Case No. 17-71692

IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

UNITED STATES OF AMERICA, *et al.*,
Petitioners,

v.

UNITED STATES DISTRICT COURT FOR
THE DISTRICT OF OREGON,
Respondent,
and
KELSEY CASCADIA ROSE JULIANA, *et al.*,
Real Parties in Interest

On Petition For Writ of Mandamus In Case No. 6:15-cv-01517-TC-AA (D. Or.)

ANSWER OF REAL PARTIES IN INTEREST TO PETITION FOR WRIT OF MANDAMUS

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CORPORATE DISCLOSURE STATEMENT

Pursuant to Rule 26.1 of the Federal Rules of Appellate Procedure, Real Party in Interest 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

Real Parties in Interest ("Plaintiffs") brought this constitutional case against Petitioners ("Defendants") because the affirmative aggregate and systemic actions of Defendants infringe Plaintiffs' fundamental rights to life, liberty, and property. Defendants admit their actions imperil Plaintiffs with "dangerous, and unacceptable economic, social, and environmental risks," and that "the use of fossil fuels is a major source of [greenhouse gas] emissions, placing our nation on an increasingly costly, insecure, and environmentally dangerous path." Dkt. 98 ¶¶ 7, 150.[1] Depositions of Defendants' witnesses independently confirm that current levels of atmospheric CO_2 and climate change are "dangerous," and that our nation is in an "emergency situation." Declaration of Julia A. Olson ("Olson Decl.") ¶¶ 53-54. In his deposition, the head of the federal climate research program testified he is "fearful," that "increasing levels of CO_2 pose risks to humans and the natural environment," and that he does not "think current federal actions are adequate to safeguard the future." *Id*. at ¶ 54.

In spite of these threats, Defendants claim this Court's intervention is necessary solely due to discovery issues, which they erroneously characterize as burdensome. However, the parties have been meeting and conferring, and Plaintiffs are reasonably responding to Defendants' concerns and assertions of privilege. No

[1] Plaintiffs refer to the District Court docket as "Dkt." and to the Ninth Circuit docket as "Doc."
[2] The National Association of Manufacturers, the American Fuel & Petrochemical

discovery motions have been filed and no discovery orders have been entered. Plaintiffs have no interest in overburdening Defendants or in drawing out discovery disputes given the urgency of the climate crisis. They intend to begin trial, as ordered by the District Court, on February 5, 2018.

Defendants also fundamentally mislead this Court by suggesting that Plaintiffs' case hangs on an unenumerated right supposedly recognized for the first time by the District Court. That is false. In order to grant the writ and dismiss this case, this Court would also need to reverse over a hundred years of Supreme Court jurisprudence and find the Fifth Amendment does not provide Americans the fundamental rights to personal security, property, life, or family autonomy and security. The radical request made by Defendants seeks to deny these children access to their third branch of government when they allege infringement of fundamental rights long recognized by the judiciary and when Defendants themselves admit the threat to Plaintiffs' lives and security. This case raises constitutional questions that must first be answered by the very capable District Court in the ordinary course of judicial review. When Defendants admit the climate system is in the "danger zone," unsupported claims of inconvenient discovery do not warrant staying this constitutional case.

STATEMENT OF THE RELEVANT FACTS

On August 12, 2015, 21 youth Plaintiffs brought this action against the United States government. Compl., Dkt. 1. Plaintiffs allege Defendants have known for decades that CO_2 pollution has been causing catastrophic climate change, and that continuing to burn fossil fuels would destabilize the climate system and threaten the personal security, lives, liberties, and property of our nation's present and future generations, including Plaintiffs. First Am. Compl. ("FAC") ¶¶ 1, 279, Dkt. 7. Despite their knowledge, Defendants affirmatively acted, and continue to act, to promote and allow increasing extraction, production, consumption, transportation, and exportation of fossil fuels, as part of the national energy system, which has resulted in dangerous levels of carbon pollution.[2] FAC ¶¶ 5, 98, 105, 111, 114, 117, 119, 121, 123, 125, 129, 130, 151-200.

In their Answer, Defendants made significant admissions, such as "'business as usual' CO_2 emissions" imperil Plaintiffs with "dangerous, and unacceptable economic, social, and environmental risks." Dkt. 98 at ¶ 150. Dr. Michael Kuperberg, Executive Director of the U.S. Global Change Program, testified: "our

[2] The National Association of Manufacturers, the American Fuel & Petrochemical Manufacturers, and the American Petroleum Institute (collectively, "Intervenors") successfully intervened in this action. Dkt. 14, 15, 50. After losing their motions to dismiss and for interlocutory appeal, and faced with answering Requests for Admissions, Intervenors subsequently withdrew from this case. Dkt. 182; Olson Decl. ¶ 24-25.

country is currently in a danger zone when it comes to our climate system." Olson Decl. ¶ 54. Plaintiffs seek an order declaring their fundamental rights and the infringement thereof and compelling Defendants to prepare a national emissions inventory and plan to protect our nation's climate system, according to factual findings on the best available science. Dkt. 7.

After reasoned analyses on four occasions, two judges rejected the merits of Defendants' Motion to Dismiss. *See* Dkts. 68, 83, 146, 172. On April 8, 2016, Magistrate Judge Coffin recommended denying Defendants' Motion to Dismiss. Dkt. 68. On November 10, District Court Judge Aiken denied Defendants' Motion to Dismiss. Dkt. 83. Nearly two months after Defendants answered the FAC, Dkt. 98, and four months after Judge Aiken's Order, on March 7, 2017, Defendants moved to certify the November 10 Order for interlocutory appeal, arguing for a stay pending interlocutory review. Dkts. 120, 121. Judges Coffin and Aiken both rejected these motions. Dkts. 146, 172.

On June 9, 2017, Defendants filed this Petition. Doc 1-1. On June 19, Plaintiffs opposed Defendants' request for stay. Doc. 4. On July 25, this Court issued a temporary stay, Doc. 7, and on July 28, ordered Plaintiffs to respond to Defendants' Petition, Doc. 8.

ARGUMENT

I. THE DISCOVERY PROCESS IN THIS CASE DOES NOT WARRANT THE EXTRAORDINARY REMEDY SOUGHT.

Defendants' claim of "an unbounded discovery process" is factually inaccurate and fails to justify mandamus. Pet. at 2. The discovery propounded does not present a "staggering burden," as the parties have met and conferred to resolve discovery issues without the need for court intervention. *Id.*; Olson Decl. ¶¶ 8-10. To date, the District Court has issued ***no*** discovery orders to Defendants. *Id.* at ¶ 3. Defendants have presented ***no*** evidence demonstrating any harm from participating in discovery or that the District Court will not properly manage discovery. A purely hypothetical "discovery burden" does not justify mandamus relief.

A. Defendants Mischaracterize the Status of Discovery.

Defendants omit that the parties have successfully met and conferred to resolve all discovery disputes without the need for motion practice or formal court intervention. *Id.* at ¶ 3-10. In addition, Intervenors withdrew from the case on June 28, 2017, substantially narrowing the scope of discovery that Plaintiffs were required to conduct. Defendants, unlike Intervenors, admit many of the core facts of the case.[3] *Id.* at ¶¶ 25-27; Dkt. 182. Finally, the District Court has successfully

[3] The District Court repeatedly directed Intervenors to take a position on Defendants' admissions to narrow the issues for trial. Olson Decl. ¶¶ 12-27. Intervenors refused, necessitating more expansive discovery. *Id.*; Dkt. 98; Dkt. 146 at 2-4.

used monthly status conferences to facilitate informal resolution of potential discovery disputes. *Id.* at ¶ 5.

Defendants overstate the significance of Plaintiffs' standard-practice Notice of Litigation Hold and Request for Preservation served on January 24, 2017. *See* Pet. at 33; *see also* Olson Decl. at ¶¶ 32-34. This letter was prompted by news reports of the Trump Administration removing and destroying records regarding climate change. *Id.* at ¶ 32. Plaintiffs repeatedly assured Defendants the January 24 letter is not a request for production. *Id.* at ¶ 33. Ultimately, Defendants promised Plaintiffs the relevant evidence was being preserved and there are no ongoing concerns regarding the January 24 letter. *Id*. at ¶ 34.

Plaintiffs have taken extraordinary efforts to narrow the scope of discovery. *Id.* at ¶ 3. First, Plaintiffs spent years conducting informal discovery, their primary discovery tool, to build their case. *Id.* at ¶ 11, 61. Second, Plaintiffs withdrew many of the discovery requests that Defendants contend "intru[de] on the separation of powers." Pet. at 33. Specifically, Plaintiffs withdrew their Third Set of Requests for Production ("RFPs") seeking emails of Rex Tillerson when he was CEO at ExxonMobil and withdrew RFPs to the Executive Office of the President ("EOP") and the President. *Id.* at ¶ 37-38. Plaintiffs also narrowed RFPs submitted to Departments of State, Defense and Agriculture. *Id.* at ¶ 39, 42. Third, Plaintiffs are not seeking discovery as to senior executive officials. *Id*. at ¶ 57.

Defendants' claim that they "will be forced to respond in the coming weeks to document requests that seek material dating back over at least five decades," is far from the truth. Pet. at 8. The primary historical documents requested by Plaintiffs are housed at Presidential libraries or the U.S. National Archives and Records Administration ("NARA"). On February 21 and March 7, Plaintiffs' RFPs identified specific documents by file and box sought from presidential libraries and NARA facilities. *Id.* at ¶¶ 35-36. Defendants agreed to make non-privileged documents available for viewing at NARA upon entry of a protective order. *Id.* at ¶ 36, 44. On January 20, 2017, Plaintiffs served ten Requests for Admission ("RFAs") on the EOP and the Environmental Protection Agency ("EPA"), to which Defendants served responses and objections. *Id*. at ¶ 28-30. Plaintiffs do not intend to move to compel further responses to these RFAs. *Id*. at ¶ 31.

On March 31, 2017, Plaintiffs served RFPs on the Departments of Agriculture, Defense, and State. *Id*. at ¶ 39. After conferring, Plaintiffs served Revised RFPs and Defendants committed to provide a document production plan by June 23, identifying proposed search terms, custodians, time periods, and media. *Id*. at ¶ 39-42. Defendants later identified responsive documents to be produced, prior to the temporary stay. *Id*. at ¶ 41. Plaintiffs continue to narrow RFPs and work with Defendants to identify responsive documents for production without implicating separation of powers issues, as indicated in Plaintiffs' most

recent correspondence. *Id.* at ¶ 39-42.

To date, Plaintiffs have taken two depositions: (1) Mark Eakin, Coordinator of NOAA's Coral Reef Watch program; and (2) Michael Kuperberg, Executive Director, U.S. Global Change Research Program. *Id*. at ¶¶ 52-54. During Dr. Kuperberg's deposition, the executive and deliberative process privileges were raised and resolved in a manner that did not impose any burden on Defendants nor implicate separation of powers concerns.[4] *Id.* at ¶ 55-56. Plaintiffs served Federal Rule of Civil Procedure 30(b)(6) deposition notices on the Departments of Defense, Energy, Interior, Transportation, State, Agriculture, and EPA. Plaintiffs expect to resolve any issues through meet and confer.[5] *Id.* at ¶ 49, 51, 58-59.

To date there have been no discovery disputes as to experts. *Id*. at ¶ 46-50. Plaintiffs disclosed expert witnesses on March 24, 2017; on June 26, the District Court scheduled the exchange of expert reports. *Id*. at ¶¶ 47-48. Many expert reports have been served on Defendants; the remaining reports will be served when the stay is lifted. *Id*. at ¶ 49. Plaintiffs do not anticipate any disputes associated with scheduling expert depositions or the exchange of expert reports. *Id*. at ¶ 50.

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[4] One outstanding issue is the scope of the deliberative process privilege as to outstanding discovery requests. *Id*. at ¶ 55. Plaintiffs anticipate resolving this issue. *Id.*

[5] While Plaintiffs initially conferred on deposing four agency officials, as required by Local Rule 30-2, Dkt.151-9, no deposition notices were served and Plaintiffs will not seek to depose these officials. *Id.* at 57.

B. Defendants Provided No Evidence of Burdensome Discovery.

Defendants contend "the burden and cost of complying with the extraordinarily intrusive and inappropriate discovery sought by plaintiffs cannot be corrected" through the appellate process. Pet. at 33. However, Defendants offered ***no*** evidence of the burden they allegedly would suffer by responding to existing discovery. Nor do Defendants present evidence to show "[t]he damage this will do to vital federal operations." Pet. at 37. In fact, Defendants misleadingly submit only the discovery requests themselves (many of which have been resolved through meeting and conferring and/or withdrawn). *See* Olson Decl. ¶¶ 2-70.

A party seeking mandamus must show that he will be "damaged or prejudiced in a way not correctable on appeal." *Perry v. Schwarzenegger*, 591 F.3d 1147, 1156 (9th Cir. 2009). This Circuit held irreparable harm must be supported by actual evidence; cursory and conclusory statements are insufficient. *Herb Reed Enterprises, LLC v. Florida Entm't Mgmt., Inc.*, 736 F.3d 1239, 1251 (9th Cir. 2013). Responding to discovery is a normal part of litigation and does not constitute irreparable harm, let alone damage or prejudice not correctable on appeal. *See F.T.C. v. Standard Oil Co. of California*, 449 U.S. 232, 244 (1980) (citing *Petroleum Exploration, Inc. v. Public Service Comm'n*, 304 U.S. 209, 222 (1938)); *Renegotiation Bd. v. Bannercraft Clothing Co.,* 415 U.S. 1, 24, (1974).

Absent affirmative evidence justifying mandamus, the petition should be denied. The federal government is capable of submitting testimony from federal employees as evidence that a discovery order is unduly burdensome. *See, e.g., In re: Thomas E. Price, Secretary of Health & Human Serv., et al.*, No. 17-71121 (Pet. for Writ of Mandamus) (filed April 19, 2017) at 19-20 ("As explained in declarations submitted below . . . reviewers would require more than three years to complete review of the hundreds of thousands of pages of material amassed thus far in response to the district court's order."). In the instant case, no such evidence exists. Pet. at 2.

This case presents a notable *absence* of discovery issues. Defendants have produced no documents in response to Plaintiffs' discovery requests. Olson Decl. at ¶ 9. No discovery orders have been entered by the District Court. The meet and confer process has thus far successfully eliminated the need for discovery motions. *Id.* at ¶ 8-10. Only two depositions have been conducted, imposing minimal burden and expense.[6] *Id*. at ¶ 9. Defendants have failed to show mandamus is warranted.

[6] In *Medhekar v. U.S. Dist. Court for the Dist. of California*, 99 F.3d 325, 326 (9th Cir. 1996), cited by Defendants, the petitioners submitted evidence showing tremendous burden and expense associated with complying with disclosures ordered by the court. Similarly, *Cheney v. U.S. Dist. Court for the Dist. of Columbia*, 542 U.S. 367 (2004) presented a court approved discovery plan and "entered a series of orders allowing discovery to proceed." *Id.* at 376. Here, no orders exist directing Defendants to produce privileged information. In *Cheney*, the government had asked the district court to narrow the scope of discovery, but "its arguments were ignored." *Id.* at 388. Finally, the high stakes of this constitutional

Defendants insinuate that *all* forms of discovery against the federal government are impermissible as overly burdensome and intrusive based on separation of powers. That is not the law. "When the government is named as a party to an action, it is placed in the same position as a private litigant, and the rules of discovery in the Federal Rules of Civil Procedure apply." *Exxon Shipping Co. v. U.S. Dep't of Interior*, 34 F.3d 774, 776 n.4 (9th Cir. 1994); *United States v. Proctor & Gamble*, 356 U.S. 677, 681 (1958); Sisk, A Primer on Civil Discovery Against the Federal Government, 52-June Fed. Law. 28, 29 (2005);

Plaintiffs acknowledge the federal government can invoke privileges to constrain discovery sought from senior officials. *See, e.g.*, *Cheney*, 542 U.S. at 390; *Kyle Engineering Co. v. Kleppe*, 600 F.2d 226, 231-32 (9th Cir. 1979). While some forms of discovery against agency heads have been upheld by this Court, s*ee, e.g., Kyle Engineering Co.*, 600 F.2d at 231-32, that issue is not present here. Plaintiffs have no pending discovery requests for information from senior officials, nor do Plaintiffs intend to seek discovery from senior officials. Olson Decl. ¶ 57.

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case differentiate it from the factual scenario in *Cheney* where the Supreme Court found that vindication of Congress' policy objectives under FACA did not rise to the level of impairment of "a court's Article III authority or Congress' central Article I powers." *Id.* at 384-85. The instant case is more similar to cases referenced in *Cheney* where efforts were taken "to explore other avenues, short of forcing the Executive to invoke privilege" to avoid separation of powers issues. *Id.* at 390.

C. The District Court Should Be Afforded Wide Discretion to Manage Discovery and Resolve Discovery Disputes.

While Plaintiffs do not anticipate protracted discovery disputes, the District Court must be allowed broad discretion to first address them. *Hallett v. Morgan*, 296 F.3d 732, 751 (9th Cir. 2002); Olson Decl. ¶ 64-70. "[D]istrict courts can, and will balance the government's concerns under the general rules of discovery." *Exxon Shipping Co.*, 34 F.3d at 779. District courts can quash or modify subpoenas, protect privileged information, and limit discovery of documents or testimony of officials. *Id*. at 779-80. Similarly, the District Court can ensure Plaintiffs are entitled only to discovery appropriate under the federal rules. *Kyle Engineering Co.*, 600 F.2d at 231-32.

The *Cheney* decision does not change this analysis: "there is sound precedent in the District of Columbia itself for district courts to explore other avenues, short of forcing the Executive to invoke privilege, when they are asked to enforce against the Executive Branch unnecessarily broad subpoenas." 542 U.S. at 390. That is what the District Court has encouraged here. Olson Decl. ¶ 4, 5, 10, 23, 64-65. Plaintiffs do not anticipate discovery disputes that cannot be resolved by the District Court, that implicate separation of powers issues, or that will delay trial of these critical claims. *Id*. at ¶ 63-70.

II. THE DISTRICT COURT HAS JURISDICTION OVER PLAINTIFFS' CONSTITUTIONAL CHALLENGE TO SECTION 201 OF THE ENERGY POLICY ACT.

In a footnote citing one out-of-circuit case, Defendants insinuate for the first time that the District Court is without jurisdiction to decide Plaintiffs' constitutional challenge to Section 201 of the Energy Policy Act, 15 U.S.C. § 717b(c). However, the District Court has original jurisdiction over Plaintiffs' constitutional challenge to Section 201 alongside other aggregate acts identified in the FAC. 28 U.S.C. § 1331. This is so notwithstanding 15 U.S.C. § 717r, which provides for exclusive appellate court review of certain Department of Energy ("DOE") orders following agency rehearing.

The District Court retains federal question jurisdiction over a facial constitutional challenge to a statute, "unless the 'statutory scheme' displays a 'fairly discernible' intent to limit jurisdiction, and the claims at issue 'are of the type Congress intended to be reviewed within the statutory structure.'" *Free Enter. Fund v. Pub. Co. Accounting Oversight Bd.*, 561 U.S. 477, 489 (2010) (quoting *Thunder Basin Coal Co. v. Reich,* 510 U.S. 200, 207, 212 (1994)). Courts "presume that Congress does not intend to limit jurisdiction if 'a finding of preclusion could foreclose all meaningful judicial review'; if the suit is 'wholly collateral to a statute's review provisions'; and if the claims are 'outside the agency's expertise.'" *Id.* (quoting *Thunder Basin,* 510 U.S. at 212-13).

Plaintiffs' constitutional challenge is not "of the type Congress intended to be reviewed within" the Natural Gas Act's review scheme, which provides for agency rehearing of certain *discretionary* DOE orders. *Id.*; 15 U.S.C. § 717r. First, because approval of export authorization permits under Section 201 is mandatory, Section 717r's venue provision is inapplicable. Defendants admit DOE's approval did not provide "any opportunity for public participation in the decision-making process." Dkt. 98 ¶ 96. For this reason, precluding District Court jurisdiction would foreclose any judicial review of Plaintiffs' constitutional challenge. Second, because Plaintiffs "do not claim that DOE/FE Order No. 3041 suffers from any procedural or facial defect," but instead challenge the constitutional validity of the underlying statute, their challenge is wholly collateral to Section 717r's review scheme and implicates issues outside the DOE's expertise. Dkt. 27 at 3.

A. There Is No "Fairly Discernable" Congressional Intent to Channel Review of Mandatory Natural Gas Export Authorizations Pursuant to Section 201.

Whether a statutory review scheme displays a "fairly discernable" intent to limit jurisdiction "is determined from the statute's language, structure, and purpose." *Thunder Basin,* 510 U.S. at 207. Where these factors show the statutory review scheme is inapplicable to a claim, the district court retains jurisdiction. *Latif v. Holder*, 686 F.3d 1122, 1127-29 (9th Cir. 2012).

Here, because Section 201's export authorizations are mandatory, and therefore not reviewable under Section 717r, the statutory scheme does not display a fairly discernable intent to limit district court jurisdiction. 15 U.S.C. § 717b(c). Defendants concede Section 201 does not "include any environmental review or other public interest analysis by DOE," and "the requirement for public notice of applications and other hearing-type procedures" are inapplicable, which means further review of the Commission's order in the Court of Appeals is precluded. Dkt. 98 at ¶ 96; DOE/FE Order No. 3041 at 11 n.5; 15 U.S.C. § 717r(a). As in *Latif*, Section 717r's review scheme – limiting judicial review to parties to the proceeding who have sought agency rehearing – is inapplicable to authorizations under Section 201, for which intervention and rehearing are not possible. *Latif*, 686 F.3d at 1127-29.

Furthermore, allowing district court jurisdiction over such claims could not undermine Section 717r's "integrated scheme of review," since the scheme does not apply. *Elgin v. Dep't of Treasury*, 567 U.S. 1, 14 (2012); *see McNary v. Haitian Refugee Center, Inc.,* 498 U.S. 479, 497 (1991). Pursuit of such claims in the district court could not be "a way of evading entirely established administrative procedures." *Latif*, 686 F.3d at 1128. Ultimately, Plaintiffs' claims, which could not be brought pursuant to Section 717r's review scheme, are not "of the type Congress intended to be reviewed within the statutory structure." *Thunder*

Basin, 510 U.S. at 212. In contrast, orders issued pursuant to Section 717b(a) are discretionary, subject to a public interest analysis, a public hearing, and are reviewable.

B. Precluding District Court Jurisdiction Would Foreclose All Meaningful Judicial Review.

For Plaintiffs, *all* meaningful judicial review would be foreclosed under Section 717r's review scheme. *McNary,* 498 U.S. at 496-97; *see NO Gas Pipeline v. F.E.R.C.*, 756 F.3d 764, 768–69 (D.C. Cir. 2014) (appellate court lacked jurisdiction under Section 717r because petitioner had not challenged FERC ruling as to its reasoning or findings).

Intervention in an export authorization proceeding under Section 201 is not allowed, since approval is mandatory under the statute "without modification or delay." 15 U.S.C. § 717b(c); 15 U.S.C. § 717r(a); Olson Decl. ¶ 71. DOE does not even publish notices in the Federal Register when it reviews permit applications under Section 201. *See* DOE/FE Order No. 3041 at 8. Accepting Defendants' argument would make it impossible to bring a constitutional challenge to Section 201. This Court should "presume that Congress does not intend to limit jurisdiction." *Free Enter. Fund*, 561 U.S. at 489.

Here, paralleling *NO Gas Pipeline*, Plaintiffs challenge the constitutionality of the underlying statute and Defendants admit Plaintiffs are not challenging the order itself. Dkt. 27 at 3-4. Plaintiffs' challenge thus does not "depend on the

merits of any given individual" order. *City of Rialto v. W. Coast Loading Corp.*, 581 F.3d 865, 876 (9th Cir. 2009).

C. Plaintiffs' Constitutional Challenge Is Wholly Collateral to Section 717r's Provisions and Outside DOE's Expertise

Constitutional claims challenging the underlying statutory authority are wholly collateral to a statute's review provisions and courts cannot infer Congressional intent to "limi[t] judicial review of these claims to the procedures set forth in [the statutory scheme]," including "general collateral challenges to unconstitutional practices and policies." *McNary,* 498 U.S. at 491-493; *Free Enter. Fund*, 561 U.S. at 489; *cf. Johnson v. Robison*, 415 U.S. 361, 373–74 (1974); *Latif*, 686 F.3d at 1128-29.

Plaintiffs' constitutional challenge is "wholly collateral" to Section 717r's review scheme and implicates constitutional questions outside DOE's expertise. *Thunder Basin,* 510 U.S. at 212-13, 215. The fact that Plaintiffs also mount an as-applied challenge to DOE/FE Order No. 3041 does not alter this analysis. The challenge to Order No. 3041 is a logical extension of Plaintiffs' facial challenge: if the statutory provision is unconstitutional, then orders issued pursuant to it are also unconstitutional. The line between facial and as-applied constitutional challenges is "hazy at best," and no talismanic invocation of this distinction can change that Plaintiffs are not seeking review of the merits of any order but instead raise constitutional claims. *Elgin*, 567 U.S. at 15, 22; *Latif*, 686 F.3d at 1129. Unlike

Elgin, Plaintiffs do not bring their claim against Section 201 as a "vehicle" to overturn a particular order, but as a facial challenge to a statute mandating promotion of fossil fuels, in the context of a larger set of challenges to government actions that infringe on Plaintiffs' constitutional rights. *Elgin*, 567 U.S. at 22; FAC ¶ 288, 299.

III. THIS CASE SATISFIES *NONE* OF THE *BAUMAN* REQUIREMENTS FOR MANDAMUS

"Mandamus is a 'drastic and extraordinary' remedy 'reserved for really extraordinary causes.'" *Cheney*, 542 U.S. at 369 (citation omitted). "[O]nly exceptional circumstances amounting to a judicial usurpation of power or a clear abuse of discretion will justify the invocation of this extraordinary remedy." *Id.* (quotes, citations omitted). As petitioners, Defendants bear the heavy burden of showing that their "right to issuance of the writ is clear and indisputable." *Id.* (quotes, citations omitted).

As the Supreme Court recently reaffirmed:

> 'From the very foundation of our judicial system,' the general rule has been that 'the whole case and every matter in controversy in it [must be] decided in a single appeal.' *McLish v. Roff*, 141 U. S. 661, 665–666 (1891). This final-judgment rule, now codified in [28 U.S.C.] §1291, preserves the proper balance between trial and appellate courts, minimizes the harassment and delay that would result from repeated interlocutory appeals, and promotes the efficient administration of justice.

Microsoft Corp. v. Baker, 582 U.S. __ (2017) (slip op., at 11-12).

The guidelines employed by this Court to determine "whether mandamus is appropriate" are:

> (1) [W]hether the petitioner has no other means, such as a direct appeal, to obtain the desired relief; (2) whether the petitioner will be damaged or prejudiced in a way not correctable on appeal; (3) whether the district court's order is clearly erroneous as a matter of law; (4) whether the district court's order is an oft repeated error or manifests a persistent disregard of the federal rules; and (5) whether the district court's order raises new and important problems or issues of first impression.[7]

Perry v. Schwarzenegger, 591 F.3d 1147, 1156 (9th Cir. 2009) (citing *Bauman v. United States District Court*, 557 F.2d 650, 654-55 (9th Cir. 1977)). Because this case does not implicate *any* of the *Bauman* guidelines, Defendants' request for this Court to employ "one of 'the most potent weapons in the judicial arsenal'" should be denied outright. *Cheney*, 542 U.S. at 380.

A. Defendants Will Not Be Prejudiced in a Way Not Correctable On Appeal, and Have Obvious and Effective Alternative Means to Obtain the Relief Requested

Defendants' claimed prejudice rests entirely upon unsubstantiated, conclusory allegations as to the burdens of responding to discovery, which Plaintiffs fully refute above. Pet. at 32-37. *See* Section I, *supra*.

[7] Defendants do not argue the fourth guideline applies. Plaintiffs' response to arguments with respect to the fifth guideline are in Plaintiffs' prior briefing, Resp. Br. to Request for Stay, Doc. 4 at 12-13, as is Plaintiffs' response to Defendants' argument that supervisory mandamus is appropriate. *Id.* at 13-15.

Further, the lack of a single discovery motion to, or order from, the District Court is fatal to Defendants' request: a petitioner must "have no other means…to obtain the relief requested." *Perry*, 591 F.3d at 1156.[8] If discovery in this matter becomes unduly burdensome, Defendants' remedy is a protective order under Federal Rule of Civil Procedure 26(c). *McDaniel v. U.S. Dist. Ct. for the Dist. of Nevada*, 127 F.3d 886, 888-89 (9th Cir. 1997) (per curiam); *Id.* at 890 (Rymer, concurring). For this reason alone, the petition should be denied.

The very cases upon which Defendants rely establish the impropriety of the drastic relief they seek. *Cheney* and *Credit Suisse v. United States District Court for the Central District of California*, 130 F.3d 1342 (9th Cir. 1997) are the ***only cases ever dismissed*** on mandamus due to alleged discovery prejudices. Crucially, the parties in both cases first sought resolution of the disputes in district court, and the district courts subsequently *ordered* production. *Cheney*, 542 U.S. at 379, 384; *Credit Suisse*, 130 F.3d at 1346. In addition, both cases presented rare circumstances not present here. *Cheney*, 542 U.S. at 385, 394 (Stevens, J., concurring) (ordering disclosure of the records would effectively prejudge the merits of the case); *Credit Suisse,* 130 F.3d at 1346 (discovery order violated Swiss banking secrecy and other laws which carried criminal penalties if petitioners

[8] *See In re Ozenne*, 841 F.3d 810, 816 (9th Cir. 2016) (en banc); *Washington Public Utilities Group v. U.S. Dist. Court for Western Dist. of Washington*, 843 F.2d 319, 325 (9th Cir. 1987).

complied); *see DeGeorge v. U.S. Dist. Ct. for Cent. Dist. of California*, 219 F.3d 930, 935 (9th Cir. 2000) (confirming *Credit Suisse* was limited to its unique circumstances). These circumstances do not apply here.

Defendants' premature and improper focus on discovery, unsubstantiated by anything but conclusory statements, really presents an inappropriate collateral attack on denial of their motion to dismiss. Defendants claim prejudice arising from discovery requests, yet improperly seek dismissal of this entire case, rather than relief from those requests. The proper course for seeking mandamus premised on discovery burdens is to challenge a *discovery order* under which the alleged burdens arise, not the very existence of the case under which discovery issues. Without a discovery order to challenge, even the more typical mandamus cases are inapposite. *See, e.g., Medhekar v. U.S. Dist. Court for the N. Dist. Of Cal.*, 99 F.3d 325 (9th Cir. 1996); *Perez v. United States Dist. Court*, 749 F.3d 849 (9th Cir. 2014); *In re Anonymous Online Speakers*, 661 F.3d 1168 (9th Cir. 2011); *Kerr v. United States Dist. Court for N. Dist. of California*, 511 F.2d 192, 199 (9th Cir. 1975), *aff'd* 426 U.S. 394 (1976). Defendants' Petition is not actually about discovery issues; rather, it presents an improper, premature attack on denial of the motion to dismiss, demonstrating abuse of the mandamus process.

The rarity of circumstances justifying mandamus "is particularly salient in the discovery context because the courts of appeals cannot afford to become

involved with the daily details of discovery," although courts of appeals "have exercised mandamus jurisdiction to review *discovery orders*" in exceptional circumstances. *In re Anonymous Online Speakers*, 661 F.3d at 1173 (quotes, citations omitted and emphasis added).

Defendants provide no other justification why denial of their motion to dismiss or the District Court's underlying conclusions will damage or prejudice them "in a way not correctable upon appeal." *Perry*, 591 F.3d at 1156. "If writs of mandamus could be obtained merely because an order [denying dismissal] was not immediately appealable…mandamus would eviscerate the statutory scheme established by Congress to strictly circumscribe piecemeal appeal and mandamus would become a substitute for the normal appellate process." *DeGeorge*, 219 F.3d at 935 (quotes, citations omitted). Similarly, the time and expense spent litigating a case, even if resulting from an erroneous legal ruling, does not constitute prejudice warranting mandamus, even in "massive civil actions." *Washington Public Utilities Group*, 843 F.2d at 325; *see also, e.g., Calderon v. U.S. Dist. Court for Cent. Dist. Of California*, 163 F.3d 530, 534-35 (9th Cir. 1998) *abrogated on other grounds by Woodford v. Garceau*, 538 U.S. 202 (2003). "There is no reason why this motion to dismiss should be treated differently, *i.e.*, reviewed by mandamus rather than on appeal from a final judgment, than the dozens of 12(b)(6) rulings that district courts in this circuit make every day." *Calderon*, 163 F.3d at 535 n. 4.

B. The District Court Committed No Clear Error Denying Defendants' Motion to Dismiss

"The key factor to be examined" in resolving a petition is whether Defendants "firmly convinced" this Court that the District Court committed clear error as a matter of law. *Christensen v. U.S. Dist. Court*, 844 F.2d 694, 697 (9th Cir. 1988). "[T]he absence of the third factor, clear error, is dispositive." *Burlington Northern v. U.S. Dist. Court for Dist. of Mont.*, 408 F.3d 1142, 1146 (9th Cir. 2005). Judge Aiken's reasoned and thorough opinion, denying the Motion to Dismiss based on Supreme Court and Ninth Circuit precedent, amply demonstrates absence of error, let alone error so obvious that it is "'clear' to all." *In re Bundy*, 840 F.3d 1034, 1041 (9th Cir. 2016); *see* Dkt. 83.

1. Plaintiffs Indisputably Have Properly Plead Standing

Defendants mischaracterize Plaintiffs' claims as running afoul of Article III principles. For more than fifty years, Defendants knowingly and substantially contributed to the dangerous climate emergency upon which Plaintiffs' claims are founded. The judiciary represents Plaintiffs' "last resort" and exercise of judicial jurisdiction is a "necessity." *Allen v. Wright*, 468 U.S. 737, 752 (1984). Plaintiffs' claims, and the standing allegations supporting them, are eminently suitable for judicial resolution without implicating separation of powers concerns. *Bowsher v. Synar*, 478 U.S. 714, 721 (1986); *Marbury v. Madison*, 5 U.S. (1 Cranch) 137, 163 (1803). Defendants' arguments to the contrary are premised on significant

misunderstandings of the pleading requirements for standing. *See Comer v. Murphy Oil USA, Inc.*, 585 F.3d 855 (5th Cir. 2009) (finding standing to bring negligence, trespass, and nuisance claims based on climate change);[9] *Connecticut v. Am. Elec. Power Co., Inc.,* 582 F.3d 309, 347 (2d Cir. 2009) (causation in climate change cases is "best left to the rigors of evidentiary proof at a future stage of the proceedings, rather than dispensed with as a threshold question of constitutional standing"), *rev'd on other grounds, Am. Elec. Power Co., Inc. v. Connecticut,* 564 U.S. 410, 429 (2011).

a. Plaintiffs' Alleged Injuries Are Concrete and Particularized

Plaintiffs have satisfied the standard for injury-in-fact, demonstrating unique and highly personalized ways in which Defendants' actions are affecting them. Defendants erroneously claim Plaintiffs' climate change harms are "generalized phenomena" which affect Plaintiffs the same way as everyone in the world. Pet. 14. A simple reading of Plaintiffs' pleadings shows the unique ways in which Plaintiffs' injuries vary according to their particular locations, interests, and circumstances. Dkt. 7 ¶¶ 16-97; *see also* Dkt. 78 (supplemental declaration of Jayden F. detailing inundation of her home with sewer water due to increased storm severity directly attributable to climate change); *see also* Declaration of Levi

[9] *Comer* was vacated for rehearing *en banc* which never occurred. *Comer v. Murphy Oil USA, Inc.*, 718 F.3d 460, 465 (5th Cir. 2015).

D. ("Levi Decl.") ¶¶ 1-19; Declaration of Jacob L. ("Jacob Decl.") ¶¶ 1-25; Declaration of Dr. Harold R. Wanless ("Wanless Decl.") ¶¶ 3, 51-63; Dkt. 47 (Supplemental Declaration of Dr. James Hansen).

Defendants' generalized grievance argument is equally mistaken on the law. A generalized grievance insufficient to establish injury is one claiming harm only to an abstract interest such as the "proper application of the Constitution and laws . . . ." *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 573 (1992). However, if an alleged harm is personally and concretely manifested in an individual, it does not matter how many people share in its effect. *Novak v. United States*, 795 F.3d 1012, 1018 (9th Cir. 2015). "It would surely be an irrational limitation on standing which allowed isolated incidents of deprivation of constitutional rights to be actionable, but not those reaching pandemic proportions." Dkt. 146 at 14.

Contrary to Defendants' incomplete quote, Pet. at 12-13, it *is* the role of courts to address "actual present or immediately threatened injury resulting from unlawful government action." *Allen*, 468 U.S. at 760.

Defendants' reliance on *Washington Environmental Council v. Bellon*, is misplaced. 732 F.3d 1131 (9th Cir. 2013). In *Bellon*, this Court assumed, without deciding, that the plaintiffs had made a satisfactory showing of injury-in-fact, *on summary judgment*, by submitting affidavits attesting to specific climate change impacts. *Id.* at 1140-41.

Notwithstanding Defendants' mischaracterization of *Massachusetts v. EPA*, extension of standing based on personal and concrete manifestation of a widely-shared harm is not limited to claims involving quasi-sovereign interests. 549 U.S. 497 (2007); *see, e.g., Novak*, 795 F.3d at 1018; *Fed. Election Comm'n v. Akins*, 524 U.S. 11 (1998). Likewise, there is "[a]bsolutely no basis for making the Article III inquiry turn on the source of the asserted right." *Lujan*, 504 U.S. at 576. Notwithstanding this clear principle, Defendants incongruously assert Plaintiffs' claims, because they are constitutionally rather than statutorily based, are not "traditionally thought to be capable of resolution through the judicial process." Pet. at 15 (quoting *Raines v. Byrd*, 521 U.S. 811, 819 (1997)), and are not "eminently suitable to resolution in federal court." *Id.* (quoting *Mass. v. EPA*, 549 U.S. at 516). However, "[i]t is emphatically the province and duty of the judicial department to say what the law is." *Marbury*, 5 U.S. (1 Cranch) at 177. In fulfilling this duty, "courts of the United States" are "the ultimate guardians of the Constitution…." *Hannah v. U.S.*, 260 F.2d 723, 728 (D.C. Cir. 1958). The *Raines* Court recognized "the irreplaceable value of the power articulated [in *Marbury*] lies in the protection it has afforded the *constitutional* rights and liberties of individual citizens and minority groups against oppressive or discriminatory government action." 521 U.S. at 829 (emphasis added). Plaintiffs properly pleaded injury-in-fact.

b. Plaintiffs Have Adequately Pleaded Causation

Plaintiffs' allegations are sufficient to adequately plead injuries "fairly traceable" to the challenged actions and omissions of Defendants. *Lujan*, 504 U.S. at 590. Defendants' arguments rely solely on mischaracterizations of Plaintiffs' pleadings and a misunderstanding of the law. Objecting that their aggregate acts and omissions cannot be used to establish causation for Plaintiffs' injuries, Defendants attempt to create a new obstacle to standing by foreclosing constitutional claims that arise from multiple actions, irrespective of the relatedness of those actions or the common identities of the actors. Pet. at 15-19. In so arguing, Defendants ignore clear precedent recognizing such claims, *see, e.g., Brown v. Plata*, 563 U.S. 493 (2011), as well as the proper standard for analyzing the sufficiency and specificity of causation in pleadings.

"At the pleading stage, general factual allegations" suffice to establish standing, "for, on a motion to dismiss" courts "presume that general allegations embrace those specific facts that are necessary to support the claim." *Lujan*, 504 U.S. at 561; Fed. R. Civ. P. 8(a)(2). Standing, when challenged in a motion to dismiss, is judged based on allegations in the complaint. *See Susan B. Anthony List v. Driehaus,* 134 S. Ct. 2334, 2342 (2014). Though Plaintiffs' allegations contain *more* than the requisite specificity, a complaint need only present sufficient allegations, which, accepted as true, "state a claim to relief that is plausible on its

face." *Bell Atlantic Corp. v. Twombly*, 550 U.S. 544, 555, 570 (2007). In deciding whether a claim is plausible on its face, a court relies on "its judicial experience and common sense." *Ashcroft v. Iqbal*, 556 U.S. 662, 679 (2009).

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 specific Defendant, which caused and are causing Plaintiffs' injuries. Dkt. 7. For instance, comparable to the complaint in *Brown v. Plata*, 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. Dkt. 7 ¶¶ 5, 7, 11, 97, 99, 112, 115, 117, 119, 123, 125, 129-130, 151, 171, 179-181, 183, 186-187; *See* First Amended Complaint Class Action, *Brown v. Plata*, 563 U.S. 493 at ¶ 192(a) – (q) (N.D. Cal. Aug. 2001). In addition, Plaintiffs provided particular examples of actions, with numeric quantification by category, for particular Defendants. Dkt. 7 *e.g.* ¶¶ 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 25.5% of the worlds cumulative CO2 emissions," thereby establishing Defendants' causal

contribution to Plaintiffs' injuries. Dkt. 7 ¶¶ 151, 185.[10]

Plaintiffs' exhaustive allegations, and the specific facts provided, are indisputably sufficient to "give the [D]efendant[s] fair notice of what the…claim is and the grounds upon which it rests." *Erickson v. Pardus*, 551 U.S. 89, 93 (2007) (citation and quotation marks omitted).[11]

Defendants' argument that individual actions in the aggregate cannot establish causation directly contradicts Supreme Court precedent. In *Brown v. Plata*, the 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 acts:

> 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 (citations omitted).

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[10] The significance of this share of global emissions renders Defendants' reliance on *Bellon* wholly misplaced. *WildEarth Guardians v. U.S. Dep't of Agric.*, 795 F.3d 1148, 1158 (9th Cir. 2015) ("such minor contributors to greenhouse gas emissions…that the contribution 'was scientifically indiscernible.'"). The causation ruling in *Bellon* was made at summary judgment, rather than a motion to dismiss. 732 F.3d at 1143 n. 6.

[11] That Defendants admitted key paragraphs of Plaintiffs' FAC on causation demonstrates *actual* notice of Plaintiffs' claims. Dkt. 98 ¶¶ 7, 150, 151.

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*, each of Defendants' acts with respect to fossil fuel emissions might not individually violate the Constitution. However, taken "in combination" and on a "systemwide" basis, these aggregate acts have a "mutually enforcing effect" in violation of Plaintiffs' rights. *Id.*

Defendants cite only two cases in their attempt to invent a new "particular causation" requirement in the constitutional standing analysis—tellingly, they severely mischaracterize both. Contrary to Defendants' implication, Pet. at 17-18, the Court was not discussing causation and aggregated causal elements when it stated: "If the right to complain of *one* administrative deficiency automatically conferred the right to complain of *all* administrative deficiencies, any citizen aggrieved in one respect could bring the whole structure of state administration before the courts for review." *Lewis v. Casey*, 518 U.S. 343, 358 n.6 (1996). Instead, the Court 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." *Id.* This, of course, is irrelevant to the instant case, in which each of Defendants' aggregate actions and omissions, taken together, cause Plaintiffs' injuries.

The Court in *Allen v. Wright* established that, where there is "actual present or immediately threatened injury *resulting* from unlawful governmental action," it is the courts' duty to review those actions, be they systemic or insular. 468 U.S. at 760 (citation and quotation marks omitted). In contrast to *Allen*, Defendants' responsibility for a major share of global CO_2 emissions is "enough" such that their elimination would "make an appreciable difference" as to the devastating injuries upon which Plaintiffs' claims are founded. *See* Dkt. 98 ¶¶ 7, 150, 151.

c. Plaintiffs Adequately Pleaded Redressability

Defendants object to the prospect of any relief in this case, mistakenly asserting "the complaint never alleges that the agencies have statutory authority" to remedy Plaintiffs' harms. Pet. at 20. The FAC clearly alleges statutory and regulatory authority of Defendants to provide the relief requested.[12] Moreover, no reference to statutory authority need be provided in order to enjoin Defendants from engaging in affirmative actions to a degree that violates Plaintiffs'

[12] Dkt. 7 ¶¶ 98-130, 137, 147, 180, 183, 265, 266 (setting forth Defendants' authorities under the Clean Air Act, the EPA's endangerment finding, the Clean Water Act, the Rivers and Harbors Act, RCRA, CERCLA, the Safe Drinking Water Act, the National Science and Technology Policy, Organization and Priorities Act, the Natural Gas Act, the Energy Policy Act, the Department of Energy Organization Act, the Energy Policy and Conservation Act, the Mineral Leasing Act, the Federal Land Policy and Management Act, the Outer Continental Shelf Lands Act, the Department of Transportation Act, the Energy Independence and Security Act, and the National Climate Program Act.).

constitutional rights.

Defendants' arguments are also unfounded because 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).

Defendants' rehash of *Lewis, Lujan*, and *Allen*, and their unfounded assertion that Plaintiffs must "identify specific agency actions or inactions that could be redressed," do not upend the redressability of Plaintiffs' injuries. Pet. at 21; *see Bellon*, 732 F.3d at 1146 (causation and redressability are two facets of single requirement). While the FAC puts Defendants on notice of the actions that may be redressed, it is not Plaintiffs' obligation to specify a step-by-step plan for Defendants to remedy their own unconstitutional behavior. *See* Section (III)(B)(1)(b), *infra*. "Traditionally, equity has been characterized by a practical flexibility in shaping remedies . . . ." *Brown v. Bd. of Educ.*, 349 U.S. 294, 300 (1955).

As in *Plata*, the District Court can set the constitutional floor necessary for preservation of 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. 563 U.S. at 533; Dkt. 83 at 17, Dkt. 146 at 8.[13]

Likewise, Defendants' argument that no relief in this case "could be obtained against the President", Pet. at 7, is without merit and has been flatly rejected by this Court as "contrary to the fundamental structure of our constitutional democracy" in *Washington v. Trump*, 847 F.3d 1151, 1161 (9th Cir. 2017). Defendants improperly attempt an "aggrandizement of one of the three co-equal branches of the Government at the expense of another." *Clinton v. Jones*, 520 U.S. 681, 699 (1997) (citations omitted). The judiciary may "severely burden the Executive Branch by reviewing the legality of the President's official conduct," *Id.* at 682, 705, and "direct appropriate process to the President himself." *Id.*

Further, Defendants' arguments on this topic were waived, as they were not presented to the District Court until Defendants' motion to certify this case for interlocutory appeal, Dkt. 120, and the District Court has not yet addressed the issue. *Westinghouse Elec. Corp. v. Weigel*, 426 F.2d 1356, 1357 (9th Cir. 1970). Even were the District Court to decide that no relief could be obtained against the

[13] Like the determination in *Plata* that prison populations needed to be reduced by a specific percentage to preserve prisoners' constitutional rights, determining the scientific level of atmospheric CO_2 concentrations necessary to preserve Plaintiffs' constitutional rights no more requires "essentially legislative determinations," Pet. at 15, than in any other case in which governmental action violates constitutional principles. *See, e.g.*, *Federal Election Com'n v. Wisconsin Right to Life, Inc.*, 551 U.S. 449 (2007).

President, relief would still be available against agency officials. *Franklin v. Massachusetts*, 505 U.S. 788, 802 (1992). Plaintiffs have adequately pleaded redressability.

2. Plaintiffs' Due Process Claims are Grounded in Well-Established Law

Defendants frame their objections to Plaintiffs' due process claims as not setting forth sufficient supporting facts. Pet. at 22. However, the FAC delineates the causal mechanisms underlying climate change, the national injuries and unique personal injuries to Plaintiffs resulting from climate change, and Defendants' responsibility for those injuries. Dkt. 7. "Every day, federal courts apply the legal standards governing due process claims to new sets of facts. The facts in this case, though novel, are amenable to those well-established standards." Dkt. 83 at 13.

Defendants misconstrue Plaintiffs' claims to suggest this case turns exclusively on recognition of the right to a "climate system capable of sustaining human life." Contrary to Defendants' mischaracterizations, in addition to their claim seeking recognition of this right, the FAC alleges violations of enumerated and unenumerated rights recognized in Fifth Amendment jurisprudence, including infringement of fundamental rights to personal security, to property, to life, to family autonomy and security, and to freedom from discrimination as a protected class and with respect to their fundamental rights, as well as violations of rights under the Public Trust Doctrine. FAC ¶¶ 277-310.

a. The Right to the Ability to Sustain Human Life is Well-Grounded

The District Court properly recognized a fundamental right to a "climate system capable of sustaining human life." Dkt. 83 at 32. When deciding upon previously unrecognized fundamental rights, the Supreme Court has inquired whether such rights are *either* "fundamental to our scheme of ordered liberty, *or*…deeply rooted in this Nation's history and tradition." *McDonald v. City of Chicago, Ill.*, 561 U.S. 742, 767 (2010) (citations and quotations marks omitted and emphasis added). However, "identification and protection of fundamental rights…has not been reduced to any formula." *Obergefell v. Hodges*, 135 S.Ct. 2584, 2598 (2015) (citation and quotation marks omitted). The right to a climate system capable of sustaining human life unquestionably meets the standard under any "formula."

Here, the District Court indisputably "exercise[d] the utmost care" in recognizing the right at issue by "beginning with a careful description" of the right, *Reno v. Flores*, 507 U.S. 292, 302 (1993), as that to a climate system *capable of sustaining human life*. Dkt. 83 at 32-33. That other courts rejected the existence of significantly broader and easily distinguishable rights to a "healthy" or "pollution-free environment" in cases presenting significantly different factual scenarios does not alter the propriety of recognizing the narrowly-cabined right within the

particular circumstances of this case.[14] Further, the unique facts underlying Plaintiffs' claims inform the fundamental rights inquiry.

> The generations that wrote and ratified the Bill of Rights…did not presume to know the extent of freedom in all 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. When new insight reveals discord between the Constitution's central protections and a received legal stricture, a claim to liberty must be addressed.

Obergefell, 135 S.Ct. at 2598. The unprecedented circumstances of the climate crisis and Defendants' responsibility for that crisis are the kind of "new insight" justifying recognition of the "claim to liberty" asserted.

