzgerald*, 457 U.S. 731, 761 (1982). Equity is an inherently flexible power. *Hecht Co. v. Bowles*, 321 U.S. 321, 329 (1944). The authorities Defendants cite ostensibly refuting this interpretation are inapposite to the systemic constitutional harms alleged here. *Guar. Tr. Co. of N.Y. v. York*, 326 U.S. 99 (1945) (examining equity principles applied to federal courts' ability to enforce non-federal rights); *Grupo Mexicano de Desarrollo S.A. v. All. Bond Fund, Inc.*, 527 U.S. 308 (1999) (relying on principles of private debtor-creditor law). Plaintiffs' claims should proceed to trial and, after considering all the evidence to determine the "nature and scope of the constitutional violation," this Court can construct an proper remedy. *Milliken*, 433 U.S. at 280.

D. Plaintiffs' Claims Do Not Fail as a Matter of Law

Defendants move for partial summary judgment on only three of Plaintiffs' Fifth Amendment substantive due process claims. Defendants argue again that there is no implied Fifth Amendment right to a climate system capable of sustaining human life and that the public trust doctrine does not apply here. They repeat their contention that the state-created danger doctrine of the Fifth Amendment only applies when a governmental body takes control over a particular individual's person. MSJ at 24-28. This Court already rejected these legal arguments and need not decide them again as a matter of law without a fully developed factual record. *Juliana*, 217 F. Supp. 3d at 1250. All of Plaintiffs' claims require an empirical scientific and historical analysis. ECF 146 at 11 ("plaintiffs' substantive due process claim presents a mixed question of law and fact that mandates an opportunity to develop the record."). Defendants have not, however, moved for summary judgment on three of Plaintiffs' Fifth Amendment claims; therefore, the merits of these claims are not at issue in Defendants' MSJ nor Plaintiffs' Response.

1. Material Facts are in Dispute Regarding Plaintiffs' Fundamental Right to a Climate System Capable of Sustaining Human Life.

The Supreme Court has intentionally availed itself to review and recognize new fundamental rights. "The identification and protection of fundamental rights is an enduring part of the judicial duty to interpret the Constitution [and] 'has not been reduced to any formula.'" *Obergefell,* 135 S. Ct. at 2598 (quoting *Poe v. Ullman,* 367 U.S. 497, 542 (1961)). In deciding whether to recognize a newly asserted fundamental right, the Supreme Court has asked "whether that right is fundamental to the Nation's scheme of ordered liberty . . . or . . . whether it is 'deeply rooted in this Nation's history and tradition.'" *McDonald v. City of Chicago, IL*, 561 U.S. 742, 744 (2010) (quoting *Washington v. Glucksberg*, 521 U.S. 702, 721 (1997)). A full fundamental rights analysis involves an empirical inquiry. *See Perry v. Schwarzenegger,* 704

F.Supp.2d 921 (N.D. Cal. 2010) (holding bench trial). Here, both historical and scientific factual evidence are material to this analysis, which should be fully developed at trial so that the appellate courts have a full record to consider with findings of fact and conclusions of law.[33]

The right, already recognized by this Court, "to a climate system capable of sustaining human life" is both fundamental to ordered liberty and deeply rooted in our history and traditions as a nation. *Juliana*, 217 F.Supp.3d at 1250. As this Court held, "roots" of the right are found in the penumbras of the Bill of Rights and the various amendments. *Id*. Often, a newly recognized unenumerated fundamental right is a "right underlying and supporting other vital liberties." *Id.*

A full merits decision of this newly recognized right and its contours involves an empirical analysis. Thus, Plaintiffs proffer material facts and opinion in the expert report of historian Andrea Wulf describing the deep roots of this fundamental right in the Nation's history and traditions. Wulf Decl., Ex. 1. Wulf explains that the natural environment was a critical underlying principle of liberty on which Jefferson, Washington, Madison, and Adams founded the Nation. The Founders were rooted in the principle Alexander von Humboldt[34] best described as: "Nature is the domain of liberty." *Id.* at 3. Humboldt wrote that "nature's balance was created by diversity, which might in turn be taken as a blueprint for political and moral truth." *Id.* The Founders echoed Humboldt's teachings in their own writings and speeches. *Id.* Washington said that the proper management of the lands would contribute more to the welfare of the states than