The right to a climate system capable of sustaining human life is both "deeply rooted in this Nation's history and tradition" and "fundamental to our scheme of ordered liberty." *McDonald*, 561 U.S. at 767*; see* Decl. of John E. Davidson, Dkt. 46 and Amicus Curiae Brief ISO Plaintiffs, Dkt. 60 (delineating the deep historical roots of the right). At the core of the Constitution is a system of intergenerational ethics focused on preservation of the human species. Dkt. 60 (citing John Locke, *Two Treatises of Government*, ¶¶ 7, 16, 134, 135, 149, 159, 171, 183 (1689) (Peter Laslett ed., 2d ed. 1967). These ideals were widely shared by the framers, and the principle that government may not deplete the resources

[14] *S.F. Chapter of A. Phillip Randolph Inst. v. EPA*, in which the plaintiffs asserted a "right to be free of global warming pollution" is not to the contrary. No. C 07-04936 CRB, 2008 WL 859985, at *6 (N.D. Cal. Mar. 28, 2008). Plaintiffs in that case challenged only the issuance of permits for two power plants. *Id.* at *1.

upon which later generations needed to survive served as a foundational principle to the Bill of Rights. *Id*. at 20-28. In his celebrated speech of May 12, 1818, James Madison expounded the importance of the balance and symmetry of nature and nature's laws:

> Animals, including man, and plants may be regarded as the most important part of the terrestrial creation…. ***To all of them, the atmosphere is the breath of life. Deprived of it, they all equally perish….***
>
> ***The atmosphere is not a simple but a compound body. In its least compound state, it is understood to contain, besides what is called vital air, others noxious in themselves, yet without a portion of which, the vital air becomes noxious. … Is it unreasonable to suppose, that if, instead of the actual composition and character of the animal and vegetable creation, to which the atmosphere is now accommodated, such a composition and character of that creation, were substituted, as would result from a reduction of the whole to man and a few kinds of animals and plants; is the supposition unreasonable, that the change might essentially affect the aptitude of the atmosphere for the functions required of it; and that so great an innovation might be found, in this respect, not to accord with the order and economy of nature?***
>
> ***
>
> The immensity of the atmosphere, compared with the mass of animals and vegetables, forms an apparent objection only to this view of the subject. ***The comparison could at most suggest questions as to the period of time necessary to exhaust the atmosphere of its unrenewed capacity to keep alive animal or vegetable nature***, when deprived, either, of the support of the other.[15]

[15] "Address to the Agricultural Society of Albemarle, 12 May 1818," *Founders Online,* National Archives, last modified June 29, 2017, http://founders.archives.gov/documents/Madison/04-01-02-0244.

The foundational importance of our atmosphere and climate system to the nation was unequivocally recognized by the Founding Fathers. These deep roots of the right to a stable climate system capable of sustaining human life are exemplified in our nation's conservation legislation. *See, e.g.,* 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.")

Further, the Supreme Court has long championed recognizing rights necessary to preserve other fundamental rights. *See*. *e.g*., *Yick Wo v*. *Hopkins*, 118 U.S. 356, 370 (1886) (right to vote is "a fundamental political right, because [it is] preservative of all rights."); *Obergefell*, 135 S.Ct. at 2602. As the District Court properly recognized, the right to a climate system capable of sustaining human life is similarly preservative of all rights. "Just as marriage is the 'foundation of the family,' a stable climate system is quite literally the foundation 'of society, without which there would be neither civilization, nor progress.'" Dkt. 83 at 32. The rights to life, liberty, and property depend upon preservation of a climate system capable of sustaining their meaningful exercise. Our previously recognized unenumerated rights rest upon a climate system capable of sustaining human life, including rights touching upon "deeply personal choices central to individual dignity and autonomy," *Obergefell*, 135 S.Ct. at 2597, including, among others, the right to

safely raise families and control the upbringing of children, to practice religious beliefs, to maintain bodily integrity and personal security, and to safely provide for basic human needs. Dkt. 7 ¶ 283. The right to a stable climate system capable of sustaining human life preserves the baseline conditions on which each of these rights depend.

b. Plaintiffs Properly Alleged a Valid Post-*DeShaney* Claim

Under the state-created danger exception to *DeShaney*,[16] the government has an affirmative obligation to act when its conduct places a person "in peril with deliberate indifference to their safety." *Penilla v. City of Huntington Park*, 115 F.3d 707, 709 (9th Cir. 1997). State-created danger claims are not, as Defendants assert, limited "to cases involving actions of police officers that placed individual plaintiffs in direct and immediate peril." Pet. at 22; *see Pauluk v. Savage*, 836 F.3d 1117 (9th Cir. 2016) (employee's long-term exposure to toxic mold). In fact, this Court's interpretation of the state-created danger exception establishes its applicability to claims involving exposure to adverse environmental conditions. *Pauluk*, 836 F.3d 1117 (toxic mold); *Munger v. City of Glasgow*, 227 F.3d 1082 (9th Cir. 2000) (freezing weather). Defendants' knowing contributions to the climate crisis put this case on all fours with this body of law.

[16] *DeShaney v. Winnebago Cnty. Dep't of Soc. Servs.*, 489 U.S. 189 (1989).

Defendants' causation of and failure to address the climate crisis clearly "shocks the conscience." Pet. at 26 n.8. "When such extended opportunities to do better are teamed with protracted failure even to care, indifference is truly shocking." *Cty. of Sacramento v. Lewis*, 523 U.S. 833, 850, 853 (1998). For over five decades, Defendants knew of the extreme dangers that their actions create. Dkt. 7 ¶¶ 1, 4, 131-150. Despite "extended opportunities" over this same period, Defendants deliberately persisted in those actions, failing to safeguard Plaintiffs from the perils in which Defendants placed them. *Id.* ¶¶ 151-191. This shocks the conscience. Each of Plaintiffs' due process claims are well-grounded and properly before the District Court.[17]

c. Plaintiffs' Claims Rest Directly On the Constitution

Equitable relief is available directly under the Due Process Clause of the Fifth Amendment. *Bolling v. Sharpe*, 347 U.S. 497 (1954). Defendants' argument to the contrary, while correctly identifying the distinction between "a cause of action for damages" and a claim seeking equitable relief, misses the reason the

[17] Defendants disjointedly address Plaintiffs' post-*DeShaney* claim alongside Plaintiffs' claim to a right to a stable climate system capable of sustaining human life. Pet. at 22-24. These separate claims present distinct standards. Courts apply strict scrutiny to governmental action implicating a fundamental right. Whether the government has an affirmative duty to act to preserve a claimant's personal security is determined by whether the government has placed the claimant "in peril with deliberate indifference to their safety." *Penilla*, 115 F.3d at 709. Plaintiffs also bring claims alleging direct infringement of their enumerated and previously recognized unenumerated rights, as well as claims arising under the Equal Protection Clause and the Public Trust Doctrine. Dkt. 7.

Supreme Court developed the distinction in the first place. Pet. at 26. In *Davis v. Passman*, the Court recognized a private right of action for damages under the Fifth Amendment. 442 U.S. 228 (1979). 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 of the Fifth Amendment." *Id.* at 243-244. 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 *monetary 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 as to whether equitable remedies are available for constitutional violations.

> [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 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). 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 v. Six Unknown Named Agents of the Federal Bureau of Narcotics*, 403 U.S. 388, 400 (1971) (Harlan, J., concurring). The Supreme Court confirmed this reasoning in *Ziglar v. Abbasi*, where plaintiffs sought money damages against "executive officers," challenging "large-scale policy decisions" as violative of their Fifth Amendment substantive due process rights and the Court stated "[t]o address these kinds of [large-scale] policy decisions, detainees may seek injunctive relief.". 582 U.S. __, slip op. at 2, 5, 16-17 (2017).

3. The Public Trust Doctrine Applies to Defendants

As an inherent attribute of sovereignty, the Public Trust Doctrine applies to all governments, state and federal. *Ill Cent. R. Co. v. State of Ill.*, 146 U.S. 387, 455 (1892). Defendants' argument that the federal government holds no Public Trust Doctrine obligations rests upon a single, erroneously decided case, affirmed by unpublished decision, reliant upon dictum from a case that did not even address the existence of a federal Public Trust.

The district court in *Alec L. v. Jackson* erroneously rejected the existence of the federal Public Trust based on the Supreme Court's dictum that "the public trust doctrine remains a matter of state law." 863 F.Supp.2d 11, 15 (D.D.C. 2012) (quoting *PPL Montana, LLC v. Montana*, 565 U.S. 576, 603 (2012)).[18] In a

[18] Defendants misstate that some Plaintiffs in this case were plaintiffs in *Alec L.* Pet. at 28. The plaintiffs are not the same.

similarly inattentive opinion, the D.C. Circuit affirmed on the same basis. *Alec L. v. McCarthy*, 561 Fed.Appx. 7 (D.C. Cir. 2014).

Importantly, *PPL Montana* did not even involve, let alone address, whether the Public Trust Doctrine applies to the federal government and, accordingly, *Alec L.*'s reliance on *PPL* dicta without analysis improperly avoided the merits of the plaintiffs' claims. *See* M. Blumm and L. Schaffer, *The Federal Public Trust Doctrine: Misinterpreting Justice Kennedy and Illinois Central Railroad*, 45 ENVTL. L. 399, 418- 421, 421 (Spring 2015). In contrast, the District Court provided a thorough and reasoned analysis of *PPL Montana*, concluding the case does not foreclose the existence of a federal Public Trust. Dkt. 83 at 43-46. As Magistrate Judge Coffin observed: "If the doctrine were to be extinguished, it assuredly would not be in the form of tangential dicta in the context of a Supreme Court ruling on a matter that did not even involve the question of whether the federal government has public trust obligations over its sovereign seas and territories." Dkt. 146 at 13-14.

Like *PPL Montana*, *United States v. 34.42 Acres of Land* did not involve, and this Court did not consider, the existence of the federal Public Trust. 683 F.3d 1030 (9th Cir. 2012). In *34.42 Acres*, this Court invoked *PPL Montana*, and its proclamation that a state's Public Trust is a matter of state law, to support the proposition that when the federal government condemns state lands, it takes title

free from the *state's* Public Trust obligations by virtue of the Supremacy clause. *Id.* at 1038. That holding is wholly inapplicable to this case. The applicability of a state's Public Trust doctrine to the federal government does not speak to the existence of a separate federal Public Trust. Because the Public Trust Doctrine is an attribute of sovereignty, its contours and applicability are necessarily a matter of each sovereign's law. *Ill. Cent. R. Co.*, 146 U.S. at 455. Importantly, the district court in *34.42 Acres* had ruled the tidelands included in the parcel condemned by the federal government were subject to the federal Public Trust. 683 F.3d at 1033, 1039 n. 2. This ruling was not overturned on appeal. *Id.* Further, as the District Court noted, two additional cases recognized that where the federal government condemns state Public Trust assets, it takes title free of the state's Public Trust obligations, but subject to obligations under the federal Public Trust Doctrine. Dkt. 83 at 46-47 (citing *United States v. 1.58 Acres of Land Situated in the City of Boston, Suffolk Cnty., Mass*. 523 F.Supp. 120, 124 (D. Mass. 1981); *City of Alameda v. Todd Shipyards Corp.*, 635 F.Supp. 1447 (N.D. Cal. 1986)). The District Court committed no clear error.

IV. ANY DELAY IN RESOLVING THIS CONSTITUTIONAL CASE AT TRIAL IRREPARABLY HARMS PLAINTIFFS AND THE PUBLIC INTEREST.

The harm Plaintiffs will suffer if their case is stayed before trial is irreparable. Environmental harm is by nature irreparable as is often infringement of

constitutional rights. *Amoco Prod. Co. v. Vill. of Gambell*, 480 U.S. 531, 545 (1987); *Goldie's Bookstore, Inc. v. Superior Court of Cal.*, 739 F.2d 466, 472 (9th Cir. 1984); *Ariz. Dream Act Coal. v. Brewer*, 757 F.3d 1053, 1069 (9th Cir. 2014). Both are threatened here by the ongoing actions of Defendants. Unlike other cases where environmental harm is threatened, here, the harm to the climate system threatens the very foundation of life, including the personal security, liberties, and property of Plaintiffs. Unlike other cases, ***Defendants concede the scope of harm***, admitting that existing harm has already put our nation in the danger zone, and that the harm could be irreversible for millennia. *See* Statement of Relevant Facts.

Because atmospheric CO_2 levels are already dangerous, every day of more carbon emissions and increased fossil fuel extraction and infrastructure exacerbates the danger. Defendants have provided no expert testimony to support their bald assertion that delay of months or years to resolve Plaintiffs' claims will not cause Plaintiffs harm. Dr. Harold Wanless, a highly respected geologist and climate expert, explains how urgent the climate emergency is and how even a short delay causes Plaintiffs harm. Wanless Decl. ¶¶ 1-5, 18-19, 22, 25-63. Dr. Wanless explicates that sea level rise of 15-40 feet is very likely by the end of the century and that Defendants' estimates of up to 8 feet of sea level rise by 2100, while still devastating to coastal cities, properties, and populations, does not present the full risks and magnitude of sea level rise we are very likely locking in by heating the

oceans. Wanless Decl. ¶¶ 29-38. Almost 94% of human-caused heating is going into the oceans and melting our planet's largest ice-sheets. Wanless Decl. ¶ 25. The U.S. is responsible for more than 25% of that heat. Dkt. 98 ¶ 7.

Moreover, the harm is not generalized harm, but is particular to Plaintiffs. Plaintiff Levi D. lives on an island off the Atlantic coast of Florida at 3 feet above sea level. Levi Decl. ¶ 1-3; Wanless Decl. ¶ 50. Already locked-in ocean heating and sea level rise could inundate Levi's island and home by mid-century, making it unlivable. Wanless Decl. ¶ 50. The only chance Levi has to protect his home, his personal security, and his health from the ongoing systemic actions of Defendants depends upon an injunction that requires carbon emissions to decline quickly. Wanless Decl. ¶¶ 51-63. "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." *Id.* ¶ 62.

Plaintiff Jacob Lebel moved to Oregon with his family to start a farm and grow nearly all of their own food. Jacob's land and livelihood are uniquely threatened by climate change and Defendants' ongoing fossil fuel energy system. Jacob Decl. ¶¶ 1-25. Jacob experiences increasing drought, wildfire threats, threats to air quality, and farming days exceeding 100 degrees F. Jacob Decl. ¶¶ 6-13.

Defendants do not dispute the irreparable harms asserted by Levi, Jacob, or Plaintiffs' experts. Because these irreparable environmental and human harms are

undisputed and because fundamental rights are at stake, the balance of harm clearly favors denying the requested stay and mandamus.

The public interest is served by allowing Plaintiffs to vindicate constitutional violations. *Rodriguez v. Robbins*, 715 F.3d 1127, 1146 (9th Cir. 2013); *Preminger v. Principi*, 422 F.3d 815, 826 (9th Cir. 2005). "The public interest is fundamentally harmed by ongoing fossil fuel combustion, which urgently needs reparation." Wanless Decl. ¶ 63.

CONCLUSION

For the foregoing reasons, Plaintiffs respectfully request this Court deny Defendants' Petition for Writ of Mandamus.

DATED this 28th day of August, 2017, at Eugene, OR.

Respectfully submitted,

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STATEMENT OF RELATED CASES

To the best of our knowledge, there are no related cases.

Dated: August 28th, 2017

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CERTIFICATE OF COMPLIANCE

I certify that the attached brief is proportionally spaced, has a typeface of 14 points or more, and contains 11233 words (based on the word processing system used to prepare the brief).

Dated: August 28th, 2017

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CERTIFICATE OF SERVICE

I hereby certify that on August 28, 2017, I electronically filed the foregoing Answer of Real Parties In Interest to Petition for Writ of Mandamus with the Clerk of the Court of the United States Court of Appeals for the Ninth Circuit by using the appellate CM/ECF system. In addition, a courtesy copy of the foregoing brief has been provided via-email to the following counsel:

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Case No. 17-71692

IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

In re: UNITED STATES OF AMERICA

UNITED STATES OF AMERICA, *et al*.,
Petitioners,

v.

UNITED STATES DISTRICT COURT FOR
THE DISTRICT OF OREGON
Respondent,

and

KELSEY CASCADIA ROSE JULIANA, *et al*.,
Real Parties in Interest

On Petition For Writ of Mandamus In
Case No. 6:15-cv-01517-TC-AA (D. Or.)

DECLARATION OF JULIA A. OLSON IN SUPPORT OF ANSWER OF REAL PARTIES IN INTEREST TO PETITION FOR WRIT OF MANDAMUS

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I, Julia A. Olson, hereby declare and if called upon would testify as follows:

1. I am an attorney of record in the above-entitled action for Plaintiffs and I have personal knowledge of the statements made herein.

Federal Defendants Incorrectly Characterize the State of Discovery

2. In their Petition, Federal Defendants incorrectly characterized the conduct of discovery in this case. For example, the parties have not yet filed a single discovery motion in this case, despite having begun discovery in January 2017. Instead, the parties have sought to resolve disputes through the meet and confer process. There have been no court orders directing Federal Defendants to produce documents.

3. In order to effectuate Plaintiffs' desire to present their claims at trial beginning on February 5, 2018, and given the substantial amount of factual information obtained through informal discovery, counsel for Plaintiffs have gone to great lengths to work with Federal Defendants to limit and narrow formal discovery and have thus far completely avoided the need for motions practice.

4. The District Court has also acted to ensure that the discovery process moves forward in an efficient manner without the need for motions practice. *See, e.g.*, Reporter's Tr. of Proceedings, Dkt. 115 at 14:7-12 (Court: "So, what we are going to try to do here in this process is take what appears to be a complex case and see how we can simplify it to where it's more understandable and

more manageable. And that task largely falls upon the shoulders of the lawyers involved with the court's assistance.").

5. During the initial proceedings in this case, the parties asked the District Court to hold monthly status conferences to provide the District Court with regular updates on the status of discovery and other litigation-related issues. *Id*. at 4:20-5:3 (Counsel for Plaintiffs: "So, first of all, we would request respectfully that the court set monthly status conferences so that we could call in perhaps the first Wednesday of each month to update the court and deal with any discovery issues that are arising, and I believe that the federal defendants, in their status report, also requested that the court take an active role in the discovery aspect of this case." Court: "Well, I can certainly accommodate you in that."). In advance of each monthly status conference, the parties met and conferred and provided the District Court with status reports detailing existing pre-trial matters, including the status of on-going discovery. Joint status reports were filed beginning on April 3, 2017. Status conferences were held on: February 7, 2017; March 8, 2017; April 7, 2017; May 18, 2017; and June 14, 2017.

6. All parties have continually expressed a willingness to meet and confer in an attempt to resolve discovery disputes without the need of court intervention. *See, e.g.*, Reporter's Tr. of Proceedings, Dkt. 179 at 12:24-13:3 (Counsel for

Plaintiffs: "We do not want millions and millions of documents, and we are very open and willing to meet and confer with counsel for the federal defendants to figure out how to better articulate our request so that we can get at the more precise documents that we are looking for."); *see also* Ex. 1 at 1 (April 13, 2017 Fed. Defs.' Meet and Confer Letter) ("We agree that the parties should try to resolve all discovery disputes amicably without the need for court intervention to the extent possible.").

7. The parties have met in-person twice to discuss discovery issues, on May 4, 2017, and June 14, 2017, have held many telephonic meet and confer sessions, and have exchanged many letters discussing how to narrow discovery in this case. *See, e.g.* Ex. 2 at 2 (June 27, 2017 Plaintiffs' Meet and Confer Letter) (clarifying "Plaintiffs do not need publicly-available documents" and "are not seeking communications or documents from 'lower level' employees.").

8. To date, the meet and confer process has significantly narrowed the scope of discovery. There has yet to be a discovery issue between the Plaintiffs and Federal Defendants that counsel have been unable to resolve. Plaintiffs are confident that the parties can continue to focus discovery and exchange thorough discovery responses with little or no court intervention.

9. In terms of the supposed "onerous and disruptive discovery," Federal Defendants' discovery responses to date have been virtually non-existent: they

have yet to produce a single document, they have only presented two witnesses for deposition, they have responded to only 10 Requests for Admissions ("RFAs"), they have answered no interrogatories, and they have disclosed no experts.

10. Plaintiffs are confident that they can continue to work with Federal Defendants through the meet and confer process to resolve any discovery issues. Plaintiffs are also confident that the District Court will place appropriate constraints on the discovery process to keep the case on track for the trial date it set – February 5, 2018.

Plaintiffs' Efforts at Informal Discovery

11. Prior to filing this case, counsel for Plaintiffs engaged in years of comprehensive factual research, or informal discovery, including, but not limited to, the submission of multiple requests under the Freedom of Information Act ("FOIA"), in-person interviews, internet research, and archival searches. The purpose of this pre-filing investigation was both to establish the underlying factual bases for the legal claims alleged and to ensure a prompt road to trial given the urgency of the climate crisis. The complaint was filed in August 2015. Even after defeating Defendants' motions to dismiss, Plaintiffs' primary discovery tool in this case remains informal discovery of publicly available information from multiple sources,

including presidential libraries, other archival sources, and the vast body of scientific literature on climate change.

The Importance of Defendants' Answers

12. In November 2015, three trade associations—the National Association of Manufacturers ("NAM"), American Fuel & Petrochemical Manufacturers ("AFPM"), and American Petroleum Institute ("API") (collectively "Intervenor Defendants")—moved to intervene in this case as full party defendants, allegedly to protect the interests of their members. Mot. to Intervene, Dkt. 14. They argued, and the District Court agreed, that the relief Plaintiffs seek in the First Amended Complaint ("FAC") could directly harm the economic interests in the production, refining, and use of fossil fuels of "virtually the entire swath of the NAM, AFPM, and API's members." Mem. in Supp. of Mot. to Intervene ("Mot. to Intervene"), Dkt. 15 at 16.

13. Plaintiffs opposed participation in this case by Intervenor Defendants. Pls.' Opp. to Mot. to Intervene, Dkt. 33.

14. The District Court found that all of the factors for intervention had been met and granted the motion to intervene as of right. Order Granting Mot. to Intervene, Dkt. 50.

15. On December 15, 2016, Intervenor Defendants answered the First Amended Complaint ("FAC"), claiming a lack of sufficient information or knowledge to

admit or deny 198 paragraphs in the FAC. In essence, Intervenor Defendants refused to take a position on over 75% of the factual allegations in the FAC. Dkt. 93. Intervenor Defendants did admit 47 partial or complete paragraphs, and specifically denied 14 paragraphs. However, because their Answer did not admit *any* of the key factual allegations in the FAC, Plaintiffs were required to propound discovery directed to prove virtually all of the alleged facts in the FAC.[1]

16. On January 13, 2017, Federal Defendants filed their Answer to the FAC. Unlike the Answer filed by Intervenor Defendants, Federal Defendants' Answer provided many substantive admissions. Dkt. 98. Federal Defendants even suggested to the District Court and Plaintiffs that the admissions in their Answer could narrow the scope of discovery. *See, e.g.*, Federal Defendants' Status Report, Dkt. 108 at 2 (Federal Defendants suggest that "its answer, which contained numerous substantive responses, could narrow the number of issues in dispute and provide a basis for more streamlined discovery.").

17. Counsel for Federal Defendants have acknowledged during meet and confer sessions that they have admitted most of the core facts alleged in the FAC, which should significantly limit the scope of discovery sought.

[1] Given that Intervenor Defendants are no longer parties to this lawsuit, this declaration does not discuss in detail the specific discovery propounded on, or related to, Intervenor Defendants since such discovery is now moot.

18. However, because of the Intervenor Defendants' full party status, Plaintiffs were faced with a discovery conundrum. On the one hand, Intervenor Defendants had refused to take a position on all the core factual allegations in the FAC, including allegations admitted by Federal Defendants. Because Plaintiffs were preparing for trial as to both sets of defendants, Plaintiffs were required to propound discovery in order to address Intervenor Defendants' factual denials that would have otherwise been unnecessary as to Federal Defendants alone, given the admissions by the latter in their Answer.

19. In light of Federal Defendants' admissions in their Answer, as early as the January 30, 2017 meet and confer, Plaintiffs sought clarification from counsel for Intervenor Defendants about their position on Federal Defendants' admissions in their Answer. I specifically asked whether Intervenor Defendants were prepared to admit the facts that Federal Defendants had admitted in their Answer as a means to limit the scope of discovery. Counsel for Intervenor Defendants responded that Intervenor Defendants wanted to largely stay out of fact discovery and the liability portion of trial, instead wanting to engage in expert discovery and the remedy phase. However, Intervenor Defendants remained unwilling to take a position on Federal Defendants' admissions and reserved the right to contest the facts that had been admitted by Federal Defendants during the liability portion of trial.

20. Over the next several months, Plaintiffs, as well as the District Court, made several attempts to get Intervenor Defendants to take a position on the admissions made by Federal Defendants as a means to limit the scope of discovery and the issues to be established at trial. During the February 7, 2017 Status Conference, counsel for Intervenor Defendants stated: "it really is beside the point whether the intervenors concede or contest the factual underpinnings of the plaintiffs' case." Dkt. 115 at 16:6-8. The District Court disagreed and directed Plaintiffs to "draw up a list of admissions that the government has made and forward those to counsel for intervenors" to facilitate the process to get Intervenor Defendants to take a position on Federal Defendants' admissions in their Answer. *Id*. at 51:21-24.

21. Following the District Court's direction, on February 15, 2017, I wrote counsel for Intervenor Defendants about the deficiencies in their Answer and attached a summary of the admissions made by Federal Defendants in their Answer. *See* Joint Status Report as of April 3, 2017, Dkt. 131 at 2-3. As part of a meet and confer on our position that Intervenor Defendant's Answer contained false information and was potentially sanctionable, I also provided counsel for Intervenor Defendants with relevant core facts from their clients and their clients' members that would assist Intervenor Defendants with correcting their Answer and/or taking a position on Federal Defendants'

admissions.

22. By the March 8, 2017 Status Conference, Intervenor Defendants had still not clarified their position on Federal Defendants' admissions, leading the District Court to observe:

    a. "[I]t would seem to me that the intervenors need to address head on the issue of the admissions of the United States that have been made in their answer, and to directly state whether they agree with or disagree with those admissions, and specify exactly which admissions they don't agree with."

    b. "[I]f you [Intervenor Defendants] are a party in any realistic sense of that term, then advise the Court what admissions of the United States you take issue with specifically. So the Court can – can [sic] be advised as to whether or not there's a need to have a trial on some of these issues or – that the Government has admitted, or whether those can be deemed admitted for purposes of any further proceedings." Dkt. 124 at 36:11-17, 37:1-10.

23. At the March 8, 2017 Status Conference, counsel for Intervenor Defendants objected to having to take a position on Federal Defendants' admissions. *Id.* at 37:11-21. On behalf of Plaintiffs, I then offered to serve Intervenor Defendants with a narrowed list of Federal Defendants' key admissions. *Id.* at

40:9-20. On March 24, 2017, I served RFAs on Intervenor Defendants in an attempt to get them to take a position on the key facts that Federal Defendants had admitted, consistent with the District Court's efforts to narrow discovery and issues in dispute at trial.

24. Despite receiving multiple requests for an extension of time to respond to these RFAs, Intervenor Defendants never took a position on Federal Defendants' admissions. Instead, Intervenor Defendant NAM filed its motion to withdraw from the case on May 22, 2017; and Intervenor Defendants API and AFPM filed motions to withdraw from the case on May 25, 2017, the very day they were required to respond to Plaintiffs' RFAs as to Federal Defendants' admissions in their Answer. Dkt. 163, 165, 166.

25. After briefing, the District Court granted all three Intervenor Defendants' motions to withdraw from the case on June 28, 2017. Dkt. 182.

26. When Federal Defendants filed this Petition for a Writ of Mandamus and request for stay on June 9, 2017, Intervenor Defendants were still parties in this case and had not yet taken a position on Federal Defendants' admissions. Thereafter, when the District Court granted Intervenor Defendants' motions to withdraw on June 28, 2017, *id.*, the scope of discovery was substantially narrowed. Plaintiffs are now only required to prove the factual allegations denied by Federal Defendants in their Answer and have been narrowing their

discovery requests accordingly.

27. At the June 14, 2017 Case Management Conference, I reiterated to the District Court that:

> all of the requests for production of documents and, in fact, a significant portion of this discovery in the case was propounded prior to the motions to withdraw by the intervenor defendants… And the intervenor defendants, as Your Honor knows, refused to concede any of the facts of the case, virtually, and were – it was unclear what they were going to dispute or not dispute. So we were preparing for trial in part in light of those positions, and I think our position can shift once Your Honor makes a decision on them leaving the case.

Dkt. 179 at 44:13-25. The District Court agreed with Plaintiffs, stating: "I can see where the plaintiffs needed to know that so that they could prepare their case accordingly." *Id*. at 47:4-5.

Requests for Admission to Federal Defendants

28. On January 20, 2017, Plaintiffs served their First Set of RFAs to Federal Defendants Executive Office of the President ("EOP") and the Environmental Protection Agency ("EPA"). As part of the meet and confer process, Federal Defendants asked Plaintiffs to define additional terms in the RFAs, which Plaintiffs did in a letter dated March 7, 2017.

29. On May 31, 2017, Federal Defendants EOP and the EPA served joint responses and objections to the RFAs, including objections as to executive privilege. At a June 14, 2017 in-person meet and confer which I attended, I

requested, and counsel for Federal Defendants agreed, they serve separate responses to the RFAs for the EOP and the EPA so that we could assess whether EPA would be objecting on the basis of executive privilege, and avoid seeking discovery invoking this privilege.

30. On July 12, 2017, Federal Defendants EOP and EPA served separate responses and objections to the RFAs.

31. In a letter to Federal Defendants regarding the status of discovery dated August 28, 2017, Plaintiffs informed Federal Defendants that they will not move to compel further responses to the RFAs from either the EOP or the EPA. Ex. 5 (August 28, 2017 Pls.' Status of Disc. Letter).

Litigation Hold Letter

32. On January 24, 2017, counsel for Plaintiffs sent a "Notice of Litigation Hold and Request for Preservation" to Federal Defendants. Dkt. 111. There were two reasons behind sending the January 24 litigation hold letter:

    a. As this Court is well aware, it is standard practice in civil litigation to send litigation hold requests to ensure that relevant evidence will be preserved for a pending lawsuit.

    b. More pressing, during the January 20, 2017 time frame, there were well-publicized accounts of removal and/or deletion of climate-related information and software from federal websites, including websites of

numerous named Federal Defendants. *See, e.g.,* Ex. 3 (January 25, 2017, Forbes Article on EPA Climate Change Webpage). Plaintiffs were reasonably concerned about the destruction of information and took steps to ensure that document retention/destruction policies were suspended and a litigation hold put in place to preserve relevant evidence to avoid spoliation issues. The litigation hold letter was *not* a request for production of documents. *See* Reporter's Tr. of Proceedings, Dkt. 115 at 5:20-6:5.

33. After receiving the January 24 litigation hold letter, counsel for Federal Defendants incorrectly conflated the January 24 litigation hold letter as equivalent to a request for production of documents, which is not what was intended by the January 24 litigation hold letter. *See* Pls.' Status Report with a Proposed Schedule, Dkt. 110 at 3. Significantly, counsel for Federal Defendants never provided any written response or objection to the January 24 litigation hold letter. Federal Defendants also did not provide any document preservation or communication protocols for any Federal Defendant despite our requesting such protocols so that Plaintiffs could revise and tailor their litigation hold letter as appropriate to conform with Federal Defendant practices, given the concern it created for defense counsel.

34. I was informed by counsel for Federal Defendants that the January 24

litigation hold letter was sent to in-house counsel of some of the named agency defendants. During the March 1, 2017 meet and confer, counsel for Federal Defendants stated that litigation hold letters were sent by the Agency General Counsels to the various Federal Defendant departments and agencies. In light of Federal Defendants' assurances that all relevant documents and information would be preserved, assurances from counsel for Federal Defendants that they would help Plaintiffs locate documents no longer publically available on agency websites, and Federal Defendants' understanding that the letter does not require processing or production of all of those documents, it is my understanding there is no longer any dispute associated with the January 24 litigation hold letter.

Requests for Production of Documents

35. On February 21, 2017, Plaintiffs sent their First Requests for Production of Documents ("RFPs") to all Federal Defendants in order to obtain specifically identified documents housed at National Archives and Records Administration ("NARA") facilities. This narrow RFP identified individual documents by description and location. Indeed, counsel for Federal Defendants indicated that Plaintiffs' RFP was narrowly tailored and specific.

36. On March 7, 2017, Plaintiffs sent a Second Set of RFPs to all Federal Defendants in order to obtain additional documents housed at NARA

facilities. Federal Defendants informed Plaintiffs that some of the folders and collections requested are not available because they have never been processed, meaning that the boxes are still closed from when the records were transferred from the White House to NARA. Ex. 4 (July 20, 2017 Fed. Defs.' Email re: NARA Docs). For some of the documents that had been processed and were not classified, Federal Defendants directed Plaintiffs to file FOIA requests. For the records of five EPA Administrators and U.S. Information Agency, Federal Defendants agreed to make the records available to Plaintiffs to come and review at the NARA facility in College Park, Maryland once a protective order is in place. Federal Defendants sent Plaintiffs a draft stipulation and protective order, which was edited and sent back to Federal Defendants. Plaintiffs are prepared to sign a stipulation and protective order and review these NARA documents as soon as possible. Federal Defendants will not be required to do any duplication or digital conversion of any of these documents.

37. On March 17, 2017, Plaintiffs sent a Third Set of RFPs to all Federal Defendants seeking email communications from the "Wayne Tracker" email address of Rex Tillerson when he was CEO at Exxon Mobil. On August 28, 2017, Plaintiffs withdrew this Third Set of RFPs in light of Intervenor Defendants' withdrawal from the case. Ex. 5 (August 28, 2017 Plaintiffs'

Meet and Confer Letter).

38. On March 7, 2017, Plaintiffs sent an RFP to the Executive Office of the President and the President. On August 28, 2017, Plaintiffs withdrew this RFP. Ex. 5. Plaintiffs do not anticipate needing to serve a new RFP on the Executive Office of the President or the President. *Id.*

39. On March 31, 2017, Plaintiffs served separate RFPs on Federal Defendants United States Department of Agriculture, Department of Defense, and the State Department. After an all-day meet and confer on May 4, 2017, which covered many topics including these RFPs, Plaintiffs served Revised RFPs on defendants United States Departments of Agriculture, Defense, and State on May 19, 2017 and in a letter dated August 28, 2017, Plaintiffs informed Federal Defendants that the RFPs have been further narrowed. Ex. 5. We are prepared to serve the amended RFPs as soon as the stay is lifted and will be ready to meet and confer on them immediately.

40. During an in-person meet and confer on June 14, 2017, Federal Defendants committed to provide Plaintiffs with a document production plan in response to the Agriculture, Defense, and State RFPs by June 23, 2017, in which they would identify proposed search terms, proposed custodians to search, the time periods they could search electronically for each agency, and the media (e.g., email, phone records, documents, etc.) that they would search for each

agency.

41. In a June 23, 2017 letter, Federal Defendants identified some responsive documents that would be produced by July 31, 2017. However, contrary to the prior assurances, the June 23 letter did not identify search terms, proposed custodians, the time frames they could search electronically for each agency, or the media that they would search for each agency. Plaintiffs have been awaiting this information in order to even further refine their requests through the meet and confer process and have not moved to compel production of any documents to date.

42. In light of the June 14 meet and confer and the June 23 letter, but without the benefit of the information Federal Defendants offered to provide, Plaintiffs have again revised and narrowed the May 19 RFPs for defendants United States Departments of Agriculture, Defense, and State and informed Defendants of this on August 28, 2017. Plaintiffs are confident that they can work with Federal Defendants through the meet and confer process to identify and obtain documents responsive to these revised RFPs without the need for court intervention.

43. Regarding the NARA RFPs, in a July 12, 2017 letter, counsel for Federal Defendants informed Plaintiffs that "President George W. Bush invoked the protections of Section 2204 of the Presidential Records Act as to the

documents Plaintiffs seek within the George W. Bush Presidential library. Such documents will not be produced in response to Plaintiffs' requests." Ex. 6 (July 12, 2017 Fed. Defs.' Meet and Confer Letter). The July 12 letter also stated that other records will not be produced because they are classified. *Id.* Federal Defendants also stated: "There are other records that Plaintiffs can request directly from the appropriate Presidential library." *Id*. Plaintiffs intend to make these requests of the presidential libraries. Other records will be produced upon the parties finalizing the aforementioned protective order. *Id.*

44. In a July 20, 2017 email, counsel for Federal Defendants informed Plaintiffs that Plaintiffs may review a portion of the requested documents from the February 21 and March 7 NARA RFPs once the protective order is in place. Ex. 4. Plaintiffs are confident that a mutually agreeable protective order could be entered by the District Court when the stay of proceedings is lifted. In light of Federal Defendants' assurance to make some of the requested NARA documents available, Plaintiffs do not anticipate any discovery disputes associated with Plaintiffs' February 21 and March 7 NARA RFPs. In a letter dated August 28, 2017, Plaintiffs informed Federal Defendants that they will not move to compel the production of NARA documents that Federal Defendants have said they will not produce. Ex. 5 (August 28, 2017 Pls.' Status of Disc. Letter).

45. While Federal Defendants have not yet produced a single document in this case, Plaintiffs are confident that they can continue to work with Federal Defendants through the meet and confer process on the production of documents responsive to their RFPs and be ready for trial in February 2017.

Expert Witness Discovery

46. During the case management conferences, the District Court has made it clear that expert testimony is the most critical aspect of this case. For example, at the June 14, 2017 case management conference, Magistrate Judge Coffin stated: "the most important evidence in the case would seem to be the presentation of the expert testimony." Dkt. 179 at 7:23-24. Federal Defendants acknowledge this view: "The Court's setting of a February 5, 2018 trial date manifests its intention to limit discovery and underscores Magistrate Coffin's repeated observation that trial in this case will focus on expert opinion and analyses, which will not require sweeping fact discovery." Ex. 6 (July 12, 2017 Fed. Defs.' Meet and Confer Letter).

47. Pursuant to the District Court's February 7, 2017 order that Plaintiffs disclose expert witnesses, Dkt. 112, Plaintiffs commenced early disclosure of their expert witnesses on March 24, 2017 by identifying their experts and providing short summaries of the content of their experts' testimony. Plaintiffs readily agreed to such early disclosure in an attempt to move the discovery process

forward as quickly as possible.

48. On June 26, 2017, the District Court entered a minute entry order setting forth the following schedule as to expert witnesses:

    A. June 23, 2017: Plaintiffs disclose any additional experts not previously disclosed (i.e., Group 2 Experts)

    B. July 5, 2017: Plaintiffs serve Group 1 Expert Reports (those identified in the March 24, 2017 letter)

    C. July 31, 2017: Plaintiffs serve Group 2 Expert Reports

    D. September 14, 2017: Defendants disclose rebuttal experts

    E. October 13, 2017: Defendants serve rebuttal expert witness reports

    F. November 1, 2017: Plaintiffs serve rebuttal expert witness reports

    G. December 4, 2017: trial memoranda due

    Dkt. 181.

49. Expert reports for Plaintiffs' experts have been served on Federal Defendants, even during the temporary stay of proceedings ordered by this Court. The remaining expert reports will be finalized and served on the Federal Defendants as soon as the stay is lifted in this case. To date, there have been no disputes between the parties about expert discovery in this case.

50. The Plaintiffs do not anticipate any discovery disputes associated with scheduling expert depositions or the exchange of expert reports.

Depositions

51. On March 24, 2017, pursuant to Local Rule 30-2, Plaintiffs informed Federal Defendants of their intent to notice depositions in order to meet and confer on potential witnesses and dates. Dkt. 151-9. On April 11, 2017, Plaintiffs sent Federal Defendants a letter describing the general categories of information likely to be included within the subject areas for the Rule 30(b)(6) depositions.

52. On May 11, 2017, Plaintiffs noticed the depositions of C. Mark Eakin, Coordinator of NOAA's Coral Reef Watch Program, and Michael Kuperberg, Executive Director of the U.S. Global Change Program within the U.S. Office of Science and Technology. The deposition of Dr. Kuperberg was taken on July 20, 2017, and the deposition of Dr. Eakin was taken on July 21, 2017.

53. During his deposition, Dr. Eakin testified that NOAA considers the impact of carbon dioxide and climate change on our oceans to be dangerous and that current levels of atmospheric carbon dioxide are dangerous for coral. Ex. 7 at 31:1-4, 34:25-35:3 (July 21, 2017 Eakin Dep. Tr.). Dr. Eakin also agreed "that carbon dioxide emissions that we emit today and carbon dioxide concentrations today will actually lock in impacts to coral reefs 10 or 20 years from now." *Id.* at 34:12-16. Dr. Eakin testified that he thinks we are in an "emergency situation" with respect to protecting our oceans. *Id.* at 70:19-22.

54. Dr. Kuperberg testified that he is "fearful," as a terrestrial ecologist and biologist about what is happening to our terrestrial climate system and that he "feel[s] that increasing levels of CO_2 pose risks to humans and the natural environment." Ex. 8 at 149:12-16, 150:1-3 (July 20, 2017 Kuperberg Dep. Tr.). Dr. Kuperberg also testified that he does not "think that the current federal actions are adequate to safeguard the future against climate change." *Id*. at 150:13-15. Finally, Dr. Kuperberg testified that "our country is currently in a danger zone when it comes to our climate system." *Id*. at 151:5-8.

55. During the deposition of Dr. Kuperberg, counsel for Federal Defendants instructed the witness not to answer a limited number of questions on deliberative process privilege grounds and counsel conferred as to the applicability of this privilege. *Id*. at 71:10-77:15. The parties agreed to meet and confer on this issue off the record, and the Plaintiffs expect to resolve these deliberative process issues through the meet and confer process or with the assistance of the District Court. *Id.* at 76:19-77:5.

56. Also during the deposition of Dr. Kuperberg, counsel for Federal Defendants raised "concerns" about certain questions "that could involve executive privilege." *Id*. at 100:7-104:8. Specifically:

> So I don't want to instruct you not to answer on executive privilege. But I just would, one, want to know what, the relevance of this is, and two, if it's something that you feel you need to pursue, perhaps we need to try

> to find out whether the Executive Office of the President wants to exert executive privilege over communications that the witness has had with the Executive Office of the President. And we can try to make a timeline to make a decision on that.

Id. at 101:8-17. Ultimately, counsel for Federal Defendants agreed to consult with the Executive Office of the President to ascertain whether the President intended to invoke executive privilege and counsel for Plaintiffs agreed to avoid asking questions regarding the witness' communications with the Executive Office of the President until that issue could be resolved. *Id.* at 103:5-104:9.

57. Plaintiffs do not intend to notice depositions or serve any discovery requests on any senior executive branch officials.

58. On June 12, 2017, Plaintiffs noticed Rule 30(b)(6) depositions on Federal Defendants Environmental Protection Agency, Department of Interior, Department of State, Department of Commerce, Department of Transportation, Department of Defense, Department of Energy, and Department of Agriculture. Counsel for Federal Defendants proposed in a June 23, 2017 letter that these depositions be completed by August 15, 2017, but in light of the temporary stay of proceedings at the District Court, these depositions have not yet occurred.

59. On June 30, 2017, the parties met and conferred regarding the subject areas

contained in the Rule 30(b)(6) deposition notices. As a result of this meeting, Plaintiffs agreed to narrow the subject areas and discussed ways in which certain subject areas could be eliminated. On July 12, 2017, Plaintiffs sent a letter to counsel for Federal Defendants, attaching a list of questions to guide the identification of Rule 30(b)(6) deponents for each agency. The parties intend to continue to meet and confer to discuss the subject areas for each 30(b)(6) deposition and the Plaintiffs expect that process will be fruitful and do not anticipate the need for motions practice. Counsel for Plaintiffs will propose a new date for completion of these depositions to counsel for Federal Defendants once the temporary stay of proceedings is lifted.

60. Federal Defendants have indicated they would like to depose each of the 21 youth Plaintiffs. Ex. 6 (July 12, 2017 Fed. Defs.' Meet and Confer Letter). Plaintiffs offered to help set a schedule for these deposition with the agreed upon goal to have Plaintiffs' depositions completed by September 4, 2017. *Id.* However, Federal Defendants have not noticed any depositions to date and due to the stay, no schedule has yet been set.

FOIA Requests

61. As discussed above, prior to the filing of the original Complaint, Plaintiffs submitted a number of FOIA requests in an attempt to gather evidence and conduct informal discovery in this case. For example, on June 4, 2015, I

submitted a FOIA request to the Office of Science and Technology Policy ("OSTP") seeking records pertinent to the issues in this case. Ex. 9 (June 4, 2015 FOIA Request to OSTP).

62. Over two years after the request was submitted, the OSTP identified 689 pages responsive to part of our FOIA request. Ex. 10 (August 3, 2017 Email from OSTP to Julia Olson). No documents are being withheld on the grounds of executive privilege.

Plaintiffs Do Not Anticipate Protracted Discovery Disputes

63. To date, Federal Defendants have not produced any documents requested through discovery.

64. However, prior to the issuance of the temporary stay of proceedings by this Court, Federal Defendants expressed a willingness to work with Plaintiffs and produce certain documents and, indeed, proposed to complete their production by July 31, 2017. Ex. 6 (July 12, 2017 Fed. Defs.' Meet and Confer Letter).

65. There are still a number of mechanisms that can be implemented to narrow the scope of discovery propounded in this case through the normal meet and confer process. For example, at the June 14, 2017 in-person meet and confer, Federal Defendants offered to provide Plaintiffs with a list of custodians for requested documents and communications. Federal Defendants have yet to provide that list; however, such a list certainly would assist in narrowing the

scope of outstanding discovery requests. At the request of Federal Defendants, Plaintiffs agreed that each discovery request going forward will be propounded on individual defendants, not multiple defendants.

66. Federal Defendants also agreed to coordinate with their IT staff to discuss how Electronically Stored Information ("ESI") is maintained in order to identify potential custodians and search terms so that outstanding discovery requests could be further narrowed. *Id.* Federal Defendants have yet to provide this information to Plaintiffs.

67. As to privileged documents, Federal Defendants "propose[d] that the issue of a privilege log be revisited after the production of any non-classified documents and after a determination is made as to whether any documents responsive to Plaintiffs' requests are classified." Plaintiffs are prepared to agree to a stipulation along these lines.

68. As of today, Federal Defendants have not propounded any discovery requests on Plaintiffs. Federal Defendants have informed Plaintiffs that other than their intention to depose the 21 youth Plaintiffs and Plaintiffs' experts, they do not intend to conduct any other fact discovery.

69. Given the urgency of the climate crisis and in light of the well-publicized fact that Federal Defendants are acting now to accelerate fossil fuel development, Plaintiffs are prepared to promptly complete fact and expert discovery and

will be ready for a court trial on February 5, 2018.

70. Federal Defendants have also stated they are willing and able to complete discovery in a timely manner. In their July 12, 2017 meet and confer letter, counsel for Federal Defendants reiterated: "it is important that fact discovery be completed sufficiently in advance of Defendants' October 13, 2017 expert report deadline so that Defendants' experts have the opportunity to review and accommodate those facts in their analyses and resulting reports." Ex. 6 (July 12, 2017 Fed. Defs.' Meet and Confer letter). For that reason, counsel for Federal Defendants "proposed that the production of documents in response to Plaintiffs' requests for production be completed by July 31, 2017." *Id.*

Energy Policy Act

71. Having reviewed all Section 201 export authorization approvals under the Energy Policy Act by the federal government from 2010 through April 2017, I did not identify a single instance of a party intervening. *See* U.S. Department of Energy, Long Term Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States (as of April 25, 2017), *at* https://energy.gov/sites/prod/files/2017/05/f34/Summary%20of%20LNG%20Export%20Applications.pdf (last visited August 28, 2017).

In accordance with 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

DATED this 28th day of August, 2017, at Eugene, Oregon.

Respectfully submitted,

/s/ Julia A. Olson

Exhibit 1 to Declaration of Julia A. Olson

U.S. Department of Justice

April 13, 2017

By Email

Re: *Juliana v. United States of America*; Case No. 15-cv-01517-TC, Meet and Confer on Outstanding Discovery

Dear Counsel:

I write to discuss the parties' forthcoming meet and confer and in response to your letter of April 11, 2017. We agree that the parties should try to resolve all discovery disputes amicably without the need for court intervention to the extent possible. We are amenable to an initial telephone conference to discuss preliminary matters, scheduling and the most fruitful topics of discussion for an in-person meet and confer. We propose that we have such a call either April 14, 2017 at 11 a.m. or early next week depending on the parties' respective availability.

We propose to meet and confer in Portland, Oregon during the week of May 1, 2017. We can secure space in the United States Attorney's Office or meet in the offices of counsel for Intervenor Defendants. Although we are willing to meet in Eugene, we have a strong preference for Portland because it saves us significant travel time and the significant additional expense of flying to Eugene. We also have agency clients in Portland and we will need to meet with them as part of this trip.

We are not available the week of April 24 in Washington, D.C. because one of the trial attorneys will be on work-related travel in San Francisco that entire week, including meeting with experts for this case and attending a hearing in another civil matter. We can discuss the possibility of meeting that week in San Francisco if necessary, but we think a meeting the following week in Portland would be far preferable.

For the meet and confer to be effective, we need the opportunity to discuss the proposed topics of the conference with each of our clients beforehand. Twelve agencies or executive components are sued in this matter; they have different concerns regarding discovery, and they are subject to different requests propounded by Plaintiffs. We must, therefore, consult with them individually. We have shared your April 11, 2017 letter with each of our clients and it will be among the things we discuss with them before our in-person conference. But it bears emphasis that if Plaintiffs send us a letter after business hours, we cannot plausibly have a meaningful conference with Plaintiffs approximately 24 hours later. Our clients have mission-critical work to perform and we often cannot get a response from them on a discovery-related inquiry immediately. Moreover, many of Plaintiffs' requests implicate several components within an agency, further complicating and delaying any response we may give. By way of example, we have discussions planned this week and likely next week concerning Plaintiffs' March 31 Requests for Production.

NARA RECORDS

While we have not yet opposed Plaintiffs' Requests for Production concerning documents in Presidential libraries and at NARA, there are nonetheless significant burdens associated with their production. We have contacted EPA to determine whether your offer to visit the NARA library will facilitate the production of the 388 boxes of documents previously referenced in the Joint Status Report. For example, there may be space limits on outside entities visiting NARA facilities that are not placed on federal employees that may undercut the expected time-saving of your proposal. We will be prepared to discuss this further on the week of May 1.

DEPOSITIONS

We are disappointed to learn that Plaintiffs are not reconsidering their demand to depose Cabinet-level Secretaries and other high level government officials. The case law is quite clear that such depositions are extraordinary and rarely appropriate. Although we can discuss this further at the in-person meet and confer, we note the subject Secretaries have been in office for mere months and we are skeptical that they possess unique personal knowledge as to the government's historic awareness of climate change so as to warrant a deposition. Plaintiffs have also indicated they intend to take 30(b)(6) depositions on each agency or executive component named in the Complaint. We believe that this should enable Plaintiffs to probe adequately the official position of the respective agency or executive component without unnecessarily burdening an agency head.

We will continue to work with you on 30(b)(6) depositions, and we appreciate your identification of general topics for those depositions in your April 11 Letter. As previously noted, however, we cannot meaningfully discuss scheduling those depositions until we have the actual notices in hand to share with our clients. For some agencies, we will need to have multiple designees but this will largely be dictated by the noticed topics. Needless to say, we cannot meaningfully discuss dates until we know which witnesses will be designated. Finally, we hope Plaintiffs reconsider noticing a 30(b)(6) designee from the Executive Office of the President. As discussed in Motion seeking certification for interlocutory appeal, a deposition on the Executive Office of the President is improper. ECF No. 139 at 17 n.7.

THE STATUS OF ONGOING DISCOVERY

The Court has indicated that the case will focus on expert testimony and has instructed Federal Defendants to focus on obtaining experts. To that end, and as reflected in the April 10 Minute Order, the Court directed the parties to meet and confer in an attempt to narrow the scope of Plaintiffs' discovery requests. The Court also tolled Defendants' existing deadlines to respond to fact discovery pending the meet and confer process.

As discussed above, we propose that this conference occur the first week in May. We believe, however, to fully carry out the Court's direction to narrow the scope of fact discovery—and for the United States to focus on expert discovery in the near term—the deadline to respond to all outstanding discovery should be stayed until the parties work together to narrow the scope

of those requests. Specifically, we suggest that the parties (1) meet and confer in person; (2) narrow all outstanding fact discovery, including Requests for Production and Admission; and (3) prepare a schedule or proposal that sets forth responsive deadlines for the outstanding Requests for Production and Admission, as narrowed. In other words, the due date for outstanding document and other discovery requests would be stayed until the completion of the meet and conferral process and a revised schedule is proposed to the Court. Please let me know if you are amenable to this proposal, which would allow the parties to focus their efforts in the manner articulated by the Court during the April 7 Status Conference.

We look forward to discussing these matters with you further at our in-person conference. In the interim, please do not hesitate to contact me if you have any questions.

Sincerely,

/s/ *Marissa Piropato*
Marissa Piropato
Senior Trial Attorney

cc: All counsel of record

Exhibit 2 to Declaration of Julia A. Olson

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June 27, 2017

VIA EMAIL

Sean C. Duffy
Frank Singer
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Re: ***Juliana v. United States*, 6:15-cv-01517-TC**
Response to June 21 and June 23 Letters from Sean Duffy

Dear Sean and Frank,

Thank you for your proposed discovery plan that will bring us to trial in early 2018. We wanted to respond to Sean's letters of June 21 and June 23 by referencing time frames for certain tasks which Plaintiffs believe will achieve the early 2018 target. We also wanted to propose topics to discuss during our meet and confer on June 30. Finally, we should reach agreement on proposed dates for a status conference in July.

June 2017: We will meet and confer on **June 30 at 10:00 a.m. Pacific**. Here are the agenda items Plaintiffs want to cover during that call:

1. **Document production by Defendants**: Plaintiffs are happy to negotiate a plan for completing Defendants' document production by July 31.

a. Two fundamental points we hope are clear, but want to reiterate: Plaintiffs do not need publicly-available documents (such as reports posted on the web sites of the various Defendants). Also, Plaintiffs are not seeking communications or documents from "lower level" employees. Rather, the focus of our document discovery has been documents and electronically-stored information ("ESI") sent to or from upper level employees and politically appointed individuals that are not publically available. We are interested in documents and ESI at the levels of Defendant Cabinet Members and their staff and Defendant Agency Heads and their staff.

b. Your letter of June 23 states that requesting briefings about climate change which were given to various Cabinet Secretaries is overly broad. Your June 23 letter is unclear: is the claimed overbreadth a result of the requested time frame (from 1965 to the present) or some other factor. We would like to discuss specifically why such requests are overbroad so that they can be promptly narrowed to minimize production.

c. Regarding the pending RFPs to the Department of Agriculture, the Department of State, and the Department of Defense, which had a due date of June 19, 2017, we are awaiting a proposed list of custodians, search terms, media being searched, and time periods being search. We also are awaiting information explaining how these agencies store documents and which time periods are easier for them to produce documents. During our June 14 meet and confer, you agreed to provide that information to us. As a result, we agreed to give those responding parties until June 23, 2017 to provide a plan and an initial response to those three RFPs. To date, you have not provided that information.

d. While Plaintiffs plan to serve additional RFPs to the Environmental Protection Agency ("EPA"), Department of Energy, and Department of Commerce, we will wait for our June 30 meet and confer before sending out any additional RFPs. We agreed to consider the information you would provide per subparagraph (c), above, so that we could further narrow our next set of RFPs and avoid many of the concerns you have raised.

2. **RFAs to EOP and EPA**: With regard to Plaintiffs' First Set of Requests for Admission, you are talking to the Executive Office of the President ("EOP") and EPA. Please tell us their positions on the objections in our June 30 call. Once we know their positions on separate objections, we will discuss ways to narrow or re-frame the RFAs in a manner that makes it easier for the EOP or EPA to answer.

3. **The RFPs to NARA**:

   a. With regard to the NARA RFPs, we need your position on whether President George W. Bush invoked Section 2204 of the Presidential Record Act ("PRA") to restrict access to the documents Plaintiffs have requested and, if so, on what grounds and on what date. If the requested documents from President George W. Bush are not going to be produced, then Plaintiffs will bring this issue before Judge Coffin to obtain an order to gain access pursuant to Section 2205 of the PRA.

   b. We are willing to enter into a protective order, if needed, for the other NARA documents to be made available to Plaintiffs. However, we will move to compel this production if it does not happen by early July.

   c. Finally, we should discuss your legal authority for your assertion that you need not provide a privilege log for the documents that you consider classified.

4. **ESI in the Possession of Defendants**: We would like to review and finalize an ESI stipulation. In advance of our call on June 30, can you outline (either in writing or on a separate call) the issues you foresee being discussed on the call so we have the right people in attendance?

5. **Depositions of Fact Witnesses**: We find it difficult to believe that it has taken well over a month to get deposition dates for two witnesses: Mark Eakin and Michael Kuperberg. Where do we stand? If you are not producing these witnesses, we need to get on the phone with Magistrate Coffin ASAP.

6. **Rule 30(b)(6) Depositions**: You have requested that Rule 30(b)(6) depositions be completed on or before August 15. As long as documents are produced promptly and thoroughly, Plaintiffs are prepared to conduct depositions to meet this request. When will you provide a list of witnesses so that we may schedule the depositions?

7. **Plaintiffs' Depositions**:

   a. As we told you, Plaintiffs are on summer vacations and available for deposition. They generally return to school around Labor Day (September 4). We would like Plaintiffs' depositions to occur during the first two weeks of August, before they go back to school. We appreciate that you will try to accommodate that schedule. Which depositions do you want to take when?

b. Also, we sent you a draft protective order for these depositions. When can we get this finalized?

8. **Disclosure of Plaintiffs' Group 2 Experts**: As Sean and I discussed, Plaintiffs will disclose these two expert witnesses on June 27.

9. **Fact Discovery**: Your letter of June 23 suggests that *Defendants*' responses to fact discovery be closed by July 31 so that *Defendants*' experts may rely on *Defendants*' discovery in their reports. Candidly that one-sided approach is not Plaintiffs' view of how things should work.

   a. As you know, pursuant to Rule 16(b), the Court issues a scheduling order that limits the time of, among other things, the completion of discovery. Fed. R. Civ. P. 16(b)(3). Typically, principal information about an expert must be disclosed at least 90 days before trial, Rule 26(a)(2)(C), and rebuttal information must be disclosed 30 days after the initial expert disclosure. Rule 26(a)(2)(C). The Court's current schedule provides for expert discovery earlier than typical under the Rules. Given that early schedule, Plaintiffs are prepared to work with Defendants to ensure documents and ESI are produced promptly and thoroughly on or before July 31 and Rule 30(b)(6) depositions are completed on or before August 15. However, if Defendants do not achieve Defendants' self-imposed goal, Plaintiffs will not be precluded from obtaining important information simply because Defendants failed to timely produce either the documents or the witnesses.

   b. Further, there are factual issues in dispute in the case that do not pertain to expert testimony, but pertain to what Defendants knew, and now know, and what they did, and are doing, with that knowledge. Given that Defendants already have complete access to all of the documents within the federal government that your experts might choose to rely upon, we do not see how production of documents affects your expert's ability to prepare reports. Indeed, our experts are preparing reports without that benefit.

   c. Your listing of proposed document productions by Departments of State, Defense, and Agriculture are examples where those Defendants are simply agreeing to produce publicly available documents, with perhaps a few exceptions. I can use Google to obtain the Department of Defense FY 2014 Climate Change Adaptation Roadmap, a document listed in your June 23 letter. To reiterate: Plaintiffs do not need Defendants to produce what a Google search will uncover. Plaintiffs are looking for focused documents and ESI that are not publicly available. Such documents are completely missing from the document discovery Defendants have offered to produce.

d. Candidly, Defendants are placing themselves in a problem of their own creation. Plaintiffs have offered, and continue to offer, to meet with agency counsel and other representatives to see if their requests for documents and other information can be appropriately narrowed. Those offers have been refused. Those refusals have been accompanied by letters and emails, such as your letter of June 23, saying our requests are overbroad without pointing out what type of request would not be overbroad and would result in production. This case has been pending for almost two years and Defendants have yet to produce a single document.

e. Plaintiffs' counsel will meet with whomever from Defendants is the decision maker on getting documents and ESI produced so we achieve your proposed July 31 deadline. We will get on the phone; we will go to Washington, D.C.; we will sit in the various Presidential libraries; we will do what it takes to get a prompt, focused production of highly relevant documents that are not publicly available. However, if Defendants believe that they can satisfy their production responsibilities under the Federal Rules simply by turning over documents easily available on the Internet, then we should immediately meet with Magistrate Judge Coffin to obtain an order delineating what documents will be produced when.

July 2017: We agree that Defendants should target completing Defendants' document production by July 31. We also need to set a July status conference date. Finally, we need to set dates in July for the depositions of Mark Eakin and Michael Kuperberg.

1. **July 5**: Exchange of Plaintiffs' Group 1 Expert Witness reports.

2. **July 31**: Exchange of Plaintiffs' Group 2 Expert Witness reports. Targeted completion of Defendants' production of non-publicly available documents and ESI.

August 2017: We agree that Defendants should target completing depositions of Defendants' Rule 30(b)(6) witnesses and Plaintiffs during this month.

August 15: Targeted completion of depositions of Defendants' Rule 30(b)(6) witnesses.

September 2017: In addition to the dates listed below, we believe September, October, and November should include the time necessary for expert depositions.

1. **September 4**: Targeted completion of depositions of Plaintiffs.

2. **September 5**: Plaintiffs are targeting this date to propound RFAs as to the authentication of documents for purposes of motion practice and trial. We have agreed that for purposes

of RFAs as to authenticity, the agency from which the document originated should be the agency that authenticates it.

3. **September 14**: Defendants' disclosure of rebuttal experts.

October 2017:

October 13: Exchange of Defendants' Rebuttal Expert Witness Reports.

November 2017:

November 1: Exchange of Plaintiffs' Rebuttal Expert Witness Reports.

December 2017:

December 4: Exchange of Trial Memoranda.

January 2018: **Trial.**

Plaintiffs want to engage in focused discovery. However, it is not helpful for Defendants to simply state a request is overbroad without constructively offering to produce a more narrow set of documents and ESI that is not publicly available.

If you think it would be helpful, I am happy to speak with you in advance of June 30 so that we can all be on the same page when we hold our meet and confer.

Regards,

PHILIP L. GREGORY

cc: **Julia A. Olson**
Daniel Galpern

Exhibit 3 to Declaration of Julia A. Olson

Forbes

David Kroll Contributor

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PHARMA & HEALTHCARE 1/25/2017 @ 8:30AM | 9,730 views

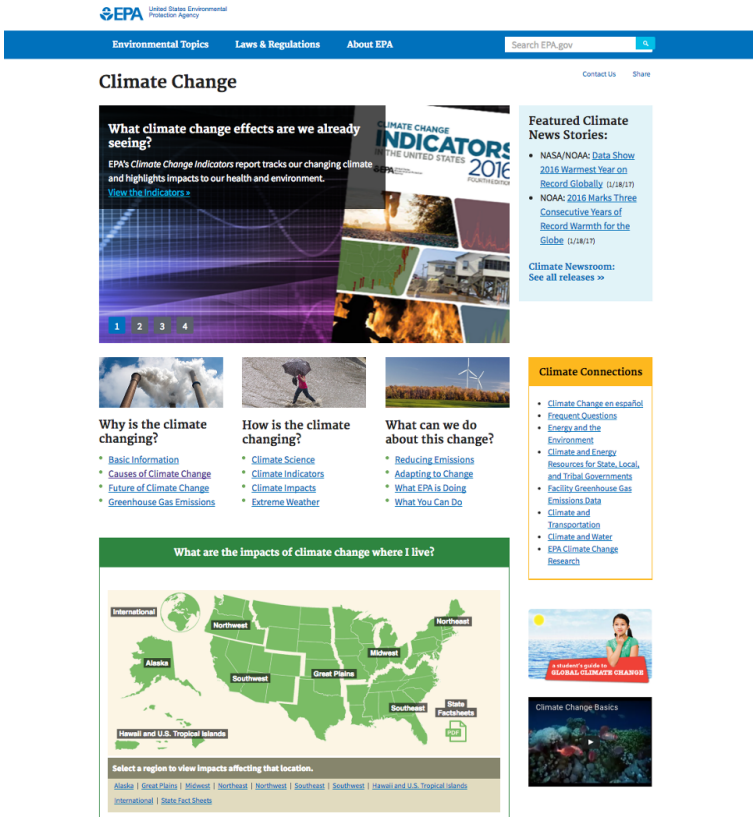
EPA Reportedly Ordered To Remove Climate Change Webpage, Rescinded 24 Hours Later

(Photo by Lukas Schulze/Getty Images)

U.S. Environmental Protection Agency employees have been ordered by the Trump administration to remove the agency's climate change webpage, a resource used by scientists and educators worldwide, according to Reuters, whose report early Wednesday morning is based on the accounts of two anonymous EPA staffers:

> The employees were notified by EPA officials on Tuesday that the administration had instructed EPA's communications team to remove the website's climate change page, which contains links to scientific global warming research, as well as detailed data on emissions. The page could go down as early as Wednesday, the sources said.

While the new administration has restricted communications between several federal scientific agencies and external audiences during recent days, this is the first example where an agency has been directly ordered to remove science-based content from the webpage of an agency dedicated to protecting human health. As Reuters reporter Valerie Volcovici writes, these collective actions appear "designed to tighten control and discourage dissenting views."



The EPA's climate change page was still active as of 12 noon EST on Wednesday.

When asked for comment, the EPA's climate change press officer referred me to the main EPA press email account. The main press office has not yet responded.

***Update**, Wednesday, January 26, 3:05 pm – Greenwire from E&E News, an energy and environmental news organization, has now reported that "Trump administration officials appear to have walked back plans to scrub climate change references from U.S. EPA's website." An*

unnamed EPA employee told reporters Robin Bravender and Hannah Hess that, "We've been told to stand down."

Established by President Richard M. Nixon in 1970, the EPA drafts and enforces regulations based on environmental laws passed in Congress. But the agency also operates 27 research laboratories and awards $4 billion in grants each year to local nonprofits, state governments and academic researchers. In addition, EPA meets Section 207(f)(2) of the E-Government Act of 2002, a rule that requires federal agencies to publish information online to teach the public, students and educators about environmental issues that affect health. The type of information provided to taxpayers is left to the discretion of each agency.

Reuters is reporting that the Trump administration has not commented on the report. Myron Ebell, an anti-climate change activist who led Trump's transition efforts at the EPA, is quoted as saying, "My guess is the web pages will be taken down, but the links and information will be available," implying that the individual resources might be buried within the EPA web directory when the climate change landing page is deleted.

The EPA student guide is a popular resource among educators. Source: https://www3.epa.gov/climatechange/kids/

Currently, Oklahoma Attorney General E. Scott Pruitt has been the subject of Senate confirmation hearings to lead the EPA, but no vote has been taken thus far. Pruitt's office has filed 14 lawsuits against the EPA and he is generally known to consider federal regulations an overreach in the business of states. As such, he established Oklahoma's first federalism unit to combat what his

office calls “unwarranted regulation and overreach of the federal government.”

Headquartered in Washington, D.C., the EPA operates 10 regional offices, and the largest of all the facilities is in my local area, the Research Triangle Park of North Carolina. In addition to its 15 offices, EPA RTP is the central research site for air pollution research and regulation. Their inhalation toxicology expertise and experimental resources are where some of the seminal research was done on health effects of tobacco smoke.

David Kroll, PhD, is a former academic pharmacologist and educator. For more health and pharmaceutical news and commentary, follow him on Facebook, Twitter @DavidKroll or here at Forbes.

Exhibit 4 to Declaration of Julia A. Olson

From: "Duffy, Sean C. (ENRD)" <Sean.C.Duffy@usdoj.gov>
Date: July 20, 2017 at 6:13:02 PM EDT
To: Julia Olson <juliaaolson@gmail.com>, Phil Gregory <PGregory@cpmlegal.com>, Dan Galpern <dan.galpern@gmail.com>
Cc: "Singer, Frank (ENRD)" <Frank.Singer@usdoj.gov>
Subject: Juliana v. United States -- Access to documents in NARA facilities and Presidential libraries

Counsel:

As discussed today, we have tried to nail down some of the issue regarding access to documents at NARA and in Presidential libraries. The attached document reflects the status in terms of access for the documents sought in Plaintiffs' two requests for production seeking such documents. On July 12, for your review, we provided Plaintiffs with a draft of a proposed protective order. I'm attaching a copy of the same proposed protective order to this emails. Do Plaintiffs intend to suggest any changes / edits to that document?

Thank you,
Sean

Sean C. Duffy
Environment & Natural Resources Division
U.S. Department of Justice
Natural Resources Section
(202) 305-0445 | sean.c.duffy@usdoj.gov

Plaintiffs' Requests for Production of Documents

Subject to the parties negotiating a protective order, Plaintiffs may view the following documents available at presidential libraries or at NARA facilities

Plaintiffs' [First] Request for Production of Documents to Federal Defendants

A. *Documents maintained at the Ronald Reagan Library*

- All documents identified are classified and will not be made available on that basis.

B. *Documents maintained at the George H.W. Bush Library*

- Item #1 [OA/ID number: 62059-008]
- All remaining documents identified are classified and will not be made available on that basis.

C. *Documents maintained at the William J. Clinton Library*

- Item #2 [Box number 14447]
- Item #3 [Box number 14447]
- Item #4 [Box number 14447]
- Item #5 [Box number 6136]
- Release of the documents in items #6-#9 is prohibited by a federal withholding statute and will not be made available on that basis. With respect to item #1 [Box number 14447], plaintiffs should contact the Clinton library to determine whether this document has been released and, if so, for assistance locating it online.

D. *Documents maintained at the George W. Bush Library*

- Access to all documents identified is restricted pursuant to the Presidential Records Act and will not be made available on that basis.

Plaintiffs' Second Request for Production of Documents to Federal Defendants

A. *Documents maintained at the John F. Kennedy Presidential Library and Museum*

- All documents identified are classified and will not be made available on that basis.

B. *Documents maintained at the Lyndon Baines Johnson Presidential Library*

- The documents Plaintiffs seek are duplicated in College Park. Some of the documents Plaintiffs seek are classified (1194 boxes); some are not classified (28 boxes). Unclassified documents may be reviewed via the usual researcher visit process.

C. *Documents maintained at the Ronald Reagan Library*

- The documents Plaintiffs seek have not been processed by NARA. Plaintiffs can file a Freedom of Information Act request for the unprocessed records.

D. *Documents maintained at the George H.W. Bush Library*

- The documents Plaintiffs seek have not been processed by NARA. Plaintiffs can file a Freedom of Information Act request for the unprocessed records.

E. *Documents maintained at the Clinton Presidential Library*

- The documents Plaintiffs seek have not been processed by NARA. Plaintiffs can file a Freedom of Information Act request for the unprocessed records.

F. *Documents maintained at the George W. Bush Presidential Library*

- Access to all documents identified is restricted pursuant to the Presidential Records Act and will not be made available on that basis. Additionally, Plaintiffs indicate a FOIA request has already been filed for these records. Plaintiffs may contact the Bush Library directly with their FOIA tracking number for the status.

G. *Documents maintained at the National Archives at College Park*

- Records of EPA Administrators. These documents may be reviewed with an appropriate protective order in place.
- Records of the U.S. Information Agency. These documents may be reviewed with an appropriate protective order in place.

Exhibit 5 to Declaration of Julia A. Olson

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August 28, 2017

VIA EMAIL

Sean C. Duffy
Frank Singer
U.S. DEPARTMENT OF JUSTICE
ENVIRONMENT & NATURAL RESOURCES DIVISION
601 D Street NW
Washington, DC 20004
sean.c.duffy@usdoj.gov
frank.singer@usdoj.gov

Re: *Juliana v. United States*, 6:15-cv-01517-TC, Discovery Status

Dear Sean and Frank,

After Intervenor Defendants withdrew from the case, the issues for discovery and trial have been substantially narrowed. I wanted to update you on Plaintiffs' position as to the status of discovery and additional methods we are implementing to further narrow discovery as a result of our meet and confer process to date.

1. **RFAs to EOP and EPA:** With regard to Plaintiffs' First Set of Requests for Admission ("RFAs") served on the Executive Office of the President ("EOP") and the Environmental Protection Agency ("EPA"), we will not move to compel further responses to the RFAs from the EOP. Regarding the EPA's objections to the same RFAs, we will seek to obtain the type of information we are seeking through the Rule 30(b)(6) deposition with the EPA and, therefore, we will not move to compel answers to the RFAs from the EPA at this time.

2. **RFPs to NARA:** With regards to the two Requests for Production ("RFPs") for NARA documents, we received your letter of July 20, 2017, which sets forth the NARA documents that Federal Defendants will produce. Plaintiffs are prepared to go to the presidential libraries to retrieve copies of those documents, as we previously discussed. With regards to the documents you indicated that Federal Defendants will not produce, Plaintiffs will not move to compel the production of those documents.

3. **Wayne Tracker RFPs:** With regards to the "Wayne Tracker" RFPs served on Federal Defendants on March 17, 2017, Plaintiffs withdraw those RFPs in light of Intervenor Defendants' withdrawal from the case.

LAW OFFICES
COTCHETT, PITRE & MCCARTHY, LLP

4. **RFPs to the EOP:** With regards to the RFP served on the EOP and the President on May 19, 2017, Plaintiffs withdraw that RFP.

5. **USDA, DOD, and State RFPs:** With regards to the outstanding RFPs to the United States Department of Agriculture, the Department of Defense, and the Department of State, based on what we have learned from the meet and confer process and our informal discovery, Plaintiffs have further narrowed those RFPs as part of the ongoing meet and confer process. We have also eliminated all requests pertaining to communications and documents between the agencies and the President. The amended RFPs will replace the previously served RFPs from June 19, 2017. We have done our best to narrow our requests without the benefit of having the information on relevant custodians and information on when records went electronic for different agencies and the search mechanisms used by agency. Once we have that information we can meet and confer on ways to further narrow the requests by custodian and searchability of databases. We are confident that through the meet and confer process we can continue to work with you, and the agencies, to better enable quick production of the narrow range of documents we are seeking.

6. **Depositions:** As you know, we have completed the depositions of Mark Eakin and Michael Kuperberg. We have also noticed Rule 30(b)(6) depositions for the Department of Commerce, Department of Defense, Department of Energy, Department of Interior, Department of Transportation, Environmental Protection Agency, Department of State, and the Department of Agriculture. Plaintiffs will not notice any depositions for the secretary or administrator of any defendant agencies or the President.

I believe that covers all outstanding discovery. Please contact me with any questions or comments.

Regards,

Philip L Gregory (JD)

Philip L. Gregory

cc: **Julia A. Olson**
Daniel Galpern

Exhibit 6 to Declaration of Julia A. Olson

United States Department of Justice

Environment & Natural Resources Division

DJ# 90-1-4-14528
Sean C. Duffy
Tel: (202) 305-0445
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Natural Resources Section
P.O. Box 7611
Washington, DC 20044

July 12, 2017

Via Email

Julia A. Olson (juliaolson@gmail.com)
Philip L. Gregory (pgregory@cpmlegal.com)
Daniel M. Galpern (Dan.Galpern@gmail.com)

Re: *Juliana v. United States*, No. 6:15-cv-1517-TC (D. Or.)

Counsel:

This letter responds to points raised in (1) Plaintiffs' letter of June 27, (2) matters discussed during the parties' telephonic meet and confer on June 30, and (3) Plaintiffs' letter of July 5. As we have stated all along, including in our mandamus petition now pending before the Ninth Circuit, Defendants believe all proceedings, including discovery, should be stayed in this improper case.

I. *Efforts to respond to the requests for production by July 31, 2017*

In our letter of June 23, Defendants explained that it is important that fact discovery be completed sufficiently in advance of Defendants' October 13, 2017, expert report deadline so that Defendants' experts have the opportunity to review and accommodate those facts in their analyses and resulting reports. To that end, Defendants proposed that the production of documents in response to Plaintiffs' requests for production be completed by July 31, 2017. To meet that deadline, Defendants provided a list of documents that the Departments of State, Defense, and Agriculture identified and indicated they would endeavor to produce within this time-frame. The Departments' efforts to identify documents in addition to those listed in our June 23 letter is still ongoing. In their letter of June 27, Plaintiffs indicate that they are amenable to Defendants completing production by July 31, but ignore the necessary limitation in scope that the July 31 deadline incorporates. As Defendants and the Magistrate Judge have advised Plaintiffs repeatedly, there is tension between expansive and unbridled discovery and a February 2018 trial. And as the Court has recognized, it would be impossible to accommodate both a speedy trial and expansive discovery. The Court's setting of a February 5, 2018, trial date manifests its intention to limit discovery and underscores Magistrate Coffin's repeated observation that trial in this case will focus on expert opinion and analyses, which will not

require sweeping fact discovery. Plaintiffs have not yet made sufficient efforts to limit the scope of discovery in line with the trial date set by the Court with respect to either their requests for production of documents or their noticed Rule 30(b)(6) topics.

Plaintiffs claim in their June 27 letter that they are not interested in the production of publicly-available records. But Plaintiffs' requests for production do not exclude publicly-available records. Defendants note that agency policy decisions and actions are memorialized in public records. If Plaintiffs seek to establish what actions agencies are taking and how the U.S. government has described climate change and its effects over time, the vast amount of information included in the public record will reflect those actions and understandings.

In the June 27 letter, Plaintiffs contend that the "focus" of their document discovery is "documents and electronically-stored information ("ESI") sent to or from upper level employees and politically appointed individuals that are not publicly available." There are four problems with this contention. First, the requests that Plaintiffs propounded recite no such focus. Instead, those requests instruct the agencies to include documents from "all current and former principles, employees, agents, attorneys, consultants, secretaries, coordinators, advisers, and other representatives" of agencies. Second, even with this newly-minted refinement, Plaintiffs fail to provide meaningful guidance as to who constitutes an "upper level employee" for the purpose of their requests. Third, Plaintiffs fail to tether an exploration of communications between political appointees and "upper level employees" to a specific factual assertion in the Complaint. Fourth, Plaintiffs ignore the practical reality that the document requests, even as narrowed, remain incompatible with a February 2018 trial date. Responding to the requests as narrowed will consist of conducting a search for communications between political appointees and "upper level employees," gathering those communications, reviewing such communications for privilege, preparing logs of such communications, resolving any motion practice concerning the applicability of various privileges and protections from disclosure, and producing the records (if the objections to production are overruled). It is unrealistic to assume that this process could be completed by our current December 4, 2017 deadline for pre-trial memoranda.

Defendants have made a good faith effort to produce documents responsive to Plaintiffs requests for production while abiding by the Court's timeline for trial. While Defendants are ready to engage and negotiate a resolution to the parties' discovery efforts, it is Plaintiffs who have to proffer a specific plan for production that focuses on disputed factual issues and that allows Defendants to estimate a timeline for completion, so that the parties can evaluate whether Plaintiffs' specific plan can be accomplished in keeping with the Court's trial schedule.

II. *Rule 30(b)(6) Depositions on Eight Federal Agency Defendants*

As we discussed in the June 30 meet-and-confer, the overbreadth of Plaintiffs' requests for production are mirrored in Plaintiffs' noticed Rule 30(b)(6) deposition topics. We appreciate Plaintiffs' willingness to re-evaluate their Rule 30(b)(6) notices, in light of the parties' June 30 discussion. For their part, Defendants focused on Topic 11 of the Rule 30(b)(6) notice served on the Department of Energy, which topic was a focus of the parties June 30 discussions. The Department of Energy confirms that discounting analyses are used as a part of virtually every economic analysis in connection with an enormous number of decisions across every component of DOE. Preparing a witness to discuss all such instances of discounting is simply not viable. Given the breath of this topic, as we suggested during our meet and confer, the parties should explore whether stipulations are a more efficient way of conducting discovery into discounting.

III. *Efforts to Respond to the RFPs to NARA*

NARA confirms that President George W. Bush invoked the protections of Section 2204 of the Presidential Records Act as to the documents Plaintiffs seek within the George W. Bush Presidential library. Such documents will accordingly not be produced in response to Plaintiffs' requests. There are other records that Plaintiffs can request directly from the appropriate Presidential library. And there are records that are not publicly available because the records contain personally-identifiable information, but that could be made available for inspection upon Plaintiffs' execution of a suitable protective order. A proposed form of protective order that would allow review of records shielded solely because of personally-identifiable information is attached. Finally, there are other records that are protected from disclosure because they are classified. Those records will not be produced. We will provide a list of the records that can currently be inspected and those that can be inspected after entry of a suitable protective order.

IV. *Requests for Admission on EOP and EPA*

Plaintiffs requested that Defendants agree to provide separate responses to the requests for admission that Plaintiffs initially propounded jointly on the Executive Office of the President ("EOP") and the Environmental Protection Agency ("EPA"). We are amenable to this request and attach separate responses from the EOP and EPA.

V. *Plaintiffs' Depositions of Fact Witnesses*

We have spoken with agency personnel and can offer the dates of July 20 and July 21 for Plaintiffs to depose Dr. Kuperberg and Dr. Eakin, at our offices, 601 D Street NW, Washington D.C.

VI. *Plaintiffs' Expert Reports*

During the May 18 status conference, when queried by the Court, Plaintiffs represented that they would endeavor to have most of their 11 expert reports ready in July 2017. ECF No. 164 at 13. Noting that "obviously [Plaintiffs] want as early a trial date as [they] can get," the Court asked Plaintiffs to produce expert reports by July 1 to the extent they can, which Plaintiffs agreed to. *Id.* at 17. During the June 18 status conference, Plaintiffs indicated that they were prepared to serve a majority of their 11 expert reports – and specifically "six or seven and up to eight or nine of those reports … by July 5th." ECF No. 179 at 18. This was the most current information that the parties provided to the Court when it scheduled trial to begin on February 5, 2018. Plaintiffs subsequently identified two additional experts.

Plaintiffs' July 5 letter deviates from the schedule Plaintiffs represented to the Court two weeks earlier. On July 5, Plaintiffs served only one expert report – that of Dr. Ove Hoegh-Guldberg – and provided a schedule for serving the remaining reports as follows: four during the week of July 10 – 15; two by July 20; and five by July 31. To date, Plaintiffs have served just two of their projected thirteen expert reports.

Plaintiffs' revised deadlines for submitting most reports in late July rather than early July, as well as the increased number of reports (13 rather than 11), makes it increasingly difficult for Defendants to meet with prospective candidates and explore the scope of any rebuttal opinion testimony in time for Defendants' disclosure deadlines. This threatens to push back the entire trial schedule.

VII. *Depositions of Named Plaintiffs*

Defendants will work to schedule the depositions of the named Plaintiffs after we have had a meaningful opportunity to review the expert reports of Drs. Frumkin and Van Susteren. If those reports are not served until July 31, as set forth in Plaintiffs' revised deadlines, and we are unable to examine them with our experts until August, then it is unlikely that Defendants will be in a position to depose the named Plaintiffs by September 4 as Plaintiffs prefer.

* * *

Considerable work lies ahead to prepare this case for trial. Defendants continue to believe that the parties' efforts are best served by focusing on expert work, rather than depositions and records that are not pertinent to the disputed issues in the upcoming trial.

Sincerely,

/s/ Sean C. Duffy
Sean C. Duffy
Trial Attorney
U.S. Department of Justice

CC: Frank J. Singer
Peter Dykema

Attachments: EOP Resp. to First Set of RFAs
EPA Resp. to First Set of RFAs
Proposed Form of Protective Order

Exhibit 7 to Declaration of Julia A. Olson

Q Sure, sure. Does NOAA consider the impact of carbon dioxide and climate change on our oceans to be dangerous?

A Yes.

Q So just to shift gears for a moment, Mark -- and I'm going to grab my phone so I can track time. 10:45:45

President Trump has a proposed budget for 2018 out, and it's my understanding that the proposed budget would cut NOAA's budget by approximately 16 percent. Is that accurate? 10:46:22

A I don't recall.

Q Are you aware that the proposed budget would cut NOAA's budget?

A Yes. 10:46:40

Q If that were to happen, how might that impact the Coral Reef Watch program and the satellite programs that you help oversee?

A At this point, we're really not sure.

Q Do you believe that budget cuts would affect NOAA's capacity to continue monitoring the oceans and the impacts of climate change? 10:47:04

A It depends on the budget cuts.

Q Has the president proposed to eliminate the Coastal Zone Management Grants Program? 10:47:32

A I believe so.
Q Has the president proposed to eliminate the Regional Coastal Resilience Grants Program?
A I don't recall.
Q Has the President proposed to eliminate the Sea Grant College Program? 10:47:46
A Yes.
Q How would the elimination of the Sea Grant College Program affect climate change research?
A I'm not sure. 10:48:06
Q Are you familiar with that program?
A Yes.
Q Does it support coastal research that is conducted in part through 33 university programs across the country? 10:48:23
A Yes.
Q Is it fair to say that if that Sea Grant's College program were eliminated, it would do harm to the climate change research conducted by those programs? 10:48:40
A I don't know.
Q To your knowledge, does NOAA have information regarding the maximum level of atmospheric carbon dioxide that would protect coral reefs? 10:49:07

A Yes.
Q And what -- what is that maximum threshold that NOAA believes would be protective of coral reefs for atmospheric carbon dioxide concentrations?
A Approximately 350 parts per million. 10:49:37
Q And does NOAA have information regarding the level of temperature increases over preindustrial levels that would also protect coral reefs?
A Yes. 10:49:55
Q A maximum temperature increase?
And what would that maximum temperature increase be?
A Approximately 1-1/2 degrees Celsius.
Q When you say "1-1/2 degrees Celsius," is 10:50:08 that a maximum peak of temperature increase that you're referring to?
A It's a long-term target. And to be clear, that's 1-1/2 degrees speaking again of global average surface temperature. 10:50:51
Q Thank you for clarifying that. Do you know what the -- let me step back.
Is it accurate that during the 1980s, we saw the first mass coral bleaching events?
A Yes. 10:51:23

Q Do you know what level of atmospheric carbon dioxide corresponded with those bleaching events?

A I don't recall.

Q Is it accurate that when bleaching events occur, that it's actually based on emissions and carbon dioxide levels that occurred decades earlier? 10:51:37

A Yes.

Q And why is that?

A There is a lag effect in the climate response to CO2 increases in the atmosphere. 10:52:06

Q So is it accurate to say that carbon dioxide emissions that we emit today and carbon dioxide concentrations today will actually lock in impacts to coral reefs 10 or 20 years from now? 10:52:37

A Yes.

Q Are current carbon dioxide levels approximately 405 parts per million as a global mean?

A Approximately. 10:52:57

Q I haven't checked recently, but I think it's --

A Neither have I.

Q -- around that.

Are current atmospheric carbon dioxide 10:53:06

levels of approximately 405 parts per million dangerous for coral?

A Yes.

Q In talking about levels of atmospheric carbon dioxide or temperature increases that protect corals, do you use the word "safe"? 10:53:31

A Not usually.

Q What phrase do you use to describe that maximum threshold?

A Maximum threshold. I mean, I'm sorry, rephrase, please. 10:53:48

Q So when I think of water quality standard for lead that is safe --

A Right.

Q -- for children, I would use the word that's a safe level in water for that amount of a pollutant. And so that's a word I use when I think of atmospheric carbon dioxide levels, I think of is it safe. 10:54:13

But it seems that scientists may use a different phrase, and so I'm trying to figure out what that word is that NOAA may use to describe thresholds. 10:54:28

A Different words may be used depending on the context. 10:54:45

Q Okay. So if the context is talking about protecting coral reefs and you set a standard to try to protect coral reefs, how would you describe that? Maybe I just did.

A We haven't set standards regarding CO2 level for coral reefs. 10:55:08

Q Why is that?

A That's not in our responsibility.

Q Whose responsibility is it to set standards to protect coral reefs? 10:55:25

A Multiple agencies.

Q Will you name them, please.

A It depends. Because you're speaking so broadly. It depends on what aspects of protecting coral reefs you're talking about. I listed a number of agencies earlier that are in the Coral Reef Task Force that deal with different parts of this. 10:55:44

Q If you were protecting corals from bleaching events and needed to set a standard for CO2 levels or warming, which agency would be responsible for setting that standard? 10:56:12

A I don't know.

Q To your knowledge, has any federal agency or department set a standard for protecting corals from bleaching? 10:56:40

explain what you mean by "urgent and rapid action to reduce global warming"?

A In the context of this, we're talking about actions to address emissions or potentially atmospheric CO2 levels on a scale of years to a few decades. 13:39:42

Q This paper also concludes that the time for recovery of corals is diminishing. Do you agree with that statement?

A I would have to read exactly how it's phrased, because that doesn't quite sound right. 13:40:00

Q Are you a scuba diver?

A Yes.

Q And have you been diving and seen coral reefs? 13:41:46

A Yes.

Q What's your favorite reef to dive on?

A Ant Atoll in Micronesia.

Q Do you have a favorite reef in U.S. waters? 13:42:03

A I'm trying to remember the name, it's something like Coral Gardens in one of the islands of the Commonwealth of the Northern Mariana Islands.

Q Have you seen firsthand coral bleaching on these reefs? 13:42:26

A On those reefs, no.
Q Have you seen coral bleaching firsthand?
A Yes.
Q Have you -- have you been there watching it as the algae are expelled? 13:42:40
A No.
Q Have you seen the effects of bleaching after the fact --
A Yes.
Q -- with the white skeletons? 13:42:52
And have you seen the effects after the coral completely die and then algae take over the skeletons?
A Yes.
Q And what is that process of the coral 13:43:05
going from the white bleached skeleton to the brown or greenish colors?
A I mean, that's the death of the corals.
Q When you witness that firsthand, do you -- do you think that we're in an emergency situation 13:43:42
with respect to protecting our oceans?
A Yes.
MS. OLSON: We're just going to step outside for one moment and then I think we'll be close to wrapping up. 13:44:26

THE WITNESS: Okay.

VIDEO OPERATOR: Going off the record at 13:44.

(Recess.)

VIDEO OPERATOR: Back on the record at 13:47. 13:47:32

BY MS. OLSON:

Q Mark, just a few more questions.

A Uh-huh.

Q When we first talked about your position in NOAA, I think I failed to ask you about any committees that you serve on with the federal government. Do you serve on any committees? 13:47:45

A Yes, I do.

Q Which committees do you serve on? 13:47:57

A So currently -- well, let's see, that one is actually not active. So I serve on the U.S. Coral Reef Task Force's Climate Change Working Group. I'm trying to figure out if there's anything else that I serve on in an active role. I can't think of any right now. 13:48:23

Q And what's the purpose of the U.S. Coral Reef Task Force's Climate Change Working Group?

A The Climate Change Working Group?

Q Yes. 13:48:42

Exhibit 8 to Declaration of Julia A. Olson

prepared by researchers that the program sponsors?

A No.

Q Does the program -- does the USGCRP sponsor any research?

A No. 12:50:15

Q Sir, I promised I would break for lunch at an appropriate time.

A I'm fine. When you get to an appropriate time --

Q This is a good time. 12:50:42

VIDEOGRAPHER: Off the record at 12:52.

(Whereupon, at 12:52 p.m., the deposition was recessed, to be reconvened at 2:00 p.m. this same day.)

AFTERNOON SESSION (2:21 p.m.)

Whereupon,

JAMES MICHAEL KUPERBERG

resumed the stand and, having been previously duly sworn, was examined and testified further as follows:

VIDEOGRAPHER: Back on the record at 2:21.

EXAMINATION (Continued)

BY MR. GREGORY:

Q Sir, since you've served as the executive director of the USGCRP, has the USGCRP played any role in developing national energy policy? 14:19:28

A No.

Q Has the USGCRP provided any reports or other documents to the Department of Energy since you've been the executive director of USGCRP where you understand those reports or other documents have played a role in developing national energy policy? 14:20:07

A I am not aware of DOE directly using GCRP's reports to develop energy policy. 14:20:32

Q Is -- we talked earlier about the three priorities for USGCRP. Do you remember that

testimony?

A I do.

Q Is USGCRP currently developing any different priorities?

A USGCRP considers and evaluates its priorities every year. So that process is always ongoing. I don't know if the principals, the agencies will choose to change the priorities in the future or not. 14:21:08

Q Have other areas -- strike that. Let me give you the context. 14:21:29

Since you served as executive director of USGCRP has the USGCRP considered other priorities?

A Yes, they have.

Q What other priorities have been considered? 14:21:52

A I don't think I'm at liberty to talk about predecisional deliberations within the USGCRP.

Q Why not?

A Because they are just that, predecisional deliberations within the government. 14:22:06

Q Okay. But for purposes of discovery in

the case, why -- and perhaps -- I'm happy to confirm with whatever attorney, but why are you not at liberty to talk about them?

A Because they are predecisional, because we have not reached a decision within the government about changing priorities or additional priorities. 14:22:28

Q But I don't hear any attorney instructing you not to answer the question.

MR. SINGER: I'm happy to make the instruction, but he's made it for me. But it is -- if you're asking him to disclose discussions that are predecisional in nature about a forthcoming final report, then I would give the instruction. He beat me to the punch. But it would be a deliberative process privilege instruction. 14:22:45 14:22:59

MR. GREGORY: But I'm asking now about matters that were considered, but then not chosen as priorities.

MR. SINGER: But if there were matters that were considered and not chosen, if such exist, that would give a window into the deliberative process that went on for the formulation of the 14:23:10

final policy. That -- disclosure of that would cut back against frank and open discussion internally. That's part of the deliberative process protection. It's not just what ended up in the report, but it's the deliberations that went before, preceded the report. 14:23:34

So if the witness is saying that "in order to answer the question I would have to divulge our internal workings, our nonpublic workings on how we formulated the report or the policy," then I would echo the witness's concern that the question calls for disclosure of deliberative process material. 14:23:46

MR. GREGORY: So -- and again, I don't want to ask a bunch of questions that are -- where I'm going to get a similar instruction. 14:24:02

MR. SINGER: Okay.

MR. GREGORY: So generally, if I ask the witness any questions about matters that did not -- I'm going to use your word -- become policy, then you would instruct the witness not to respond on that basis? 14:24:17

MR. SINGER: I would say I would -- yes, I

think the answer to your question -- let me think it through real quick.

MR. GREGORY: And I'm not trying to put words in your --

MR. SINGER: No, I understand. That's why I'm taking a second, to make sure that is a fair formulation. Yeah, I would say discussions internally within, in this case, USGCRP or among the component agencies that talk about -- that deliberate on what should be in a final report are subject to the deliberative process protection. 14:24:31 14:24:45

MR. GREGORY: Okay. And I follow that so far.

MR. SINGER: Okay.

MR. GREGORY: And then the next question is, let's say they consider item X and they make a conscious decision not to include item X. 14:24:55

Are you saying that that falls within the instruction?

MR. SINGER: If there's not a public discussion of why they didn't include -- if there's a report that says we did not include item X because 14:25:07

of why, then you could explore that. But if there's only a prediscussional -- or a predecisional discussion of item X and item X ends up getting dropped off at some point in the deliberative process, then yes, I would give the instruction not to divulge predecisional communications regarding an option or a topic that ultimately didn't make the final report. 14:25:24

MR. GREGORY: But again, let's say -- let's pick a -- a committee says we are not going to choose item X for the following reasons. You're saying that unless that's in a report, that I can't ask this witness questions about that? That's what I'm trying to figure out. 14:25:40

MR. SINGER: Yeah, I don't think you can ask the witness what the people contributing to the process at developing the report considered as they were drafting the report. 14:25:59

MR. GREGORY: Okay. But my -- I'm sorry. But I'm trying to say, they meet, the committee meets and says we have a potential to have priority X, and we're not going to -- and the committee makes 14:26:13

a decision not to pursue priority X for what we earlier said, reason Y. And my understanding of your instruction is that the instruction would also apply to my hypothetical, that committee deliberation and decision concerning X and Y? 14:26:41

MR. SINGER: Yeah, if it was in conjunction with the formulation of a report or policy, then yes. If it's some discussion about whether to consider X independent of some policy, then that's different. But if it's in conjunction 14:26:57 with the formulation of a policy or the drafting of a report, then that's part of the deliberative process.

MR. GREGORY: Okay.

MR. SINGER: I didn't mean to get too 14:27:15 long-winded. I hate when attorneys have to babble on the record. But hopefully that -- and if we need to talk more offline, we can.

MR. GREGORY: So can we meet and confer about that later rather than take up this witness's 14:27:36 time with that now?

MR. SINGER: Yes.

MR. GREGORY: Because obviously, we're in disagreement on that.

MR. SINGER: And it will save us money with the court reporter as well. I'm happy to do that. 14:27:47

MR. GREGORY: Okay. Sir, I'm going to ask you about a couple of documents. We'll mark this, and it's a -- as Exhibit 3, and it's "Preparing the Nation for Change: Building a Sustained National Climate Assessment Process." 14:28:27

(Exhibit Kuperberg 3 marked for identification.)

BY MR. GREGORY:

Q Sir, have you had a chance to review the document we've marked as Exhibit 3? 14:29:41

A I have not reviewed this document.

Q Have you seen it before?

A Yes, I have.

Q Please let me know when you are finished reviewing, it because I'm going to ask you if this 14:29:55 is a copy of "Preparing the Nation for Change: Building a Sustained National Climate Assessment

Process."

A Yes, it appears to be that document.

Q And sir, did you have any role in the preparation of this document?

A No, I did not. 14:30:14

Q What do you understand this document to be?

A This is the work product of a federal advisory committee called NCADAC, the National Climate Assessment Development Advisory Committee, 14:30:31 sponsored by NOAA. That advisory committee was responsible for drafting the Third National Climate Assessment. At the end of that process, late in that process, they provided a report to the federal government making recommendations about the future 14:30:52 process for sustained assessment, conducting National Climate Assessments. That's this report.

Q You used the acronym "NOAA." Is that the United States -- National Oceanic and Atmospheric Administration? 14:31:13

A Yes, it is.

Q And for purposes of this report, the

MR. SINGER: No, no, I appreciate -- are you feeling comfortable or --

THE WITNESS: I'm okay.

MR. SINGER: You're okay.

If he feels comfortable, then we'll keep working our way through this. 15:02:19

BY MR. GREGORY:

Q And sir, do you remember any instances where USGCRP provided, I'm going to call it, some form of report or an Excel spreadsheet, whatever, nonverbal information to CEQ? 15:02:32

A No, I don't.

Q Sir, has the -- sir, I'm going to mark as the next exhibit in order the "America First A Budget Blueprint to Make America Great Again." 15:03:42

(Exhibit Kuperberg 6 marked for identification.)

BY MR. GREGORY:

Q Sir, have you seen a copy of Exhibit 6 before? 15:04:43

A Yes, I have.

Q And is Exhibit 6 a copy of the "America

First A Budget Blueprint to Make America Great Again" Office of Management and Budget document?

A It appears to be.

Q Did USGCRP have any role in the development of this document? 15:05:03

A No, we did not.

Q Since this document was generated, have you had any discussions with anyone about the contents of this document?

A Yes, I have. 15:05:27

Q Anyone with the Executive Office of the President?

A Yes, I have.

Q Who have you had discussions with?

A I've had discussions with my division of the -- the Environment and Energy Division at OSTP, I've had discussions with OMB about the budget. 15:05:41

Q And in your discussions with OMB about the budget, what topic or topics did you discuss?

MR. SINGER: Hold on before you answer that. 15:06:10

I have two concerns. One is, I'm

concerned that we're getting into subject matter that could involve executive privilege, which is the President's to raise and not necessarily Justice's right here.

And second, I have a concern about relevance to the lawsuit, what the budget -- what a proposed budget's relevance is to the lawsuit. 15:06:27

So I don't want to instruct you not to answer on executive privilege.

But I just would, one, want to know what, the relevance of this is, and two, if it's something that you feel you do need to pursue, perhaps we need to try to find out whether the Executive Office of the President wants to exert executive privilege over communications that the witness has had with the Executive Office of the President. And we can try to make a timeline to make a decision on that. 15:06:40 15:06:55

MR. GREGORY: Okay. Well, A, I don't think it's appropriate under the Federal Rules to instruct on the grounds of relevance, particularly discussions regarding budget -- discussions regarding the budget for his agency. 15:07:12

But if you want to -- me to table this while you wait for a decision on executive privilege, we don't even have to get into the relevance.

MR. SINGER: That's fine. I mean -- 15:07:29

MR. GREGORY: If you understand what I'm saying.

MR. SINGER: I understand what you're saying. I think I do. And I'm happy to talk offline. Perhaps a better understanding of what 15:07:37 line of inquiry Plaintiffs want to see so that the Executive Office of the President can make a decision as to whether or not a privilege should be asserted. But in any event, I will -- I appreciate and will accept your offer to defer questioning on 15:07:51 this until we can get an answer.

MR. GREGORY: Do you mind, can we just talk quickly right now?

MR. SINGER: We can go off the record, sure. 15:08:04

VIDEOGRAPHER: This is the end of DVD 2. Off the record at 3:10.

(Recess.)

VIDEOGRAPHER: This is the beginning of DVD labeled number 3 in the deposition of Mr. Kuperberg. On the record at 3:33.

MR. GREGORY: Counsel, would it be fair to say that you're going to go to the Executive Office of the President on the issues that we discussed off the record and that I will at this point avoid asking this witness questions of the conversations that we -- 15:31:20 15:31:34

MR. SINGER: Of the conversations he's had with the Executive Office of the President?

MR. GREGORY: Yes.