[33] Important fundamental rights cases were all decided on appeal of merits decisions: *Brown v. Bd. of Ed.*, 347 U.S. 483, 486 n.1 (1954) (four district court records); *Plata*, 563 U.S. at 499-500 (two district courts), *Obergefell*, 135 S.Ct. 2584 (three final decisions for plaintiffs and one preliminary injunction), *Grutter v. Bollinger*, 539 U.S. 306 (2003), *Lawrence v. Texas*, 539 U.S. 558 (2003), *Furman v. Georgia*, 408 U.S. 238 (1972); *Atkins v. Virginia*,536 U.S. 304 (2002); *Roper v. Simmons*, 543 U.S. 551 (2005).

[34] The Founders spent time with and were greatly influenced by the German explorer and scientist Alexander von Humboldt. *Id*. at 2. They read his books, kept their own climate journals, worried about the state of the natural environment, and were, at their core, farmers who understood the importance of protecting nature for future generations of Americans. *Id.*

anything else and they linked national "happiness, dignity and independence" to the quality of the lands. *Id.* at 3-4. Wulf opines that "it was America's nature, soil and plants that provided a transcendent feeling of nationhood. Nature was inextricably linked to guarding liberty." *Id.* at 4.

James Madison's speech of 1818, after ending his Presidency, was especially prophetic and "emblematic of how deeply rooted the importance of nature in balance was to the founders and to the young nation:"

> Madison was the first American politician to write that 'the atmosphere is the breath of life. Deprived of it, they all equally perish,' referencing animals, man and plants. He spoke of the balanced composition of the atmosphere and the give and take of animals and plants, which allowed the atmosphere the aptitude to function so as to support life and the health of beings, according to nature's laws. The threat to nature in 1818 was largely from deforestation, the degradation of soils and the agricultural practices that Humboldt spoke of—threats to what Madison called the 'symmetry of nature.'

Id.

Defendants contend that, "unlike the right recognized in *Obergefell*, the right to a climate-system capable of sustaining human life has no relationship to 'certain personal choice central to individual dignity and autonomy,'" thereby creating a dispute of empirical historical and scientific fact that should be resolved at trial. MSJ at 25. Expert Wulf disagrees. Wulf Decl., Ex. 1 at 4, 7-8 (President Roosevelt explaining: "The function of our Government is to insure to all its citizens, now and hereafter, their rights to life, liberty and the pursuit of happiness. If we of this generation destroy the resources from which our children would otherwise derive their livelihood, we reduce the capacity of our land to support a population, and so either degrade the standard of living or deprive the coming generations of their right to life on this continent.").

Plaintiffs and their experts make clear that the dangers of climate destabilization do in fact, as President Roosevelt predicted, threaten personal choice central to individual dignity and autonomy. Jaime Decl., ¶¶ 4, 12–14, 26–27 (drought and lack of water forced her from her home

on the Navajo Nation reservation, eliminated her ability to harvest important traditional plants and medicines, and extreme heat forces her to stay inside all day when she would rather be active outdoors); Nicholas Decl., ¶ 7 ("Colorado is my home and where I want to spend the rest of my life. It is my dream to live in the foothills of the Rocky Mountains but I am now too scared to move there because of the threat of wildfires."); Running Decl., Ex. 1 at 5-9, 12-18, 24-27, 29; Trenberth Decl., Ex. 1 at 21; Van Susteren Decl., Exhibit C to Ex. 1 (filed pursuant to protective order). Thus, like the historical roots of the fundamental right to marry, the same can be said for the climate. *Obergefell*, 135 S. Ct. at 2594; Hansen Decl., Ex. 1 at 44-49; Wulf Decl., Ex. 1.

Defendants incorrectly contend that the Court's recognition of a fundamental right to a climate system capable of sustaining human life "wrests fundamental policy issues" from the Legislative branch. MSJ at 34. This argument ignores Supreme Court precedent that the declaration and protection of fundamental rights is the *duty* of the judicial branch. *Obergefell*, 135 S. Ct. at 2598. Defendants' theory that a fundamental rights analysis should be rejected when the right would require a change to large government policies and systems would have been the downfall of cases on desegregation, prison reform, same-sex marriage, or the right of women to serve on juries and have access to contraception, among other rights. *See supra* C.1. In contrast to those cases, the United States already has a clear policy of protecting the climate system by ratifying the United Nations Framework Convention on Climate Change and in our nation's conservation legislation, and thus the Court's recognition of this fundamental right is not inconsistent with policy decisions that have already been made.[35]

[35] *See, e.g.*, UNFCCC, *adopted* May 9, 1992, 1771 U.N.T.S. 107, S. Treaty Doc. No. 102-38 (1992); Clean Air Act § 101, 42 U.S.C. § 7401; National Environmental Policy Act § 101, 42 U.S.C. § 4331(b)(1) ("[I]t is the responsibility of the Federal Government to . . . fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.").