MR. SINGER: Yes. I will raise that line of inquiry as a categorical matter to the White House counsel and get back to you on what I hear back. 15:31:44

MR. GREGORY: Thank you.

MR. SINGER: And just to clarify something we discussed off the record, too, because I was worried there were ships passing in the night, the two objections I raised on relevance and executive 15:31:53

privilege were intertwined, and I was not making a stand-alone instruction not to answer the question based on relevance, but I was trying to weigh the probative value of the examination against the Executive's interest in frank discussions. So -- but I think we did discuss that offline as well. 15:32:10

MR. GREGORY: Yes, we did.

MR. SINGER: Very good.

BY MR. GREGORY:

Q Sir, turning back to Exhibit 6. 15:32:21

A Yes.

Q The America First budget. Did you do any analysis of the America First budget to determine what effect it would have on research for global change issues? 15:32:39

A No.

Q Did you consider what effect the America First budget would have on the USGCRP?

A I did consider it, yes.

Q In what respect did you consider it, or respects? 15:32:55

A This budget proposes reductions in very

broad categories of agency spending. And depending on how those reductions were detailed out in subsequent budgets, it would have an important impact on the research being done and the activities of the USGCRP. 15:33:24

Q In what respect would it have an important impact, or respects?

A If the funding reductions were targeted programs that are part of the USGCRP, there would be less research going on in those programs, and the 15:33:42 USGCRP offices are funded by a shared cost budget based on that allocation. So less research and less funding -- if there's less money, there's less research, and there's less funding to support the office. 15:34:04

Q And have you had discussions with any of the participating agencies and departments in the USGCRP about the America First budget?

A Yes, I have.

Q What agencies and departments have you had 15:34:23 such discussions with?

A This is a topic that we discuss routinely

Q Have you since -- let's make this broad. Have you ever had a conversation about setting national greenhouse gas emission limits?

A No, I have not.

Q Sir, for how many years has scientific data from experts commissioned by the federal government been available indicating that climate change poses a danger to our nation? 16:49:29

A I believe that Jim Hansen's testimony to Congress years ago, I can't even guess at the date, it's generally seen as one of the first documented strong public cases in that context. 16:49:58

Q You're talking about the, I'll call it, the 1980s?

A I should know this, but sure, 1980s, that's a guess. 16:50:24

Q But it's in that general time frame?

A It is in that general time frame.

Q Sir, do you agree that recent scientific studies conclude that our country's now in a period of carbon overshoot? 16:50:37

A I don't understand what you mean

by "overshoot."

Q Well, that the CO2 emissions are such that there are consequences that are already threatening and will in the short term rise to, I'll call it, unbearable unless action's taken to abate fossil fuel emissions? 16:51:07

A I'll put this in my words. There are effects of increasing CO2 concentrations in the atmosphere that are currently seen and detectable and that our projections for the future say they're going to get worse. 16:51:31

Q Are you fearful as a terrestrial biologist -- terrestrial ecologist and biologist about what's happening to our terrestrial climate system? 16:51:50

A Yes, I am.

Q As a terrestrial ecologist, do you believe that 450 parts per million and 2 degrees warming are dangerous level of carbon dioxide?

A I can't characterize a specific number as being dangerous, which implies that another specific number is not dangerous. 16:52:03

In general, I feel that increasing levels of CO2 pose risks to humans and the natural environment.

Q Do you think that the U.S. government is currently paying attention to the National Climate Assessment and engaging in climate and energy policies that will protect our climate system? 16:52:28

A You asked two questions. There are certainly parts of the federal government that are paying attention to the National Climate Assessment. 16:52:46

I don't --

Q What -- go ahead. I'm sorry.

A I don't think that the current federal actions are adequate to safeguard the future against climate change. 16:53:02

Q What agency or department do you believe is paying attention to the National Climate Assessment, or departments?

A EPA's endangerment finding is based, to a substantial degree, on findings from the National Climate Assessment. There are management activities going on within the Department of Interior that take 16:53:25

into account -- that I'm aware of that take into account projections from the National Climate Assessment. Those are two examples that come to mind.

Q Sir, do you believe that our country is currently in a danger zone when it comes to our climate system? 16:53:45

A Yes, I do.

MR. GREGORY: That's all we have.

MR. SINGER: Okay. I have a couple redirect, I think, if I can go through my notes a little bit. 16:54:11

EXAMINATION

BY MR. SINGER:

Q Dr. Kuperberg, I'll ask you to turn to Exhibit 2. You recall being asked questions about this 2012 "National Global Change Research Plan"? 16:54:23

A I do.

Q And I believe you said that this appeared to be a true and accurate copy of the report; correct? 16:54:42

A I did.

Q But there is a difference between Exhibit 2 and the actual report, is there not?
A There is.
Q What's one of the key differences?
A This is a black-and-white copy or photocopy of the report. 16:54:53
Q Okay. And would having a color copy be important to reading the report?
A It would help, yes.
MR. GREGORY: Excuse me, Counsel. We're happy to substitute a color copy. 16:55:07
MR. SINGER: Or we can add it as an exhibit at some other time, tomorrow maybe.
BY MR. SINGER:
Q Let's turn now to Exhibit 6. You were asked a series of questions about Exhibit 6; correct? 16:55:18
A That's correct.
Q Let me ask you, does Exhibit 6 reflect an actual appropriation of funds? 16:55:31
A It does not.
Q What does it reflect?

Exhibit 9 to Declaration of Julia A. Olson

Gmail by Google

FOIA Request for OSTP

1 message

Julia Olson <julia@ourchildrenstrust.org> Thu, Jun 4, 2015 at 5:34 PM
To: ostpfoia@ostp.eop.gov

June 4, 2015

Office of Science and Technology Policy
Attn: FOIA Officer
1650 Pennsylvania Ave, NW
Washington, DC 20504

Phone: (202) 456-6125
Fax: (202) 395-1224
Email: ostpfoia@ostp.eop.gov

Re: Freedom of Information Act Request For OSTP

Dear FOIA Officer,

Pursuant to the Freedom of Information Act ("FOIA"), 5 U.S.C. § 552, I hereby request for access to and copies of the following records:

I. All emails and memos sent from (a) John P. Holdren, between March 19, 2009 and June 4, 2015; and (b) emails and memos sent from Dr. Fabien Laurier, between December 13, 2013 and June 4, 2015; and (c) emails and memos sent by Timothy "Tim" Stryker, (tstryker@ostp.eop.gov), Program Director, U.S. Group on Earth Observations Program, between January 1, 2012 and June 4, 2015; which contain any of the following terms:

"350"
"450"
"2 degree"
"1 degree"
"Hansen"
"stabilization of greenhouse gas concentrations in the atmosphere"
"prevent dangerous anthropogenic interference with the climate system"
"public trust"
"Our Children's Trust"

II. All emails and memos sent between John P. Holdren and IPCC participant Christopher "Chris" Field between January 1, 2015 and June 4, 2015.

III. From any private meetings, and/or closed-portions of public meetings, held in November 2012 between the President and PCAST:[1]

1. Invitations to the aforementioned meetings received by OSTEP Director and PCAST Chair Dr. John P. Holdren.
2. Meeting agendas received by OSTP Director and PCAST Chair Dr. John P. Holdren.
3. Meeting minutes or notes, either taken by OSTP Director and PCAST Chair Dr. John P. Holdren or OSTP staff, or others, but ultimately provided to Holdren.
4. Any slide or multimedia presentation given at, or related to, the meeting given to OSTP Director and PCAST Chair Dr. John P. Holdren.
5. Any packet or documents from that meeting given to OSTP Director and PCAST Chair Dr. John P. Holdren.
6. Emails sent or received by OSTP Director and PCAST Chair Dr. John P. Holdren from October 1, 2012 to March 31, 2013 containing the word "president."

To the extent that relevant records are available electronically, please provide those records to me in that format.

I respectfully request that you waive all fees in connection with this request as provided by 5 U.S.C. §552(a)(4)(iii) and 5 C.F.R. §1303.70. Our Children's Trust is a national, nonprofit 501(c)(3) organization with no commercial interest in obtaining the requested information. Our Children's Trust thus respectfully requests, because the public will be the primary beneficiary of this requested information, that the Office of Science and Technology Policy waive processing and copying fees pursuant to 5 U.S.C. § 552(a)(4)(A).

In the event that your Office denies a fee waiver, please send a written explanation for the denial.

Please produce the requested records on a rolling basis. At no time should the Office's search for, or deliberations concerning, any records requested herein delay the production of other records that the Office has already elected to produce.

If you regard any of the requested records to be exempt from required disclosure under FOIA, we request that you disclose them nevertheless; as such disclosure would serve the public interest of educating citizens. See 10 C.F.R. §1004.1 (authorizing disclosure of documents exempt from FOIA disclosure where such disclosure is in the public interest).

In addition, should you invoke a FOIA exemption regarding any of the requested records, we request that you release any segregable portions of such records that are left after the exempted material has been redacted from the records we are seeking.

I appreciate your help in obtaining the requested information. As provided in FOIA, I expect a reply within 20 working days. 5 U.S.C. §552(a)(6)(A)(iii); 5 C.F.R. §1303.10(c).

Please send the requested records by email to julia@ourchildrenstrust.org, or for records not available electronically, by regular mail to P.O. Box 5181, Eugene, OR 97405. If you find that this request is unclear in any way, please do not hesitate to contact me.

Thank you for your time and assistance. I look forward to your prompt reply.

Sincerely,

s/Julia Olson

Julia Olson
Executive Director
Our Children's Trust
(541) 375-0158
julia@ourchildrenstrust.org

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[1] The President's Council of Advisors on Science and Technology ("PCAST") represented in a March 2013 report that President Barack Obama met with PCAST in November 2012 requesting the Council's input in formulating a strategy for addressing climate change during his second term. Possibly, PCAST was referring to PCAST's partially-closed meeting with the President scheduled for November 30, 2012. [FR Doc. 2012–27684 Filed 11–13–12; 8:45 am]

Julia Olson
Executive Director, Chief Legal Counsel
Our Children's Trust
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http://ourchildrenstrust.org/
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Exhibit 10 to Declaration of Julia A. Olson

From: FN-OSTP-OSTPFOIA <OSTPFOIA@ostp.eop.gov>
Subject: RE: OSTP FOIA 15-71
Date: August 3, 2017 at 2:58:08 PM PDT
To: 'Julia Olson' <julia@ourchildrenstrust.org>
Cc: FN-OSTP-OSTPFOIA <OSTPFOIA@ostp.eop.gov>

Dear Ms. Olson:

On July 8, 2015, you sent the Office of Science and Technology Policy (OSTP), a request under the Freedom of Information Act, 5 U.S.C. § 552, seeking records: "from any private meetings, and/or closed-portions of public meetings, held in November 2012 between the President and PCAST: (1) Invitations to the aforementioned meetings received by OSTEP Director and PCAST Chair Dr. John P. Holdren; (2) Meeting agendas received by OSTP Director and PCAST Chair Dr. John P. Holdren; (3) Meeting minutes or notes, either taken by OSTP Director and PCAST Chair Dr. John P. Holdren or OSTP staff, or others, but ultimately provided by Holdren; (4) Any slide or multimedia presentation given at, or related to, the meeting given to OSTP Director and PCAST Chair Dr. John P. Holdren; [and] (5) Any packet or documents from that meeting given to OSTP Director and PCAST Chair Dr. John P. Holdren."

OSTP assigned your request OSTP FOIA request number 15-71. OSTP conducted a search of its records for records responsive to the November 2012 meeting portion of your request, and located 689 pages. Due to the size of the files, OSTP has uploaded the files to the Safe File Transfer system. You should receive a system message from the file system with a link to download the two production files. OSTP has withheld portions of the files under 5 U.S.C. §§ 552(b)(2), (b)(5) and (b)(6). In addition, OSTP has withheld 28 pages in full under 5 U.S.C. § 552(b)(5).

OSTP is continuing to process the remaining portions of your FOIA request and will release responsive, non-exempt records to you as they are processed and become available for release. In the meantime, please let me know if you have any questions.

Regards,

Jennifer Lee
Office of Science and Technology Policy

Case No. 17-71692

IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

In re: UNITED STATES OF AMERICA

UNITED STATES OF AMERICA, *et al*.,
Petitioners,

v.

UNITED STATES DISTRICT COURT FOR
THE DISTRICT OF OREGON
Respondent,

and

KELSEY CASCADIA ROSE JULIANA, *et al*.,
Real Parties in Interest

On Petition For Writ of Mandamus In
Case No. 6:15-cv-01517-TC-AA (D. Or.)

DECLARATION OF DR. HAROLD R. WANLESS IN SUPPORT OF ANSWER OF REAL PARTIES IN INTEREST TO PETITION FOR WRIT OF MANDAMUS

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Attorneys for Real Parties in Interest

I, Harold R. Wanless, hereby declare as follows:

1. My name is Harold Rogers Wanless. I am a Professor in the Department of Geological Sciences and was Cooper Fellow of the College of Arts and Sciences at the University of Miami. My office is located in Coral Gables, Florida. I am a Registered Professional Geologist in the State of Florida #985. My professional and educational experience is summarized in my curriculum vitae attached to this declaration as **Exhibit A**.

2. My father, Dr. Harold Rollin Wanless, was a sedimentary geologist who extensively studied the rocks of Paleozoic Pennsylvania Period and was one of the first to publish on the cyclical nature of sedimentation during Pennsylvanian Period resulting from sea level rises and falls in response to repetitive glaciations. As a child, I grew up immersed in the history of the "rocks" of Pennsylvania and the ancient stories they told of dramatic and repetitive fluctuations of sea level on scales from hundreds to millions of years. Those early beginnings led me to my own deep study of geology and the paleo-sea level record, and ultimately human-induced climate change and resulting modern-day sea level rise.

3. Below I describe my qualifications and experience and then offer my expert opinion, on behalf of the youth plaintiffs (real parties in interest) in this case, as to the dire urgency of their plight to stop additional greenhouse gas

emissions, and the very real harms they face as children, with particular focus on 10-year-old plaintiff Levi D., who lives in Satellite Beach, on a barrier island in southeastern Florida that separates the Indian River Lagoon from the Atlantic Ocean.

Expert Qualifications and Experience

4. I received an A.B. degree in Geology from Princeton University in 1964; a M.S. degree in Marine Geology and Geophysics from the University of Miami in 1967; and a Ph.D. degree in Earth and Planetary Sciences from the John Hopkins University in 1973. My Master's Thesis was on the Holocene sediments that have accumulated in the Biscayne Bay region over the past 7,000 years and the character and role of sea level rise and storm and biological processes in defining the nature of these sediments. During my time as a Master's student I worked for my Advisor, Dr. A. Conrad Neumann on developing a sea level curve for south Florida, the Bahamas and Bermuda using core boring samples from freshwater peat deposits that formed close to sea level elevation. My Ph.D. dissertation was on the Cambrian strata in Grand Canyon where small-scale sedimentary cyclic sequences were deposited in response to natural cycles of sea level fluctuation operating a half billion years ago.

5. Since 1971, I have had 46 years of experience as a geologist and marine geologist at the University of Miami. My research specialty is coastal and shallow marine sedimentology, modern and ancient, with a focus on documenting and understanding the role of sea level dynamics and storm processes in creating and modifying coastal and shallow marine environments. Much of my research, and that of my students, has focused on determining the fine-scale sea level history over the past 7,000 years and the associated response of coastal and shallow marine environments. This research has focused on the South Florida-Bahamas-Caicos region. Our research has been funded from a variety of sources including, the National Science Foundation, the Department of Interior (National Park Service) and Department of Commerce (Sea Grant and National Oceanic and Atmospheric Administration), Miami-Dade County Department of Environmental Resource Management, petroleum companies (including Exxon, for whom I received research funding through much of the 1980s), and development companies. I have been publishing on past sea level trends in the juried literature since 1976 and have been projecting future trends since 1982 (Wanless, 1976; Wanless, 1982; Wanless and Parkinson, 1989; Dominguez and Wanless, 1991; Wanless, Parkinson, and Tedesco, 1994; Science Committee, 2008; Technical Ad Hoc Work Group, 2011and 2015).

6. Since 1981, I have been using our knowledge of past environments to look to the future. My students and I have been documenting the changes in south Florida coastal environments in response to both accelerated sea level rise occurring since 1930 and major (category 4 and 5) hurricanes. Through this research we have studied the coastal and low wetland environments bordering Biscayne Bay, Florida Bay, southwest Florida from Cape Sable to Everglades City, and the 10,000 islands. We focus our research on coastal sandy beaches and barrier islands, mangrove wetlands, low-lying freshwater wetlands near the coast, as well as the adjacent Everglades and low-lying upland. To put it simply, the scientific study of islands, mangroves, sand, mud, reefs, and rocks gives us a clear window into historic sea level rise and, combined with other scientific tools, allows us to project sea level rise into the future.

7. As polar ice sheet melt has significantly accelerated on both Greenland and Antarctica since about the 1990s, I have been active in working with other scientists, communities, Miami-Dade County, the State of Florida and Federal agencies in using new research data from myself and others to project future sea level rise both globally and regionally and to determine the impact it will have on low-lying coastal environments, coastal communities, agriculture, and industry. This includes an evaluation of the changing anthropogenic effects

on coastal and shallow marine environments with rising sea level (Science Committee, 2008; Technical Ad Hoc Work Group, 2011 and 2015).

8. I was an active member of, and invited speaker at, the Miami-Dade County Climate Change Advisory Task Force (CCATF), comprised of 25 members, appointed by the Commissioners, Mayor, and County Manager. Throughout its existence, I served as the Chair of CCATF's Science Committee and drafted their reports. From 2006-2011, the CCATF served as an advisory board to the Board of County Commissioners and was charged with identifying potential future climate change impacts to Miami-Dade County, while providing recommendations regarding mitigation and adaptation measures to respond to climate change.

9. Miami-Dade County has officially recognized and relied upon my expertise and peer-reviewed research on climate change and sea level rise as evidenced through County review and adoption of CCATF recommendations, which was based in-part upon my peer-reviewed research, as well my position as the Chair of CCATF's Science Committee.

10. In 2010, the Southeast Florida Regional Planning Council initiated efforts to create a four county "Regional Compact," an agreed-upon statement of climate change and anticipated sea level rise. I was part of the committees that used the peer-reviewed scientific literature and our expertise to provide

reports on anticipated sea level rise for the Compact. These reports are incorporated into the overall "Regional Compact" Documents (Technical Ad Hoc Work Group, 2011 and 2015).

11. The South Florida Water Management District ("SFWMD") has previously relied upon and cited to my peer-reviewed research in assessing sea level rise implications for South Florida. (SFWMD, "*Preliminary Estimate Of Impacts of Sea Level Rise on The Regional Water Resources of Southeastern Florida*;" SFWMD, "*Estimated Impacts of Sea Level Rise on Florida's East Coast*").

12. U.S. Army Corps of Engineers personnel acknowledged and cited to my research regarding sea level rise in a presentation entitled "Climate Change Concerns for Everglades Restoration Planning," which was presented at the Planning Community of Practice Conference 2008.

13. I have twice been an invited speaker to the State of Florida legislature to present evidence for anticipated sea level rise and implications to South Florida coastal environments and the Everglades (2007). I have been an invited speaker to the Council on Environmental Quality at the White House, addressing sea level rise and the urgent need to shift the Mississippi River outlet to help save the Mississippi River Delta (2009).

14. I am familiar with the findings of the U.S. Global Change Research Program ("USGCRP") and the 2014 Report entitled "Global Climate Change Impacts

in the United States: A State of Knowledge Report from the U.S. Global Change Research Program" as well as the Final Draft of the 2017 USGCRP National Climate Assessment. I am also familiar with the broad body of scientific literature on climate change and sea level rise.

The Paleoclimate Record and Fluctuations in Sea Level Rise

15. Earth has different orbital cycles that affect global temperatures. One of the three Milankovitch Cycles is a ~100,000 year cycle of Earth's eccentricity, or the shape of its orbit around the sun, which shifts from a circular formation to an oval formation. A second cycle is how the Earth is tilted toward the sun, which changes every ~40,000 years. The third, precession, are ~19,000 and ~21,000 year cycles, which changes the wobble of the Earth as it moves around the sun.

16. These natural cycles of how Earth presents herself to the Sun result in slight differences in illumination and warming/cooling which triggers slight changes in productivity and surficial weathering which in turn result in changes in carbon dioxide and warming. By studying historic CO_2 levels through ice cores and deep ocean sampling, the scientific community has established with high confidence the close correlation between CO_2 and temperature change.

17. During the most recent period of the Holocene (past 12,000 years) when human civilization developed, Earth's optimum presentation to the sun

occurred about 6,500 years ago, which was the warmest period of the Holocene before human-caused climate change began occurring. During that time, atmospheric CO_2 levels were ~280 ppm. As the Earth's orbit moved away from the optimum presentation, a natural, slow and slight cooling would have naturally occurred, and has been clearly documented for the 1,000 years prior to the beginning of the industrial revolution (Mann, 1994). This natural cooling has since become overshadowed by increasing human-caused greenhouse gas emissions, predominantly CO_2.

18. In contrast to the Holocene, 120,000 years ago during the warmest interglacial period, known as the Eemian, atmospheric CO_2 levels were at 280-300 ppm, temperatures were only slightly warmer than today and sea level rise was 26 feet higher than it is today (because of significant ice melt from both Greenland and Antarctica). As shown in Figure 1 below, the fluctuations of CO_2 from between 180-280 ppm for hundreds of thousands of years moves parallel with the changes in Earth's temperature, noted in the green line. Large changes in climate typically occur over hundreds of thousands of years. However, humans have caused the CO_2 dial to shoot up like a rocket to over 405 ppm, which is a 40% increase over preindustrial levels, and it has happened in a very short period of time as compared to earlier natural shifts. Based on our understanding about how climate changes, the results will be

dire for humanity, and even worse if we continue to inject even more CO_2 into the system.

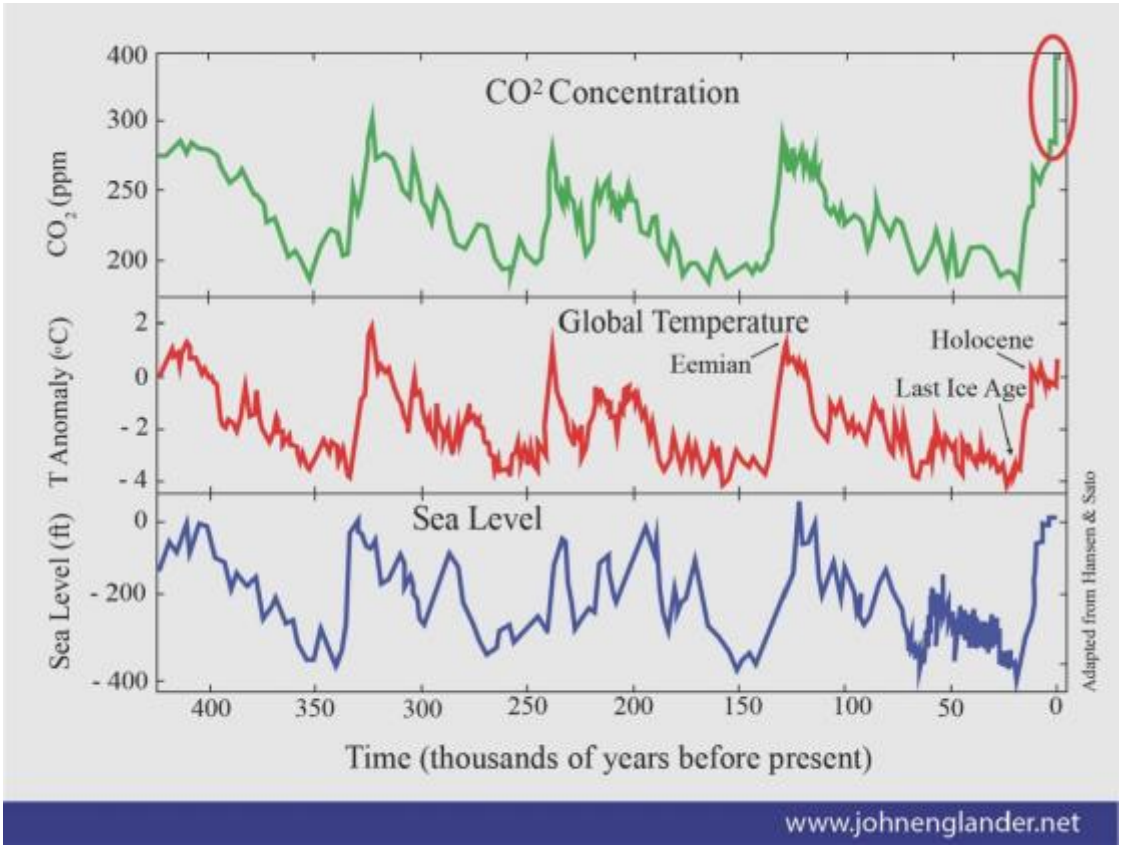


Figure 1.

19. Through scientific study of the geologic record, we have shown that in response to climatic changes and CO_2 levels, sea levels did not rise in a gradual linear manner in response to gradually increasing natural warming and carbon dioxide levels as we came out of the last glacial period. Global sea level rose from about -120 meters (-420 feet) 18,000 years ago to the present as a series of rapid pulses of rise followed by pauses as warming initiated one pulse of ice sheet collapse after another. This is evidenced by drowned

coastal deposits left across the continental shelves of the world. Through our research and studies and radiometric dating of deposits from former coastal wetlands (especially red mangrove peat), reefal systems (coral and oyster), sandy barrier islands, intertidal encrusting and boring organisms (such as barnacles), we have understood since the middle 1980s that there is a pattern of 1-10 meter sea level pulses of rapid coastal inundation followed by pauses, repeated rapid flooding and pauses. These pulses of sea level rise occur over relatively short periods of time (within a century or so) and are a reflection of a phase of rapid disintegration of some ice sheet sector. Each pulse was associated with a rather small increase in CO_2 as compared to the increase that has occurred since the beginning of the industrial revolution. When the seas rise slowly, the barrier islands can keep up and grow or migrate landward and thus stay above sea level, and mature reefs would have at least parts growing upwards in response to increased subtidal space becoming available. But if the rise is too rapid, it will simply over step and drown the barrier island, the reef, or the coastal wetland and begin forming a new one elsewhere. All across the continental shelves of the world are old sandy barrier islands, reefs and coastal wetlands that were drowned out and left behind. If subsequent waves and currents permitted, these relict coastal deposits remain as testament. We can definitively establish that during certain periods the rises

in sea level occurred very rapidly. This geologic evidence for rapid ice sheet disintegration, once destabilized, is the verification that the numerous reinforcing, accelerating feedbacks scientists are observing for recent ice sheet melt on Greenland and Antarctica is cause for deep concern.

20. Figure 2 below depicts the post-glacial pulses of rapid sea level rise and pauses that are well documented in the literature. These include those over the past 5,500 years that my students and I have measured in Florida and Brazil (Dominguez and Wanless, 1991; Gelsanliter, 1996; Gelsanliter and Wanless, 1995). Others have documented earlier pulses of rapid rise, including Locker *et al*., 1996; Jarrett *et al*., 2005; Milliken *et al*., 2008; and Pretorius *et al.*, 2017.

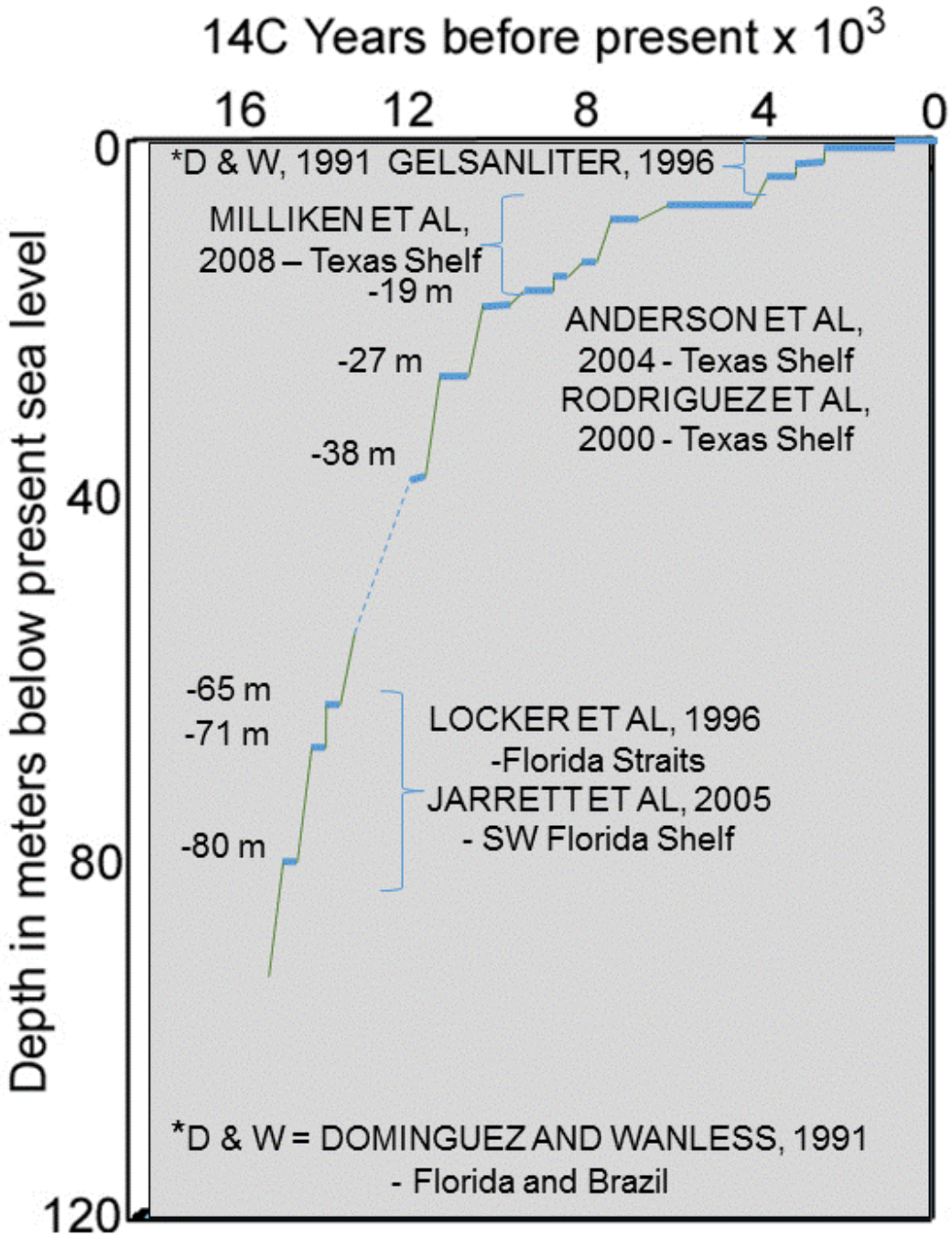


Figure 2.

21. The reason for the pulses of sea level rise is the non-linear melting of ice superimposed on the thermal expansion of water and other lesser influences.

Dr. James Hansen best describes this phenomenon as rapid ice sheet disintegration, as we are now seeing in Antarctica and Greenland, which I discuss in greater detail below.

The Reality of Human-Caused Climate Change, Ocean Warming and Accelerating Sea Level Rise

22. Notwithstanding these natural long-term cycles affecting Earth's temperatures, the most significant effect on Earth's temperatures since the 1950s is from the increasing CO_2 levels in the atmosphere that result from human-induced burning of fossil fuels. There is an extremely strong consensus among actively publishing scientists and strong scientific evidence that the climate is warming due to human activities, primarily the burning of fossil fuels such as coal, oil and gas. Carbon dioxide emissions are the strongest human-induced climate forces, but other human-induced greenhouse gas emissions also contribute to climate change, including methane and nitrous oxide. At the time of the industrial revolution global CO_2 levels were ~280 ppm. As depicted in **Figure 2** above, for the past 400,000 years, CO_2 fluctuated between 180 ppm and 280 ppm, and in concert sea level went down and up 100 meters or more. These natural changes in CO_2, temperature and sea level occurred over thousands of years. For the first time in the paleo-record, CO_2 levels have risen by more than 125 ppm and within only 150 years. This is more than double the 180-280 ppm post glacial CO_2 increase which drove

the entire series of pulses that totaled 120 meters of sea level rise in response to warming and ice melt. There is no historical precedent for this rapidity of change that we can find in the paleo-record. The unprecedented rate and degree of human-caused CO_2 increase and warming should serve as a warning the Earth will now respond in unprecedented and dire ways.

23. Referring to the late 18th century as the beginning of the HyperAnthropocene, when the improved steam engine initiated the industrial revolution (Hills, 1993) and the exponential growth in fossil fuel combustion, Hansen et al., explain that three-quarters of human-caused warming since 1850 (~1◦C) has occurred since 1975 (Hansen et al., 2016). When I was born in 1942, there were less than two billion people on the planet, and many countries were not at all industrialized. Now we have over 7.5 billion people, and also many large countries are rapidly industrializing.

24. The global-mean temperature has increased by more than 1.8º F (1º C) over the past century, and is projected to warm by a total of 3.6-4.8º F/ 2-4.8º C over the next century depending upon future emissions of greenhouse gases (IPCC, 2014).

25. Very importantly, nearly all the excess atmospheric heat produced by the greenhouse gasses from burning fossil fuels has transferred to the oceans. Approximately 93.4% of the excess energy (heat) human pollution has forced

on the planet has been absorbed by the oceans to 1000 meters or more in depth. This heat transfer is rapidly accelerating as people burn more and more fossil fuel. Over half of this excess heat from human-induced global warming has transferred to the ocean since 1997. **Figure 3 below** shows the distribution of global-warming energy accumulation (heat) relative to 1971 and from 1971–2010.

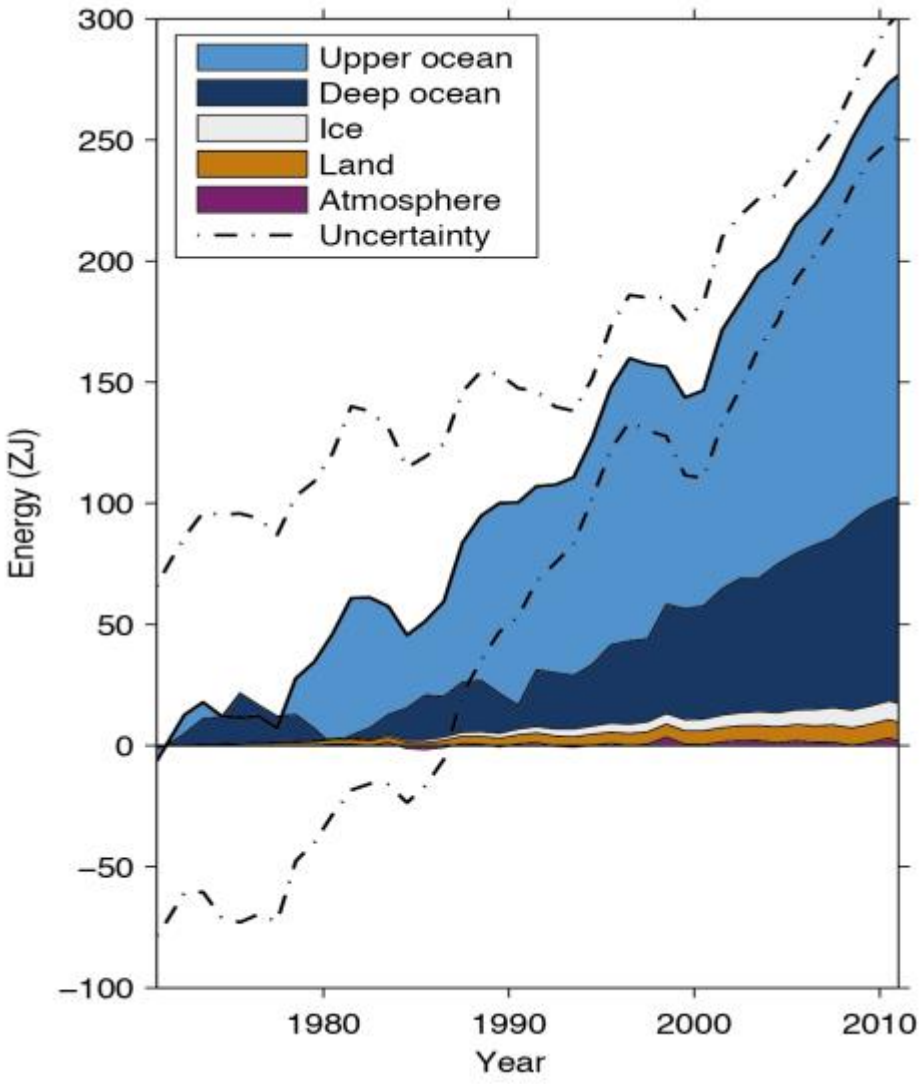


Figure 3. IPCC, 2014.

26. In high school physics children are taught that water has great capacity to take in, hold, and use heat. Atmospheric warming will continue for some 30 years after we stop putting more greenhouse gasses into the atmosphere. But that warmed atmosphere will continue warming the ocean for centuries, the accumulating heat in the oceans will persist for millennia – unless truly dramatic steps are taken. The CO_2 has a several thousand year residence time in the atmosphere and is not consumed as it warms the atmosphere and ocean. Due to that large thermal inertia, the climate will continue to warm over the next half-century, even if a reduction in fossil fuel emissions and stabilization of CO_2 concentrations occurred today, and ice will continue to melt. Put simply, the climate has warmed and future warming is unavoidable. However, how much more climate forcing we put into the system through CO_2 and other greenhouse gas emissions this year and in the years to follow, and how much carbon we sequester from the atmosphere through improved land management practices and active sequestration, will dictate how much additional warming will occur and whether the impacts of climate change are survivable for much of humanity and many other species living on the planet.

27. Global warming from the influx of CO_2 and other greenhouse gasses leads to a number of changes in climate beyond simply an increase in land surface and ocean temperatures. These include, but are not limited to: increased frequency

and intensity of heavy rainfall events and floods, increased sea level, and more intense hurricanes, higher atmospheric and oceanic temperatures, ocean acidification, and destabilization of permafrost in the arctic and methane hydrates frozen in the sediments in the Arctic Ocean bottom.

28. Global mean sea level (GMSL) has risen ~8-9 inches since the industrial revolution and 3 of those inches have occurred since 1993 (Church and White, 2011; Hay et al., 2015; Nerem et al., 2010). Even these relatively small increases have had substantial effect on low-lying areas. The question now is not whether the seas will continue to rise, but by how much and by when.

29. In 2017, the National Oceanic and Atmospheric Administration (NOAA) published the most recent United States Government sea level rise projections, once again confirming that sea level rise is a certain impact of climate change (*Global Sea Level Rise Scenarios for the United States; National Climate Assessment* (NOAA, December 2017)). NOAA's projections, which included acceleration of ice melt from Greenland and Antarctica, included a range between 1.2-2.5 m (4.1-8 ft) global mean sea level rise (GMSL) for 2100. However, for certain coastlines across the U.S, the high ranges could be .3-1.0 m higher than the GMSL, thereby increasing projections upwards by 1-3.3 feet. NOAA's 2017 projections are higher than the projections NOAA made just five years ago in its 2012 assessment. In addition, NOAA's, and most

other, projections conclude that sea level rise will continue to rise and to accelerate even more after 2100. If sea level has risen 5 feet (1.5 m) by 2100 it will be rising at a rate of one foot (0.3 m) per decade – and accelerating.

Table 5. GMSL rise scenario heights in meters for 19-year averages centered on decade through 2200 (showing only a subset after 2100) initiating in year 2000. Only median values are shown.

GMSL Scenario (meters)	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100	2120	2150	2200
Low	0.03	0.06	0.09	0.13	0.16	0.19	0.22	0.25	0.28	0.30	0.34	0.37	0.39
Intermediate-Low	0.04	0.08	0.13	0.18	0.24	0.29	0.35	0.4	0.45	0.50	0.60	0.73	0.95
Intermediate	0.04	0.10	0.16	0.25	0.34	0.45	0.57	0.71	0.85	1.0	1.3	1.8	2.8
Intermediate-High	0.05	0.10	0.19	0.30	0.44	0.60	0.79	1.0	1.2	1.5	2.0	3.1	5.1
High	0.05	0.11	0.21	0.36	0.54	0.77	1.0	1.3	1.7	2.0	2.8	4.3	7.5
Extreme	0.04	0.11	0.24	0.41	0.63	0.90	1.2	1.6	2.0	2.5	3.6	5.5	9.7

Figure 4.

30. Using NOAA's projections, the time at which each foot of sea level rise will be reached can be anticipated by using their 'Intermediate High' and 'Highest' scenarios. The Intermediate High scenario projects sea level rise incorporating a warming ocean and 'limited ice sheet loss' and some ice melt acceleration. The 'Intermediate Low' scenario only incorporates sea level rise from ocean warming, minor ice melt but no ice melt acceleration. The 'Lowest' scenario is a linear projection based on historical sea level rates derived from tide gauge measurements beginning in 1900. Neither the Lowest nor the Intermediate Low scenarios are valid scenarios to use for the future. They both fail to reproduce the observed sea level rise over the past two

decades because of significant acceleration from already occurring observed ice melt.

31. Under NOAA's 2017 projected scenarios, there could be 2 feet of sea level rise by 2048 and 3 feet by 2065. A 2-3 foot rise of sea level will make nearly all of the barrier islands of the world uninhabitable, result in inundation of a major portion of the world's deltas, and make low-lying coastal zones like south Florida increasingly challenging communities in which to maintain infrastructure and welfare and to assure protection of life and property during extreme rainfall events and hurricanes.

32. NOAA reports that even 0.9 m (3 feet) of sea level rise would permanently inundate 2 million American's homes and communities. Two meters (6.6 feet) of sea level rise would put 6 million U.S. homes underwater (Hauer et al., 2016).

33. While NOAA's projection of up to 8 feet of sea level rise by 2100 is representative of sea level projections typically made in the scientific literature based on current modeling, including the current rate of accelerated melting in the poles, it does not address other plausible high-risk scenarios.

34. Importantly, sea level rise is now accelerating due primarily to the rapid loss of ice on Greenland and Antarctica. This is occurring faster than any of the climate models predict because the models currently do not include many of

the numerous accelerating feedbacks in ice melt that are now being observed. Although not yet in the models, these accelerating feedbacks for ice melt are a reflection of the fact that ice, when destabilized, disintegrates very rapidly resulting in significant pulses of sea level rise such as are documented throughout the past. The historic record of sea level rise clearly establishes that sea level rises in pulses. Our scientific understanding of the historic rapid pulses in sea level rise as ice sheets disintegrate is not incorporated in any U.S. government models, including NOAA's 2017 model, or any of the modeling summarized by the Intergovernmental Panel on Climate Change (IPCC), the governmental body reporting on the consensus science of climate change. NOAA confirms "the GMSL exceedance probabilities for the scenarios may underestimate future rates of ice melt due to effects such as Antarctic ice sheet instability." (NOAA 2017).

35. Dr. James Hansen and co-authors published a peer-reviewed paper in 2016 that attempted to take into account the rapid disintegration of ice sheets that the models have not accounted for. They used a combination of climate modeling, paleoclimate analyses, and modern observations to incorporate climate feedback processes in an effort to explain the more rapid paleoclimate changes to sea levels.

36. Hansen, et al., explain broad scientific understanding that during the late-Eemian, sea level reached +6–9 m (20-30 feet), due in substantial part from melting in Antarctica at a time when Earth was only slightly warmer than today (Dutton et al., 2015; Hansen et al., 2016).

37. Hansen, et al., ultimately conclude that while precise predictions of sea level rise are not possible given the uncertainties around how quickly the ice sheets will disintegrate, the authors state with a high degree of confidence that multi-meter sea level rise would become practically unavoidable, probably within 50–150 years, if current emission trends continue.

38. In my expert opinion, based on the historic record, the rapid pulses, and current rates of sea level rise acceleration, I project a 15-40-foot rise in sea level by 2100 if current trends continue, with ever greater rises and acceleration in subsequent centuries until such time as we dramatically reduce the levels of CO_2 in the atmosphere and take steps to cool the upper portion of the ocean. I am not alone in this conclusion. One of the world's eminent glaciologists, Dr. Eric Rignot, predicts that an increase in global temperatures to 1.5-2°C over pre-industrial levels, will commit the planet to sea level rise of six to nine meters, which could occur in the next 100-200 years. In addition, James Hansen has projected 5-10 meters this century (Hansen et al., 2016).

Thus, only NOAA's extreme sea level rise scenario presents anything close to approximating the real risk we face with sea level rise.

Sea Level Rise in Southern Florida and its Barrier Islands

39. While climate change will be felt globally, the low-lying and heavily-populated coastline of south and southeastern Florida, including its barrier islands, makes it extremely vulnerable to the effects of climate change, particularly sea level rise, amplified by storm surges. Hurricane storm surges will make low-lying south Florida an increasingly risky place to live. The maps in **Figure 5** below show the increased extent and depth of a category 5 Hurricane Andrew (1992) storm with a further three feet of sea level rise. Nearly the entire southern two-thirds of the county will be affected by a deep, powerful, violent lateral storm surge and the seaward barrier islands will be dangerously swept by a deep surge.

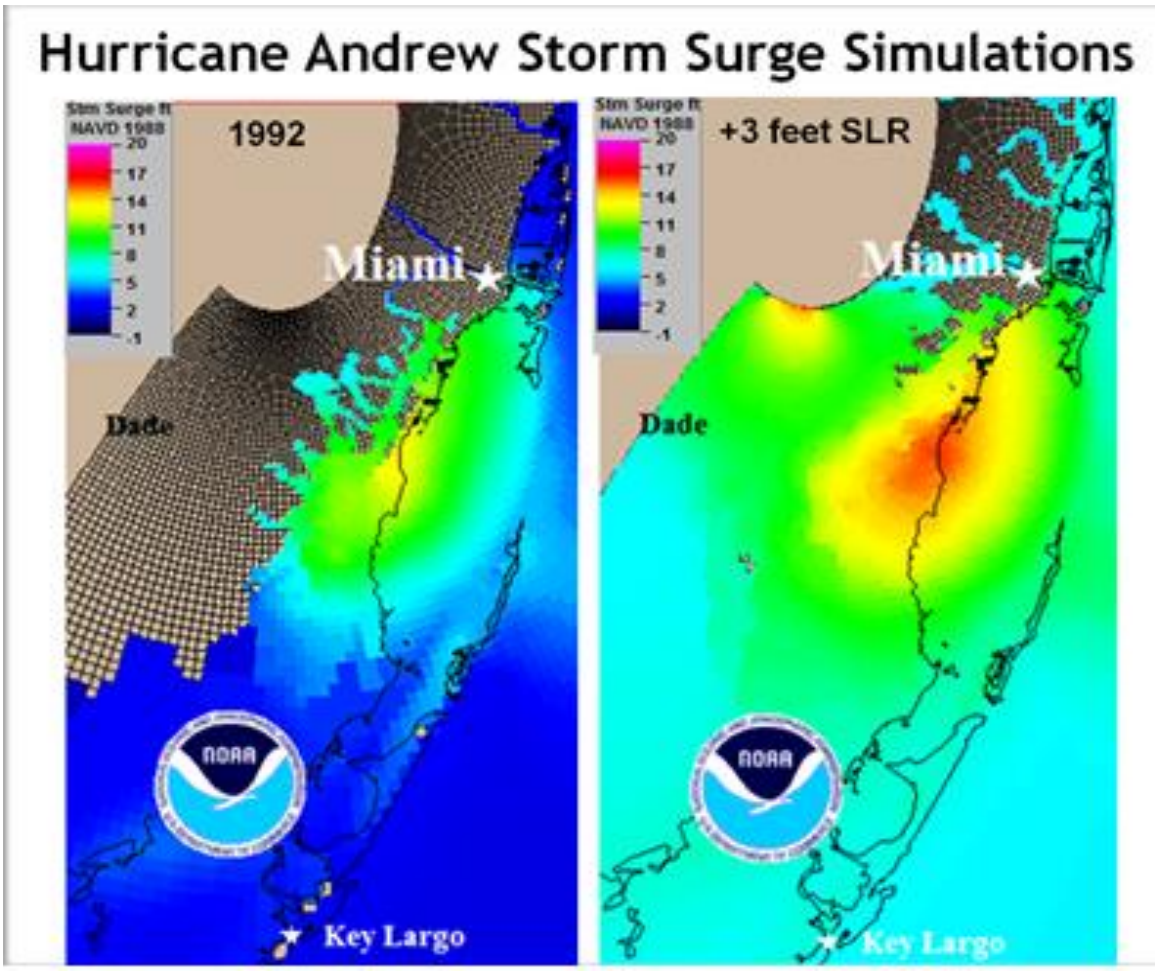


Figure 5.

40. South Florida is not significantly sinking or rising so sea level change in south Florida basically follows the global sea level change, with some potential for enhanced rises. South Florida's sea level has risen about 12 inches (30 cm) since 1930 and is currently increasing at a rate of ~1.3 inches (3.5 cm) per decade; a rate that is approximately 10 times faster than what occurred naturally over the past 2,500 years. If the current trend were to continue at the same linear rate of 1 inch per decade, the oceans along South Florida's coast

would rise another 5 inches (12.5 cm) by 2060 and 10 inches (25 cm) by the end of the century. As discussed above, these scenarios are highly improbable and vastly underestimate potential sea level rise given the non-linearity we are observing and that is predicted of ice melt and resulting sea level rise.

41. In January 2008, the Science Committee (of which I was Chair) of the M-DCCTAF issued a projection of future sea level rise for south Florida, stating:

> With what is happening in the Arctic and Greenland, many respected scientists now see a likely sea level rise of **at least** 1.5 feet in the coming 50 years and a total of **at least** 3-5 feet by the end of the century, possibly significantly more. Spring high tides would be at +6 to +8 feet. This does not take into account the possibility of a catastrophically rapid melt of land-bound ice from Greenland, and it makes no assumptions about Antarctica (MDC-CCATF, 2008).

42. Since issuing this statement, evidence for dramatically accelerating ice sheet melting has increased on both Greenland and Antarctica, again not accounted for in the modeling (Van den Broeke et al., 2009; Velicogna, 2009; Kerr, 2009; and Jiang et al., 2010; Rignot et al., 2016, 2017).

43. Miami is particularly at risk to the environmental impacts of sea level rise as acknowledged in the 2014 USGCRP Third National Climate Assessment:

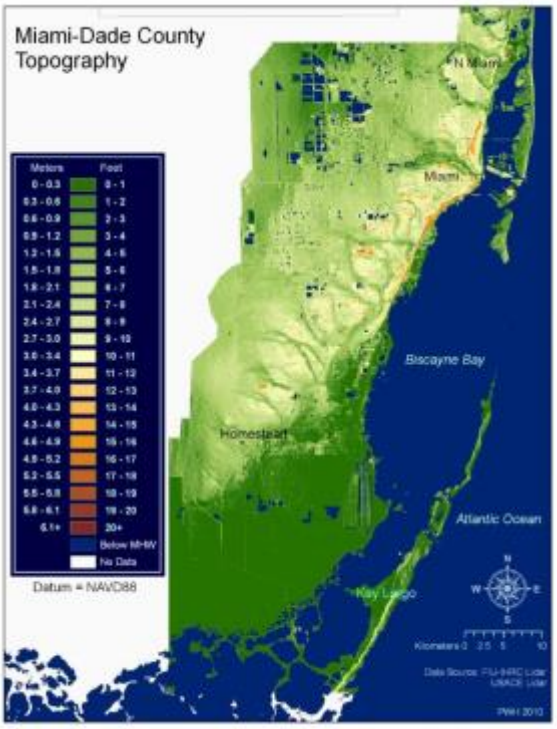
> Large numbers of cities, roads, railways, ports, airports, oil and gas facilities, and water supplies are at low elevations and potentially vulnerable to the impacts of sea level rise. New Orleans (with roughly half of its population living below sea level), Miami, Tampa, Charleston, and Virginia Beach are among those most at risk. (Strauss et al., 2012).

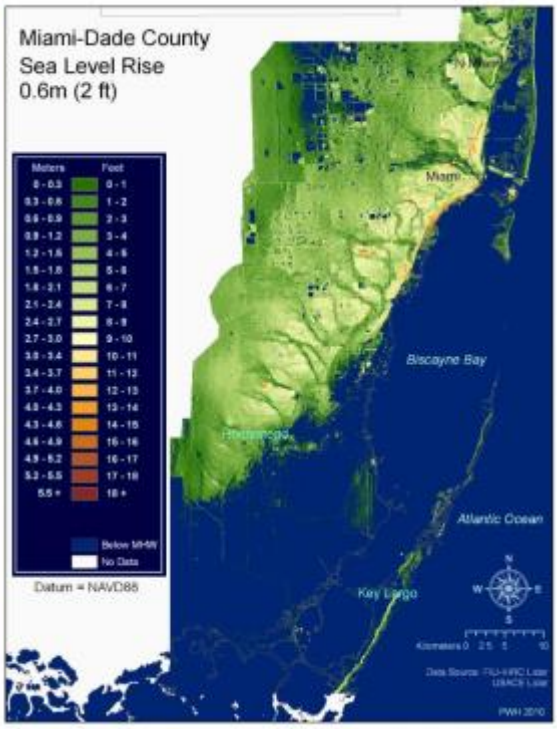
***

> Even today, residents in some areas such as Miami Beach are experiencing seawater flooding their streets

44. All climate and sea level assessments agree that ice melt and sea level rise will be accelerating well into the next century. This means that Floridians will not be adjusting to a fixed higher sea level at the end of the century, but one that continues to rise at an accelerating rate. For example, if we have reached plus five feet by the end of the century, sea level will be rising at a foot per decade and accelerating into the next century. Long-term adaptation to sea level rise in Florida under current rates of warming are not realistic.

45. Using LiDAR high-resolution elevation mapping from a plane with ground-truthing, the late Peter Harlem and I mapped Miami-Dade County to show the progressive inundation of Miami-Dade County based on U.S. government projections. These are depicted below in **Figure 6**. These LiDAR maps are at only mean high tide and do not include storm surge inundation, which will be substantial. They do clearly illustrate the complete and irreversible loss of land and property we expect this century. With the NOAA 'Highest' sea level rise scenario, we would see 2 feet of sea level rise by 2048, 4 feet by 2074, 6 feet by 2093, 8 feet by 2110, and 10 feet by 2125.


Miami-Dade County
Topography
Meters
Feet
Below MHW
No Data
Datum = NAVD88
N Miami
Miami
Biscayne Bay
Homestead
Atlantic Ocean
Key Largo


Miami-Dade County
Sea Level Rise
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Meters
Feet
Below MHW
No Data
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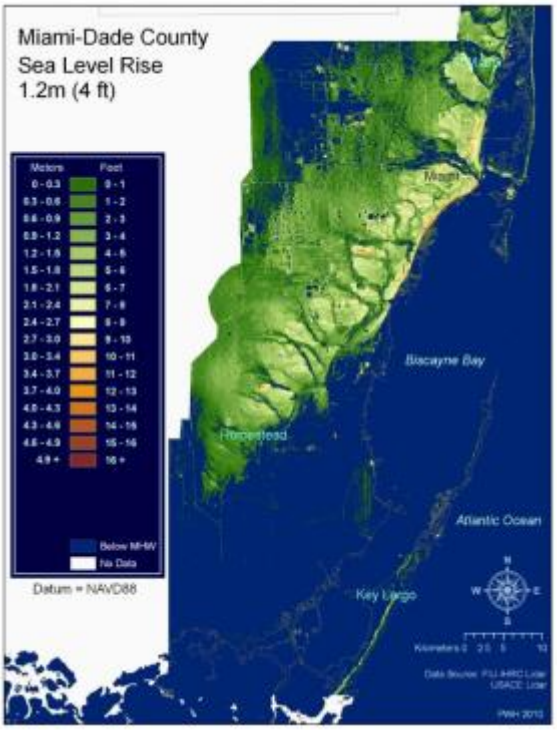
Miami
Biscayne Bay
Homestead
Atlantic Ocean
Key Largo


Miami-Dade County
Sea Level Rise
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Meters
Feet
Below MHW
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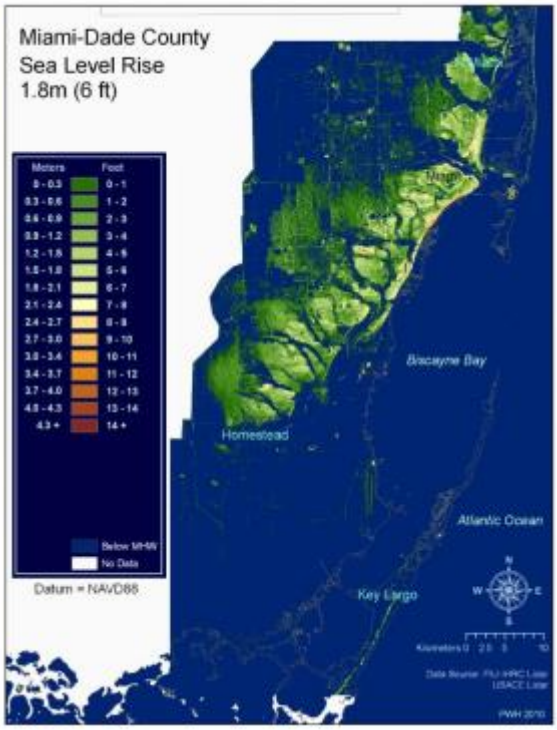
Homestead
Atlantic Ocean
Key Largo


Miami-Dade County
Sea Level Rise
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Meters
Feet
Below MHW
No Data
Datum = NAVD88
Miami
Biscayne Bay
Homestead
Atlantic Ocean
Key Largo

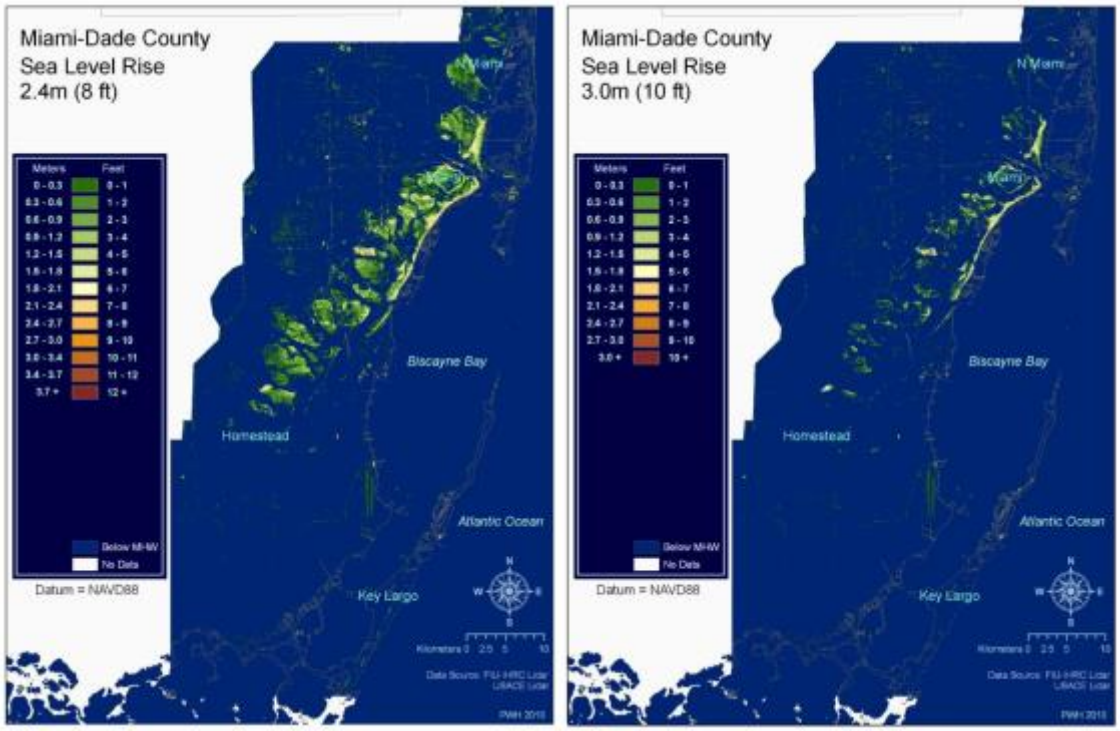

Figure 6.

46. Sandy barrier islands along tectonically passive margins, such as southeast Florida are on a gently sloping continental shelf setting and tend to shift dramatically landward with rising sea level. A one-foot rise in sea level will commonly result in a landward migration of a barrier island of 500 to 2,000 feet. This occurs as sand over washes the island or is swept through inlets or to the offshore during storms.

47. Rising sea level will significantly change the coastal environments, interactions of land and water (including salinity), base-level elevations, tidal current patterns and strengths, and storm surge patterns and strengths. With even a two-foot rise in sea level, saltwater will intrude into Florida's southern

and southeastern aquifers. For instance, saltwater intrusion is already affecting the Biscayne Aquifer, and this will become a rapidly increasing problem (Heimlich et al., 2009), diminishing and then eliminating sources of freshwater (Science Committee, 2008; Heimlich et al., 2009).

48. In addition to harming private and public property, rising sea level will also harm the viability of infrastructure like wastewater treatment facilities, nuclear power plants, roads, and landfills, which will become vulnerable to disruption or destruction by storms, leading in some cases to vast contamination of lands and waters as other pollutants are released. There is no planning in southern Florida for cleaning the land before inundation even though many of the waste disposal sites, sewage treatment plants, industrial sites and superfund sites are in low-lying coastal zones. For example, with only 1.5 to 3 feet of further sea level rise, the Central Treatment Plant and the adjacent abandoned unlined dump of Virginia Key, Florida will be all that is left of the ocean-facing sandy barrier island. Those pollutant-filled facilities will be exposed to the full force of the oceans tides, waves and storm surges. For those areas on septic tank systems, increasingly frequent sunny day flooding will flood neighborhoods and roads with fecal pollution.

49. Southeastern Florida and its barrier islands will experience at least two feet of sea level rise in the next 30-50 years. This rise, combined with storm effects, will eliminate the habitability of most of Florida's barrier islands.

50. Plaintiff Levi lives in Satellite Beach on a southeastern Florida barrier island, much of which is less than 6 feet above sea level. Levi's home is at 3 feet above sea level. His island is already facing sea level rise and increased inundation during storms. At 3 feet of sea level rise, Levi's home will be in the sea. That is likely to happen between 2065 and 2083. But long before 3 feet of sea level rise, Levi and his family will have been forced out because of increasing frequency and depth of flooding and infrastructure failure in their home and community from sunny day flood events (King Tides and heavy rainfalls) and storm surges from tropical storms and hurricanes.

Unprecedented Urgency of Reducing Greenhouse Gas Emissions

51. The U.S. government has long known that burning fossil fuels would cause global warming and ultimately sea level rise. In 1979-80, I attended my first meetings with EPA where they were discussing accelerating sea level rise. I have been speaking about the threat of sea level rise since 1981 and became certain in the mid-1990s that humans were the cause.

52. The last time in the geologic record that atmospheric CO_2 was at present levels, the seas were 70-90 feet higher. In my expert opinion we need to return

from over 400 ppm to 300-325 ppm to prevent further ocean warming and eventually attempt to return to the levels of the Holocene. Even so, the heat that is now in the ocean is not going to revert back to the atmosphere. It's going to stay in the oceans for centuries continuing to expand the ocean and melt polar ice. And this is why we so urgently need to stop burning fossil fuels and sequester more carbon into our lands and forests.

53. We are headed to catastrophic sea level rise a lot faster than we have anticipated. If we act now, we may not be able to save Naples and Miami and other low-lying regions. But if we do not act now, we have no chance to protect plaintiff Levi's barrier island, and we will also be heading towards losing Orlando and many other places presently above any projected sea level rise.

54. In addition to sea level rise, we are also acidifying the oceans, which will decimate productivity of the world's oceans. Plankton provide our atmosphere with much of the oxygen we breathe, and a productive ocean provides the food humans and all life in the sea depend on. Ocean life also provides critical medicines, livelihoods and recreation. As the ocean warms we are also causing the release of huge amounts of methane and CO_2 from permafrost and methane hydrates from the Arctic tundra and Arctic Ocean floor.

55. Already, our local governments in southern Florida must plan for 4-8 feet of sea level rise by century's end according to the U.S. Government projections. Although I consider 15-40 feet by century's end to be likely, 4-8 feet will be enough to basically eliminate habitation of south Florida's barrier islands and low mainland areas.

56. At times, the hard facts of science do not convey the grave danger we face, particularly when the consequences of invisible CO_2 pollution are locked in long before we physically see them. I express the urgency in this way: As we continue burning fossil fuels today, tomorrow, next month and into next year, a significant portion of the resulting CO_2 pollution is going to be in the atmosphere for 4000 years. Every ton of fossil fuels the U.S. government grants private companies permission to extract, when burned, adds more energy to the oceans, and our oceans will hold that heat for hundreds to thousands of years, leading to more and more ice melt.

57. For hundreds of thousands of years, CO_2 has fluctuated up and down about 100 ppm, between 180-280 ppm, during which time sea level has been going up and down by about 100 meters in response. In the flash of time since the industrial revolution, we have tipped the CO_2 scale over 405 ppm, an increase of 125 ppm, and that rapidly warming atmosphere has already heated the ocean enough to initiate rapid melting of the ice on both Greenland and

Antarctica and to initiate destabilization of the Arctic Pack Ice, permafrost and methane hydrates. To stay at that level for long or to further increase CO_2 levels will wreak havoc on our oceans, our coastal lands within 100 feet of sea level, and human civilization.

58. Dr. Hansen, et al., concluded their 2016 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," by saying:

> We understand that in a system that is out of equilibrium, a system in which the equilibrium is difficult to restore rapidly, a system in which major components such as the ocean and ice sheets have great inertia but are beginning to change, the existence of such amplifying feedbacks presents a situation of great concern. There is a significant possibility, a real danger, that we will hand young people and future generations a climate system that is practically out of their control. We conclude that the message our climate science delivers to society, policymakers, and the public alike is this: we have a global emergency. Fossil fuel CO_2 emissions should be reduced as rapidly as practical.
>
> Social disruption and economic consequences of such large sea level rise, and the attendant increases in storms and climate extremes, could be devastating (Hansen, 2017).

59. Along similar lines, NOAA concludes that a strategy for decisions and planning processes where *long-term* risk management is paramount is to:

> Define a scientifically plausible upper-bound (which might be thought of as a worst-case or extreme scenario) as the amount of sea level rise that, while low probability, cannot be ruled out over the time horizon being considered. Use this upper-bound scenario as a guide for overall system risk and long-term adaptation strategies.

60. Given all of the above, it is my opinion, stated to a reasonable degree of scientific certainty, that any delay in resolution of these children's constitutional claims against the U.S. defendants will cause them ongoing harm, and an increase in the very dangerous situation they already face.

61. For Plaintiff Levi, it may very well be too late to save his barrier island from the rising seas, but to have any reasonable possibility of avoiding irreversible harm to his home island and State, we must limit any additional warming of the oceans and slow the risk of rising ocean levels.

62. In my expert opinion, 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.

63. In closing, I am sometimes asked by adults about how I give hope to young people given the dire projections for their future. I tell them "I hope *you* are listening." It does a disservice to young people for adults in positions of power and governmental leadership to sugarcoat or deny the very real irreversible harms that are already occurring. Without transparent and honest planning for mitigating climate change, we betray young people. We cannot have government disregard for this or have planning regarding their survivability behind closed doors. The purpose of government is not to do business with and for the oil and gas industry and others who benefit from the short-term

ignoring of this serious problem, to the detriment of the broad public interest and certainly the public interest in protecting our children. The public interest is fundamentally harmed by ongoing fossil fuel combustion, which urgently needs reparation.

I certify under penalty of perjury in accordance with the laws of the State of Florida, and to the best of my knowledge, that the foregoing is true and correct. DATED this 25th day of August, 2017 in Coral Gables, Florida.

Harold R. Wanless, Ph.D.
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REFERENCES

Dominguez, J.M.L., and Wanless, H.R., 1991. Facies architecture of a falling sea-level strandplain, Doce River coast, Brazil, in: D.J.P. Swift and G.F. Oertel (Eds.), International Association of Sedimentologists, Spec. Publ. #14, p. 259-289.

EPA, 2012. United States Environmental Protection Agency, Coastal Areas Impacts and Adaptation. http://www.epa.gov/climatechange/impacts-adaptation/coasts.html

Gelsanliter, S., 1996. Holocene Stratigraphy of the Chatham River region, southwestern Florida; with a reevaluation of the Late Holocene sea-level curve. Master's Thesis, University of Miami, Coral Gables, Florida, 182 p.

Gelsanliter, S., and Wanless, H.R., 1995. High frequency sea-level oscillations in the late Holocene of South Florida: a dominating control on facies initiation and dynamics (abstr.). First SEPM Congress on Sedimentary Geology (St. Petersburg, FL, Program with Abstracts, p. 58.

Hansen, J., Sato, M., Hearty, P., Ruedy, R., Kelly, M., Masson-Delmotte, V., Russell, G., Tselioudis, G., Cao, J., Ringot, E., Velicogna, I., Tormey, B., Donovan, B., KNSIno, E., von Achuckmannm K., Kharecha, P., Legrande, A.N., Bauer, M., and Lo, K-W., 2016. Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling and modern observations that 2oC global warming could be dangerous. *Atmospheric Chemical Physics*, Volume 16, p. 1-52. www.atmos-chem-phys.net/16/1/2016/

Heimlich, B.N., Bloetscher, F., Meeroff, D. & Murley, J., 2009. Southeast Florida's Resilient Water Resources: Adaptation to Sea Level Rise and Other Impacts of Climate Change; Florida Atlantic University, 2009

IPCC, 2014. Climate Change 2014 Synthesis Report; Summary for Policymakers. A summary of three working groups of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. 31p. https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

Jarrett, B.D., Hine, A.C., Halley, R., Naar, D., Locker, S., Neumann, A.C., Twichell, D., Hu, C., Donahue, B.T., Jaap, W., Palandro, D., Ciembronowicz, K.

(2005). Strange bedfellows - A deep-water hermatypic coral reef superimposed on a drowned barrier island; Southern Pulley Ridge, SW Florida platform margin. Marine Geology. 214. 295-307. 10.1016/j.margeo.2004.11.012.

Jevrejeva, S., Moore, J.C., and Grinsted, A. 2010. How will sea level respond to changes in natural and anthropogenic forcings by 2100?, Geophysical Research Letters, v.37, L07703, doi:10.1029/2010GL042947.

Karl, T.R., Melillo, J.M., and Peterson, T.C., (eds.), 2009. Global Climate Change Impacts in the United States, Cambridge University Press, 192.

Kerr, RA., 2009. Both of the world's ice sheets may be shrinking faster and faster. *Science*, V. 326, p. 217.

Locker, S.D., Hine, A.C., Tedesco, L.P., Shinn, E.A., 1996. Magnitude and timing of episodic sea-level rise during the last deglaciation. Geology 24, 827–830.

Mann, M.E., Bradley, R.S., and Hughes, M.K., 1994. Northern Hemisphere temperatures during the past Millennium: Inferences, uncertainties, and limitations, American Geophysical Union, Geophysical Research Letters, v. 26 (6), p. 759-762. *doi*:*10.1029/1999GL900070*

Milliken, K.T., Anderson, J.B., and Rodriguez, A.B., 2008. A new composite Holocene sea-level curve for the northern Gulf of Mexico, *in* Anderson, J.B., and Rodriguez, A.B., eds., Response of Upper Gulf Coast Estuaries to Holocene Climate Change and Sea-Level Rise: Geological Society of America Special Paper 443, p.1-11.

NOAA, 2012. Global Sea Level Rise Scenarios for the United States National Climate Assessment. NOAA Technical Report OAR CPO-1. Climate Program Office, Silver Spring MD, 27p. (done cooperatively with United States Geological Survey, Department of Defense, Environmental Protection Agency, Department of Energy, and the US Army Corps of Engineers).

NOAA (Sweet, W.V., Kopp, R.E., Weaver, C.P., Obeysekera, J., Horton, R.M., Thieler, E.R., and Zervas, C.), 2017. Global and Regional Sea Level Rise Scenarios for the United States. NOAA Technical Report NOS CO-OPS 083. National Ocean Service, Center for Operational Oceanographic Products and Services, Silver Spring MD, 55p. plus appendices (done cooperatively with United

States Geological Survey, Environmental Protection Agency, and Rutgers University).

NOAA-OAR, 2012. 2012 Arctic Report Card, 11p.
http://www.climatewatch.noaa.gov/article/2012/2012-arctic-report-card

Pretorius, L, Green, A., and Cooper, A., 2017. Submerged shoreline preservation and ravinement during rapid postglacial sea-level rise and subsequent "slowstand", Geological Society of America Bulletin, v. 128, no. 7/8, p.

Rahmstorf, S., 2010. A new view on sea level rise. Nature Reports Climate Change
Published online: 6 April 2010 | doi:10.1038/climate.2010.29
http://www.nature.com/climate/2010/1004/full/climate.2010.29.html

Science Committee, 2008. Statement on Anticipated Sea Level Rise in the Coming Century. Science Committee, Miami-Dade County Climate change Advisory Task Force, Miami, Fl, 9 p. (Can be found on P. 28-36 of 'Second Report and initial Recommendations, Miami-Dade County Climate change Advisory Task Force, April 2008, 101 p., at http://www.miamidade.gov/derm/library/08-10-04_CCATF_BCC_Package.pdf).

Technical Ad Hoc Work Group (Nancy Gassman, Glenn Landers, Jayantha Obeysekera, Joseph Park, John Van Leer, and Harold Wanless), 2011. A Unified Sea Level Rise Projection for Southeast Florida. Regional Compact, Southeast Florida Regional Planning Council. 27p.
http://www.broward.org/NaturalResources/ClimateChange/Documents/SE%20FL%20Sea%20Level%20Rise%20White%20Paper%20April%202011%20ADA%20FINAL.pdf

Technical Ad Hoc Work Group (Danchuk, S., Berry, L., Enfield, D., Gassman, N., Harlem, P., Hefty, N., Heimlich, B., Jurado, J., Kivett, J., Landers, G., Murley, J., Obeysekera, J., Park, J., Steelman, M., Van Leer, J., Wanless, H.R., Wdowinski, S.), 2015. Unified Sea Level Rise Projection for Southeast Florida. Southeast Florida Regional Compact, Southeast Florida Regional Planning Council. 35p.
http://www.southeastfloridaclimatecompact.org/wp-content/uploads/2015/10/2015-Compact-Unified-Sea-Level-Rise-Projection.pdf

U.S. Army Corps of Engineers, 2009. Water Resource Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs. USACE Circular No. 1165-2-211. Washington, DC, 1 July 2009. 23 p.

Van den Broeke, M., Bamber, J., Ettema, J., Rignot, E., Schrama, E., van den Berg, W., van Meijgaard, E., Velicogna, I, Wouters, B., 2009. Partitioning recent Greenland mass loss. Science, v. 326, p. 984-986 and supporting on-line material. http://www.sciencemag.org/cgi/content/full/326/5955/984 http://www.sciencemag.org/cgi/content/full/326/5955/984/DC1

Velicogna, I., 2009. Increasing rates of ice mass loss from the Greenland and Antarctic ice Sheets revealed by GRACE. Geophysical Research Letters, v. 36, L19503, doi: 10.1029/2009GL040222, 4 p.

Wanless, H.R., 1976. Geologic setting and recent sediments of the Biscayne Bay region, Florida. In Biscayne Bay: Past, Present and Future. P. 1-32. Edited by A. Thorhaug and A. Volker. University of Miami, Sea Grant Special Report, No. 5, 315p.

Wanless, H.R., 1982. Sea level is rising - so what? Jour. Sed. Petrology 52(4): 1051-1054.

Wanless, H.R., and Parkinson, R.W., 1989. Late Holocene sealevel history of southern Florida: control on coastal stability. In Tanner W.F. (ed.), Coastal sediment mobility. Proc., Eighth symposium on Coastal Sedimentology, Fla. State Univ., Tallahassee, Fl, p. 197-213.

Wanless, H.R., Parkinson, R., and Tedesco, L.P., 1994. Sea level control on stability of Everglades wetlands, *in* Proceedings of Everglades Modeling Symposium. St. Lucie Press, FL, p. 199-223.

Ward, P.D., 2010. *The Flooded Earth: Our Future in a World Without Ice Caps.* Basic Books Publ., New York. 272 p.

Exhibit A to Declaration of Harold R. Wanless

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Curriculum Vitae

1. **Date:** January 2017

PERSONAL

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Secondary Department: Division of Marine Geology and Geophysics, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami

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HIGHER EDUCATION

10. **Institutional:**

Johns Hopkins University; Ph.D. 1973 (Dr. L.A. Hardie, Dissertation Advisor)

University of Miami; M.S. 1968 (Dr. A. Conrad Neumann, Thesis Advisor)

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11. **Non Institutional:** NONE

12. **Certification:** Registered Professional Geologist, State of Florida, #985, 1989 to present.

EXPERIENCE

13. **Academic:**

Geological Assistant; Scripps Institution (for Dr. Francis P. Shepard); 1962-63

Geological Assistant; University of Illinois (for Dr. Harold R. Wanless); 1964

Research Assistant; University of Miami (for Dr. A. Conrad Neumann); 1965-67

Graduate Fellow; Johns Hopkins University; 1967-71

Research Scientist; University of Miami; 1971-73

Assistant Professor; University of Miami; 1973-81

Associate Professor; University of Miami; 1981-1993

Professor, University of Miami; 1993-present

Chairman, Department of Geological Sciences, University of Miami 1998-2017

Elected Interim Director, Institute for Interdisciplinary Tropical Science, University of Miami, 2003-2004

Cooper Fellow of the College of Arts and Sciences, University of Miami, 2010-2013.

14. **Non-Academic Employment:** Private consultant: petroleum, coastal and environmental, forensic and educational, climate change and sea level rise.

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PUBLICATIONS

16. **Books and Monographs Published:**

Wanless, H.R., Tedesco, L.P., Rossinsky, V., Jr., and Dravis, J.J., 1989. Carbonate Environments and Sequences of Caicos Platform with an Introductory Evaluation of South Florida. Am. Geophysical Union, 28th Internatl. Geol. Congress Field Trip Guidebook T374, American Geophysical Union, Washington D.C., 75 p.

Wanless, H.R., Tedesco, L.P., Risi, J.A., Bischof, B.G., Gelsanliter, S., 1995, The Role of Storm Processes on the Growth and Evolution of Coastal and Shallow Marine Sedimentary Environments in South Florida, 1st SEPM Congress on Sedimentary Geology, Field Trip Guidebook, 179 p.

Martini, I.P., and Wanless, H.R., Editors, 2014. *Sedimentary Coastal Zones from High to Low Latitudes: Similarities and Differences*, The Geological Society Special Publication

SP388, University of London Press. London, 600 p.

17. **Juried or Refereed Journal Articles and Exhibitions:**

1970 (with R.N. Ginsburg, O.P. Bricker and P. Garrett). Exposure index and sedimentary structures of a Bahama tidal flat. Discussion paper, Geol. Soc. America Abstract with Program. 2(7):744-745.

1972 (with E. Bonatti and O. Joensuu) Geological observations in the submarine caldera of Santorin (Aegean Sea). Rapp. Comm. Int. Mer. Medit. 20(4): 569-570.

1974 "Mangrove sedimentation in geologic perspective." In Environments of South Florida: Present and Past. P. 190-200. Edited by P. Gleason. Miami: Miami Geological Society.

1975 "Carbonate tidal flats of the Grand Canyon Cambrian." In Tidal Deposits: A Casebook of Recent Examples and Fossil Counterparts. P. 269-277. Edited by R.N. Ginsburg. New York: Springer-Verlag.

"Intracoastal sedimentation." In New Concepts of Continental Margin Sedimentation. P. 221-239. Edited by D.J. Stanley. New York: Wiley Interscience.

1976 Geologic setting and recent sediments of the Biscayne Bay region, Florida. In Biscayne Bay: Past, Present and Future. P. 1-32. Edited by A. Thorhaug and A. Volker. University of Miami, Sea Grant Special Report, No. 5, 315p.

Man's impact on sedimentary environments and processes. In Biscayne Bay: Past, Present and Future. P. 287-300. Edited by A. Thorhaug and A. Volker. University of Miami, Sea Grant Special Report, No. 5, 315p.

(with H.J. Teas and R.E. Chardon) Effects of man on shore vegetation of Biscayne Bay. In Biscayne Bay: Past, Present and Future. P. 133-156. Edited by A. Thorhaug and A. Volker. University of Miami, Sea Grant Special Report, No. 5, 315p.

1979 Limestone response to stress: solution and dolomitization. Jour. Sed. Petrology 49(2): 437-462.

1981 Wanless, H.R., E.A. Burton and J.J. Dravis. Hydrodynamics of carbonate fecal pellets. Jour. Sed. Petrology 51(1): 27-36.

Fining upwards sedimentary sequences generated in seagrass beds. Jour. Sed. Petrology 51(2): 445-454.

Limestone response to stress: solution and dolomitization. In Diagenesis of Carbonate Rocks: Cement-Porosity Relationships. No. 10, p. 251-276. Edited by G.M. Friedman. and S.A. Ali. Soc. Econ. Paleontologists Mineralogists Reprint Series.

1982 Limestone response to stress: pressure solution and dolomitization-reply. Jour. Sed. Petrology 52(1): 328-332.

Burial diagenesis in limestones. In Sediment Diagenesis. Edited by A. Parker and B.W. Sellwood. Proceedings of NATO Advanced Study Institute, John Wiley and Sons.

Sea level is rising - so what? Jour. Sed. Petrology 52(4): 1051-1054.

1984 Styles of pressure dissolution, In Stylolites and Associated Phenomena: Relevance to Hydrocarbon Reservoirs. P. 81-105. Abu Dhabi National Reservoir Research Foundation Special Publication, Abu Dhabi, U.A.E., 304p.

Wanless, H.R., Rossinsky, V., Jr., and McPherson, B.F. Sedimentologic History of the Loxahatchee River Estuary, Florida, U.S.G.S. - Water Resource Investigations Report 84-4120, 58p.

Pilkey, O.N., Sharma, D.G., Wanless, H.R., and others. Living with the East Florida Shore, Duke University Press, Durham, N.C., 200p.

1988 Wanless, H.R., L.P. Tedesco and K.M. Tyrrell. Production of subtidal tubular and surficial tempestites by Hurricane Kate, Caicos Platform, British West Indies. Jour. Sed. Petrology. 58(4): 739-750.

Wanless, H.R., K.M. Tyrrell, L.P. Tedesco and J.J. Dravis. Tidal-flat sedimentation from Hurricane Kate, Caicos Platform, British West Indies, Jour. Sed. Petrology, 58(4): 724-738.

1989 Wanless, H.R. and M.G. Tagett. Origin and dynamic evolution of carbonate mudbanks in Florida Bay. Bull. Mar. Sci., Symposium on Florida Bay, 44(1): 454-489.

Tedesco, L.P. and Wanless, H.R., Role of burrow excavation and infilling in creating the preserved depositional fabric of Pennsylvanian phylloid mounds of southeastern Kansas: in Sequence Stratigraphic Interpretations and Modeling of Cyclothems, W.L. Watney, J.A. French and E.K. Franseen (eds.), Kansas Geological Society 41st Annual Field Trip, p. 179-192.

Wanless, H.R., and Parkinson, R.W., 1989. Late Holocene sealevel history of southern Florida: control on coastal stability. In Tanner W.F. (ed.), Coastal sediment mobility. Proc., Eighth symposium on Coastal Sedimentology, Fla. State Univ., Tallahassee, Fl, p. 197-213.

1991 Dominguez, J.M.L., and Wanless, H.R. Facies architecture of a falling sea-level strandplain, Doce River coast, Brazil, in: D.J.P. Swift and G.F. Oertel (Eds.), International Association of Sedimentologists, Spec. Publ. #14, p. 259-289.

Rossinsky, V., Jr., and Wanless, H.R. Topographic and vegetative controls on calcrete

formation, Turks and Caicos Islands, British West Indies. Jour. Sedimentary Petrology, v. 62, p. 84-98.

Tedesco, L.P., and Wanless, H.R. Generation of sedimentary fabrics and facies by repetitive excavation and storm infilling of burrow networks: Palaios (Ichnofabric Theme Issue) v. 6, p. 326-343.

Wanless, H.R. Observational foundation for sequence modeling. E.K. Franceen, W.L. Watney, C.G.St.C. Kendall, and W. Ross (eds.) Sedimentary Modeling: Computer simulations and methods for improved parameter definition, Kansas Geological Survey Bull. 233, p. 42-62.

1992 Rossinsky, V. Jr., and Wanless, H.R. Topographic and vegetative controls on calcrete formation, Turks and Caicos Islands, British West Indies. Jour. Sedimentary Petrology, v. 62, p. 84-98.

Rossinsky, V. Jr., Wanless, H.R. and Swart, P.K. Penetrative calcretes and their stratigraphic implications. Geology, v. 20, p. 331-334.

1993 Wanless, H.R., and Tedesco, L.P. Comparison of oolitic sand bodies generated by tidal versus wind-wave agitation, *in* B.D. Keith and C.W. Zuppann (Eds.) Mississippian oolites and modern analogs, American Association of Petroleum Geologists Studies in Geology #35, Amer. Asoc. Petroleum Geologists, Tulsa, OK, p. 199-225.

Wanless, H.R., and Tedesco, L.P. Depositional and early diagenetic controls on texture and fabric of carbonate mudbanks, south Florida, *in* R. Rezak and D.L. Lavoie (Eds.) Carbonate Microfabrics, Frontiers in Sedimentary Geology. Springer-Verlag, NY, p. 41-63.

Rossinsky, V. Jr., Wanless, H.R. and Swart, P.K. Penetrative calcretes and their stratigraphic implications, Reply #1. Geology, vol 21, no. 2, p. 186-187.

Rossinsky, V. Jr., Wanless, H.R. and Swart, P.K. Penetrative calcretes and their stratigraphic implications, Reply #2. Geology, vol. 21 no. 6, p. 573-574.

1994 Smith III, T.J., Robblee, M.B., Wanless, H.R., and Doyle, T.W. Mangroves, hurricanes, and lightning strikes. Bioscience, vol. 44, p. 256-262.

Tilmont, J.T., Curry, R., Jones, R., Szmant, A., Zieman, J.C., Flora, M., Robblee, M.B., Smith, D., Snow, R.W., and Wanless, H.R. Hurricane Andrew's effect on marine resources. Bioscience, vol. 44, no. 4, p. 230-237.

Wanless, H.R., Parkinson, R., and Tedesco, L.P. Sea level control on stability of Everglades wetlands, *in* Proceedings of Everglades Modeling Symposium. St. Lucie Press, FL, p. 199-223.

1995 Risi, J.A., Wanless, H.R., Tedesco, L.P., and Gelsanliter, Catastrophic sedimentation from Hurricane Andrew along the southwest Florida coast. J. Coastal Res., v. 21, p. 82-102.

Tedesco, L.P., and Wanless, H.R. Growth and borrow-transformation of carbonate banks: comparison of modern skeletal banks of south Florida and Pennsylvanian phylloid banks of south-eastern Kansas, USA. Spec. Publs. Int. Assoc. Sedimentologists, No. 23, p. 495-521.

1995 Tedesco, L.P. Wanless, H.R., Scusa, L.A., Risi, J.A., and Gelsanliter, S. Impact of Hurricane Andrew on south Florida's sandy coastlines. J. Coastal Res. v. 21, p. 59-82.

1995 Wanless, H.R., Tedesco, L.P., Cottrell, DJ.., Tagett, M.G., and Warzeski, E.R. Origin and growth of carbonate mud banks in south Florida. Spec. Publs. Int. Assoc. Sedimentologists, No. 23, p. 439-473.

Wanless, H.R., Tedesco, L.P., Risi, J.A., Bischof, B.G., and Gelsanliter, S., 1995. The Role of Storm Processes on the Growth and Evolution of Coastal and Shallow Marine Sedimentary Environments in South Florida, Field Trip Guide, The 1st SEPM Congress on Sedimentary Geology, St. Petersburg, FL, 179p.

2000 Kang, Woo-Jun, Trefry, J.H., Nelsen, T.A., and Wanless, H. Direct atmospheric inputs versus runoff fluxes of Hg to the Lower Everglades and Florida Bay. Environmental Science and Technology (16 msp., 2 tables, 4 figs.).

2001 Browder, J.A., and Wanless, H.R. Biscayne Bay Partnership Initiative Science Team Co-Chair's report, *in: Biscayne Bay Partnership Initiative Survey Team Final Reports*, Biscayne Bay Partnership Initiative, Ft. Lauderdale, Fl, p. 75-108.

Wanless, H.R. Geology, Sedimentology, Climate and Sea Level, *in: Biscayne Bay Partnership Initiative Survey Team Final Reports,* Biscayne Bay Partnership Initiative, Ft. Lauderdale, Fl, p. 109-133.

Thorhaug, A., Browder, J., Wanless, H.R., and others. Habitat and Species of Concern, *in: Biscayne Bay Partnership Initiative Survey Team Final Reports,* Biscayne Bay Partnership Initiative, Ft. Lauderdale, Fl, p. 175-217.

2002 Nelsen, T.A., Wanless, H.R., Trefry, J.H., Alvarez-Zarikian, C., Hood, T., Blackwelder, P., Swart, P., Tedesco, L.P., Kang, W-J., Metz, S., Garte, G., Feathersonte, C., Souch, C., Pachut, J.F., O'Neal, M., and Ellis, G. Linkages between the south Florida peninsula and coastal zone: a sediment-based history of natural and anthropogenic influences., *in* (Porter, J.W. and Porter, K.G., eds.) *The Everglades, Florida Bay, and Coral Reefs of the Florida Keys: An Ecosystem Sourcebook,* CRC Press, Boca Raton, p. *415-449.*

2004 Wanless, H.R. Keep it clean and do the research. *Groundwater,*April 2004; and reply to discussion in *Groundwater,* October 2004.

2005 Davis, S.M., Childers, D.L., Lorenz, J.J., Wanless, H.R., and Hopkins, T.E., A conceptual model of ecological interactions in the mangrove estuaries of the Florida Everglades, *Wetlands*, 25 (4)27: 832-842.

2007 Wanless, H.R., and Maier, K.L., Evaluation of beach nourishment sands adjacent to reefal settings, southeast Florida, *Southeastern Geology*, V. 45, No. 1, p. 25-42.

2008: Dravis, J.J., and Wanless, H.R., Caicos platform models of Quaternary carbonate deposition controlled by stronger easterly Trade Winds – applications to petroleum exploration. *In* Morgan, W., and Harris, P. (eds.), *Developing Models and Analogs for Isolated Carbonate Platform – Holocene and Pleistocene Carbonates of Caicos Platform, British West Indies, SEPM Core Workshop 22*, Society of Sedimentary Geology, 10 ms pages and 4 figures.

2008 Van Ee, N., and Wanless, H.R., Ooids and Grapestone- A Significant Source of Mud on Caicos Platform. *In* Morgan, W., and Harris, P. (eds.), *Developing Models and Analogs for Isolated Carbonate Platform – Holocene and Pleistocene Carbonates of Caicos Platform, British West Indies, SEPM Core Workshop 22*, Society of Sedimentary Geology, 13 ms pages and 1 figure.

2008 Wanless, H.R., and Dravis, J.J., Pleistocene Reefal and Oolitic Core Sequences from West Caicos, Caicos Platform, *In* Morgan, W., and Harris, P. (eds.), *Developing Models and Analogs for Isolated Carbonate Platform – Holocene and Pleistocene Carbonates of Caicos Platform, British West Indies, SEPM Core Workshop 22*, Society of Sedimentary Geology, p. 171-177.

2009 Wanless, H.R., and Dravis, J.J. Role of Storms and Prevailing Energy in Defining Sediment Body Geometry, Composition, and Texture on Caicos Platform, *In* Morgan, W., and Harris, P. (eds.), *Developing Models and Analogs for Isolated Carbonate Platform – Holocene and Pleistocene Carbonates of Caicos Platform, British West Indies, SEPM Core Workshop 22*, Society of Sedimentary Geology, p. 13-20.

2009 Vlaswinkel, B.M., and Wanless, H.R. Rapid recycling of organic-rich carbonates during transgression: a complex coastal system in southwest Florida. *In* Swart, P., Eberli, G., and McKenzie, J., (eds.) *Perspectives in Sedimentary Geology: A tribute to the Career of R.N. Ginsburg*, International Association of Sedimentologists Special Publication, Wiley-Blackwell, p. 91-112.

2009 Wanless, H.R. A History of Poor Economic and Environmental Renourishment Decisions in Broward County, Florida., *in* Kelley, J.T., Pilkey, O.H., and Cooper, J.A.G., eds., America's Most Vulnerable Communities: Geological Society of America Special Paper 460, p. 111-119. Doi:10.1130/2009.2460 (07).

2009 Wanless, H.R. Layering – what does it mean? *In* Swart, P., Eberli, G., and McKenzie, J., (eds.) *Perspectives in Sedimentary Geology: A tribute to the Career of R.N. Ginsburg*, International Association of Sedimentologists Special Publication, Wiley-Blackwell, p. 297-304.

2011 Wanless, H.R., with Gassman, N.J., Soden, B., Landersand , G., Obeysekera, J., Park, J., and Van Leer, J. Southeast Florida Regional Climate Change Compact Technical Ad hoc Work Group. April 2011. A Unified Sea Level Rise Projection for Southeast Florida. A document prepared for the Southeast Florida Regional Climate Change Compact Steering Committee. 27 p.

2014 Wanless, H.R., and Van Leer, J. A tsunami sculpted beach, Sermermiut Beach, Jacobshaven Icefjord World heritage Site, south of Ilulissat, western Greenland. http://coastalcare.org/2014/08/a-tsunami-sculpted-beach-sermermiut-beach-jacobshaven-icefjord-world-heritage-site-south-of-ilulissat-western-greenland-by-harold-r-wanless-and-john-c-van-leer/

2015 Southeast Florida Regional Climate Change Compact Sea Level Rise Work Group (Compact). October 2015. *Unified Sea Level Rise Projection for Southeast Florida.* A document prepared for the Southeast Florida Regional Climate Change Compact Steering Committee. 35 p.

2016 Wanless, H.R. The coming reality of sea level rise: Too fast too soon. Paper and recorded discussion and consensus statements of 2-day presentation in St. Petersburg, FL on October 2-3, 2015. Pages 16-27, *in* ISGP Climate Change Program (ICCP): "Sea Level Rise: What's Our Next Move?", Institute on Science for Global Policy, Publishers, Washington DC. 73 p.; ISBN: 978-09861007-5-8.

Wanless, H.R. The coming reality of sea level rise along the New Jersey Coast: Too fast too soon. Paper and recorded discussion and consensus statements of 2-day presentation in Toms River, NJ on November 20-21. Pages 11-22 , *in* ISGP Climate Change Program (ICCP): "The Shore's Future: Living with Storms and Sea Level Rise." Institute on Science for Global Policy, Publishers, Washington DC. 73 p.; ISBN: ISBN: 978-09861007-4-1.

2017 Dravis, J., and Wanless, H.R., Accepted for Publication. The Impact of Stronger Easterly Trade Winds on Carbonate Plays - Relationships Developed from Caicos Platform, Southeastern Bahamas. *Marine and Petroleum Geology*. 24 manuscript pages plus 23 pages of figures with captions.

18. **Other Works and Publications:**

1969 Sediments of Biscayne Bay - distribution and depositional history. Technical report 69-2, Inst. Marine Sciences, University of Miami, Miami, Florida, 260pp.

Sedimentary structure and zonation on tidal levees, Andros Island, Bahamas. Amer. Assoc. Petrol. Geol. Bull. 53(3): 748.

1970 Influence of pre-existing bedrock topography on bars of lime mud and sand. Biscayne Bay,

Florida. Amer. Assoc. Petrol. Geol. Bull. 54(5): 875.

1971 Carbonate tidal flats of the Grand Canyon Cambrian. Geol. Soc. America Abstract with Program. 3(7): 743.

1973 Preliminary report on the sediments and sedimentary processes in natural and artificial waterways, Marco Island, Florida. Report 22 to Deltona Corp., December. 15 pp. and 6 figures.

Cambrian of the Grand Canyon - a re-evaluation. Amer. Assoc. Petrol. Geol. Bull. 57(4): 810-811.

Microstylolites, bedding, and dolomitization. Amer. Assoc. Petrol. Geol. Bull. 57(4): 811.

1974 Fining-upwards sequences generated by seagrass beds. Geol. Soc. America Abstract with Program. 6(7): 999.

"Intracoastal sedimentation." In The New Concepts of Continental Margin Sedimentation II. P. 391-429. Edited by D.J. Stanley. Falls Church, Va.: Amer. Geol. Inst.

Concepts in carbonate sedimentation: A problem oriented field excursion on the origin of carbonate sand and mudbanks - Biscayne Bay, Florida. Amer. Geol. Inst. Mimeo. 15 pp.

Sediments and sedimentary processes in natural and artificial waterways, Marco Island area, Florida. Scientific report UM-RSMAS, No. 74032, Univ. Miami, Miami, Florida. 127 pp.

1975 (with J. Dravis) "Characterization of carbonate sand fraction from MAFLA Areas I, II, and III." In Final Report on the Baseline Environmental Survey of the MAFLA Lease Areas CY 1974. St. Petersburg: State University System of Florida, Inst. Ocy. BLM Contract No. 08550-CT4-11. 191 pp.

(with E. Barron and J. Rine) Sediments and sedimentation in inland waterways, Marco Island, Florida. Progress report to Deltona Corp. 48 pp.

Sedimentary dynamics and significance of seagrass beds. Florida Scientist 38(Suppl.1): 20.

1976 (with J.M. Rine) Timing, character and preservability of sedimentation events in low-energy coastal environments, southwest Florida, Amer. Assoc. Petrol. Geol. Bull. 60(4): 731.

Carbonate Sediment Constituents and Molluscan Lithotopes on the MAFLA Continental Shelf. Final Report to the Bureau of Land Management. 280 p.

Sedimentary dynamics and significance of seagrass beds. Geol. Soc. America Abstracts with Programs 8(6): 1160.

1978 Limestone Response to Stress: Neomorphism, Solution and Dolomitization. P. 6 of abstracts. 6th Meeting of Carbonate Sedimentologists, Liverpool, England, Jan. 3-7, 1978.

Storm generated stratigraphy of carbonate mud banks, South Florida. Geol. Soc. America Abstracts with Programs 10(7): 512.

1979 Role of physical sedimentation in carbonate bank growth. Amer. Assoc. Petrol. Geol. Bull. 63(3): 547.

1981 Environments and dynamics of clastic sediment dispersal across the Cambrian of the Grand Canyon. Amer. Assoc. Petrol. Geol. - Soc. Econ. Paleontologists Mineralogists Ann. Mtg., San Francisco.

1982 Diagenetic fabric and structures in Ordovician slope limestones. Amer. Assoc. Petrol. Geol. Bull. 66(5): 640.

1983 Turbidity in Biscayne Bay. Annual Report to Dade County and Sea Grant, 226 p.

1984 (with J. Dravis) Comparison of two Holocene Tidal Flats - Andros Island, Bahamas, and Caicos, British West Indies. Am. Assoc. Petrol. Geol. Bull. 68(4): 537.

(with D. Cottrell, R. Parkinson and E. Burton) Sources and Circulation of Turbidity, Biscayne Bay, Florida. Final report to Sea Grant and Dade County, 499 p.

1985 (with J. Dravis and G.S. Grabowski, Jr.) Exposed Pleistocene platform margin reef sequence, West Caicos Island, British West Indies. Soc. Econ. Paleontologists Mineralogists Ann. Midyear Mtg., Abstracts, 2: 25-26.

1986 Transgressive and regressive stromatolites. Stromatolite symposium. Abstracts Soc. Econ. Paleontologists Mineralogists Ann. Midyear Mtg., Raleigh, 3: 114.

(with V. Rossinsky) Coastal accretion on leeward margins of carbonate platforms, Turks and Caicos Islands, British West Indies. Amer. Assoc. Petrol. Geol. Bull. 70: 660.

(with M. Tagett) Burrow-generated false facies and phantom sequences. Amer. Assoc. Petrol. Geol. Bull. 70: 660.

Tagett, M.G. and H.R. Wanless. Gradients in carbonate mudbank stratigraphy and dynamics: Florida Bay, South Florida. Abstracts Soc. Econ. Paleontologists Mineralogists Ann. Midyear Mtg., Raleigh, 3: 108.

Tedesco, L.P., H.R. Wanless and K.M. Tyrrell. Tabular and tubular tempestites from Hurricane Kate, Caicos Platform, British West Indies. Abstracts Soc. Econ. Paleontologists Mineralogists Ann. Midyear Mtg., Raleigh, 3: 108.

1987 Wanless, H.R., K.M. Tyrrell, and L.P. Tedesco. Hurricane-dominated tidal flats, Caicos Platform, British West Indies. Amer. Assoc. Petrol. Geol. Bull. 71: 200.