Defendants cite no compelling authority or evidence to support their dispute with the Court's finding that "a stable climate system is quite literally the foundation 'of society, without which there would be neither civilization nor progress.'" *Juliana*, 217 F.Supp.3d at 1250. Wulf explains that there is ample support for this in the historic record:

> The 'breath of life' that the atmosphere, forests, soils, waters (the climate system) was to the agrarian society in which the founding fathers lived was also foundational to the liberties they staked out for their new nation. There may be no other implicit liberty right more rooted in the history and traditions of the United States than the right to a climate that sustains life the life that humans have enjoyed for generations and that is now catastrophically threatened.

Wulf Decl., Ex. 1 at 4. Defendants raised a disputed fact as to this claim by denying the historical and scientific facts and empirical evidence demonstrating the unenumerated right recognized by this Court has deep roots in our nation's history and is implicit, as demonstrated by hard scientific evidence, in the concept of ordered liberty. That is both a factual and legal inquiry that courts must engage, one best suited for the merits at trial.

2. Plaintiffs' Proffer of Evidence of Material Facts Disputed by Defendants Demonstrates That the Federal Government Has Put Them in a Position of Danger in Violation of the Fifth Amendment.

This Court has recognized Plaintiffs' allegations that their injuries stem from Defendants' affirmative actions and deliberate indifference to the dangers of climate change constitute a valid State-created danger claim under the Due Process Clause. *Juliana,* 217 F.Supp.3d at 1251-1252. Defendants suggest that proving a State-created danger claim requires "a clear and present danger of imminent physical harm to a specific plaintiff with whom the government had a distinct relationship, an overt government act that proximately caused the dangerous situation, deliberate indifference by the government to the particular plaintiff's safety, and subsequent physical harm or loss of life." MSJ at 27. But Defendants cite no authority for so construing the principles articulated in *Deshaney v. Winnebago Cnty. Dep't of Soc. Servs.,* 489 U.S. 189 and its

progeny. Rather, as this Court stated, "A plaintiff asserting a danger-creation due process claim must show (1) the government's acts created the danger to the plaintiff; (2) the government *knew* its acts caused that danger; and (3) the government with *deliberate indifference* failed to act to prevent the alleged harm." *Juliana,* 217 F.Supp.3d at 1252 (emphasis in original).

Although a State-created danger claim "imposes rigorous proof requirements," *Id*., Plaintiffs proffer ample evidence to make a triable issue of material fact for each limb of the test articulated by this Court. With respect to the first limb, Plaintiffs proffer material facts for each link in the causal chain establishing that Defendants at minimum placed Plaintiffs "in a worse position than that in which [they] would have been had the state not acted at all." *Pauluk,* 836 F.3d at 1125 (internal quotation marks and citations omitted). Plaintiffs submit evidence that the U.S. is responsible for a substantial percentage of current and historical CO_2 emissions, and that Defendants' aggregate actions—including but not limited to fossil fuel subsidies and leasing of federal land to fossil fuel exploration—perpetuate a fossil fuel energy system and result in greater CO_2 emissions than would occur in the absence of Defendants' aggregate actions. *See* Hansen Decl., Ex. 1 at 26; Erickson Decl., Ex. 1 at 4-20; *See* Section III(A)(2), *supra*. Plaintiffs proffer evidence that these excess GHGs cause and enhance myriad dangers to Plaintiffs. *See* Section III(A)(1). Plaintiffs present evidence that they are personally suffering harm from these dangers. *Id.*

Defendants argue the harm suffered under the State-created danger exception must be "physical harm." MSJ at 36. There is no reasoned basis and Defendants cite no authority for the proposition that psychological harms are excluded from a State-created danger claim. Although Plaintiffs proffer disputed material facts of physical harm, and thus do not need to solely rely on psychological harm, Plaintiffs' evidence of psychological harm from Defendants' actions is

staggering, and in many respects equivalent to the proffered evidence of physical harm. As summarized in the expert opinion of Dr. Lise Van Susteren,