Waltz, M., V. Rossinsky, and H.R. Wanless. Repetitive reef to ooid sequences near the leeward margin of Caicos Platform, British West Indies, Am. Assoc. Petrol. Geologists Bull., 71: 200.

Wanless, H.R. Key Biscayne's "mangrove reef", a reflection of barrier island and sea level history. in Maurrasse, F.J-M.R. (Ed.), Symposium on south Florida geology. Miami Geological Society Mem. 3, p. 16.

Wanless, H.R., and Tagett, M.G. Origin and dynamic evolution of carbonate mudbanks in Florida Bay, Florida Bay Symposium, Univ. Miami/Everglades National Park, June 1987.

Wanless, H.R., and Tedesco, L.P. Burrow-generated sedimentary sequences: An example from the Glen Rose Formation, Lower Cretaceous, Austin, Texas: Soc. Econ. Paleontologists Mineralogists Midyear Mtg., Austin, IV: 88-89.

1988 Rossinsky, V. Jr., and H.R. Wanless. Penetrative Calcretes: Origin and stratigraphic pitfalls: Geol. Soc. America, Ann. Mtg., Denver, Abstracts with Programs 20(7): 329.

Tedesco, L.P. and Wanless, H.R. Paleoenvironmental reconstruction of Paleozoic mud mounds: A reinterpretation based on modern burrow infill fabrics: Geol. Soc. America, Ann. Mtg., Denver, Abstracts with Programs, 20(7): A211.

Wanless, H.R. and Tedesco, L.P., Sand Biographies: Sea Frontiers, 34, p. 224-231.

1989 Tedesco, L.P. and Wanless, H.R., Biogenic generation, transformation and destruction of sedimentary facies: 28th International Geological Congress, Washington, D.C., Abstracts, v. 3, p. 224-225.

Wanless, H.R., Tedesco, L.P., Dravis, J.J., and Emerson, J.D., Alternate models of Bahamian platform carbonate sedimentation: Caicos Platform, British West Indies: 28th International Geological Congress, Washington, D.C., Abstracts, v. 3, p. 331-332.

Wanless, H.R., Tedesco, L.P., and Dravis, J.J., An expanded model for ooid form and genesis: Caicos Platform, British West Indies: Am. Assoc. Petrol. Geol. Bull., v. 73, p. 1041.

Wanless, H.R., Observational Foundation for and Scaling Limitation to Sequence Modeling, in Sedimentary Modeling: Computer Simulation of Depositional Sequences; Franceen, E.D. and Watney, W.L. (eds.) Kansas Geological Survey Subsurface Geology Series 12, p. 7.

Wanless, H.R. and Parkinson, R., Late Holocene Sea Level History of south Florida: Control on coastal stablitiy: Geol. Soc. America, Ann. Mtg. Abstracts, St. Louis, p. A35.

Tedesco, L.P. and Wanless, H.R., The depositional sequences of phylloid mounds: a reappraisal: Geol. Soc. America Ann. Mtg., Abstracts, St. Louis, p. A292.

Browne, K.M., Wanless, H.R., Swart, P., Rossinsky, V., and Tyrrell, K.M., Dolomite cementation and sediment dissolution in association with ponded brines, Caicos, B.W.I.: Geol. Soc. America Ann. Mtg., Abstracts, St. Louis, p. A220.

1990 Tedesco, L.P. and Wanless, H.R. Role of burrow excavation and infilling in creating the preserved depositional fabric of the core facies of modern and Paleozoic mud mounds: 13th International Sedimentological Congress, Abstracts of Posters, Nottingham, England, p. 214.

Tedesco, L.P. and Wanless, H.R. Biogenic generation, transformation and destruction of sedimentary facies by excavation and catastrophic infilling of burrow networks: 13th International Sedimentological Congress, Abstracts for Papers, Nottingham, England, p. 546.

Wanless, H.R. Late Holocene sealevel history of south Florida: control on coastal Stability. Navigating the Nineties, Florida Coastal, Management Conference, Clearwater, FL, Sept, 1990.

Wanless, H.R., Cottrell, D.J., Tagett, M.G., Tedesco, L.P., and Warzeski, E.R. Origin and growth of carbonate mud banks in south Florida: a reevaluation: 13th International Sedimentological Congress, Abstracts for Papers, Nottingham, England, p. 588.

Wanless, H.R., and Tedesco, L.P. Comparative facies analysis of oolitic sand bodies generated by tide versus wind agitation, Geol Soc. America Ann Mtg. Abstracts, Dallas, TX, p. A131-132.

Wanless, H.R. and Tedesco, L.P. Ooids: an expanded model for petrologic form, genesis and sediment body geometry: 13th International Sedimentological Congress, Nottingham, England, p. 587-588.

1991 Tedesco, L.P., Aller, R.C., and Wanless, H.R., 210-Bp chronology of sequences affected by burrow excavation and infilling: examples from shallow marine carbonate sediment sequences, Holocene south Florida and Caicos Platform, BWI. Geol Soc. America, Ann. Natl. Meeting, San Diego, 1991.

Tedesco, L.P., and Wanless, H.R. Fabric selective dolomitization and porosity enhancement in fine-grained shelf and bank facies. International Symposium on the Exploration and Development of Low Permeability Oil and Gas Reservoirs, Abstracts; Xian, China, 2 p.

Wanless, H.R. Porosity and permeability destruction and enhancement in limestones during burial and tectonic stresses. International Symposium on the Exploration and Development of Low Permeability Oil and Gas Reservoirs, Abstrasts; Xian, China, 2 p.

Wanless, H.R., and Tedesco, L.P., A re-evaluation of Mississippian mud mounds based on

their internal stratigraphy. Geol Soc. America, Ann. Natl. Meeting, San Diego, 1991.

1992 Frederick, B.C., Gelsanliter, S., Risi, J.A., and Wanless, H.R. Historical evolution of the southwest Florida coastline and its effect on the adjacent marine environments. 1992 Symposium on Florida Keys Regional Ecosystem, Abstracts. Univ. Miami and NOAA, p. 11.

Tedesco, L.P., and Wanless, H.R. Variability of ooid grain form and internal microstructure: a response to energy level of the formational environment. Geological Society of America, 1992 Annual Meeting, Abstracts with Programs, Cincinnati, p. A350-A351.

Wanless, H.R. Progress Report 1. Dynamics and Historical Evolution of the Mangrove/Marsh Fringe Belt of Southwest Florida, in Response to Sea-level History, Biogenic Processes, Storm Influences and Climatic Fluctuations. 3p. Plus 3 Appendicies, to Everglades National Park.

Wanless, H.R., and Tedesco, L.P., Paleoenvironmental setting of Paleozoic mud mounds. Geological Society of America, 1992 Annual Meeting, Abstracts with Programs, Cincinnati, p. A141-A142.

Wanless, H.R., Tedesco, L.P., Hine, A.F., and Dravis, J.J. Facies geometries of shallowing-upwards sequences associated with leeward-margin sediment wedges, Caicos Platform, British West Indies. American Assoc. Petroleum Geologists 1992 Annual Convention, Program with Abstracts, Calgary, p. 137.

Wanless, H.R., Tedesco, L.P., Cottrell, D., and Tagett, M.G. Holocene environmental history of carbonate banks in Florida Bay and Biscayne Bay, south Florida. 1992 Symposium on Florida Keys Regional Ecosystem, Abstracts. Univ. Miami and NOAA, p. 68.

1993 Risi, J.A., and Wanless, H.R. Physical modifications to the shallow marine environments of south Florida by Hurricane Andrew. Geological Society of America southeast Section Meeting. Tallahassee, April, 1993.

Gelsanliter, S., and Wanless, H.R. Modifications to the mangrove environment and coastlines of south Florida as a result of Hurricane Andrew. Geological Society of America southeast Section Meeting. Tallahassee, April, 1993.

Tedesco, L.P., Wanless, H.R., and Scusa, L. Impact of Hurricane Andrew on sandy coastlines and shallow marine banks of south Florida. Geological Society of America southeast Section Meeting. Tallahassee, April, 1993.

Wanless, H.R., Frederick, B., Gelsanliter, S., and Risi, J.A. First Annual Report. Dynamics and Historical Evolution of the Mangrove/Marsh Fringe Belt of Southwest Florida, in Response to Sea-level History, Biogenic Processes, Storm Influences and Climatic Fluctuations. 28p. Plus 6 Appendices, to Everglades National Park.

Wanless, H.R., and Tedesco, L.P. Wind transport and damage by Hurricane Andrew.

Geological Society of America southeast Section Meeting. Tallahassee, April, 1993.

1994 Wanless, H.R., Frederick, B., Gelsanliter, S., and Risi, J.A. Semi-annual Research Report, June 1993 to February 1994.Dynamics and Historical Evolution of the Mangrove/Marsh Fringe Belt of Southwest Florida, in Response to Sea-level History, Biogenic Processes, Storm Influences and Climatic Fluctuations. 15p. Plus 3 Appendicies, to Everglades National Park and National Biological Survey.

Wanless, H.R. Investigators [2nd] Annual Report. Dynamics and Historical Evolution of the Mangrove/Marsh Fringe Belt of Southwest Florida, in Response to Sea-level History, Biogenic Processes, Storm Influences and Climatic Fluctuations. 5p. To Everglades National Park and National Biological Survey.

Wanless, H.R., Tedesco, L.P., Risi, J.A. 11-Month Progress Report, Post Hurricane Sediment Redistribution and Benthic Community Response and Evolution Within Biscayne Bay, the Coral Reef Platform and the Southwest Florida Coast. 26p, plus Figures and 5 Appendices (October 15). To Biscayne and Everglades National Parks

1995 Gelsanliter, S., and Wanless, H.R. Evidence for high-frequency sea-level oscillations during the late Holocene: implications for modeling sediment body initiation and evolution. Amer. Assic. Petrol. Geologists Ann. Natl. Mtg., Program and Abstracts., p. 32a.

Tedesco, L.P., and Wanless, H.R. Redefined paleoenvironmental interpretation of Mississippian oolites. Amer. Assoc. Petrol. Geologists Ann. Natl. Mtg., Program and Abstracts., p. 94a.

Gelsanliter, S., and Wanless, H.R., High-frequency sea-level oscillations in the late Holocene of south Florida: a dominating control on facies initiation and dynamics. 1st SEPM Congress on Sedimentary Geology, Congress Program and Abstracts, Vol. 1, St. Pete Beach, Fl, p. 58.

Risi, J.A., Hurricane event and post-event sedimentation: taphonomy and geologic signature. 1st SEPM Congress on Sedimentary Geology, Congress Program and Abstracts, Vol. 1, St. Pete Beach, Fl, p. 105.

Wanless, H.R., Gelsanliter, S., Bischof, B., and Bossung, J. Research Progress Report. Dynamics and Historical Evolution of the Mangrove/Marsh Fringe Belt of Southwest Florida, in Response to Sea-level History, Biogenic Processes, Storm Influences and Climatic Fluctuations. 9p. To Everglades National Park and National Biological Survey.

Wanless, H.R., Tedesco, L.P., Smith, T., Bischof, B., and Risi, J.A. Controls on mangrove community recovery or evolution following major hurricanes. 1st SEPM Congress on Sedimentary Geology, Congress Program and Abstracts, Vol. 1, St. Pete Beach, Fl, p. 126.
Wanless, H.R., Nelsen, T.A., Tedesco, L.P., Trefry, J.H., Blackwelder, P.L., and Risi, J.A., Documenting the styles of sedimentation and contained historical sedimentary record in

shallow marine environments in and adjacent to Florida Bay, south Florida. Florida Bay Science Conference, Gainesville, FL, September, 1995 (3 p.).

Wanless, H.R., Tedesco, L.P., Bischof, B., Risi, A. and Smith, T., Post-Event subsidence: a dominating control on mangrove community evolution following major hurricanes. Geol. Soc. America, Abstracts with Programs, 1995 Annual Meeting, Vol. 27, No. 6, p. A-452.

Wanless, H.R., Tedesco, L.P., Risi, J.A. 17-Month Progress Report, Post Hurricane Sediment Redistribution and Benthic Community Response and Evolution Within Biscayne Bay, the Coral Reef Platform and the Southwest Florida Coast. Figures and 8 Appendices (July 5). To Biscayne and Everglades National Parks

Wanless, H.R., Tedesco, L.P., Risi, J.A. 23-Month Progress Report, Post Hurricane Sediment Redistribution and Benthic Community Response and Evolution Within Biscayne Bay, the Coral Reef Platform and the Southwest Florida Coast. 15p, plus Figures and 9 Appendices (November 20). To Biscayne and Everglades National Parks

1996 Tedesco, L.P., Risi, J.A., Wanless, H.R., and Hernly, F.V., The evolution of shallow marine environments of south Florida following Hurricane Andrew., Geol. Soc. America 1996 Annual Meeting, Abstracts with Programs, p. A-274.

Wanless, H.R., Bischof, B. Gelsanliter, S., Frederick, B., and Risi, J.A. Final Report. Dynamics and Hirtorical Evolution of the Mangrove/Marsh Fringe Belt of Southwest Florida, in Response to Sea-level History, Biogenic Processes, Storm Influences and Climatic Fluctuations. 12p. To Everglades National Park and National Biological Survey.

Wanless, H.R., Gelsanliter, S., and Herman, K., Sea-level control on carbonate, clastic and organic sediment body initiation and evolution. 30th International Geological Congress, Abstracts Beijing, Peoples Republic of China.
Vol. 2, p. 209.

Wanless, H.R., Gelsanliter, S., and Herman, K., Sea-level control on carbonate, clastic and organic sediment body initiation and evolution. Geol. Soc. America
1996 Annual Meeting, Abstracts with Programs, p. A-275.

Wanless, H.R., Tedesco, L.P., and Dravis, J.J., Facies geometry of shallowing upwards sequences associated with leeward-margin sediment wedges, Caicos Platform, British West Indies. 30th International Geological Congress, Abstracts Beijing, Peoples Republic of China. Vol. 2, p. 208.

Wanless, H.R., Tedesco, L.P., Risi, J.A. 29-Month Progress Report, Post Hurricane Sediment Redistribution and Benthic Community Response and Evolution Within Biscayne Bay, the Coral Reef Platform and the Southwest Florida Coast. Figures and 8 Appendices (June 15). To Biscayne and Everglades National Parks

Wanless, H.R., Tedesco, L.P., Risi, J.A., and Smith, T., Post-event subsidence: a dominating control on mangrove community evolution following major hurricanes. 30th International Geological Congress, Abstracts Beijing, Peoples Republic of China. Vol. 2, p. 150.

Nelsen, , T., Zetwo, M, Wanless, H., Risi, A., Blackwelder, P., Swart, P., Alvarez-Zarikian, C., Hood, T., Trefrey, J., Kang, W-J., Metz, S., Trocine, R., Tedesco, L., Capps, M., O'neal, M. The sediment record as a monitor of the natural and anthropogenic changes in the lower Everglades/Florida Bay ecosystem. NOAA Report, 4 p..

Nelsen, , T., Zetwo, M, Wanless, H., Risi, A., Blackwelder, P., Swart, P., Alvarez-Zarikian, C., Hood, T., Trefrey, J., Kang, W-J., Metz, S., Trocine, R., Tedesco, L., Capps, M., O'Neal, M. The sediment record as a monitor of the natural and anthropogenic changes in the lower Everglades/Florida Bay ecosystem: a high resolution study. Program and Abstracts, 1996 Florida Bay Science Conference (Florida Sea Grant), Key Largo, Florida, p. 62-65.

1997 Tedesco, L.P. and Wanless, H.R. Stability of coastal wetlands of south Florida: the role of sea level and major hurricanes. Estuarine Research Federation Annual Convention, Rhode Island, Abstr. p. 81.

Wanless, H. R., Risi, J.A., Tedesco, L.P., and Nelsen, T.A., Occurrence and character of stratification in mudbanks in south Florida. Geological Society of America Abstracts with Programs, p. A-111.

1998 Wanless, H.R., Nelsen, T, Trefry, J., Blackwelder, P., Swart, P., Risi, A., Hood, T., Alvarez-Zarikan, C., Kang, W-J., Metz, S., Tedesco, L.P., and O'Neal, M. Mud Banks of south Florida: Stratification Type and the contained paleoenvironmental record. in: Paleoecology and ecosystem history of Florida Bay and the lower Everglades. Proceedings of Workshop held January 22-23 and sponsored by the Florida bay Program Management Committee.

Hood, T., Alvarex-Zarikian, C., Blackwelder, P., Nelsen, T., Wanless, H.R., and Trefry, J. Paleoecological reconstruction in the lower Everglades/Florida Aby Environments using ostracods and benthic foraminifera. in: Paleoecology and ecosystem history of Florida Bay and the lower Everglades. Proceedings of workshop held January 22-23 and sponsored by the Florida bay Program Management Committee.

Tedesco, L.P., O'Neal, Pachut, J.F., and Wanless, H.R. Application of surface pollen zonation to sequences of southwestern Florida: pitfalls, lessons and utility of hte pollen record. in: Paleoecology and ecosystem history of Florida Bay and the lower Everglades. Proceedings of Workshop held January 22-23 and sponsored by the Florida bay Program Management Committee.

Wanless, H.R. A summary of what we know and need to know. in: Paleoecology and ecosystem history of Florida Bay and the lower Everglades. Proceedings of Workshop held

January 22-23 and sponsored by the Florida bay Program Management Committee.

1999 Dravis, J.J., and Wanless, H.R. Application of the Caicos Platform Model to exploration: trade wind controls on carbonate distribution. 1999 AAPG Annual Convention, San Antonio, TX.

Wanless, H.R., Tedesco, L.P. and Hall, R.E. Historical changes in mangrove, seagrass and calcareous algal communities in south Florida. 1999 Florida Bay and Adjacent Marine Systems Science Conference, Key Largo, FL November 5, 1999.

Tedesco, L.P., Souch, C., Pachut, J., Arthur, J.A., Wanless, H.R., Blackwelder, P., Hood, T., Alvarez-Zarikian, C., Trefry, J., Kang, W.J., Metz, S., and Nelsen, T.A. The Signature of Hurricane Sedimentation in the Lower Everglades/Florida Bay Ecosystem: Recognition of Sedimentologic, Geochemical and Microfaunal Indicators. 1999 Florida Bay and Adjacent Marine Systems Science Conference, Key Largo, FL November 5, 1999.

Nelsen, T.A., Garte, G., Featherstone, C., Blackwelder, P., Hood, T., Alvarez-Zarikian, C., Swart, P., Wanless, H.R., Tedesco, L.P., Souch, C., Pachut, J., and Arthur, J.Understanding Long-Term Rainfall, Freshwater Flow and Salinity Patterns with Concomitant Responses of Benthic Microfauna, Stable Isotopes, and Pollen in Oyster and Florida Bays. 1999 Florida Bay and Adjacent Marine Systems Science Conference, Key Largo, FL November 5, 1999.

2000 "The Interaction of Hurricanes Events and Sea Level in the Dynamics and Evolution of Tropical Coastal and Shallow Marine Environments." NOAA/Office of Atmospheric Research, Senior Research Council Meeting and Symposium on Hurricane Research, Miami, FL, February 8, 2000.

Wanless, H.R., Tedesco, L.P., and Hall, R.E., Mapping south Florida in 2100: rapid transgression of coastal wetlands. Geological Society of America, 2000 Abstracts with Programs, 34th Annual Meeting, North-Central Section, Indianapolis, p.A-66.

Wanless, H.R., and Tedesco, L.P., "Storm Events as Initiators of Coastal Evolution in Times of Rising Sea Level" The Coastal Society 17th Conference - Coasts at the Millennium Session on "Temporal and Spacial Scaling in Coastal Science: Insights into Natural and Anthropogenic Processes" Corvallis, OR

Wanless, H.R., Oleck, P., Tedesco, L.P., Hall, B.E. Next 100 Years of Evolution of the Greater Everglades Ecosystem in Response to Anticipated Sea Level Rise: Nature, Extent and Causes. Greater Everglades Ecosystem Restoration Science Conference, Naples, Fl., December, 2000. p. 174-176.

2001 Wanless, H.R., "Aquifer Storage and Recovery: lessons from failing injection wells." The Everglades Coalition annual meeting, Stewart, Fl., January 2001.

Wanless, H.R., "Geological Controls on Fate of Pharmaceuticals in Surface and Ground Waters", Oral and written presentation at the Center for Disease Control meeting on 'Fate of

Pharmaceuticals in Surface and Ground Waters, October, 2001, Atlanta, Ga. Transcript in review.

Thorhaug, A., and Wanless, H.R., "The role of Hurricanes, Tornados and gale force winds in seagrass distribution in Subtropical and Tropical Nearshore Waters." Abstr. Botany, 2000.

Wanless, H.R., "Florida Geology and ASR's" Summit Meeting of Legal Environmental Assistance Fund, Orlando, March, 2002, 9p.

Vlaswinkel, B.M., Wanless, H., Robertson, W., Zhang, K and Leatherman, S., 2001. Airborne Laser Altimetry: the potential of first and last stop detection in mangrove swamps. Poster for MTS/IEEE Oceans 2001 Conference, Honolulu

2002 Wanless, H.R. "Sediment Stability in Tropical Carbonate and Organic Environments". U.S. Army Corps of Engineers sponsored *Sediment Stability Workshop*, New Orleans, LA. 41p. PowerPoint.

Controlling Influences on Sediment Stability of Coastal and Shallow Marine Carbonate Mud and Organic Substrates, South Florida and the Bahamas. U.S. Army Corps of Engineers sponsored *Sediment Stability Workshop*, New Orleans, LA. 17p.
Dravis, J.J., and Wanless, H.R., "Stratigraphy and Controls on Development of Isolated Carbonate Platforms." American Association of Petroleum Geologists Annual National Meeting, Houston, TX. March 2002.

Wanless, H.R., and Manne, T., 2002. Caicos Platform Sand Resources Evaluation: Sediment Thickness and Character. Report to Shoreline Foundation and Turks and Caicos Government, May, 2002, 30p.

Wanless, H.R., "An Evaluation of Cape Sable Canals, Everglades National Park, Florida." Submitted to Everglades National Park., March, 2002; 20p. report and 62 p. PowerPoint.

Wanless, H.R., "The Nature of Transgression: Cape Sable, Florida." Geological Society of America, Annual Meeting & Exposition Abstracts with Programs. p. 206-207.

Tedesco, L.P., and Wanless, H.R. H.M.S. Fowey Project: Biscayne National Park Submerged Site Stabilization, Sedimentology/Seagrass Dynamics/Bioturbation. National Park Service (22 p., 11 figs.).

2003 Wanless, H.R., " Aquifer Injection and Storage Wells – Opportunity of Disaster?". National Groundwater Association, 2003 Annual Meeting,.

Vlaswinkel, B.M., Wanless, H.R. and Rankey, E.C. Changing land- and seascape environments at Cape Sable, a coastal wetland complex in South Florida. Geophysical Research Abstracts, Vol. 5, 07245

2004 Vlaswinkel, B. and Wanless, H.R. Wetland and tidal channel evolution affecting critical habitats at Cape Sable, Everglades National Park, Florida. Abstract with Programs, First National Conference on Ecosystem Restoration, Florida, p. 452.

Vlaswinkel, B., Wanless, H., and Rankey, E. Processes and dynamic evolution of a rapidly changing, low energy carbonate coastal system, Southwest Florida. Abstract with Programs, 23rd IAS Meeting of Sedimentology, Coimbra, Portugal, p. 284.

Jackson, K.L,. and Wanless, H.R. Shift of Everglades Discharge in Response to Late Holocene Coastal Buildup, southwest Florida/ Geological Society of America, Annual Meeting and Exposition Abstracts with Programs, Vol. 36 (5), p. 192.

2005 Wanless, H.R., and Vlaswinkel, B.M. Coastal Landscape and Channel Evolution Affecting Critical Habitats at Cape Sable, Everglades National Park, Florida. Final Report of Research Project to Everglades National Park, 197 p.

Wanless, H.R., Vlaswinkel, B.M., and Jackson, K.L. Transgressive recycling produces organic-rich carbonate muds. American Association of Petroleum Geologists Annual National Meeting, Calgary, Alberta, June.

Wanless, H.R. Layering – what does it mean? Geological Society of America, Annual Meeting & Exposition Abstracts with Programs. Paper 179-3, vol. 37, no. 7, p.400(also online as recorded session (http://gsa.confex.com/gsa/2005AM/finalprogram/abstract_90897.htm)

Wanless, H.R., and Vlaswinkel, B.M. 2005. "Coastal Landscape, Wetland and Tidal Channel Evolution Affecting Critical Habitats of Cape Sable, Everglades National Park, Florida." Final Report to National Park Service, Department of Interior, 196p.

Wanless, H.R., and Gonzales, C., "Detection, Mapping, and Characterization of Groundwater Discharges to Biscayne Bay" Final Report to State of Florida, Biscayne Bay Regional Restoration Coordination Team, as sub-contract with National Oceanic and Atmospheric Administration through CIMAS. With Dr. John R. Proni, NOAA, AMOL., 11p.

2006 Wanless, H.R. with others. Final report and Findings from Technical Group, Envisioning the Future of the Gulf Coast Conference, New Orleans. By America's Wetland: Campaign to Save Coastal Louisiana, 11p.

Wanless, H.R., and Vlaswinkel, B.M., Composite shallowing sequences generated within overall highstands. Geological Society of America Annual National Meeting, Abstracts with Programs, p.477, Philadelphia, PA.

2007 Wanless, H.R., Integrated Fine-Scale Temporal and Spatial Controls on Carbonate Sedimentation (Abstract). SEPM Research Symposium - Changing Paradigms in Carbonates, American Association of Petroleum Geologists/ SEPM Annual Meeting, Long Beach, CA.

Wanless, H.R., A history of poor economic and environmental renourishment decisions in Broward County, Florida (Abstract). Symposium on Endangered Beaches, Geological Society of America Annual National Meeting, Denver, October, 2007.

Wanless, H.R., Water sources and "re" sources and potential losses: south Florida's diminishing freshwater future. *Partnering with Water and Sewer Agencies: The Key to Future Development* , Lormen Educational Services, Eau Claire, WI, p. 491-504.

Wanless, H.R., Leatherman, S., and Committee. Statement on Sea Level Rise in the Coming Century. Science and Technology Committee, Miami-Dade County Climate Change Task Force. September 20, 2007; revised with full citations and notes, January 18, 2008.

2008 Dravis, J.J., and Wanless, H.R> Caicos Platform models of Quaternary carbonate deposition controlled by stronger easterly Trade Winds – applications to petroleum exploration. American Association of Petroleum Geologists Annual Convention and Exhibition, Abstracts Volume, San Antonio, TX, P. 47.

Van Ee, N., and Wanless, H.R. Ooids and grapestone – a significant source of carbonate mud. American Association of Petroleum Geologists Annual Convention and Exhibition, Abstracts Volume, San Antonio, TX, P. 205.

Wanless, H.R., and Smith, L., How N.H. Voters Can Help Save Florida. *The Keene Sentinel*, P. 6, January 3, 2008.

Wanless, H.R. Role of Storms and Prevailing Energy in Defining Sediment Body Geometry, composition and texture from Caicos Platform. American Association of

Petroleum Geologists Annual Convention and Exhibition, Abstracts Volume, San Antonio, TX, P. 211.

Wanless, H.R. Pleistocene reefal and oolitic core sequences from West Caicos, Caicos Platform. American Association of Petroleum Geologists Annual Convention and Exhibition, Abstracts Volume, San Antonio, TX, P. 211.

2009 Wanless, H.R. Sea Level Rise on the Southern Florida Coast: Past, Present, and Future Trends. Rethinking Protected Areas in a Changing World, The 2009 George Wright Society Biennial Conference on Parks, Protected Areas, and Cultural Sites, Program and Abstracts. Portland, Oregon. P. 60.

2010 Wanless, H.R., and Harlem, P. Accelerating sea level rise – projections and implications. 2010 Geological Society of America Annual Meeting and Exposition; Abstracts with Programs, p. 489.

2011 Wanless, H.R., and Harlem, P. Accelerating sea level rise – projections and implications. Sea Level Rise Adaptation in the Florida Keys: Conserving Terrestrial and Intertidal Natural Areas and Native Species. May 10th – 12th, 2011, Hawks Cay Resort, Florida Keys

2012 Wanless, H.R. Carbonate Depositional Systems in the Context of Previous, Current, and Anticipated Global Change, in Gerace Symposium on Rapid Pulses of Sea Level Rise and Their Effect on Past, Present, and Future Coastal Environments and Sequences. 2 page Abstract in Abstract Volume.

Wanless, H.R. Pulses of Rapid Sea Level Rise: Their Effect on Past, Present and Future Coastal Environments and Sequences. Invited presentation in session on 'Rapid Sea Level Rise and Its Impacts: Past, Present and Future.' Geological Society of America Annual National Meeting and Exposition Abstracts with Programs, Vol. 44. No. 7, p 53.

"Role of Storms, Oceanic Swells, Prevailing Energy and Sea Level in Defining Sediment Body Geometry, Composition and Texture on Caicos Platform, Turks and Caicos Islands." Keynote Presentation in session on 'New Insights on the Geology, Karst, and Paleontology of Carbonate Systems of the Bahamian Archipelago.' Geological Society of America Annual National Meeting and Exposition Abstracts with Programs, Vol. 44. No. 7, p 67.

2013 "Pulses of Rapid Sea Level Rise – Past, Present and Future", Penrose/Chapman Conference on Coastal Processes and Environments Under Sea-Level Rise and Changing Climate: Science to Inform Management, jointly sponsored by the Geological Society of America and the American Geophysical Union. Abstracts. Galveston, TX. April 15-19, 2013.

"Need for Orderly Planning for Barrier Island Inundation", in Session 107, The Sandy

Beaches of Atlantis: Success Stories and Cautionary Tales for Coastal Development. Geological Society of America Annual National Meeting and Exposition Abstracts with Programs, Vol. 45. No. 7, p 273.

2014 "The Coming Reality of Sea Level Rise: Too Fast Too Soon", Illustrated Abstract for National League of Cities Conference. September 20, 2014.

"The Coming Reality of Sea Level Rise: Too Fast Too Soon", Illustrated Abstract for Best Practices Conference, Miami-Dade County League of Cities, Miami, FL. October 24, 2014.

2015 "Thriving *Acropora* in Caicos – a Refugia?" Invited presentation GSA 193-11in session T148 on.' Geological Society of America Annual National Meeting and Exposition Abstracts with Programs, Baltimore, MD, Vol. 47, No. 7, p. 489-490.

"The Coming Reality of Sea Level Rise: Too Fast Too Soon." A 4-10 page illustrated summary of the seriousness and urgency of climate change and sea level rise; revised and updated monthly and provided at all my invited lectures, interviews and other events.

2016 "The Coming Reality of Sea Level Rise: Too Fast Too Soon." A 4-10 page illustrated summary of the seriousness and urgency of climate change and sea level rise; revised and updated monthly and provided as handout at all my invited lectures, interviews and other events.

"Anaerobic Bottom Waters Need Not Be Deep." Geological Society of America Annual National Meeting, Abstracts with Programs V. 48, No. 7. Session T296. Carbonate Sediments Session. Paper 12.
https://gsa.confex.com/gsa/2016AM/webprogram/Paper283809.html

2017 "The Coming Reality of Sea Level Rise: Too Fast Too Soon." A 10-12 page illustrated summary of the seriousness and urgency of climate change and sea level rise; revised and updated for each lecture/event and provided as handout at all my invited lectures, interviews and other events.

Book Reviews:

1980 The North-West European Shelf Seas: The Sea Bed and the Sea in Motion. I. Geology and Sedimentology. (F.T. Banner, and M.B. Collins, and K.S. Massie, Eds.), Bull. Mar. Sci., 30(3): 746.

1981 Barrier Islands from the Gulf of St. Lawrence to the Gulf of Mexico. (S.P. Leatherman, Ed.), Academic Press, New York.

1983 "Tempestites", review of Cyclic and Event Stratification, 1980, G. Einsele and A. Seilacher, Eds., Science, v. 220, #4564: 296-297.

1987 An Introduction to Carbonate Sediments and Rocks (Terence P. Scoffin), Bull. Mar. Sci. 41(3): 909-910.

19. **Other Works Accepted for Publication:**

Refereed Articles Accepted and in Press:
Tedesco, L.P., and Wanless, H.R. Fabric selective dolomitization and porosity enhancement in fine-grained shelf and bank facies. Proceedings of the International Symposium on the Exploration and Development of Low Permeability Oil and Gas Reservoirs, Xian, China [12 msp, 12 figs.; in English and Chinese].

Wanless, H.R. Porosity and permeability destruction and enhancement in limestones during burial and tectonic stresses. Proceedings of the International Symposium on the Exploration and Development of Low Permeability Oil and Gas Reservoirs, Xian, China [19 msp., 15 figs.; in English and Chinese].

PROFESSIONAL

20. **Funded Research Performed**, H.R. Wanless, Principal Investigator. (Since 1978):

Role and Record of Storms on Sedimentation in Subtropical Lagoons, National Science Foundation (Geology), 1978-1980.

Pressure Solution and Dolomitization, National Science Foundation (Geology), 1978-1980.

Sedimentation History of Loxahatchee River Estuary, Florida. U.S.G.S., 1981-1982.

Sources and Circulation of Turbidity in Biscayne Bay, Florida. Dade County, 1982-1984.

Sources and Circulation of Turbidity in Biscayne Bay, Florida. Sea Grant, 1982-1984.

Limestone Diagenesis and Porosity Modification Associated with Exposure Surfaces: Influence of Climate, Depositional Fabric and Topography, Exxon Production Research Co., Tenneco Oil Co., and Union Oil of California, 1985-1986.

Effect of Hurricane Kate on Carbonate Sedimentation, Caicos Platform, B.W.I. National Science Foundation (Surficial Processes) 1986.

Carbonate Mud Mound Facies Evolution. Champlain Oil, 1987.

Carbonate Facies on Caicos Platform. Union Oil of Calif., and ARCO, 1987, 1988 and 1989.

Facies Generation, Transformation and Destruction by Repetitive Excavation and Infilling of Burrow Networks, National Science Foundation, 1990-1991.

Carbonate Facies and Shallow Seismic Signature on Caicos Platform. Texaco, BP and UNICAL, 1991.

Dynamics and Historical Evolution of the Mangrove/Marsh Fringe, Southwest Florida, in Response to Sea-level History, Biogenic Processes, Storm Influences, and Climatic Fluctuations. Department of Interior, National Park Service, June, 1992 to June, 1996.

Post-Hurricane Sediment Redistribution and Benthic Community Response and Evolution within Bicayne Bay, the Coral Reef Platform and the Southwest Florida Coast. Department of Interior, National Park Service, November 1993 to October 1996.

Sediment Dynamics and Substrate Characterization Legare Anchorage, Mid-Reef-Tract Shelf, Biscayne National Park. National Park Service, April 1995 to December 1995.

Historical Changes in the Coastal and Shallow Marine Environments in and Proximal to Florida Bay, Florida: a Retrospective analysis using sedimentologic parameters. Department of Commerce, National Oceanic and Atmospheric Administration, April 1994 to June 2001.

Project SUCCEED: School University Community Coalition for Excellence in Education. Co-geology leader, working with members of Biology, Chemistry and Physics to develop an integrated curriculum for middle school science and for undergraduate education majors. U.S. Department of Education (5 years: 2000-2004; discontinued participation 2002)

Experimental coral/coralline algae transplanting on carbonate banks in Biscayne Bay. Oil Spill Research Fund, subcontract of sea grass planting program (April 2001-April 2002).

"Coastal landscape, wetland and tidal channel evolution affecting critical habitats of Cape Sable, Everglades National Park, Florida." National Park Service, August 2002-June 2005.

"Detection, Mapping, and Characterization of Groundwater Discharges to Biscayne Bay" State of Florida, Biscayne Bay Regional Restoration Coordination Team, as sub-contract with National Oceanic and Atmospheric Administration through CIMAS. With Dr. John R. Proni, NOAA, AMOL. March 2003- December 2004

21. **Editorial Responsibilities:**
Reviewer for numerous journals.

Co-Chair Biscayne Bay Initiative Science Survey Team, responsible for preparation of Synthesis, critical issues and recommendation to the Florida Legislature, 1999-2001.

Invited member of Core Group for evaluating and prioritizing research and monitoring research (RECOVER) associated with the Comprehensive Everglades Restoration Plan 2004-2005.

National Science Foundation Panel on the Coastal SEES Program (SEES a new program

within NSF's "Science, Engineering and Education for Sustainability." – 2012 - 2015.

22. **Professional and Honorary Organizations:**
Society of Economic Paleontologists and Mineralogists
International Association of Sedimentologists
Gulf Coast Section; Society of Economic Paleontologists and Mineralogists
Geological Society of America, elected Fellow
American Association of Petroleum Geologists
Board of Directors: The Conservancy, Inc. (Collier County) (1983-1987)
Miami Geological Society
Board of Directors, CLEO Institute, Miami, (2011-present)

23. **Honors and Awards:**

1976 American Association of Petroleum Geologists General Chairman's Award for Best Paper in Poster Session at 61st Annual Meeting in New Orleans.

1980 Best paper for 1979 in Journal of Sedimentary Petrology. ("Limestone Response to Stress: Pressure Solution and Dolomitization") from the Society of Economic Paleontologists and Mineralogists. Presented at May 1981, San Francisco Mtg.

1986 Society of Economic Paleontologists Mineralogists Excellence of Presentation: AAPG-SEPM Annual National Meeting, Atlanta. "Burrow-Generated False Facies and Phantom Sequences." Presented at June 1987, Los Angeles Mtg.

1993 Awarded Undergraduate Course Enhancement Grant, College of Arts and Sciences, University of Miami.

2001 Earth Trustee, Presented at the United Nations by the Earth Society, March 21, 2001.

2002 Environmental Leadership Award for 2001, Sierra Club, Miami Group.

2004 Honorary Member Board of Directors, Montgomery Botanical Center, Miami-Dade County

2007 Sabbatical, Spring 2007 – College of Arts and Sciences, University of Miami.

2010-2013 Cooper Fellow, College of Arts and Sciences, University of Miami

2011. Named by Poder Hispanic Magazine as one of the 100 Most Influential Persons in Miami.

2012. Named by Poder Hispanic Magazine as one of The Most Influential People in Miami.

Keynote Speaker and honoree at Gerace Geology Symposium, San Salvador, Bahamas, June, 2012.

Keynote Speaker at Bahamian Symposium, Geological Society of America Annual National

Meeting, Charlotte, NC, November, 2012.

Inducted into CLEO Leadership Circle, CLEO Institute (Department of Geological Sciences also received award for Sponsoring 'Empowering Capable Climate Communicators' climate training series), December, 2012.

2013 Written up as a "Gables Great" in an article entitled 'Dr. Hal Wanless Easily Mixes Science and Fun' in ***Coral Gables News***, January 8-12, 2013.

2015 "Founders Award." Earth Web Foundation, Orlando, Earth Day 2015 (April 18).

2016 Featured in "10 by 10" in ***Malibu Magazine***, April 2016.

Named one of ***Politico Magazine's*** 50 plus 'thinkers, doers and visionaries who are transforming American Politics in 2016.'

Lifetime Achievement Award for leadership work with youth and climate change, Adams Foundation.

24. **Post-Doctoral fellowships:** NONE

25a. **Other Professional Activities - Invited Lectures** (see #18 for papers presented at scientific meetings and symposiums):

1981 Sediment Diagenesis, a NATO Advanced Study Institute at Reading University, U.K., 12-25 July, 1981. Specific Topic: "Late Stage Diagenesis in Carbonates".

"Dynamics of Carbonate Sedimentation in Florida Bay". Invited lecture at Univ. of South Florida, October, 1981.

1982 "Modern Carbonate Sedimentation and Early Diagenesis". Invited lecture and field study, University of Kansas, March, 1982.

"Sea Level Rise: Evidence and Implications". TV Channel 17, Miami, March, 1982.

"Sea Level Rise: Evidence and Implications". Invited Lecturer at Florida Department of Environmental Regulation, Tallahassee, Florida, March, 1982.

"How Biscayne Bay Works". Invited Lecturer and Techn. Coordinator, October, 1982, RSMAS and Dade County sponsor.

1983 Invited Lecture series, University of Tubingen, West Germany, I. "Pressure Dissolution"; II. "Facies Reconstruction of the Cambrian of Grand Canyon", November, 1983.

"Styles of Pressure Dissolution", Abu Dhabi Reservoir Research Foundation, Abu Dhabi, U.A.E., November, 1983.

1984 "Understanding and Managing Florida's Estuaries", Keynote speaker at St. Lucie Estuary Coordinating Conference, Jensen Beach, Fl., March, 1984.

"Biscayne Bay Problems and Solutions". Baynanza Symposium RSMAS, October, 1984.

1985 "Environmental Implications of Sea Level Rise". The Conservancy, January, 1985.

1986 "Storm Sedimentation and Burrow Dynamics". Department of Geology, Cambridge University, February, 1986.

"Coastal Dynamics and Trends: A Necessary Background for Beach and Shore Management". Keynote speaker, 1986 Coastal Management Conference-Florida's Coastal Future: The Challenge Remains. State of Florida. Department of Environmental Regulation, Miami Beach, September, 1986.

"The Geology of Hurricanes", Distinguished Lecture Series, in celebration of the 60th Anniversary of the University of Miami, October, 1986.

"Hurricanes and Sea Level Rise; Effect on Coastal Environments", Fairchild Tropical Gardens, Annual Mtg. Native Plant Society, October, 1986.

"Influence of Sea Level Rise on Coastal Mangrove Communities", Naples City Council, December, 1986.

1987 "Biogenic Facies Destruction, Modification and Generation", Champlain Oil Co., Denver, June, 1987.

1988 "Will Our Rising Sea Level Cause Disaster in South Florida?" American Littoral Society, South Florida Chapter, Key Biscayne, Florida, March 1988.

Evolution of Coastal Environments in Response to Increased Rate of Sea Level Rise", Admirals of the Fleet of Florida, October, 1988.

"The Role of Excavating Burrowers in Generating, Transforming and Destroying Sedimentary Facies", Kansas Geological Survey and University of Kansas, October, 1988.

1990 Invited Lecture series, National Taiwan University, Taipei, Republic of China, I. "New Models of Carbonate Platform Sedimentation"; II. "Burrow Generation and Modification of Sedimentary Facies", March, 1990.

Invited Lectures series, East China Petroleum University of Beijing, Peoples Republic of China, I. "New Models of Carbonate Platform Sedimentations"; II. "New Models of Ooid Sedimentation"; III. "Carbonate Reefs and Leeward Margin Evolution"; IV. "New Models of Carbonate Tidal Flat Sedimentation"; V. "Seagrass/Crinoid Influence on Sedimentation"; VI.

"Origin and Growth of Modern Carbonate Mud Mounds"; VII. "Porosity Evolution During Karst and Calcrete Development"; VIII. "Holocene Evaperite and Dolomite Sedimentation"; IX. "Cambrian Cyclic Sedimentation"; X. "Pressure Dissolution and Dolomitization in Carbonate Rocks", April, 1990.
"New Models of Carbonate Platform Sedimentation", Chengdu College of Geology, Chengdu, Sichian, Peoples Republic of China, April, 1990.

Invited Lectures series, Changying Petroleum Exploration Gen. Co. of China National Petroleum Corp., Qinayang, Gansu, Peoples Republic of China; I. "New Models for Ooid Sedimentation"; II. "Reefs and Leeward Margin Evolutions"; III. "Carbonate Tidal Flat and Evaperite sedimentation and Holocene Dolomitization"; IV. "Origin and Facies Development of Modern Carbonate Mud Mounds"; V. "Porosity Evolution During Karst and Calcrete Development"; VI. "Pressure Dissolution and Dolomitization in Carbonate rocks", April, 1990.

Invited Lectures series, East China Petroleum University at Dangyang, Shengdong, Peoples Republic of China, I. "New Models of Ooid Sedimentation"; II. "Reefs and Leeward Margins Evolution of Carbonate Platforms"; III. "Carbonate Tidal Flat Sedimentation"; IV. "Origin and Facies Development of Modern Carbonate Mud Mounds"; V. "Pressure Dissolution and Dolomitization in Carbonate Rocks", April, 1990.

"Observations of Changing Sea Levels and Storms on Coastal Environments", Astronaut Office Colloquium on Earth: a Changing Planet, Johnson Space Center, Houston, Texas, July 25, 1990

"New Models of Carbonate Platform Sedimentation". Royal Dutch Shell, Den Hague, The Netherlands, August 1990.

"New Models of Carbonate Platform Sedimentation". British Petroleum, London, August, 1990.

"Biscayne Bay's Response to Urbanization and Rising Sea Level", Baynanza 90 and Sierra Club, Miami, FL, Oct., 1990.

"Sea Level and Hurricanes: Their Effects on Our Coastal Environments". RSMAS School Council Staff Seminar Series, December, 1990

1991 "Porosity and Permeability destruction and Enhancement in Limestones during Burial and Tectonic Stresses." International Symposium on the Exploration and Development of Low Permeability Oil and Gas Reservoirs, Xian, China, May, 1991.

"Differentiating Porosity Development Resulting from Karst Versus Late-stage burial Dissolution in Limestones", Changying Petroleum Exploration Co. of China National Petroleum Corp., Qinayang, Gansu, China, June, 1991.

"Origin and Evolution of Holocene Sedimentary Environments in Florida Bay". Indiana University Purdue University at Indianapolis, Indiana, November, 1991.

1992 "Plio-Pleistocene stratigraphy of Caicos Platform based on high-resolution Seismic profiles and core borings." Texaco Research and Exploration, Houston, February, 1992.

"Recommendations for the Future Management of Key Biscayne's Beaches and Coastline," Village of Key Biscayne Public Lecture Series in Conjunction With Master Plan Development, April 1992.

"Hurricane Andrew: the Geological Implications." Special evening symposium at the 1992 Annual Meeting of the Geological Society of America, Cincinnati. Organizer and one of four speakers.

"Physical and Biological Effects of Hurricane Andrew: a Summary. Hurricane Andrew Session of the 1992 Symposium on Florida Keys Regional Ecosystem. NOAA and University of Miami, RSMAS Conveners, Miami, November, 1992.

1993 "Hurricane Andrew: the Short and Long Term Impacts." Sigma XI Lecture series, Tallahassee, April 1993.

1994 "The Impact of Hurricane Andrew on the Terrestrial, Wetland, Coastal and Shallow Marine Environments of Florida" Environmental Lecture Series, The Conservancy, Inc., Naples, FL; February, 1994

"Sea Level Rise and Mangrove Forests" Department of Environmental Protection Coastal Zone Resource Management Workshop, Rookery Bay National Estuarine Research Reserve, Naples, FL; February, 1994.

1995 "Coastal changes resulting form Hurricanes and Global Warming" NOVA University, September, 1995

"Geology of Western Cuba" Miami Geological Society, September, 1995

“How Hurricanes and Sea-Level Rise Are Changing Our Coastal Environments” Science Expo ‘95, Univ. Miami, September, 1995

1996 “Land from the Sea: the Geological Origins of south Florida;” Lecture #2 of the Miami Centennial Celebration Lecture Series, January, 1996.

Past and Future Sea-Level Rise

1997 “The Geologic Wonders of Newfoundland,” Miami Geological Society, February, 1997

“Hurricanes and Sea-Level Rise: Effectors of Coastal Evolution,” Florida Tech, Melbourne,

FL, February, 1997.

"Anticipated Sea Level Change and Effects" and Panelist at 'Impacts of Climate Change in South Florida's Growing Urban Area' a regional teleconference in conjunction with 'President Clinton Speaks Out on Climate Change', Florida international Univeristy, October, 1997.

"Beach Dynamics and Coastal response to Sea Level Rise and Hurricane Events," Rookery Bay National Estuarine Research Reserve, November, 1997

1998 "Geological History, Evolution of Modern Environments and Processes Controlling the Coastal Systems of Southwest Florida". A lecture and field seminar for Faculty of the Keck Consortium of Undergraduate Geoscience Departments. Naples, FL January 7-10, 1998.

"Mud Banks of South Florida: Stratification Type and the Contained Paleoenvironmental Record." Workshop on Paleoecology and Ecosystem History of Florida Bay and the Lower Everglades. Sponsored by the Florida bay Program Management Committee, Key Largo, January, 1998.

"A Summary and Perspective on What We Know and need to Know" Workshop on Paleoecology and Ecosystem History of Florida Bay and the Lower Everglades. Sponsored by the Florida Bay Program Management Committee, Key Largo, January, 1998.

(poster) Stratification types of Florida Bay. Workshop on Paleoecology and Ecosystem History pf Florida Bay and the Lower Everglades. Sponsored by the Florida bay Program Management Committee, Key Largo, January, 1998.

"Natural and Geological Wonders of Newfoundland." Miami Geological Society, February 28, 1998.

"Geological Influences on the Big Cypress Basin." Workshop II of the Big Cypress Basin Science Plan Steering Committee, Department of Environmental Protection. February 26, 1998.

"The Imact on Florida of Global Warming." 1st Orlando Earth Day Symposium, sponsored by Orange County Medical Society Environmental Committee., Orlando Regional Medical Center, April 25, 1998.

19991"The Geologic Dynamics of Everglades National Park." Everglades National Park Interpreter's Training Workshop. January, 1999.

"Life as a Geoscientist." Centennial Middle School, Miami-Dade County, April, 1999.

"The Future of South Florida." Friends of the Everglades, April 1999

"South Florida in the Face Of Global Warming." Miami Marine Council. Coral Gables, FL,

May, 1999.

"Sea Level Rise Adaptation Options for South Florida." Environmmental Protection Agency Conference: *Climate Change: What Does It Mean for South Florida?* Miami, FL, May 26, 1999.

"Sea Level Rise Adaptation for the Florida Keys." Environmental Protection Agency Conference: *Climate Change: What Does It Mean for the Florida Keys?* Marathon, FL, May 27, 1999.

"Harold Rollin Wanless – a Son's View." 8th International Carboniferous Congress, Session on Cyclothems dedicated to Harold R. Wanless. Calgary, Alberta, Canada, August 18, 1999.

"The origin and dynamics of intertidal sand and mud flats." Rookery Bay National Marine Estuarine Reserve Conference on biodiversity of intertidal environments, Naples, FL, November 1999

"South Florida Environments in the Face of Rising Sea Level." Sierra Club, Miami Chapter, Coral Gables, FL, November, 1999.

2000 "South Florida-- the Next 100 Years." South Florida Audubon Society, January, 2000

"Evolution of Biscayne Bay -- Past and Future." Biscayne Bay Partnership Initiative, Science Survey Team Working Session, Miami, FL, January 28, 2000

2001 "Aquifer Storage and Recovery: lessons from failing injection wells." Everglades Coalition Annual Meeting invited breakfast speaker, Stewart, Fl. January 2001.

"The Evolution of the Florida Keys and Reefs over the next 100 years in the face of global warming." John Pennecamp State Park, Key Largo, Fl. February 2001

The Risk of Injection Wells and impure ASRs." LEAF meeting on Aquifer Storage and Recovery, Winter Park, Fl. May 2001.

"You're a Scientist Now – Don't Believe a Word You Hear." INQUIRY, University of Miami, November, 2001.

"The Risks to South Florida over the next 100 Years from Global Warming: Need for Council Action." South Florida Regional Planning Council, Hollywood, Fl. December 3, 2001

"The Risks to South Florida over the next 100 Years from Global Warming: need for Coalition Action." Florida Gold Coast Clean Cities Coalition meeting, Hollywood, Fl. December 3, 2001.

2002 "Aquifer Storage and Recovery" – a panel on questions and feasibility. The Everglades

Coalition annual meeting, Ft. Lauderdale, Fl., January 2002.

"Biscayne Bay in the Face of Global Warming" National Park Service Discovery Series Lectures, Miami, FL, April 2002.

Wanless, H.R. "Sediment Stability in Tropical Carbonate and Organic Environments". U.S. Army Corps of Engineers sponsored *Sediment Stability Workshop*, New Orleans, LA, Jan 22-24, 2002. (Invited presenter and panelist)

Wanless, H.R., "An Evaluation of Cape Sable Canals, Everglades National Park, Florida." Invited presentation to Superintendent and staff, Everglades National Park, October, 2002.

Wanless, H.R., "Rapid Ecosystem and Coastscape Evolution of South Florida, in response to Sea Level Rise, Hurricane Events, and Human Stresses", National Oceanic and Atmospheric Administration, National Ocean Service, Coastal Oceans Division. Rockville, MD, (with synchronous feed to regional centers), October 2002.

Wanless, H.R., "The Nature of Transgression: Cape Sable, Florida." Geological Society of America Annual National Meeting, Denver, October, 2002

2003 "Inundation of South Florida: Past, Present and Future." Invited paper at 13th South West Florida Water Research Conference: The Rising Tide: Emerging Coastal Issues, Gulf Coast University, November 2003.

"Aquifer Injection and Storage Wells – Opportunity or Disaster?" invited paper at the National Groundwater Association meeting: Groundwater in Coastal Zones, Availability, Sustainability and Protection, Orlando, December, 2003.

2005 South Florida Coastal Response to anticipated Sea level Rise" invited presenter and panelist, Everglades Coalition Annual Meeting, Naples, January, 2005.

"With Global Warming – Comes the Sea" invited lecturer and panelist, 11th Annual Public interest and Environmental Conference, University of Florida, Gainesville, FL, February, 2005

"Regional Impacts of Climate Change: Hurricanes and Sea Level Rise" and panelist South Florida Parks and Preserves, Climate Friendly Parks Workshop, Environmental Protection Agency and National Park Service. Everglades National Park, Florida, June, 2005

"Welcome to the Tropics: Where the Canadian Rockies Were Made" Canmore Geoscience Museum Open House, Canmore, Alberta, June, 2005

2006 Climate Change Workshop, Florida Atlantic University, January, 2006.

"Impact of Climate Change on South Florida" on *Topical Currents* on WLRN Radio, January 19. 2006

"Coastal Systems and Climate Change – It is real – It is Now – Change Your Ways – Change Your Plans" South Florida Association of Environmental Professionals Conference on Global Climate Change: Implications for South Florida's Future, Florida, January 20, 2006.

"The Everglades in the Next 100 Years" and panelist discussing 'Global Warming's Threats to Florida's Everglades, Economy and Way of Life.' Everglades Restoration: Are We Making Progress? Everglades Coalition 21sat Annual Conference, Stuart, FL, January, 2006.

"Providing Water for a Viable Everglades Restoration" and Panelist discussing 'Deep Concern for ASR Wells and Everglades Restoration.' Everglades Restoration: Are We Making Progress? Everglades Coalition 21sat Annual Conference, Stuart, FL, January, 2006.

"Towards Effective Everglades Restoration and south Florida Resource Management" 5th Annual Environmental Ethics Conference, Ft. Lauderdale, Florida, February 17, 2006.

"Beach Renourishment is Becoming an Economic and Environmental Disaster in Florida" Invited workshop with Regional Environmental Protection Agency heads preliminary to a regional workshop and new regulations. Palm Beach, Florida, February 22, 2006.

"How We Know Global Warming is Human Induced and Real" League of Women Voters, Broward County, Florida, February 25, 2006.

"With Warming Comes the Sea – Global Warming's Effect on South Florida", Broward County Audubon Society, Ft. Lauderdale, FL. April 20, 2006.

"We have Made a Mess of Earth and Earth is Responding" Earth Day Miami. Miami, FL April 22, 2006

"Saving America's Wetland's – Alternatives for Action" A presentation to the State of Louisiana'a Governor's office based on recommendation of an international workshop held in April in Louisiana. New Orleans, LA. June 1, 2006.

"Anticipating and Managing Climate Change – a Conservation View", The Nature Conservancy annual Florida Meeting St. Petersburg Beach. September 17, 1006.

"Global Warming and its Implications for Managing South Florida" Broward County Water Advisory Board, Ft. Lauderdale, September 21, 2006

"Global Warming and Coastal Architecture" University of Miami, November 11, 2006

"Anticipating and Managing Global Warming in Florida – A Conservation View", to the Florida Board of Directors, The Nature Conservancy./ November 16, 2006.

2007 "Global Warming: Its Effect on Southeast Florida" VisionBROWARD Leadership Community Forum, Ft. Lauderdale, FL. February 9, 2007

"Rising Sea Level and its Anticipated Effect on Southwest Florida" Gulf Coast Alliance Workshop on Water. Rookery Bay, Naples, FL, February 20, 2007.

"Comes the Sea – Global Warming's Anticipated Effect on South Florida" Miami Rotary Club, Miami, FL, February 22, 2007.

"Comes the Sea – Global Warming and Sea Level in South Florida" Dade Native Plant Society, Fairchild Gardens, September 25, 2007.

"Water Resources and 'Re'Sources and Potential Losses – South Florida's Diminishing Freshwater Future" Legal Symposium - Partnering With Water and Sewer Agencies: The Key to Future Development in Florida, Miami, October 26, 2007.

"Florida's Diminishing Coastal Future" Florida Legislature, Energy and Environmental Council – Symposium on the Science and Economics of Climate Change, Tallahassee, November 6, 2007.

"Florida's Diminishing Coastal Future" Symposium on Global Warming in honor of Dr. Jack Parker, Florida International University, November 29, 2007.

"Florida's Diminishing Coastal Future" South Florida Association of Environmental Professionals, Workshop and Symposium for Wetland Professionals in South Florida, Miami, November 29, 2007.

2008 "Rising Seas: Will the Everglades and Coastal Areas Survive?" Keynote Address, Everglades Coalition Annual Conference, Captiva, FL, January 12, 2008.

"Rising Seas: Will the Everglades and Coastal Areas Survive?" Miami-Dade College, sponsored by Earth and Environmental Ethics Institute, Miami, January 31, 2008.

"Comes the Sea" Global Warming Teach-In, University of Miami, January 31, 2008.

"Rising Seas: Will the Everglades Survive?" Climate Change Discussion/Mini-Workshop, Greater Everglades Ecosystem Restoration, Florida Atlantic University, February 6, 2008.

"Managing the Everglades in a Time of Rapidly Rising Sea Level" State of Florida Legislative Committee on Everglades Restoration, Tallahassee, February 18, 2008.

"Rising Sea Level and Implications for Future Development in Miami-Dade County." Hold

The Line Meeting, South Miami, Florida. February 20, 2008.

"Rising Seas: Realities for our South Florida Coastlines." Climate Protection and Greenhouse Gas reduction Workshop for Local Governments, Palm Beach, FL, February 21, 2008.

"Rising Seas: Realities for Our South Florida Coastlines." Kiwanis Club of Coral Gables, FL, March 11, 2008.

"Rising Seas: Realities for the Everglades and Our South Florida Coastlines." Ecosystem Science Seminar, University of Miami, FL, March 19, 2008.

"Sea Level Rise in South Florida." Faiths United for Sustainable Energy (FUSE), Beth Ann Synagogue, Miami Beach, FL, March 31, 2008.
"Comes the Sea: Earth's Changing Coastal Future." Quantum Leap – 1st Annual Meeting of the Climate Group, Miami, FL, April 1, 2008.

"Rising Seas: A Challenge to the Everglades' Survival – Realities and What We Have to Do."

Friends of the Everglades – Founder's Day Celebration, April 13, 2008.

"Key Biscayne – Past, Present and Future." Key Biscayne / RSMAS Lecture Series, Key Biscayne, FL, April 15, 2008.

"Comes the Sea: South Florida in the Face of Global Warming." Friends of Forest Hill Environmental Academy – 8th Annual Nicolas Megrath Dinner, Palm Beach, FL, April 17, 2008.

"Statement on Sea Level in the Coming Century" from the Science Committee of the Miami-Dade County Climate Change Advisory Task Force for the Board of County Commissioners, Miami, FL, April 22, 2008.

"Comes the Sea: Earth's Changing Coastal Future." Scripps Howard Institute on the Environment (a National Workshop for Journalists), Florida Atlantic University, Jupiter Campus, May 12, 2008.

"Implications of Rising Sea Level on Everglades Restoration." American Geophysical Union Annual Meeting, Ft. Lauderdale, FL, May 28, 2008.

"Comes the Sea: Earth's Changing Coastal Future." One-on-one presentation and discussion with Presidential Candidate and U.S. Senator John McCain and Florida Governor Charlie Crist, in the Everglades, FL, June 6, 2008.

"Ocean Effects of Rising Sea Level on Coastal Environments." Florida Wildlife – on the Front Line of Climate Change, Orlando, FL, October 1, 2008.

"Comes the Sea: Earth's Changing Coastal Future." University of Miami URB 201 – Metropolitan Miami, Coral Gables, FL, September 9, 2008.

"Climate Change and Sea Level Rise – Impacts on Florida in the Coming Century." Florida Shore and Beach Preservation Association Annual Meeting, Captiva Island, FL, September 12, 2008.

"Ocean Effects of Rising Sea Level on Coastal Environments – Biscayne Bay." Miami, FL, October 10, 2008.

"In Future of the Environment and the Nation: A Forum on Sustainability." A Dialogue for Democracy, University of Miami, Coral Gables, FL, October 22, 2008.

"Ocean Effects of Rising Sea Level on Coastal Environments." University of Miami Oceans and Human Health Graduate Course, RSMAS, Miami, FL, November 3, 2008.
"Rising Seas: Realities for the Southwest Coast of Florida." A Sustainable Southwest Florida: Creating a vision. Ft. Myers, FL, November 6, 2008.

"Rising Seas: Realities for the Coming Century." University of Miami ECS201 (Contemporary Environmental Issues), Coral Gables, FL, November 13, 2008.

"Rising Seas: Coastal Realities for the Coming Century." University of Miami, RSM-581 (Carbon and Climate), Virginia Key, FL, November 21, 2008.

"South Florida and Global Warming." Miami-Dade County League of Cities Dinner Meeting, Miami, FL, December 3, 2008.

2009 "Climate Change and Sea Level Rise – The Coming Century." Broward County Climate Change Task Force, Ft. Lauderdale, Florida. January 22, 2009.

"Effects of Rising Sea Level on the Florida Keys and Reef Tract." Federal Regional Management Meeting. Marathon, Florida. January 27, 2009.

"Climate Change and Sea Level Rise – the Coming Century." Gumbo Limbo Eco Center Evening Lecture Series, Boca Raton, Florida. January 27, 2009.

"Climate Change and Sea Level Rise – the Coming Century." Miami-Dade College, Kendall Campus, Miami, Florida. February 5, 2009.

"Climate Change and Sea Level Rise – the Coming Century." Space Coast Climate Change Initiative, Melbourne, Florida. February 9, 2009.

Climate and Ecosystem workshop, invited panelist. Washington D. C. February 17-19, 2009.

Beach Restoration Panelist. Ocean Awareness Week. University of Miami, Coral Gables,

Florida. February 24, 2009.

"Sea Level Rise on the Southern Florida Coast: Past, Present, and Future Trends." In Session: Navigating Terra Incognita: New Management Strategies in an Era of Climate Change II • Confronting Climate Change in Everglades and South Florida. Rethinking Protected Areas in a Changing World, The 2009 George Wright Society Biennial Conference on Parks, Protected Areas, and Cultural Sites, Program and Abstracts. Portland, Oregon. March 3, 2009, P. 60.

"Climate Change and Sea Level Rise – the Coming Century." EPH 541, Environmental Health, University of Miami Medical School, Miami, Florida. March 24, 2009.

"Effects of Sea Level Rise in South Florida in the Coming Century." The Impact of Climate Change on South Florida. Florida Atlantic University. April 3, 2009.

"Climate Change and Sea Level Rise – the Coming Century." Gateway To Green Symposium, Parrot Jungle venue, Miami, Florida. April 8, 2009.

"Climate Change and Sea Level Rise – the Coming Century." City of Plantation Climate Change Task Force, Plantation, Florida. April 15, 2009.

"Climate Change and Sea Level Rise – the Coming Century." Broward County Directors and Managers Quarterly Meeting, Ft. Lauderdale, Florida. April 17, 2009

"The Influence of Sea Level Change on Florida's Ecology." Florida Native Plant Society, 29th Annual Conference. West Palm Beach, Florida. May 23, 2009

"Rising Sea Level and Florida's Tenuous Future." PCB 3352 – Issues in Human Ecology with a focus on South Florida. Florida Atlantic University, Davie Campus, Florida. October 5, 2009.

"Accelerating Predictions for Rising Sea Level: Florida's Tenuous Future." Southeast Coastal and Ocean Stewardship Workshop: Challenges in a Changing Environment. Mandarin Oriental Hotel, Miami, Florida. November 2, 2009.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Oxbow Eco-Center Lecture Series. Port St. Lucie, Florida. November 7, 2009.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Executive Committee, South Florida Builders Association. Miami-Dade Water and Sewer building, Miami, Florida. November 12, 2009.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Harbor Branch Evening Lecture Series, Ft. Pierce, Florida. November 18, 2009.

"Coral Gables, A Jewel From the Sea – Will It Return?" Coral Gables Museum, Coral Gables, Florida. November 7, 2009.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Managing Climate Change with Sustainable Initiatives. Lee County, Florida. December 4, 2009.

"Be Bold or Start Packing up the Shop – Recommendation to move the Mississippi River Outlet from the Scientists of the 'Envisioning the Future of the Gulf Coast Workshop." White House Council on Environmental Quality, Washington D.C., December 1, 2009.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Florida Natural Resources Leadership Institute. Preparing for Sea Level Rise: Local Government Planning and Community Management, Deauville Hotel, Miami Beach, Florida, December 10, 2009.

2010 "Sea Level Rise and the Everglades Through the Century: the Need for More Proactive Management of the Everglades." Global Climate Change and the Changing Role of Everglades Restoration. Everglades Coalition Conference, Palm Beach Gardens, Florida. January 8, 2010.

"Rapid Sea Level Rise Steps Are the Norm in Post-glacial Rise." Predicting Climate of the Coming Decades: Paleo-perspective on decadal variability. Rosenstiel School of Marine and Atmospheric Science, University of Miami, Virginia Key, Florida. January 13, 2010.

"Capstone Address - Summary of Challenges and Opportunities." Keeping out Heads Above Water: Surviving the Challenges of Sea Level Rise in Florida. Archbold Biological Station, Lake Placid, Florida. January 13, 2010.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future". Dagny Johnson Key Largo Hammock Botanical State Park Lecture Series, John Pennecamp Coral Reef State Park, Key Largo, Florida, January 27, 2010.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." ECS 310 – Sustainable Living (but maybe not in south Florida. University of Miami, Coral Gables, Florida. January 28, 2010.

"Sea Level Rise in the Coming Century – How Much and How Do We Prepare?" NOAA sponsored Community Conversations on Climate Change and Sea Level Rise, Ft. Lauderdale, Florida. February 27, 2010.

"Anticipated Global Warming and Sea Level Rise – What They Mean for Your Career Opportunities?" ULecture Series, University of Miami. April 7, 2010

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." FNS 199 – Global Warming. University of Miami, Coral Gables, Florida. April 13, 2010.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Science Café Series: Eat, Think and be Merry, Bookstore in the Grove, Coconut Grove, Florida, April 19, 2010

"Accelerating Sea Level Rise and Florida's tenuous Coastal Future," University of Florida Everglades conference at FIU North Campus. May 18, 2010

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." US State Department International Visitor Leadership Program, Sustainable Development and Environmental Projections to Chinese Delegation, August 11, 2010.

"Recovery of An *Acropora* Reef Following Hurricane Ike Devastation, SE Caicos Platform." 2nd Annual NCORE University-wide Coral Reef Forum, University of Miami, Virginia Key, Florida. August 23, 2010

"Emergence of Modern reefs and Their Dynamics in Times of Major Sea Level Fluctuations – Past and Future. Graduate Marine Biology and Fisheries course in Reef Systems, RSMAS, University of Miami, August 26, 2010.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." ESC Sustainability program, RSMAS, Coral Gables, Florida. September 13, 2010.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Distinguished Lecturer Series, Florida Atlantic University, September 17, 2010.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Osher Lifelong Learning, University of Miami, Coral Gables, Florida. September 21, 2010.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Lecture Series, RSMAS, University of Miami, Florida. November 10,, 2010.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." MSC 220 – Global Climate Change, University of Miami, Coral Gables, Florida. November 23, 2010.

With Peter Harlem: "Accelerating Sea-Level Rise – Projections and Implications. Geotopics, Division of Marine Geology and Geophysics, RSMAS, University of Miami, Florida. November 29, 2010.

2011 "Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." ECS 310 Sustainable Living,, University of Miami, Coral Gables, Florida. January 27, 2011.

"Accelerating Sea Level Rise and Earth's Tenuous Coastal Future." Distinguished Lecrure Series, NOVA Southeast University, Ft. Lauderdale, FL, February 8, 2011.

"Accelerating Sea Level Rise and Earth's Tenuous Coastal Future." Distinguished Lecture Series, Indian River State College Institute for Lifelong Learning, Vero Beach, Florida,

February 10, 2011.

"Accelerating Sea Level Rise and Earth's Tenuous Coastal Future." Distinguished Lecture Series, Indian River State College Institute for Lifelong Learning, Stuart, Florida, February 10, 2011.

"Accelerating Sea Level Rise and Earth's Tenuous Coastal Future." University of Florida Natural Resources Leadership Institute, Homestead, Florida, February, 11, 2011.

"Accelerating Sea Level Rise and Earth's Tenuous Coastal Future." Gradaute course in Global Warming and Environmental Health, Miller School of Medicine, University of Miami, Miami, Florida, February 21, 2011.

"Accelerating Sea Level Rise and Earth's Tenuous Coastal Future." Empowering Capable Climate Communicators Training Series, College of Arts and Sciences, University of Miami, March 5, 2011.

"Accelerating Sea Level Rise: Projections and Implications." Climate Change Professional Fellows Program, Florida International University, March 28, 2011.

"Accelerating Sea Level Rise: Projections and Implications." Climate Change Communication, Florida Atlantic University, Gumbo Limbo Nature Center, April 5, 2011

"Accelerating sea level rise – projections and implications (poster and talk). Sea Level Rise Adaptation in the Florida Keys: Conserving Terrestrial and Intertidal Natural Areas and Native Species. Hawks Cay Resort, Florida Keys. March 11, 2011.

"Rapidly Accelerating Sea Level Rise and Earth's Tenuous Coastal Future." Miami-Dade College, downtown campus, in conjunction with 24 hour presentation on Extreme Events. September 15, 2011.

"Accelerating Sea Level Rise: Projections and Implications." CLEO Institute, Vizcaya. Miami. September 22, 2011

"Rapidly Accelerating Sea Level Rise and Earth's Tenuous Coastal Future." Florida International University. Miami. October 12,2011

"Rapid Steps of Sea Level Rise: An Ominous View into the Future." Presentation during Field Trip in conjunction with the Society of Environmental Journalists Annual National Meeting, Emergency Management Center, Miami-Dade County. October 20, 2011.

"Rapid Steps of Sea Level Rise: An Ominous View into the Future." Plenary Presentation and Panelist at Plenary Luncheon of the Society of Environmental Journalists Annual National Meeting, Intercontinental Hotel, Miami. October 22, 2011.

"Rapid Steps of Sea Level Rise: An Ominous View into the Future." CLEO Institute, Pinecrest Gardens, Miami-Dade. November 4, 2011.

"Rapid Pulses of Sea Level Rise." Earth Ethics Institute, Miami Dade College, Kendall Campus. November 29, 2011.

2012 "Accelerating, Pulsed Sea Level Rise: Dire Implications for South Florida. Sustainable Living ECS 310. University of Miami. January 31, 2012.

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future." Ecology Club, Palm Beach State College, Boca Raton. February 10, 2012

"Accelerating Sea Level Rise and Florida's Tenuous Coastal Future," University of South Florida at St Petersburg, Geography Department, April, 2012.

"Sea Level Rise and Climate Change: Your Property Value in the Balance." Friends of the Everglades 43rd annual meeting, Miami. April 15, 2012

Keynote Speaker: "Carbonate Depositional Systems in the Context of Previous, Current, and Anticipated Global Change," in Gerace Symposium on Rapid Pulses of Sea Level Rise and Their Effect on Past, Present, and Future Coastal Environments and Sequences, Gerace Research Center, San Salvador, Bahamas, June 14, 2012.

Gulf Coast Science Consortium Invited Workshop and presentation on Evidence for Rapid Steps of Sea level Rise: Past, Present and Future." Shell Center for Sustainability, Rice University, Houston, Texas. June 27-29, 2012.

"Evolution of the Loxahatchee River Estuary: Past–Present–Future." Friends of the Loxahatchee River, Jupiter, Florida. October 5, 2012.

"The Frightening Acceleration in Ice Melt and Sea Level Rise." For Is Miami the Next Atlantis? Community Conversations in the Good Government Initiative, University of Miami, Coral Gables, Florida. October 9, 2012.

"Pulses of Rapid Sea Level Rise: Their Effect on Past, Present and Future Coastal Environments and Sequences." Invited presentation in session on 'Rapid Sea Level Rise and Its Impacts: Past, Present and Future.' Geological Society of America Annual National Meeting, Charlotte, NC. November 4, 2012.

"Role of Storms, Oceanic Swells, Prevailing Energy and Sea Level in Defining Sediment Body Geometry, Composition and Texture on Caicos Platform, Turks and Caicos Islands." Keynote Speaker in session on 'New Insights on the Geology, Karst, and Paleontology of Carbonate Systems of the Bahamian Archipelago.' Geological Society of America Annual National Meeting, Charlotte, NC, November 4, 2012.

"The Frightening Acceleration in Ice Melt and Sea Level Rise." Howard Hughes Medical Institute Holiday Lectures Festival: Changing Planet: Past – Present – Future. University of Miami, Coral Gables, Florida. November 14, 2012

"The Frightening Acceleration in Ice Melt and Sea Level Rise." Howard Hughes Medical Institute Holiday Lectures Festival: Changing Planet: Past – Present – Future. Miami Dade College, Miami, Florida. December 3, 2012.

"The Frightening Acceleration in Ice Melt and Sea Level Rise." Broward County, Climate Change Task Force, Plantation, Florida. December 12, 2012.

2013 "Statement on Anticipated Sea Level Rise." Board of County Commissioners, Miami-Dade County, Miami, Florida. January 10, 2013

"The Frightening Acceleration in Ice Melt and Sea Level Rise." City of Miami Beach Chamber of Commerce, Miami Beach, Florida. January 23, 2013.

"The Frightening Acceleration in Ice Melt and Sea Level Rise." For Environmental History, University of Miami, Coral Gables, Florida. January 24, 2013.

"The Frightening Acceleration in Ice Melt and Sea Level Rise." For ECS 310, Sustainable Living, University of Miami, Coral Gables, Florida. January 24, 2013.

"Dynamics of a Warming Ocean: Changing Ocean Circulation, Changing Currents." For Empowering Capable Climate Communicators 2013 I, University of Miami, Coral Gables, Florida, February 2, 2013.

"The Frightening Acceleration in Ice Melt and Sea Level Rise." For Empowering Capable Climate Communicators 2013 I, University of Miami, Coral Gables, Florida, February 2, 2013.

"Straining the Fiber of Civilization: What We Lose If We Do Nothing." For Empowering Capable Climate Communicators 2013 I, University of Miami, Coral Gables, Florida, February 9, 2013.

"The Cyclic Drivers of Climate change and Sea Level Through Geologic Time." For Empowering Capable Climate Communicators 2013 I, University of Miami, Coral Gables, Florida, February 16, 2013

"Dynamics of a Warming Ocean: Changing Ocean Circulation, Changing Currents." For Empowering Capable Climate Communicators 2013 I, University of Miami, Coral Gables, Florida, February 16, 2013.

"The Frightening Acceleration in Ice Melt and Sea Level Rise." For Empowering Capable Climate Communicators 2013 I, University of Miami, Coral Gables, Florida, February 16,

2013.

"The Frightening Acceleration of Ice Melt and Sea Level Rise." for Democrats of South Dade County, Miami, Florida. February 19, 2013.

"Straining the Fiber of Civilization: What We Lose If We Do Nothing." For Empowering Capable Climate Communicators 2013 I, University of Miami, Coral Gables, Florida, February 23, 2013.

"Hurricanes and Sea Level Rise – A Deadly Combination." For GSC 107, Natural Disasters: Hollywood Versus Reality. University of Miami, Coral Gables, FL. March 5, 2013

"The Frightening Acceleration in Ice Melt and Sea Level Rise." Oceans and Human Health. Rosenstiel School of Marine and Atmospheric Science, University of Miami. Virginia Key, FL. March 25, 2013

"The Frightening Acceleration in Ice Melt and Sea Level Rise." Miami Beach 2100 Design Challenge: A Workshop on Sea Level Rise and Planning for resilience, Miami Urban Studies Studios, College of Architecture and the Arts, Florida International University. Miami Beach, FL. March 28, 2013.

"The Frightening Acceleration in Ice Melt and Sea Level Rise." Graduate Climate Education Program, Florida Atlantic University, Boca Raton, FL. April 4, 2013.

"Sea Level Rise and Climate Change: An Update of Dramatic Acceleration." Friends of the Everglades 44th Annual Meeting, Miami. April 14, 2013

"Pulses of Rapid Sea Level Rise: Past, Present and Future", for Penrose/Chapman Conference: 'Record of Sea-Level Rise', Galveston TX. April 15, 2013

"Frightening Acceleration in Ice Melt and Sea Level Rise", Rising Seas Summit ACCO, Ft. Lauderdale, FL. June 18, 2013.

"Greenland's Melt will Inundate South Florida", for ECS 310, Sustainable Living, University of Miami. September 3, 2013.

"Greenland's Melt will Inundate South Florida", for CLEO Institute Board Meeting Pinecrest, FL. September 16, 2013.

"Make the Difficult Decisions on Water Resources and Infrastructure with Sea Level Rise", for National League of Cities, Energy, Environment and Natural Resources Steering Committee, Pinecrest, FL. September 20, 2013.

"Frightening Acceleration in Ice Melt and Sea Level Rise", for Graduate Seminar,

Department of biology, University of Miami, September 24, 2013.

"The Need for Orderly Planning for Inundation of Barrier Island Inundation", Geological Society of America, Denver, CO. October 28, 2013.

"The Need for Orderly Planning for Inundation of Barrier Islands and Low Coasts", for MSC 220, Climate Changes at UM, University of Miami. November 5, 2013

"The Need for Orderly Planning for inundation of Barrier Islands and Low Coasts", for High Water Line Miami at University of Miami, November 12, 2013.

"Why is Miami Ranked as the Most Vulnerable City to Climate Change?" for Miami Dade College Climate Change Symposium, Kendall, FL. November 19, 2013.

2014 "Reinforcing Feedbacks Make Future Accelerating Ice Melt and Sea Level Rise Inevitable and Unstoppable", CLEO Institute Climate Training, Coral Gables, FL. January 23, 2014.

"The Need for Orderly Planning for inundation of Barrier Islands and Low Coasts", for ECS 310, Sustainability at UM, University of Miami, Coral Gables, FL. January 28, 2014.

"The Need for Orderly Planning for inundation of Barrier Islands and Low Coasts", 23rd Annual Southwest Florida Water Conference, Florida Gulf Coast University, Ft. Meyers, FL. January 31, 2014.

"What Sea Level Rise Should We Be Planning For?", for Energy, Climate Disruption and Sea Level Rise: New Directions in Law and Policy, Nova Southeastern University, Ft. Lauderdale, FL. February 6, 2014.

"The Need for Orderly Planning for Inundation of Barrier Islands and Low Coasts", for Climate Disruption and Sea Level Rise: New Directions in Law and Policy, Nova Southeastern University, Ft. Lauderdale, FL. February 6, 2014.

"Global Warming is a Warming Ocean", for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 8, 2014

"What Sea Level Rise Should We Be Planning For?" for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 8, 2014.

"The Beach on Key Biscayne: Problems and Solutions", for Condominium Association of Key Biscayne, Beach Club at Ocean Club, Key Biscayne, FL. February 11, 2014.

"Sea Level Rise Might Be Much Faster Than Models Are Predicting", for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 15, 2014.

"The Need for Orderly Planning for Inundation of Barrier Islands and Low Coasts", for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 15, 2014.

"Human-induced Global Warming is Causing An Acceleration in Global Sea Level Rise – This Will Have Serious Consequences for South Florida As The Century Progresses" Miami Beach Chamber of Commerce, Miami Beach, FL, March 16, 2014.

"Climate Briefing – Sea Level Rise Predictions and Possible More Severe Scenarios" Public event sponsored by CLEO Institute, Pinecrest, FL. March 24, 2014.

"This Can't Be Happening with David Lindorff", a one hour one-on-one interview with call in on the reality and rates of global warming, sea-level rise and desertification; nationally broadcast live on PRN, April 9, 2014.

"Oceans: The Future of Water – Coming To A Home Near You Sooner Than You Think." Featured Speaker - 17th Annual Earth Day Symposium, EarthWeb Foundation and Rollins College, Winter Park, FL. April 12, 2014.

"Climate Science Briefing Panel with U.S. Senator Sheldon Whitehouse." Pinecrest FL. April 25, 2014.

"Sea Level Response to Climate Change." Art Marshall Foundation Summer Intern Program, given at University of Miami, FL. June 16, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Florida League of Cities, Pinecrest, FL. August 15, 2014

"The reality of Human-Induced Climate Change." An invited presentation with four other scientists to Florida Governor Rick Scott. The Governor's Office, Tallahassee, FL. August 18, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Pinecrest Rotary Club, FL. August 19, 2014.

"Comes the Sea." Panelist and speaker following climate change movie presentation, Miami Beach Botanical Gardens, Miami Beach, FL. August 20, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Coral Gables Rotary Club, FL. September 4, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." 'BAD' (Boating, Angling and Diving) Group - Coconut Grove Yacht Club, Miami, FL. September 18, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." 'Protecting SE Florida's Oceans and Coastal Heritage', Sierra Club, Hallandale Beach, FL. September 20, 2014.

"Environmental Risks of Sea Level Rise on Miami Beach." EECOMB, Panelist and Speaker following three climate change movies. Miami Beach Botanical Gardens, Miami Beach, FL. September 20, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Coral Gables Women's Club, Coral Gables, FL. October 1, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Stag Night – Biscayne Bay Yacht Club, Miami, FL. October 14, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Best Practices Conference, Miami-Dade county League of Cities, Miami, FL. October 24, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." COSEE Florida: Water as Habtat Science Café, Wynwood (Gramps Bar), FL. October 28, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Presentation to Oxford Brooke's University, School of Architecture students and faculty. Miami, FL. November 3, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change plant life on Earth as the century progresses." University of Miami Arboretum Society, Coral Gables, FL. November 5, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Carl Sagan Day at Broward College, North Campus, Coconut Creek, FL. November 8, 2014.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." MSC 220 – Climate and Global Change, RSMAS, UM. November 20, 2014.

"The Risk We Face from Accelerating Sea Level Rise", CLEO Climate Change Symposium at Vizcaya, Miami, FL Dec. 10, 2014.

2015 "Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Biscayne Bay Regional Restoration Coordination Team, National Park service and NOAA, NOAA Marine Fisheries, Miami, FL January 14, 2015.

"The Risks of Fracking in south Florida." Miami-Dade County Commissioners meeting, Miami. FL. January 20, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Committee for Conservation at Deering Bay, Deering Bay Country Club, FL. January 20, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." ECS 310 – Sustainability, University of Miami. I on January 27 and II on January 29, 2015.

Panel discussing future of Andean Glaciers, following film presentation, ECCOMB, Miami Beach Gardens, Miami Beach, FL. February 6, 2015.

"Global Warming is a Warming Ocean", for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 21, 2015

"What Sea Level Rise Should We Be Planning For?" for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 21, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Coral Gables Garden Club, Coral Gables, FL. February 23, 2015.

"Sea Level Rise Might Be Much Faster Than Models Are Predicting", for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 28, 2015.

"The Need for Orderly Planning for Inundation," for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 28, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." League of Women Voters of Collier County, Naples, FL. March 19, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Oceans and Human Health, RSMAS, University of Miami. March 24, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Sea Keepers and British Counsel General, RSMAS, University of Miami. April 14, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Keynote Speaker, Earth Web Foundation Annual Meeting, Orlando,

FL. April 18, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." College of Arts and Sciences review Committee, University of Miami. April 23, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Southwest Florida Sea level Rise Summit. Florida Gulf Coast University, Ft. Myers, FL. May 7, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Florida Trust Annual conference, Miami, FL. May, 8, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." South Miami Rotary Club, South Miami, FL. May 12, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Western Newfoundland Environmental Program, Woody Point Newfoundland, Canada. June 30, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." ECS 310 – Sustainability. University of Miami. September 8, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Coral Gables Volsky Assembly, Coral Gables, FL. September 22, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." FSS 190 – Miami: Transformations in a Global City, University of Miami. September 22, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." CLEO Teachers Training Event, University of Miami. September 15, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." City of Coral Gables, Commission Chambers, Coral Gables, FL. September 29, 2015. (hour plus presentation posted on Community Television Network)

"The Coming Reality of Sea Level Rise: Too Fast Too Soon." Institute on Science for Global Policy, St. Petersburg College, St. Petersburg, FL. October 2-3, 2015.

"The Coming Reality of Sea Level Rise: Too Fast Too Soon." Speaker, Climate Change Workshop, Village of Pinecrest Council Chambers, FL. October 6, 2015.

"Historical Wetland Community Evolution in the Lower Everglades and Cape Sable." South Florida Water Management District, West Palm Beach, FL. October 29, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." University of Miami Citizen's Board – Lunch and Learn. Miami, FL. November 18, 2015.

"The Coming Reality of Sea Level Rise in New Jersey: Too Fast Too Soon." Institute on Science for Global Policy, Toms River, New Jersey. November 20-21, 2015.

"Changing Influences on South Florida's Beaches." ECS 310 – Sustainability. University of Miami. December 1, 2015.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Brandeis Study Group, Pinecrest, FL. December 1, 2015.

"Historical Wetland Community Evolution in the Lower Everglades and Cape Sable." ECS 310 – Sustainability. University of Miami. December 3, 2015.

"Assessment of Paris COP21.CMP11 Agreements on Sea Level Rise." French Consulate Evening on Global Ties. Center for Social Change, Miami, FL. December 11, 2015.

"Future Sea Level Rise in South Florida." Young Democrats Club. Miami, FL. December 16, 2015.

2016 "Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." South Florida Mensa. Coral Gables, FL. January 5, 2016.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Road Scholar, Miami Beach, January 11, February 1, and February 22, 2016.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." City of Miami Sea Level Rise Committee, Miami City Hall, Miami, FL. January 11, 2016.

"The Risk of Turkey Point with Sea Level Rise." CLEO Panel, Pinecrest Gardens, FL. January 19, 2016.

"Community Responsibility in the Face of Sea Level Rise." CLEO Institute Community Panel, Pinecrest, FL., January 18.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." ECS 310, Sustainability, University of Miami. January 21 and 26.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Opening Address, Northeast Florida Environmental Summit, Jacksonville, FL., January 25, 2016. See: https://www.youtube.com/watch?v=SooK37SuY_8&feature=youtu.be (7:27-36:06) and https://www.youtube.com/watch?v=aBVhJ4tQyC0&feature=youtu.be (38:38-59:42)

"How Climate Trends Will Impact Storms of the Future: Preparing Today for Later in the Century – King Tides, Storm Surges, Salt Spray and Sea Level Rise – Imminent Threats Now and Growing." Data Driven Outage Restoration for Electric Distribution 2016 Conference, Coconut Grove, FL., January 27.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Talk and Panel. Florida Interfaith Climate Action Network National Assembly, Longwood, FL., January 28-29.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." University of Miami Woman's Guild, University of Miami. February 1, 2016.

"Geologic Evolution of the Everglades from Start to Finish – The Past 5,000 years and the Next 100." Southeastern Geological Society Field Conference on the Everglades. Talk on 12th and Field Guide on 13th. Miami and the Everglades, February 12-13, 2016.

"Global Warming is a Warming Ocean", for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 20, 2016

"What Sea Level Rise Should We Be Planning For?" for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 20, 2016.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Miami Beach as the century progresses." Harvard University Graduate School of Design Conference: 'South Florida and Sea Level – The Case of Miami Beach,' Miami Beach, FL., February 23.

"Sea Level Rise in South Florida," On-air panel with Elizabeth Kolbert of the *New Yorker* on NPR's WLRN *Topical Currents*, 1-2 PM, February 24.

"Sea Level Rise Might Be Much Faster Than Models Are Predicting", for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 27, 2016.

"The Need for Orderly Planning for Inundation," for Empowering Capable Climate Communicators, College of Arts and Sciences, University of Miami. February 27, 2016.

"Comes the Sea. Miami's Vulnerabilities: an Overview. UNESCO World Field

Laboratory Symposium on Sea Level Rise and the Future of Coastal Settlements. Miami, FL. March 3, 2016.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." URB 301 – Cities in Time and Space. University of Miami. March, 15, 2016.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." The Conservancy of Southwest Florida, Naples, Earth Day, April 22, 2016.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." Earth Day with Congressional Candidate Ed Emery, Gainesville, FL, April 22, 2016.

"Changing Influences on South Florida's Beaches." University of Miami / Florida International University Architectural symposium on Beach Vulnerability, Miami Beach, May 2, 2016.
Role of Anticipated Sea Level Rise in Urban Planning." Urban Land Trust Focus on Arch Creek. Florida International University Symposium, FIU North Campus, Miami, Florida. May 24, 2016.

"Comes the Sea: Accelerating sea level rise will dramatically change life on Earth as the century progresses." NCGE (National Conference on Geographic Education), Human Geography Teacher Workshop, Keynote Speaker. Tampa, Florida, July 27, 2016.

"Comes the Sea – Miami's Vulnerabilities: an Overview." U.S. State Department International Visitor Leadership Program and Global Ties Miami. Miami, Florida, September 19, 2016.

"Historical Wetland Community Evolution, Collapse, and Migration in the Lower Everglades and Cape Sable. Florida International University Symposium on Wetland Dynamics and Saline Intrusion. Miami, Florida September 29, 2016.

"Comes the Sea - Miami's and the World's Vulnerabilities: an Overview." Villa Regina on Brickell Symposium, Miami, Florida. October 1, 2016.

"Comes the Sea." Symposium on the Current state of our Sea" in conjunction with the Smithsonian "Waterways Exhibit." The Curtiss Mansion, Miami Springs, Florida. October 6, 2016.

"Comes the Sea - Miami's and the World's Vulnerabilities: an Overview." ECS-310 Sustainability. University of Miami, Florida. October 13, 2016.

"Comes the Sea – A: The Reality of Human-Induced Climate Change; B: Causes for and

Projections of Sea Level Rise; C: What This Means for Coastal Environments and Cities; and D: What We Must Do and Opportunities for Our Students." (a 6-hour training presentation) Gulliver Schools Teacher Training Program. October 29, 2016.

"Comes the Sea – Planning for Accelerating Sea Level Rise Through This Century and Beyond." Board of Directors, The Conservancy of Southwest Florida, Naples, Florida. November 1, 2016.

"Planning for significant Sea Level Rise in Pinecrest." Village of Pinecrest Council chambers, Florida. Presentation to Mayor and citizens. November 2, 2016.

"Comes the Sea – Planning for Accelerating Sea Level Rise Through This Century and Beyond." Climate Across the Curriculum CLEO Workshop, University of Miami, Florida. November 12, 2016.

"Comes the Sea." Presentation and panel discussion as part of UM's Citizen U with Joshua Myers. Student Center, University of Miami, Florida. November 16, 2016.

"Comes the Sea – Planning for Accelerating Sea Level Rise Through This Century and Beyond." Keynote Speaker: NAIC (National Association of Insurance Companies) National Meeting: Sea Level Rise Workshop, Fontainebleau Hotel, Miami Beach, Florida. December 10, 2016.

2017 "Comes the Sea – Planning for Accelerating Sea Level Rise Through This Century and Beyond." Keynote Speaker. Now in My Back Yard. Rising Sea Level on the Florida Gulf Coast and What Can Be Done About It. South Seas Resort, Captiva Island, Florida. January 13, 2017.

"The Coming Reality of Sea Level Rise: Too Fast Too Soon – Planning for Accelerating Sea Level Rise Through This Century and Beyond." Florida Oceanographic Foundation Coastal Lecture Series, Blake Library, Stuart, Florida. January 23, 2017.

"Comes the Sea – Planning for Accelerating Sea Level Rise Through This Century and Beyond." Key Biscayne Rotary Club, Key Biscayne Yacht Club, Florida. January 27, 2017.

"Comes the Sea – The Future of south Florida Fishing with Accelerating Sea Level Rise Through This Century and Beyond." Tropical Anglers Club, Miami, Florida. January 31, 2017.

"Comes the Sea – Planning for Accelerating Sea Level Rise Through This Century and Beyond." Green Sanctuary Program: Progressive Voices Speak Out. Unitarian Congregation of Greater Naples, Florida. February 1, 2017.

"Anaerobic Bottom Waters Need Not Be Deep." Geo-Topics at Rosenstiel School of

Marine and Atmospheric Science, University of Miami, Virginia Key, FL. February 6, 2017.

"An introduction to South Florida – Planning for Accelerating Sea Level Rise Through This Century and Beyond. Opening Lecture for Community Resilience Panel. Neumann Alumni Center, University of Miami, March 9, 2017.

"Climate Change and Sea Level Rise in South Florida – Realities, Rates and Needed Responses." Lecture, Discussions, and Field Trip. Young Presidents Group. Ritz Carleton Hotel South Beach, Miami Beach, FL March 29, 2017.

"The Coming Reality of Sea Level Rise: Too Fast, Too Soon." American Institute of CPAs, Government Performance and Accountability Committee (GPAC) Meeting, Florida International University, Miami, FL. April 3, 2017.

"The Coming Reality of Sea Level Rise: Too Fast, Too Soon." Oceans and Human Health Course, Rosenstiel School of Marine and Atmospheric Science, University of Miami, Virginia Key, FL. April 4, 2017.

25a. **Other Professional Activities – Symposia Organization** (see #18 for papers presented at scientific meetings and symposiums):

"Empowering Capable Climate Communicators" a Cooper Fellow climate training series involving 14 climate scientists and communicator lecturers and panelists for four full Saturdays in the spring of 2011, College of Arts and Sciences, University of Miami. There were 65 participants.

"Empowering Capable Climate Communicators 2012" a Cooper Fellow climate training series involving 14 climate scientists and communicator lecturers and panelists for four full Saturdays in the spring of 2012, College of Arts and Sciences, University of Miami. There were 70 participants.

"Empowering Capable Climate Communicators I 2013" a Cooper Fellow climate training series involving 14 climate scientists and communicator lecturers and panelists for two full Saturdays in the spring of 2013, College of Arts and Sciences, University of Miami. There were 85 participants.

"Empowering Capable Climate Communicators II 2013" a Cooper Fellow climate training series involving 14 climate scientists and communicator lecturers and panelists for two full Saturdays in the spring of 2013, College of Arts and Sciences, University of Miami. There were 120 participants.

"Empowering Capable Climate Communicators 2014" a Cooper Fellow climate training series involving 13 climate scientists and communicator lecturers and panelists for two full Saturdays in the spring of 2014, College of Arts and Sciences, University of Miami. There were 110 participants; February 8 and 15, 2014.

"Empowering Capable Climate Communicators 2015" a Cooper Fellow climate training series involving 13 climate scientists and communicator lecturers and panelists for two full Saturdays in the spring of 2015, College of Arts and Sciences, University of Miami. There were 95 participants; February 21 and 28, 2015.

"Empowering Capable Climate Communicators 2016" a Cooper Fellow climate training series involving 13 climate scientists and communicator lecturers and panelists for two full Saturdays on February 20 and 27, 2016, College of Arts and Sciences, University of Miami. There were 120 participants and 15 lecturers.

"Empowering Capable Climate Communicators 2017" a Cooper Fellow climate training series involving 7 climate scientist lecturers and panelists for one full Saturday on February 11, 2017, College of Arts and Sciences, University of Miami.

25a. **Other Professional Activities** – Provided requested professional interviews to **Newspaper, Magazine, Book, Radio, TV, video, and online organizations (list only kept since 2014)**

2014 Newspapers: Miami Herald (numerous), Washington Post, Sun Centennial, New York Times, Key Biscayne Times, other Community Newspapers.

Magazines: Time, Rolling Stone, National Geographic, Die Stern (German), a Dutch magazine, Boca Raton Magazine (link below), and others.

Radio and TV: NPR (3), Marketplace (link below), WLRN 91.3 (link below), Fox News, NBC, CBS, Huffington Post, CBC Canada One (link below), and others. Several web-based news and talks shows.

http://www.cbc.ca/radio/thesundayedition/a-christmas-concert-michael-s-essay-harold-wanless-mail-about-dying-at-age-75-cat-christmas-documentary-mail-about-refugee-policy-bob-bossin-menorah-s-hidden-history-1.2905337/coastal-florida-and-miami-are-doomed-says-scientist-harold-wanless-1.2905344

http://www.marketplace.org/topics/sustainability/water-high-price-cheap/rising-seas-threaten-south-floridas-drinking-water

http://bocamag.com/blog/2015/03/02/is-south-florida-in-hot-water/

http://wlrn.org/post/florida-officials-ban-term-climate-change

2015 Boca Raton Magazine, Center for Investigative Reporting (Tristan Korten), Verge (Josh Dzieza), Fairchild Garden, Morad – pbu TV (Clemence de la Robertie), MSNBC (Ed Schultz), Puerto Rican Sistema TV Geo, Sun sentinel (David Flescher), Stewart News on

ASRs (Scripps Howard), Perkins and Will, Agencie France Television (Frederica Nanancio), WWL First News radio New Orleans (Tommy Tucker), Progressive News Network (Karina Veaudry Internet Radio Podcast), Korean Broadcasting Service, The Nation (re Jeb Bush record), Tampa Bay Tribune, The Daly Show, ZDF German TV, Years of Living Dangerously (Jon Meyershon), Vanity Fair (David Kamp), American Prospect (Nathalie), Fabiano D'Yomato, CBC (Michael Enright – replaying previous interview), ABC (Evan Simon), CNBC (Robert Ferris), City University of NY (Ashley Dawson – book interview), Miami Herald, France 2 TV (Sabrina Buckwalter), conserve turtles.org (Gary), Dutch Freelance (Eline van Nes), Center for Urban and Community Design (Sonia Chao), New Yorker (Elizabeth Kolbert), the Weather Channel (Michael Lowery and Mark Elliott).

2016 NJTV News (Brenda Flanagan), KYW Radio (Madden), Radio Free Europe (Igor Yefimov), Orlando Sentinel (Kevin Spear), University of Amsterdam Graduate Program in Human Geography (Lars Ankum, Wessel Brocken, and Tiemen Koch), Ed Emery for Congress (training about Climate Change and effects), Weather Channel (Sam Champion), University of Buenos Aires Law Program (Claude Lutzky, Exec. Director), MIT Masters in City Planning, Urban Studies (Devon Neary), Politico Magazine (Sarah Solovitch), WLRN Topical Currents (Joseph Cooper) hour show with Elizabeth Kolbert, MSNBC (Chris Hayes), Malibu Magazine (full page coverage), FORWARD Florida Magazine (Dave Cocchiarella), Olonne sur Mer, Vendée, France (Germain Piveteau, and Emmanuel Ayet); *Ahead of the Tide* (Ariel Gudwin); CBS News (Chris Libel); Organized *Ahead of the Tide* video presentation at UM (4/11/17); MSNBC interview (Joelle Martinez); NPR Interview (Gina Jordan and Laura Coburn); Gizmo Science Tech (Maddie Stone); Muse Magazine (Corbie); Josh Dzieza; The Hokkaido Shimbun Press (Katsuhori Hashimoto); The Tokyo Shimbun (Tomonori Ishikawa); The Chunnhi Shimbun (Conrad Chaffee); Louisville Courier-Journal (James Bruggers); National Geographic (Laura Parker); CavU (recorded sea level Webinar on SLR); THEOECO.org (Steve Richards); Years of Living Dangerously (interview in advance of premier of Climate/Sea Level episode with Jack Black), Tower Theater, Miami; Distraction Magazine (Marissa Vonesh); Dutch Journalist video interview on Sea level rise on Miami Beach (Max van der Heijden); Film on sea level rise by David Able(visiting Knight Chair in Journalism Department); Sea level rise interview with Prof. Alejandre Portes, UM School of Law; Sea level rise interview with Molly Cominick, Sophie Barrows, and Danni Dikes, UM Communication Program; Sea level rise interview with Ben Travers (on 1,000 mile awareness tour of Florida);Climate Change interview (Prof Rick Van Noy, English Dept, Radford University, Virginia).

2017 Throughline Productions interview for movie on water and sea level rise in Florida (Chuck Davis and Dr. Timothy Beatley, a University of Virginia Sustainable Communities Professor); Santiva Chronicle (reporter David Rohn interview re sea level rise presentation on Captiva Island, Florida); captivasanibel.com Community News (reporter Ashley Goodman interview re sea level presentation on sea level rise on Captiva Island, Florida); KelvinFilm (2-day film interview by Joanna Engel on Major film on worldwide adaptation to climate change including interactions with Angaangaq Angakkorsuaq an Elder representative from the Greenland Eskimos); clearpath.org (Jay Faison, clean energy advocates for republicans in Washington D.C.; Mary Ann Rozance, Toulan School of

Urban Studies and Planning, Portland State University; Chris De Angelo, Huffington Post, Washington D.C.;

TEACHING

26a. **Courses Taught:**

ENS 103-104 - Environmental Issues of South Florida
Taught 1996, Spring 1998, Spring 1999.