> [T]hese youth Plaintiffs, and many other children, are already experiencing acute and chronic mental health impacts as a result of climate change and its impacts. These mental health impacts are exacerbated because climate change is a direct result of actions taken by the federal defendants, who are supposed to be protecting the Plaintiffs and future generations. Some of the Plaintiffs are in a state of despair, others are angry and have feelings of hopelessness. They are extremely worried about their futures and the world that they will grow up in. Without immediate action by the federal defendants to address climate change, it is my expert opinion that these Plaintiffs will continue to suffer acute and chronic mental health impacts and that their suffering will worsen. These conclusions are consistent with what I have seen in my practice and the literature."

Van Susteren Decl., Ex. 1 at 23. As one example of the gravity of Plaintiffs' psychological harms, Plaintiff Levi D. describes having recurring nightmares about climate change damage to his home. Levi Decl. at ¶5.

With respect to the second limb of the State-created danger test, Plaintiffs, through the expert declaration of James Gustave "Gus" Speth, proffer decades of material facts of Defendants' knowledge that its actions caused dangers to Plaintiffs:

> [I]t is my expert opinion that the U.S. government, including Federal Defendants and the highest levels of the Executive Branch and Congress, knew by the late 1970s, with enough certainty to act, that the ongoing reliance on fossil fuels posed a serious threat to earth's climate system, the nation, and future generations. It is also my opinion that Federal Defendants were well informed and advised about alternative energy pathways for the nation that were within their authority to pursue, which would have minimized or avoided the increasing threat of climate change caused by greenhouse gas emissions and met the energy and security needs of the nation.

Speth Decl. ¶ 8. Speth's opinion is supported not only by his years of service within the Carter Administration and decades of public service outside the U.S. government, but also by his expert historical analysis of an extensive record of government documents.

With respect to the third limb of the State-created danger test, the Speth declaration also proffers material facts of Defendants' deliberate indifference:

> The Federal Defendants' actions managing the national energy system from each administration after Carter is, in my view, *the greatest dereliction of civic responsibility in the history of the Republic*. And it is worse today than ever. This shocking historical conduct, government malfeasance on a grand scale, summarized below, has left current and future generations enormously vulnerable to substantial danger.

Speth Decl. ¶ 11 (emphasis added). Speth explains how, "year by year, and administration by administration, Federal Defendants knowingly pursued and enacted national fossil fuel-based energy policies and planning that would increase climate change-inducing greenhouse gas emissions" despite full and ever-growing knowledge of the grave consequences of these actions. *Id.* at ¶ 8. Plaintiffs submit evidence establishing that Defendants' culpable state transcends "gross negligence" and falls within the conscience-shocking realm of deliberate indifference. *Pauluk*, 836 F.3d at 1125 (quotation marks omitted). To hold otherwise would set an impossibly high factual threshold for culpability and insulate "the greatest dereliction of civic responsibility in the history of the Republic" from constitutional scrutiny. Plaintiffs have identified material facts going to each limb of the State-created danger test and have demonstrated that there are genuine issues for trial with respect to this claim. This Court should deny summary judgment.

3. Plaintiffs Submit Evidence of Material Facts Disputed by Defendants Regarding Their Claim That The Public Trust Doctrine Applies to the Federal Government's Management of Trust Resources.

This Court has previously determined the Public Trust Doctrine "is deeply rooted in our nation's history and indeed predates it," and provides Plaintiffs a cause of action under the Fifth Amendment Substantive Due Process Clause. *Id.* at 1274-1276. This Court provided a well-reasoned analysis in rejecting Defendants' arguments that: (1) *PPL Montana, LLC v. Montana*, 565 U.S. 576 (2012), precludes a federal Public Trust Doctrine claim; (2) *Illinois Central Railroad v. Illinois*, 146 U.S. 387 (1892), was only a statement of law relevant to State sovereigns and not the Federal sovereign; (3) the Property Clause entrusts Congress exclusively

with unlimited power over public lands without limitation;[36] and (4) under *AEP v. Connecticut*, 564 U.S. (2011), the Clean Air Act displaces any Public Trust Doctrine claim. *Juliana*, 217 F. Supp. 3d at 1272-1276. Under the clear error standard, the Ninth Circuit upheld this Court's order. *In re United States*, 884 F.3d 830 (2018).