ENS 492 - Field Study in Environmental Science
Taught: Spring 2000, Fall 2001, 2002

FNS 180 - Evidence for and Societal Implication of Global Change (Freshman Seminar)
Taught: 1991, 1992.

GSC 100 – Marine Geology of South Florida, part of Summer Scholar Program for High School Students.
Taught: Summer of 1998, 1999, 2000.

GSC 105 – The Global Environment
Taught: Fall 2004

GSC 110 - Physical Marine Geology (A dual enrollment course taught at MAST Academy, Dade County Public Schools)
Taught: 1993, 1996.

GSC 111 – Historical Geology
Taught: 2003, 2006

GSC 120 - Environmental Geology
Taught Spring 1993, Fall 1993, Fall, 1994, Fall 1995, Spring 1996, Fall, 1996, Spring 1997, Fall 1997, Fall 1998, Fall 1999, Fall 2000.

GSC 160 - Historical Geology: Taught Spring 1993.

GSC 230 - Reef Systems through Time:
Taught Spring 1998, 1999, 2000, 2001, 2002, 2004, 2005, 2006, 2009, 2010, 2011, 2012, 2013, 2014.

GSC 231 - Field Study of Reef Systems Through Time
Taught: Spring Break 2000, 2001. 2004, 2009, 2011, 2012, 2014, 2016.

GSC 260 – Earth Materials: Co-taught fall 2011, 2012, 2013, 2014, 2015, 2016.

GSC 350 - Stratigraphy: Taught: 1992, 1994, 1995, 1996, 1997, 1998, 2004.

GSC 360 - Depositional and Diagenetic Systems:
Taught: Spring 1999, 2000, Fall 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009 2010, 2011, 2012, 2013, 2014, 2015, 2016.

GSC 440 – Petrology
Taught with D. McNeill: Spring 2015, 2016, 2017.

GSC 450 - Sedimentology
Taught: 1988, 1989, 1990, 1992, 1993, 1994, 1995, 1996, 1997, 1998.

GSC 462 – Paleoclimatology Taught: Spring 2014, 2015, 2016, 2017.

GSC 480 – Structural Geology: Taught with D. Olson: Spring 2013.

GSC 482 (was 596) - Field Methods and Mapping:
Taught: spring 1994, 1995, 1996, 1997, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2017.

GSC 561 – Colloquium, fall (capstone course for seniors) 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016.

GSC 574; now 580-581 - Geology Summer Field Course
Taught: 1994, 1995, 1996, 1997, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2017.

GSC 574 - Geologic Studies in the Grand Canyon
Taught: 2007

GSC 575 – Coastal Processes
Taught: 2008

GSC 582(01) - Field Study of Reef Systems Through Time
Taught: Spring Break 2012, 2014, 2016

MGG 511 - Sedimentation
Taught: 1972-1991.

MGG 541 - Field Evaluation of Fossil Platforms, Margins and Basins
Taught: 1978, 1980, 1981, 1984, 1985, 1986, 1987, 1988, 1991.

MGG 558 - Geology of Florida
Taught: Fall 1979, 1982, 1983, 1985, 1986.

MGG 584, 585 - Geology of Tropical Marine Environments
Taught: Summer 1979.

MGG 672 - Basin Analysis (with others)
Taught: 1979.

MGG 683 - Sediment Diagenesis
Taught: 1977, 1982, 1984, 1987, 1989.

MGG 684 - Environments of South Florida
Taught: 1981, 1984.

MGG 685 - Sediment Dynamics
Taught: 1981, 1983, 1984, 1985.

MGG 687 - Substrate Influence on Benthic Communities
Taught: 1977, 1987.

MSC 111 – Introduction to Marine Science. Taught: Fall 2002

MAST Academy – Dual Enrollment Marine Geology 1996, 1997.

27. **Thesis and Dissertation Advising:**

Major Advisor for the Following Undergraduate Senior Thesis:

1997 Rodebaugh, Amy. Diatom Assemblages in a 100-Year Sediment Record from Whitewater Bay, South Florida.

1999 Kathrine A. Banner. Internal Architecture of Archaeocyathid Bioherms, Labrador, Canada, 64p.

1999 Andrew Zachary Krug. Environmental Zonations Within a Platform Margin Reef, Lower Head, Newfoundland.

2000 Stacy Anderson. A Paleoenvironmental Analysis of the Key Largo Limestone.

2002 Matthew Brewer. Mangroves, Storms and Sea-Level: an air photo analysis of the past 70 years of coastal evolution in the Gopher Key Region, SW Florida.

2002 Katie Inderbitzen. A Sedimentary-Exhalatory Barite Deposit and Associated Chemosynthetic Bioherm, Aguathuna Quarry, Port au Port Peninsula, Newfoundland, Canada.

2002 Lauren Moyer. Diagenesis and Tectonic history of Cambro-Ordovician Sediments in a Fore-

Arc Basin, Northwestern Newfoundland.

2002 Amy Sofge. Origin of Cavities in Lower Cambrian Archaeocyathid Reefs, Southeast Labrador.

2004 Kelly Jackson. Late Holocene Evolution of the Lower Shark River Discharge in response to a high-frequency sea level oscillation, Everglades National Park, Florida

2006 Katie Murray (Magna Cum Laude), Potential Effects of Increased Scour Depth on Chum Salmon Redds in the Gray's River, Washington. November, 2006

2007 Noelle Van Ee, Analysis of abrasion susceptibility of Bahamian sands proposed for placement on south Florida's beaches, 2008

2012 Max Tenaglia, Re-evaluation of the Late Permian carbonate reef margin facies patterns, Dark Canyon, New Mexico, December 2012.

2015 William Farrell, Diagenetic and porosity evolution in Early Pennsylvanian carbonate mud mounds, New Mexico.

Zoe Smith, Fauna and diagenesis in Lower Cambrian carbonate nodules in black shale sequences.

Major Advisor of the Following Masters of Science Theses:

1976 Barron, Eric J. Suspended Sedimentation Processes, Marco Island, Florida. M.S. Thesis, University of Miami, 182p.

1976 Warzeski, E. Robert. Growth History and Sedimentary Dynamics of Caesar's Creek Bank. M.S. Thesis, University of Miami, 195p.

1977 Dravis, Jeffrey J. Holocene Sedimentary Depositional Environments on Eleuthera Bank, Bahamas. M.S. Thesis, University of Miami, 386p.

1978 Bohlke, Brenda. Clay Fabric and Geotechnical Properties Associated with Crust Zones in the Mississippi Prodelta Deposits. M.S. Thesis, University of Miami, 95p.

1979 Harlem, Peter. Aerial Photographic Interpretation of the Historical Changes in North Biscayne Bay, Florida: 1925-1976. M.S. Thesis, University of Miami, 152p.

1983 Craig, Genevieve. Holocene Carbonate Sedimentation in a Pleistocene Depression Adjacent to Key Largo. M.S. Thesis, University of Miami, 120p.

1984 Burton, Elizabeth Ann. X-ray Diffraction of Natural High and Low Mg Calcites. M.S. Thesis, University of Miami, 148p.

Rossinsky, Victor, Jr. Sedimentation and Holocene History in the Loxahatchee River Estuary, Jupiter, Florida. M.S. Thesis, University of Miami, 247p.

1988 Waltz, Michael D. The Evolution of Shallowing-Upwards Reef to Oolite Sequences at the Leeward Margin of Caicos Platform, B.W.I. M.S. Thesis, University of Miami, 98p.

1989 Tagett, Mathew G. Stratigraphy, Nucleation and Dynamic Growth History of a Holocene Mudbank Complex, Dildo Key Mudbank, Western Florida Bay. M.S. Thesis, University of Miami, 210p.

1990 Huang, Holan. Holocene Environmental History in a Marginal Marine Area of the Everglades of South Florida. M.S. Thesis, University of Miami, 131p.

1991 Emerson, James D. Surficial Carbonate Facies of the Caicos Platform, British West Indies. M.S. Thesis, University of Miami, 183p.

1993 Frederick, Bruce. The Development of the Holocene Stratigraphic Sequence Within the Broad-Lostman's River Region, Southwest Florida Coast, M.S. Thesis, University of Miami, 173p.

1995 Bischof, Barberel. Aerial Photographic Analysis of Coastal and Estuarine Mangrove System Dynamics of the Everglades National Park, Florida, in Response to Hurricanes: Implications for the Continuing Sea-level Rise. M.S. Thesis, University of Miami, 135p. Plus Figures.

1996 Gelsanliter, Sarah. Holocene Stratigraphy of the Chatham River Region, Southwest Florida; with a Reevaluation of the Late Holocene Sea-level Curve, M.S. Thesis, University of Miami, 182p.

2001 Michaels, Brian A. Holocene Stratigraphy and Geomorphic Evolution of the Cape Sable Region, Southwest Florida: Evidence for Late Holocene Sea-level Dynamics, M.S. Thesis, University of Miami, 183p.

2003 Manne, Tiina. Archaeocyath Growth Morphology as a Reflection of Bioherm Form, Cavity Development and Life Habit, Newfoundland nad Labrador, Northeastern Canada, M.S. Thesis, University of Miami, 100 p. (awarded Rosenstiel School's Dean Prize for outstanding M.S. Thesis for 2002-2003)

2006 Christina Smith (Defended and completed, April, 2006).

Major Advisor for the following Ph.D. Dissertations:

1981 Nelson, Terry. The Nature of the General and Mass Sedimentary Processes on the Outer Shelf, Slope and Upper Rise, Northeast of Wilmington Canyon. Ph.D. Dissertation, University of Miami, 303p.

1982 Perlmutter, Martin. The Role and Recognition of Storm Deposits in the Subtidal Sediments of the Ten Thousand Islands, southwest Florida. Ph.D. Dissertation, University of Miami, 230p.

1984 Figueiredo, Alberto G., Jr. Submarine Sand Ridges: Geology and Development, New Jersey, U.S.A. Ph.D. Dissertation, University of Miami, 408p.

1987 Dominguez, Jose M.L. Quaternary Sealevel Changes and the Depositional Architecture of Beach-Ridge Strandplains Along the East Coast of Brazil. Ph.D. Dissertation, University of Miami, 288p.

1987 Meeder, John F. A Depositional Model of the Tamiami Formation of Southwestern Florida. Ph.D. Dissertation, University of Miami, v. 1, 433p.; v. 2, -748p.

1987 Parkinson, Randall. Holocene Sedimentation and Coastal Response to Rising Sea Level Along Subtropical Low Energy Coast, Ten Thousand Islands, Southwest Florida. Ph.D. Dissertation, University of Miami, 224p.

1989 Cottrell, Daniel J. Holocene Evolution of the Coast and Nearshore Islands, Northeast Florida Bay, Florida. Ph.D. Dissertation, University of Miami, 194p.

1990 Rossinsky, Victor Jr. Topographic, Vegetative and Climatic Controls on the Petrography and Geochemistry of Calcretes in the Bahamas and South Florida. Ph.D. Dissertation, University of Miami, 228p.

1991 Tedesco, Lenore P. Generation of Carbonate Fabrics and Facies by Repetitive Excavation and Infilling of Burrow Networks in Recent and Ancient Sequences. Ph.D. Dissertation, University of Miami, 434p.

1993 Briggs, Kevin B. High-frequency Acoustic Scattering from Sediment Interface Roughness and Volume Inhomogeneities. Ph.D. Dissertation, University of Miami, 143 p.

1998 Risi, J. Andrew. Event Sedimentation from Hurricane Andrew Along the Southwest Florida Coast. Ph.D. Dissertation, University of Miami, 198 p.

2007 Brigitte M. Vlaswinkel. Field Results and Physical Modeling of the Sediment Dynamics of a Channeled, Peritidal Coastal System in Southwest Florida, Ph.D. Dissertation, University of Miami, 303 p.

Member of Advisory Committee for the following graduate students:

Completed: Shirley Pomponi, Mark Palmer, James Rine, Mohammed Almasi, David Beach, Bernard Pierson, Zelinda Leao, Bill Corso, Charles Evans, Sue Markley, Stuart Williams, Sach Prasad, Pamela Ried, Charles Evans, Michael Westphall, Jorge Jiminez, Kathy Browne, Joshua Feingold, Michael Grammar, David Obdura, Carrie Kievman, Ken Lindeman, Symma

Finn, Tony Poiriez, Xavier Jansen, Matt Bonicotti, Emily Bowlin.

SERVICE

28. **University Committee and Administrative Responsibilities:**

RSMAS School Council 1984-1987

MGG Academic Committee 1990-1992

Chairman Search Committee for Paleoecologist, GSC 1993

Tenure Review Committee, College of Arts and Sciences, 1993-1996

Search Committee for Dean, School of Arts and Sciences, 1996-1997

Senate Committee on Rank, Salary and Terms of Employment 1997-1999

Chair, Department of Geological Sciences, September 1998-.

Interim Director, Institute for Interdisciplinary Tropical Science 2003-2004

Search Committee, Weeks Endowed Professorship 2005-2006

29. **Community Activities:**

Scoutmaster of Troop 322, Key Biscayne, Boy Scouts of America 1979-1987 and 1995-2001; asst. leader 2002-2006.

Member of Technical Advisory Committee to EPA and Munisport Dump Coalition on Munisport Toxic Waste Dump: 1989-2000.

Advisor to Key Biscayne Council and Village of Key Biscayne on shore management: 1989-1992. Member Technical Advisory Task Force on Beach Management: 1995- termination of Task Force in 1998. (including preparation of guidelines for future beach renourishment activities in 1998).

Scientific advisor to the City of Naples, Florida: on beach, lagoons and wetland management, 1978 and 1989-1990.

Judge at elementary, middle and high school science fair competitions: 1965-1995.

Advisor on Post-Hurricane Resource Inventory and Recovery Strategy to Everglades National Park, Biscayne National Park, Cape Florida Park, Dade County Parks, and coastal citizen groups and individuals.

Technical Advisor to South Florida Water Management District: 1997-present.

Mentor to Miami-Dade County High School Interns (two of which have achieved semifinalist in Westinghouse Science Talent Search), 1993-present.

Advisor on forensic geology to Miami Homicide, Miami-Dade States Attorney Office and Federal Justice Department, 1998-2000.

Co-Chair Biscayne Bay Initiative Science Survey Team, 1999-2001. Coordination and preparation of science synthesis, issues, and recommendations to State of Florida Legislature.

Invited contributor to scientific design of South Florida Management District's RECOVER (research and monitoring) design for the Comprehensive Everglades Restoration Plan, 2001-2005.

Invited Advisor to Everglades National Park, Coastal Instability on southwest coast of Everglades National Park, 2002.

Invited Advisor to Big Cypress National Preserve on Recreational Off-road Management Plan and construction of defined vehicle trails, 2002.

Invited member and leader of science evaluation group, Miami-Dade County's 'Climate Change Adaptation 'Task Force' and now Committee, a committee of the Miami-Dade County Commissioners, 2003 – 2007.

Chair of Science and Technology Committee, Miami-Dade County Climate Change Advisory Task Force of the Miami Dade County Commissioners (2007-2011).

Member of Miami-Dade County Climate Change Advisory Task Force of the Miami Dade County Commissioners (2007-2011).

Invited speaker/advisor to Florida legislative committees on the Everglades (2007).

Invited speaker to White House Council on Environmental Quality concerning relocation of Mississippi River outlet (2009).

Member, Ad Hoc Committee on Sea Level Rise, South Florida regional Planning Council, tasked with defining a projected sea level rise for 2030, 2060, 2100, and 2110 to be used by southeast Florida Counties for planning purposes – final report is published and has been adopted by the four southeast Florida Counties. Presented at a Four County Compact meeting in December, 2011. (2010-2011).

Member Science Advisory Committee Florida Beaches for Habitat Conservation Plan, Florida Fish and Wildlife Conservation Commission. 20defining habitat risks for construction and other activities in the portion of the coastal beach/dune zone that can be regulated, including changes in response to rising sea level, 2010 - present.

Coordinator and Host of "Empowering Capable Climate Communicators" and full four Saturday series of training lectures and discussions to produce qualified speakers on climate change. Done as a Cooper Fellow Series and Sponsored by the Department of Geological Sciences and the College of Arts and Sciences, University of Miami. Spring of 2011, Spring of 2012, Spring of 2013 (two sessions), Spring of 2014, and Spring of 2015.

Board of Directors, the CLEO Institute. A program for involving and training secondary school, college students and adults in climate change, locally, nationally, and globally. (2011-present).

Invited Speaker to Miami Beach Chamber of Commerce, January 2013.

Informal (non-paid) advisor to numerous coastal governments, chambers of commerce, businesses, and/or organizations in Florida on optimal response to sea level rise, including Miami Beach Chamber of Commerce, Bay Harbor Islands, Fairchild Gardens, (2014).

Member, Committee on Sea Level Rise, South Florida Regional Planning Council, tasked with revisiting and revising (upwards) projected sea level rise rates for 2045, 2060, 2100, and 2130 being used by southeast Florida Counties for planning purposes – Adopted by the four-county Compact (October 2014 - March 2015).

Stormwater Master Plan – Pinecrest (2015).

Invited presenter and advisor to cities of Coral Gables, Miami, and Pinecrest; Fairchild Gardens, community groups, service organizations, and individuals on projected rates of sea level rise and recommended solutions (2016).

Case No. 17-71692

IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

In re: UNITED STATES OF AMERICA

UNITED STATES OF AMERICA, *et al*.,
Petitioners,

v.

UNITED STATES DISTRICT COURT FOR
THE DISTRICT OF OREGON
Respondent,

and

KELSEY CASCADIA ROSE JULIANA, *et al*.,
Real Parties in Interest

On Petition For Writ of Mandamus In
Case No. 6:15-cv-01517-TC-AA (D. Or.)

DECLARATION OF JACOB LEBEL IN SUPPORT OF ANSWER OF REAL PARTIES IN INTEREST TO PETITION FOR WRIT OF MANDAMUS

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Attorneys for Real Parties in Interest

I, Jacob Lebel, hereby declare as follows:

1. I am a twenty-year old resident of Roseburg, Oregon and a citizen of the United States. In 2001, when I was four years old, I moved with my family from Quebec, Canada to Roseburg. We came to the West Coast to start a new life in a place filled with pristine wilderness and natural resources. We moved to Roseburg because the mild and temperate weather of this region would allow us to start a farm and create a self-sustainable lifestyle that we could pass on to future generations.

2. My family founded Rose Hill Farms ("the Farm") in Roseburg, Oregon. The Farm extends over 500 acres, providing milk, eggs, meat, vegetables, fruits, nuts, honey, and products such as wool and timber to me, my family, and members of the local community. Over 80% of the food my family and I eat comes from the Farm. Our large tropical greenhouse even provides us with products such as passionfruit, citrus, mangoes, and bananas.

3. I graduated with honors from Umpqua Community College and hold an Associate of Arts Oregon Transfer with a focus on natural science and journalism. I am currently living and working full-time at the Farm as I plan the next step of my academic future. Much of my work is outdoors, constructing farm structures or helping to run our animal breeding programs that help preserve endangered and unique heritage livestock breeds.

4. My connection to the Oregon wilderness and to the Farm is deeply personal. As a child, I was homeschooled and spent most of my free time playing in the fields and forests around our house. Family trips included swimming in the South Umpqua River and hiking the forests around Crater Lake, Mount Thielsen, and Toketee Falls. As a teenager, I wrote poetry and composed songs drawing on the natural beauty that surrounded me on the Farm.

5. I intend to continue working and living on the Farm as an adult and I currently take an active role in managing and growing our family business. Thus, the economic future and sustainability of the Farm is very closely tied to my own future. The Farm provides me with fresh, healthy food, recreational opportunities, and a home that reflects my spiritual values. I would like to see my own future children have these same benefits in the future.

6. Federal Defendants' actions to perpetuate continuing high levels of greenhouse gas emissions have created an unsafe climate for the future of the Farm. Rising temperatures and earlier springs have caused the average fire season in the Pacific Northwest to extend drastically from 23 days in the 1970's to 116 days in the 2000's (Westerling, 2016). The Third Oregon Climate Assessment Report, released in January 2017, projects that climate

change in the Pacific Northwest will lead to even longer fire seasons and a drastic increase in acres burnt (Dalton, et al., 2017).

7. The 2015 fire season was the most severe on record. That summer, Douglas County experienced two major wildfires: the Cable Crossing and Stouts Creek Fires. Combined, these fires burnt 28,000 acres. The massive smoke cloud from the Stouts Creek Fire was clearly visible from the Farm. We are located in a rural area with limited road access for easy firefighting. This increase in wildfire activity threatens everything I have invested my life in over the past 16 years.

8. The Farm contains seven permanent structures and three greenhouses. These structures include the house where I grew up and currently live, as well as a cabin hand built out of wood harvested from our own forests and milled in our workshop. As a young adolescent, I helped lay planking on the walls and roof and varnish the structure. This cabin and the entire infrastructure of the Farm is now at heightened risk from increased wildfire activity in Douglas County due to rising temperatures and climate change.

9. Smoky and hazy skies during summer have become the norm for me over the past three years, affecting my outdoor work and recreation on the Farm. This summer, heavy smoke from a complex of wildfires burning about 40 miles east of the Farm gathered in the Roseburg area for over a week

prompting an air quality alert by the Oregon DEQ that smoke levels in the air could rise to unhealthy levels. The air on the Farm remained brown and opaque for days.

10. The Farm contains five ponds that fill from rainfall and groundwater during the winter and provide all the water for our livestock, gardens, and orchards during the summer. In the summer of 2015, a state of emergency was declared across the State of Oregon due to an historic drought that came after four straight years of drought conditions. Water shortages due to drought conditions forced my family to begin implementing an extended water collection and irrigation system, which includes three additional ponds and a large scale solar pumping and water transport system. Record temperatures and heat waves have stressed the garden crops and livestock and increased my workload, while also making it harder and more dangerous to work long hours in the heat. In fact, the number of days with temperatures exceeding 100 degrees Fahrenheit in Roseburg, Oregon is trending upward with multiple days over 100 degrees.

11. Approximately four-hundred fruit and nut trees grow on our Farm, many of them over fifteen years old. I take special pleasure in walking through the groves of Asian pear and peach trees and picking ripe figs and pomegranates from our plantations. As a small boy, I helped plant many of these trees and

they are part of the heritage I want to pass on to my children. In addition to the spiritual and aesthetic meaning these orchards have for me, they represent a significant economic asset for my family, bringing in roughly $20,000 in revenue every year. Weather extremes, such as droughts in summer and heavy rains in spring and winter, stress the fruit trees and decrease their ability to defend themselves from fungal infections and pest attacks.

12. Rising temperatures and weather extremes caused by Federal Defendents' actions are also degrading the ecosystem on and surrounding the farm, and thus harming my recreational and aesthetic interests. The majority of the land on the Farm is covered with conifer forest. Over the past two years, I witnessed a large number of Douglas Fir, Cedar, and Ponderosa Pine trees turning red and dying on our properties and in the surrounding community. On one of the large forested slopes on the Farm, approximately 30% of the trees in the forest are dead. On another large hill within view of our property, 60% of the tree cover is dying or dead.

13. Local biologists have directly linked these massive tree die-offs to the ongoing effects of the four years of drought in Oregon from 2011-2015. Lack of water and stress from heat waves make the conifers susceptible to disease and insect infestations. Besides the impact on the Farm, the die-offs

have already impacted my recreation. I enjoy rafting on the Rogue River in Southern Oregon and this summer I began noticing patches of dead trees tarnishing the natural beauty of the landscape surrounding the river.

14. I regularly see bird species on the Farm, such as the American Bald Eagle, the Allen's Hummingbird, the Spotted Owl, and the Ruffed Grouse. These species' survival is threatened by a changing climate and their range may no longer extend to Douglas County. Drought conditions and wildfire activity also severely affect the plant biodiversity in Oregon, as well as the State's rivers, watersheds, and snowpack.

15. I enjoy winter recreation and sports, including snowboarding, sledding, and hiking in the snow. Having spent the first three and a half years of my life in Canada, recreating in cold weather and deep snow with my family helps me reconnect with my roots. I learned to snowboard at Timberline Ski Area on Mount Hood, and retain magical memories of soaking in the snowy outdoor spa and pool and enjoying the breathtaking winter vistas.

16. Rising global temperatures caused by Federal Defendants as set forth in our Complaint are already affecting my ability to enjoy activities that require snow. Due to an historic lack of snow in the winter of 2014-2015, the Mt. Ashland Ski Area remained closed throughout the winter and resorted to making snow to be able to open in 2016. That winter, Mount Hood received

record low snowfall, and the Willamette Pass Resort was only open for a handful of days. As a result, my family was forced to cancel a planned skiing/snowboarding trip to the Willamette Pass Resort.

17. Every year since 2010, my family has rented a cabin in Bandon (on the Oregon Coast) for several days to a week. During these annual visits, I enjoy walking the shoreline and exploring the caves exposed by low tide. I want to be able to bring my own children to marvel at the sea stars and crabs in tidal pools. However, due to rising sea levels and changing ecology, this stretch of coastline and many of the species that inhabit it are projected to not be available for recreation and enjoyment by my family and me.

18. I vividly remember going on my first crabbing trip. The excitement of reeling in a pot full of the brilliantly colored crustaceans and then being able to cook and eat them fresh off the boat was unprecedented for me. The opening of the 2015 Dungeness crabbing season in Oregon was unusually delayed from its usual December 1st date and remained closed until Jan 4th due to an unprecedented toxic algae bloom that current research has linked directly to warmer ocean waters (McCabe, et al., 2016; McKibben, et al., 2017). In 2016, the crabbing season was delayed again due to another algae bloom. Ocean acidification resulting from carbon dioxide pollution, and its

absorption in the oceans, is also endangering the survival of the crabs and all the shellfish that I consume.

19. In addition to crab fishing, which I intend to continue if possible, my family and I receive monthly deliveries of fresh seafood from Port Orford Sustainable Seafood. These deliveries form an integral part of my regular diet and include Dungeness crab and clams. During the winter of 2015, we were told there would be no crab available for Christmas.

20. My family and I also often procure a permit to harvest mussels from seashore rocks in Bandon, Oregon. However, algal bloom biotoxins are forcing Oregon officials to restrict mussel harvesting for longer and longer periods. It is not easy for me to find a time for a seaside trip when the mussels are safe to eat. Furthermore, oyster, mussel, and clam populations are already shrinking due to ocean acidification and lack of oxygen. The effects of ocean acidification and ocean warming stemming from Federal Defendants' actions are already affecting my food supply and my ability to personally participate in activities such as crab-fishing and mussel gathering.

21. The expansion and creation of new fossil fuel infrastructure, such as the proposed Jordan Cove Liquefied Natural Gas ("LNG") Project in Southern Oregon, made possible by Federal Defendant's energy policies, also threaten my family's Farm and my way of life. The Canadian company responsible

for this proposed LNG project obtained an LNG export authorization from Federal Defendant Department of Energy under the Energy Policy Act, which did not allow for any public participation or any consideration of my fundamental rights or the public interest.

22. The border of the Farm is located approximately one mile from the route of the proposed Pacific Connector Pipeline, which would carry the natural gas necessary for Jordan Cove's LNG export facility. If built, the pipeline and the associated 100-150 foot-wide clear-cut may be visible from scenic points on the Farm where I regularly hike and pose dangers to the hundreds of Oregon waterways it would cross. This would cause me significant emotional distress and harm my enjoyment of the Farm.

23. According to testimony by oyster farmers such as Lili Clausen of Coos Bay, silt and water conditions that would be created by construction of the Pacific Connector Pipeline and Jordan Cove LNG factory would harm oyster beds. The oysters that I eat are mostly bought locally in Coos Bay and construction of this project would harm this important food supply.

24. If built, Jordan Cove would be the single largest emitter of greenhouse gases in Oregon once the coal-fired Boardman Power Plant closes in 2020. The pipeline would require a clear-cut through old-growth, carbon sequestering

forests. This project would contribute to climate change and worsen its impacts on my life.

25. The danger of explosions along the length of the Pacific Connector Pipeline would heighten the risk of a wildfire starting nearby to the Farm. Williams Pipeline, the company that would build the pipeline, has already had explosion incidents on its pipelines. Coupled with already severe fire seasons and drought conditions, the Pacific Connector Pipeline would put my family's Farm in constant danger. These extreme climate conditions created by Defendants and the continuation of fossil fuel production projects such as Jordan Cove are harming my daily life and personal security, as well as my future ability to enjoy and sustain myself into the future.

I certify under penalty of perjury in accordance with the laws of the State of Oregon, and to the best of my knowledge, that the foregoing is true and correct.

DATED this 28th day of August, 2017 at Roseburg, Oregon.

Jacob Lebel

JACOB LEBEL

REFERENCES

Dalton, M.M, K.D. Dello, L. Hawkins, P.W. Mote, and D.E. Rupp (2017). The Third Oregon Climate Assessment Report, Oregon Climate Change Research Institute, College of Earth, Ocean and Atmospheric Sciences, Oregon State University, Corvallis, OR.
http://www.occri.net/media/1042/ocar3_final_125_web.pdf

McCabe, R. M., B. M. Hickey, R. M. Kudela, K. A. Lefebvre, N. G. Adams, B. D. Bill, F. M. D. Gulland, R. E. Thomson, W. P. Cochlan, and V. L. Trainer (2016), An unprecedented coastwide toxic algal bloom linked to anomalous ocean conditions, Geophys. Res. Lett., 43, 10,366–10,376, doi:10.1002/2016GL070023.

McKibben, S. Morgaine; Peterson, William; Wood, A. Michelle; Trainer, Vera L.; Hunter, Matthew; and White, Angelicque; 2017. Climatic regulation of the neurotoxin domoic acid, PNAS 2017 114 (2) 239 244; http://www.pnas.org/content/114/2/239.full.

Westerling, Anthony LeRoy, 2016. Increasing western US forest wildfire activity: sensitivity to changes in the timing of spring; in: Phil. Trans. R. Soc. B 371: 20150178. http://rstb.royalsocietypublishing.org/content/371/1696/20150178.

Case No. 17-71692

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In re: UNITED STATES OF AMERICA

UNITED STATES OF AMERICA, *et al*.,
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UNITED STATES DISTRICT COURT FOR
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and

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Real Parties in Interest

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

DECLARATION OF LEVI D. IN SUPPORT OF ANSWER OF REAL PARTIES IN INTEREST TO PETITION FOR WRIT OF MANDAMUS

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Attorneys for Real Parties in Interest

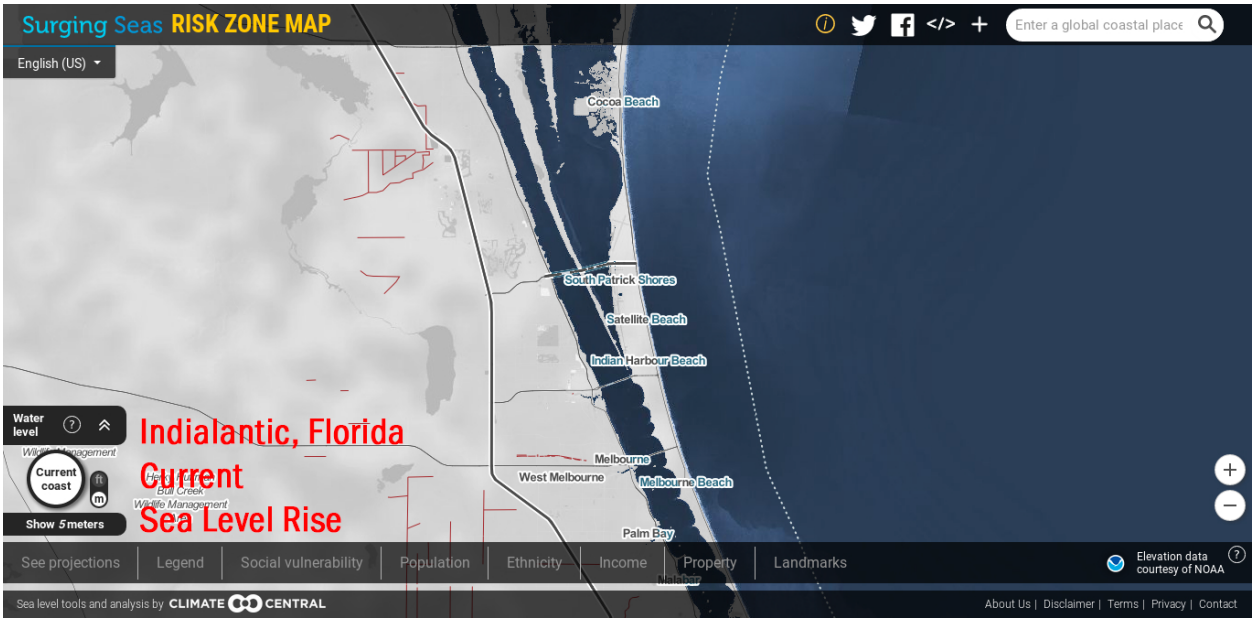
I, Levi D., hereby declare as follows:

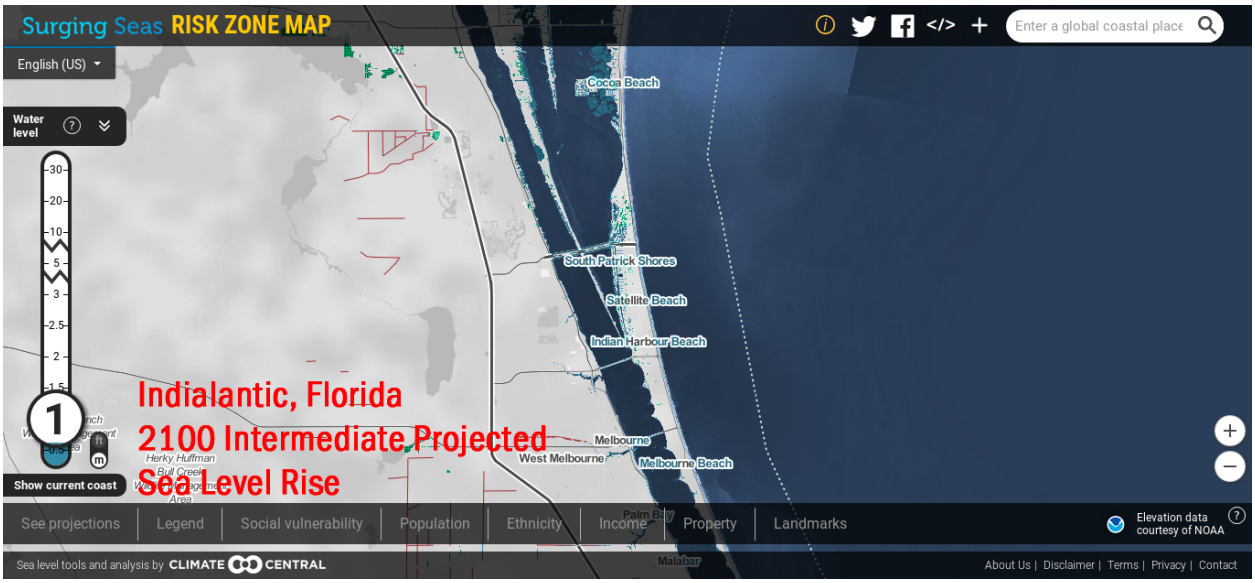
1. I am a 10-year-old citizen of the United States and resident of Satellite Beach, Florida. I live with my mom and her boyfriend in a duplex that we rent in Satellite Beach, Florida. Our home is right about at sea level and is located about one mile from the Atlantic Ocean and only half a mile from the Indian River Lagoon. Satellite Beach is a town on a barrier island that separates the Indian River Lagoon from the Atlantic Ocean. The barrier island is made up of unconsolidated sand that sits on top of porous limestone bedrock.

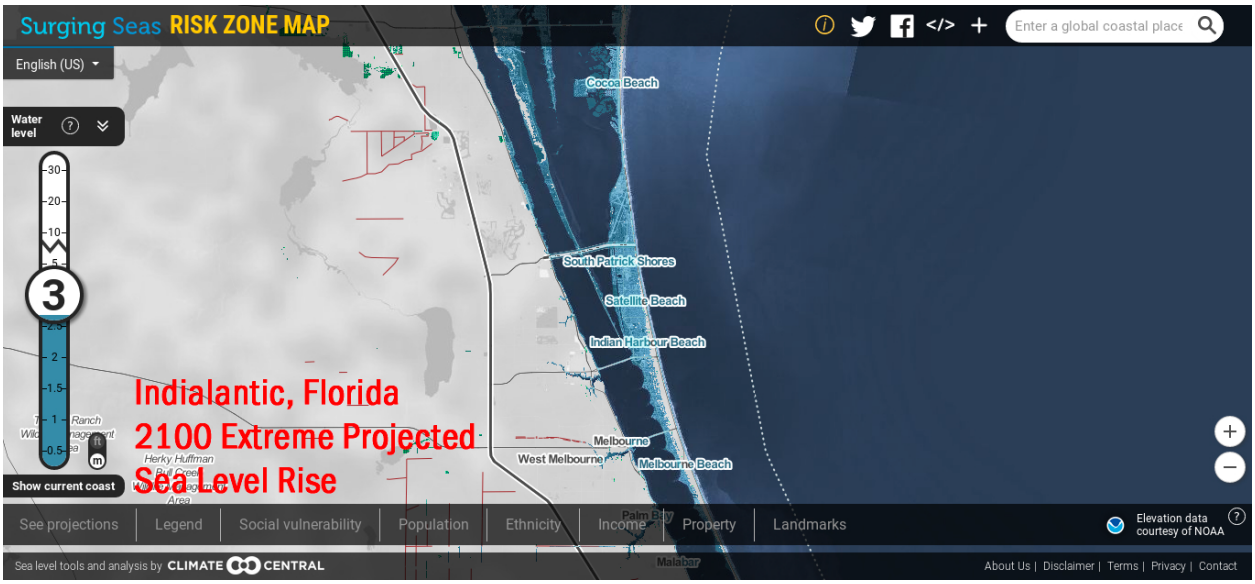
2. My grandparents (my mom's parents) live about four miles to the south of me in Indialantic, a city on the same barrier island as Satellite Beach. They have owned their property since 2005, before I was born. My mom and I used to live with them until recently and I still visit them several times a week. Their home is also right at sea level and is located about half a mile from the Atlantic Ocean and a quarter mile from the Indian River Lagoon.

3. I have been provided maps created by Dr. James Hansen, one of the expert witnesses supporting my case, that show how sea level rise could affect my home in Satellite Beach. Dr. Hansen says that the ocean may be at my doorstep within a few decades, and that my home may be full of water by

the end of this century and completely underwater by 2200 if emissions don't decrease. *See* maps of sea level rise *infra* at 3-5.



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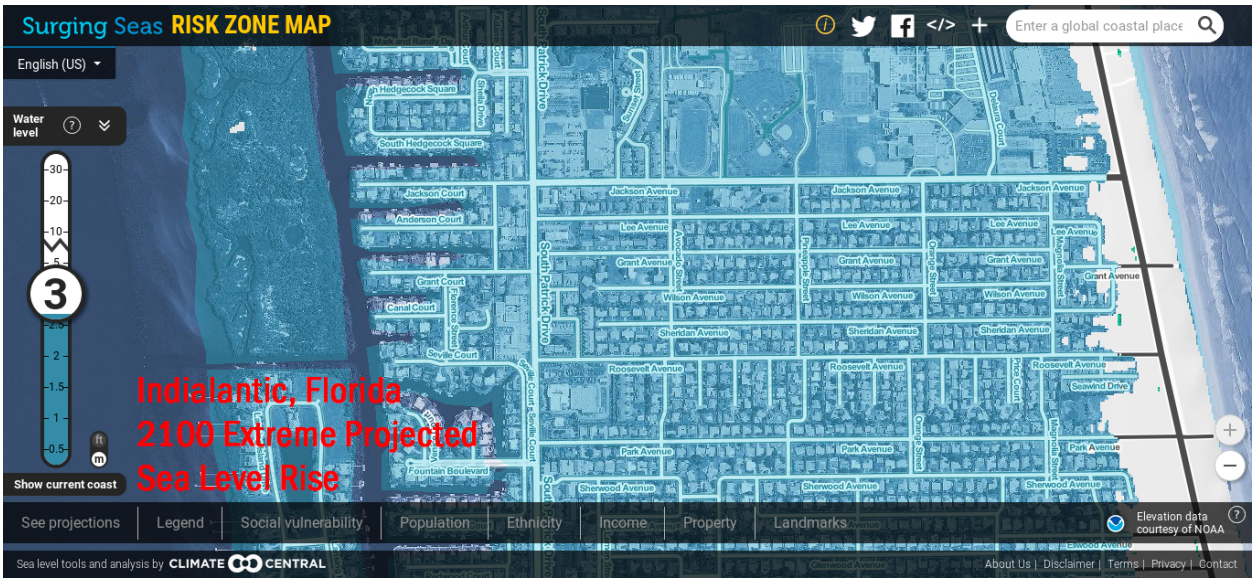
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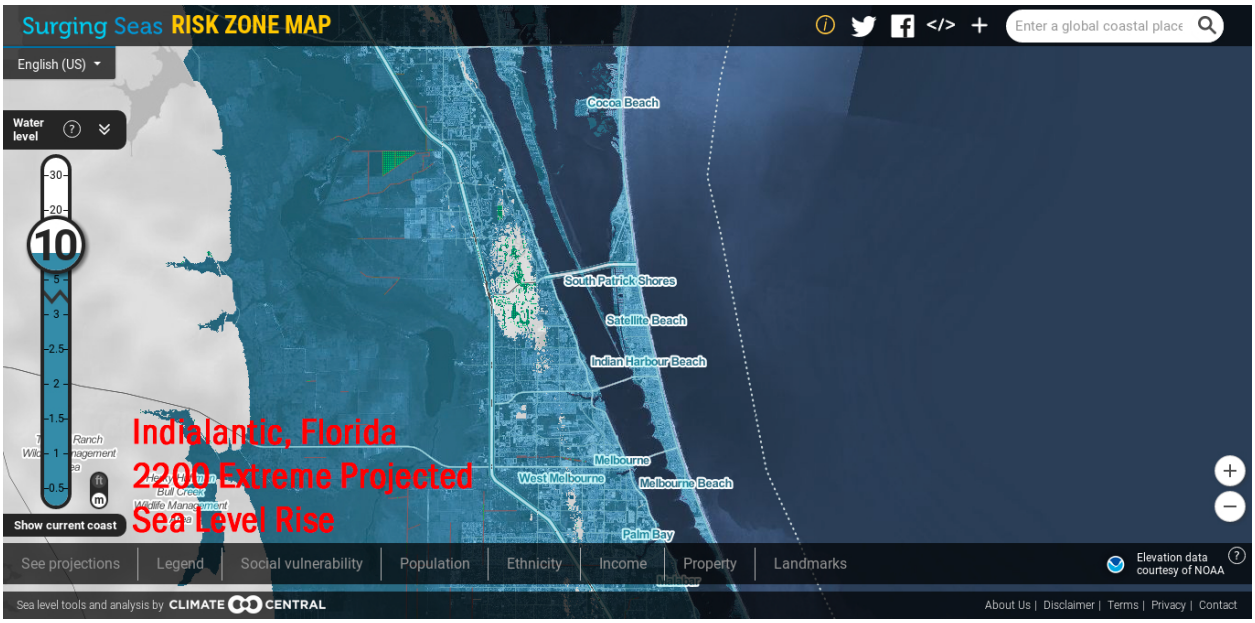

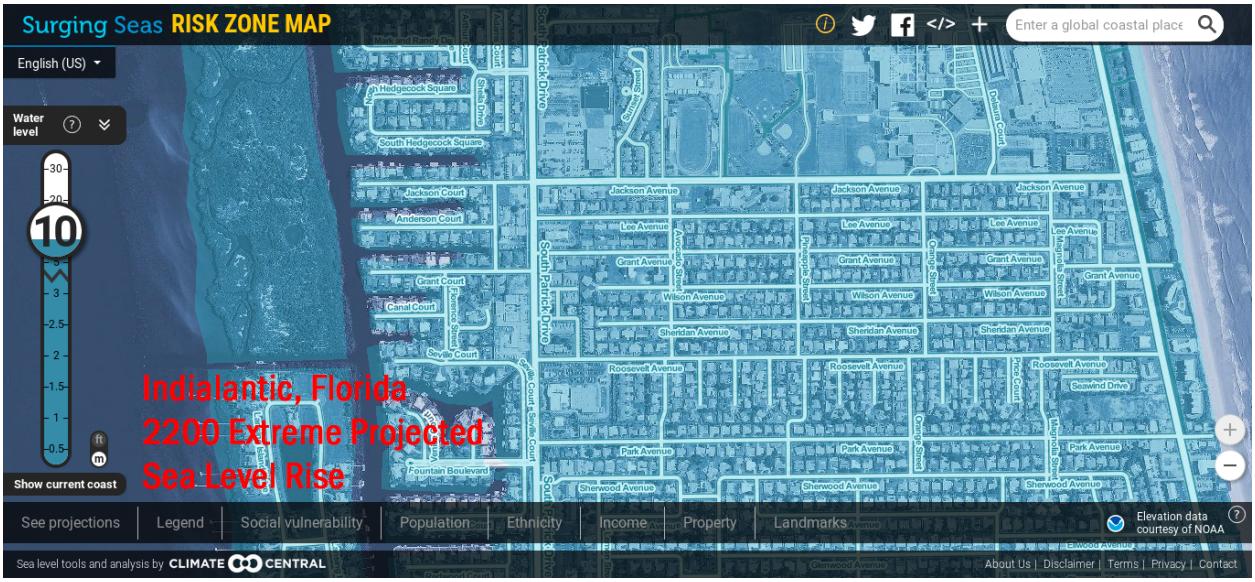

4. I am already being harmed by the impacts of climate change caused by my government, these Defendants.

5. I have recurring nightmares about the impacts of climate change on my home. In these nightmares, the barrier island and beaches are destroyed, and I can't figure out where I am or where I should go. It's dark and there are

piles of leaves, sticks, and broken cars. I'm on the beach and there's nobody around me. I see rubble and wonder where my family and everyone else is. I wake up with a feeling of falling, and only then realize that I'm not standing on the beach and that it was just a dream.

6. I am anxious, sad, and angry about the current and future effects of climate change on my home and my community. I feel unsafe and fear that I will lose my barrier-island home and the beaches I love to visit because of rising sea level if these Defendants do not begin to reduce greenhouse gas emissions right now, by a lot, and slow the effects of climate change.

7. The beach on the barrier island is my backyard and is the place that I feel most connected to. Year round, I spend time playing in the forests near the beach, swimming, boogie boarding, and learning how to surf at the beach five days a week. In the last couple of years, I've noticed a Sargassum seaweed invasion, with seaweed covering the beach on the barrier island in my backyard. Climate change is likely the cause of the seaweed increase. I'm now having a hard time enjoying beach activities because the rotting seaweed sometimes smells like sulfur.

8. I have also seen the negative effects of climate impacts on other parts of the beach environment that I love. There are fewer sea turtles in the area, which I used to enjoy watching. 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 and dead fish. My family and I are able to smell the dead fish in our community whenever there is a fish kill.

9. Satellite Beach and Indialantic both have "worm rock" reefs along their coastlines. These reefs are habitat for sea turtles and other marine life that I love. Because of beach erosion from sea level rise, new sand has been

poured along the coast, but the new sand hurts the existing reef. An artificial reef was also built further offshore in the hopes that sea life would use it instead of the natural reef, but it just isn't the same. It is much deeper and is made of cement with some natural rock stuck into it, so it looks really different compared to a natural limestone reef.

10. I have learned that the City of Satellite Beach did a study in 2010 that showed our City is threatened by sea level rise and needs to plan for its impacts. The barrier island's real estate prices are declining. The value of my grandparents' home, which they own, has decreased in value, and could eventually be lost completely, due to sea level rise caused by warming temperatures and melting ice caused by climate change. This would be really hard for me because I spend so much time there and want to continue to live in this area where I have grown up.

11. I love to experience nature and wilderness in healthy conditions. I'm scared about how climate change impacts and ocean acidification will continue to harm the beaches and springs in Florida and the wildlife that inhabit them. I can already notice the beaches around me getting smaller because of sea level rise. The reason why I care so much is I basically grew up on the beach. It is like another mother, sort of, to me.

12. I am also experiencing other effects of climate change. During the summer of 2015, I experienced a lack of rainfall that the island usually receives in the afternoons. Also, temperatures were abnormally hot, making it much harder than normal for my family to grow vegetables and herbs. This is happening more and more as the planet heats up.

13. In the last three years, increased temperatures have caused my allergies to be much more severe, making it harder for me to spend time outdoors.

14. I was forced to evacuate my home and island when Hurricane Matthew arrived in October 2016. We were warned that if the hurricane hit full on, our roof would likely be ripped off. Before evacuation, we used sandbags and taped windows and doors to prevent water damage to our home. Sandbags available in Satellite Beach from businesses and the government ran out, leading many people to scoop sand into grocery bags from the beach and dunes. We were fortunate to already have sandbags to protect our home.

15. On October 7th, while I was waiting out the hurricane in Gainesville, Florida, I saw on the news that South Tropical Trail, a road on Merritt Island, another smaller barrier island between our barrier island and the mainland in the Indian River Lagoon, was entirely submerged by the Indian River Lagoon storm surge. Seeing this on the news was scary for me because the location is close to my house in Satellite Beach.

16. While I was away, my house in Satellite Beach was without power from October 7th until the 10th. Over one inch of water flooded our house and our neighbor's home burnt to the ground after a falling tree hit a power line and ignited a fire. The fire could not be put out because the water plant on the

mainland had been shut down during the storm to encourage people to evacuate the barrier reef.

17. The hurricane caused erosion and left a lot of debris on the beaches I visit.

18. I'm worried that the barrier island won't exist when I'm older and when my future kids grow up. I fear that my own kids won't see where I grew up and the things that I enjoyed. I also worry that other parts of Florida will be under water during my life and that the melting ice caps will harm other people around the planet.

19. Me and my family have already been harmed by climate change impacts. I desperately need the government to stop making the climate crisis worse so that I have a chance to stay on our barrier island. Without changes, I'm afraid I'll lose my home during my lifetime and that my nightmares will become real. These Defendants may not have to wake up to that reality, but me and my children will if we don't do something to stop climate change soon.

I certify under penalty of perjury in accordance with the laws of the State of Florida, and to the best of my knowledge, that the foregoing is true and correct.

DATED this 28th day of August, 2017, at Satellite Beach, Florida.

LEVI D

LEVI D.