Defendants' argument that the Public Trust Doctrine does not apply to Defendants' management of the atmosphere presents mixed questions of law and disputed material facts and fails on summary judgment. Resting strictly on the identical legal arguments Defendants made in their Motion to Dismiss and Petition for Writ of Mandamus, Defendants do not make any legal or factual arguments as to why the atmosphere is not a public trust resource subject to protection, even though they raise it in the MSJ. It should be rejected for that reason alone.

Moreover, the contours of the federal Public Trust Doctrine, and whether the atmosphere or climate system is part of the federal trust *res* is a mixed question of law and fact. The Doctrine is deeply rooted in United States history and tradition. *See* Wulf Decl., Ex. 1 at 2 (Founders saw "nature as the foundation of the nation."); Smith Decl., Ex. 1 at 6-18; The Federalist No. 46 (James Madison) ("The federal and State governments are in fact but different agents and trustees of the people"); *Martin v. Waddell*, 41 U.S. 367, 413 (1842). The Founders saw the atmosphere and the climate as integral to their liberties. *See* Wulf Decl., Ex. 1 at 21-22.

[36] Defendants cite one new case, *United States v. Bd. of Cty. Comm'rs of Cty. of Otero,* which stands for the proposition that, due to the Supremacy Clause, the federal government's power to protect federal lands under the Property Clause preempts contradictory *state* or *local* laws. 843 F.3d 1208, 1213 (10th Cir. 2016), *cert. denied,* 138 S. Ct. 84 (2017). Neither *Otero* nor *Kleppe* stand for the proposition that the federal government has no *federal* public trust obligation to protect public trust resources or that the federal government cannot be constrained by *federal* law in how it manages federal property. In fact, *County of Otero* expressly left open the question of whether the Forest Service could be held liable under *federal* common law. *Id.* at 1215.

Further evidence exists in public laws, which do not form the origination of the federal Public Trust Doctrine, but affirm the Doctrine applies, and its contours. 42 U.S.C. § 4331(b)(1) (declaring government has "continuing responsibility" to "use all practicable means" so as to "fulfill the responsibilities of each generation as trustee of the environment for succeeding generations."); 42 U.S.C. § 9607(f)(1) (directing Defendants to act as trustees of *all natural resources* under their management and control); *see also* 33 U.S.C. § 2706 (b)(1)&(2) (Oil Pollution Act); 40 C.F.R. § 300.600(b) (designating Departments of Agriculture, Commerce, Defense, Energy, and Interior); 40 C.F.R. § 300.600(a) (defining natural resources to "mean[] air, . . . , and other such resources . . . , held in trust by" Defendants); 42 U.S.C. § 9607(f)(2)(A).

According to the U.S. Commission on Ocean Policy, "the U.S. government holds ocean and coastal resources in the public trust—a special responsibility that necessitates balancing different uses of those resources for the continued benefit of all Americans."[37] *See also* Olson Decl. Ex. 371 ("NOAA recognizes it has the duty to protect public trust resources such as fish and shellfish, and that climate change threatens those resources.").

Defendants also have taken the position before federal courts that they are trustees over natural resources and have rights and obligations under the Public Trust Doctrine. *See, e.g.*, *U.S. v. CB & I Constructors, Inc*., 685 F.3d 827 (9th Cir. 2011); *Conner v. U.S. Dep't of Interior*, 73 F.Supp.2d 1215, 1219 (D. Nev. 1999); *U.S. v. Burlington N. R.R.*, 710 F.Supp. 1286 (D. Neb. 1989); *In Re Steuart Transp. Co.*, 495 F.Supp. 38 (E.D. Va. 1980). In a case against British Petroleum over their oil spill, the United States claimed damages for "[n]atural resources under

[37] U.S. Senate Committee on Commerce, Science, & Transportation: Hearing on Oceans Commission (Sept. 21, 2004) (statement by Admiral James D. Watkins USN (Ret.), http://www.commerce.senate.gov/public/index.cfm/hearings?Id=51065a2d-0cd0-41c7-b916-fbbb50cc9fec&Statement_id=4814F650-71F1-40A1-90E7-7F563C08D25A

the trusteeship of the United States." Compl., *United States v. BP Exploration & Production, Inc*., No 2:10CV04536, 2010 WL 5094310, ¶ 66 (E.D. La. 2010).

Defendants remain sovereign trustees for public trust resources still within the federal public domain, which transcends state borders and includes the air and atmosphere, the oceans, migratory wildlife, and federal public lands. *See* J. Inst. 2.1.1 (T. Sanders trans., 4th ed. 1867); 2 William Blackstone, Commentaries on the Laws of England 4 (1766) ("[T]here are some few things which . . . must still unavoidably remain in common . . . Such (among others) are the elements of light, air, and water . . . ."); *United States v. Beebe*, 127 U.S. 338, 342 (1888); *United States v. California*, 332 U.S. 19, 33 (1889); *United States v. Causby*, 328 U.S. 256, 260, 266 (1946) (holding airspace is part of the federal public domain); *United States v. Trinidad Coal & Coking Co.*, 137 U.S. 160, 170 (1890) (finding public lands are "held in trust for all the people"); *Idaho v. Coeur d'Alene Tribe*, 521 U.S. 261, 283-84 (1997); *U.S. v. Oregon*, 295 U.S. 1, 14 (1935); 49 U.S.C. § 40103(a)(1) ("[t]he United States Government has exclusive sovereignty of airspace of the United States."); *see* 1958 Air Commerce and Safety Act, Pub. L. No. 85-726, § 101(33), 72 Stat. 731, 740 (1958).

This Court may properly decide which natural resources, such as the atmosphere, are subject to state sovereignty, federal sovereignty, or dual sovereignty, after a full factual record is developed, including consideration of expert testimony. *See* Wulf Decl., Ex. 1.

4. Plaintiffs' Have Preserved Three Fifth Amendment Claims that are Not at Issue in Defendants' Motion

Defendants have not sought summary judgment on the Fifth Amendment Substantive Due Process claim for government infringement of Plaintiffs' enumerated rights of life and property and already recognized implicit liberties. This Claim includes Plaintiffs' implied recognized rights to move freely, to family, and to personal security. FAC Claim One, ¶¶ 277-89.

Defendants did not move on the Fifth Amendment Substantive Due Process and Equal Protection Claim for systemic government discrimination against Plaintiffs with respect to the exercise of their fundamental rights. FAC Claim Two, ¶¶ 290-93, 298-301. Finally, summary judgment is not sought on the Fifth Amendment Substantive Due Process Equal Protection Claim for government discrimination against Plaintiffs as a class of children, who should have suspect or quasi-suspect classification and some heightened level of constitutional protection against discrimination. FAC Claim Two, ¶¶ 290-91,294-301. Plaintiffs have put forth significant expert testimony regarding this claim not yet addressed by the Court. *See, e.g.*, Smith Decl., Ex. 1; Pacheco Decl., Ex. 1; Ackerman Decl., Ex. 1; Stiglitz Decl., Ex. 1; Hansen Decl., Ex. 1. Importantly, even were no fundamental right at stake, rational basis review would *not* apply if children are afforded a suspect or quasi-suspect classification, a combined factual and legal issue that the court has not ruled on and which should be fully developed at trial.

Plaintiffs have likewise not abandoned the argument that their Equal Protection Claim would survive rational basis even if children are not a protected class and even if there were no fundamental right at stake. Although the Court indicated that "defendants' affirmative actions would survive rational basis review," it premised this statement, at least partially, on its belief that satisfaction of the rational basis test "appears undisputed by plaintiffs." *Juliana*, 217 F. Supp. 3d at 1249. However, Plaintiffs have always disputed and continue to dispute that Defendants' actions can survive rational basis review, which Plaintiffs should have the opportunity to prove through expert testimony and Defendants' admissions,. ECF No. 159 at 18-19; Stiglitz Decl., Ex. 1 at 27, 40, 80, 47 ("No rational calculus"); Speth Decl., ¶¶ 8-16; Jacobson Decl., Ex. 1 at 20-21; Answer ¶¶ 7, 278-306; Olson Decl. Ex. 47; 105 (DOE stating "[a]s part of prudent risk management, our responsibility to future generations is to eliminate most of our

carbon emissions and transition to a sustainable energy future."); 275 (climate change is likely to pose "wide-ranging" national security challenges); 290 (DOD stating: "Climate change will affect the Department of Defense's ability to defend the Nation and poses immediate risks to U.S. national security."). Whether Plaintiffs could survive rational basis review is a factual inquiry for trial. *See Perry v. Schwarzenegger,* 704 F.Supp.2d 921 (N.D. Cal. 2010) (applying all three levels of scrutiny to facts at trial). Plaintiffs preserved each of these claims and will proffer evidence to prove them at trial. Nor did Defendants move on these claims in their MSJ.

E. This Court Should Not Certify a Denial of Defendants' Motion for Summary Judgment for Interlocutory Appeal.

Contrary to Defendants' mischaracterization, the Ninth Circuit did not invite or "contemplat[e] future certification," for interlocutory appeal, MSJ at 39, but only stated that, as in any case, "defendants retain the option of asking the district court to certify orders for interlocutory appeal of later rulings." *In re United States*, 884 F.3d at 838. Under 28 U.S.C. § 1292(b), an otherwise non-final order may be subject to interlocutory appeal only if the district court certifies, in writing that: (1) the order involves a "controlling issue of law"; (2) for which there is a "substantial ground for difference of opinion"; and (3) "an immediate appeal from the order may materially advance the ultimate termination of the litigation." 28 U.S.C. § 1292(b). The party seeking interlocutory appeal bears the burden of establishing that all three criteria are met. *Couch v. Telescope Inc.*, 611 F.3d 629, 633 (9th Cir. 2010). Yet, "even when all three statutory criteria are satisfied, district court judges have unfettered discretion to deny certification." *Mowat Const. Co. v. Dorena Hydro, LLC*, No. 6:14-CV-00094-AA, 2015 WL 5665302, at *5 (D. Or. Sept. 23, 2015) (Aiken, C.J.) (quotations and citation omitted). Congress "carefully confined the availability" of review under section 1292(b) to exceedingly rare

circumstances to prevent debilitating effects of piecemeal appeals. *Id.* at 471, 474; *U.S. Rubber Co. v. Wright*, 359 F.2d 784, 785 (9th Cir. 1966).

Defendants' fails to satisfy their burden and seek certification for the same issues for which they sought interlocutory appeal after denial of their Motion to Dismiss. *See* ECF No. 172; *see also* Pl's Resp. to Def's Obj's re: Mot. to Certify for Interlocutory Appeal, ECF No. 159.[38]

Defendants cannot satisfy the standard on any issue in their MSJ. Each of the issues in the MSJ implicates a genuine issue of material fact. *See Chehalem Physical Therapy, Inc. v. Coventry Health Care, Inc.*, No. 09-CV-320-HU, 2010 WL 952273, at *3 (D. Or. 2010). In turn, appellate review is aided by a developed record and full consideration of issues by the trial courts. *In re United States*, 884 F.3d at 837.

There are also no substantial grounds for differences of opinion on these issues just because this Court is the first to rule on them. *Couch*, 611 F.3d at 633. Further, no issue presented in the MSJ, excepting standing,[39] is dispositive as to Plaintiffs' entire complaint so as to "materially advance the ultimate termination of the litigation." Thus, denial of this MSJ is not appropriate for interlocutory appeal on any grounds. *See* ECF No. 172 at 4; ECF No. 146 at 14.

IV. CONCLUSION

Plaintiffs respectfully request Defendants' partial MSJ be deferred or denied until a full factual record can be prepared to resolve genuine disputes as to issues of material facts.

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[38] Contrary to Defendants' misleading parenthetical, MSJ at 30, Judge Berzon's complete statement regarding interlocutory appeal was as follows: "So really what this is is an objection to the fact that [the Court] didn't certify it – the interlocutory appeal. And maybe many judges would have but she didn't and that's the system and that's the way it's set up." *See* Oral Arg. Recording at 5:41-5:53, *United States v. U.S. Dist. Court for Dist. of Or.*, No. 17-71692 (9th Cir. Dec. 11, 2017), https://www.ca9.uscourts.gov/media/view_video.php?pk_vid=0000012816.

[39] Standing does not satisfy the other criteria for interlocutory appeal. *See In re Anchorage Nautical Tours, Inc.*, 145 B.R. 637, 641 (B.A.P. 9th Cir. 1992) (mixed question of fact and law)

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Respectfully submitted,

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