September 22, 2014

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of the Chief Information Officer
High Performance Computing and Communications
Attn: Ms. Wendy Schumacher
NOAA Freedom of Information Officer
Public Reference Facility (SOU1000)
1315 East-West Highway (SSMC3)
Room 9719
Silver Spring, Maryland 20910

Re: Filing of New ITSSD FOIA Request
Withdrawal of FOIA Request No. DOC-NOAA-2014-000714

Dear Ms. Schumacher:

This new ITSSD FOIA Request is the follow-up to our conference call of June 12, 2014 with yourself and NOAA Office of General Counsel representative Roxie Allison-Holman.

The purpose of this call was to address the National Oceanic and Atmospheric Administration ("NOAA")'s confusion(s) concerning the scope and focus of current ITSSD FOIA Request No. NOAA-HQ-2014-000714,[1] particularly, its relevance to the FOIA Requests ITSSD has filed with the Environmental Protection Agency ("EPA"),[2] notwithstanding the previous filing by ITSSD of a (NOAA) FOIA Request Clarification,[3] that, we submit, satisfied NOAA's concerns.

To help resolve NOAA's confusion(s) regarding these and related issues, ITSSD hereby files this new FOIA Request to supersede the current ITSSD FOIA Request, Docket No. NOAA-HQ-2014-000714, as supplemented by the May 5, 2014 FOIA Request Clarification, which are each hereby simultaneously withdrawn (without prejudice).

And, to further assist NOAA national FOIA officials in identifying and locating the requested records, this new ITSSD FOIA Request includes several additional resources. For example, it includes an "Explanation" section containing the relevant applicable statutory (Information Quality Act ("IQA")) and administrative (Office of Management and Budget ("OMB") and NOAA) IQA-implementing guideline provisions. In also includes and incorporates an "Annotated Addendum" discussing the IQA compliance of NOAA and NOAA third-party contractor peer review practices, as well as, numerous annotated Appendices containing relevant supporting information.

Furthermore, ITSSD will file under separate cover, by the close of business Monday, September 22, 2014, a new annotated ITSSD FOIA Fee Waiver Request relating to this new FOIA request. When filed, the new FOIA Fee Waiver Request will supersede ITSSD's current FOIA Fee Waiver Request and Clarification which will then be simultaneously withdrawn (without prejudice).

ITSSD hereby requests and shall look forward to receiving a response to this new FOIA Request and to the accompanying Fee Waiver Request to be filed later today as noted above, within twenty (20) working days as provided by law. If ITSSD's request is denied in whole or in part, it requests disclosure of segregable portions and a *Vaughn v. Rosen* index justifying the withholding of non-segregable information.

We thank you for your prompt attention to this matter.

Very truly yours,

Lawrence A. Kogan

Lawrence A. Kogan

CEO
ITSSD

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ITSSD FOIA REQUEST
ANNOTATED ADDENDUM

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ITSSD FOIA REQUEST

I. Scope and Focus of this New FOIA Request

ITSSD files this new NOAA FOIA Request with the clear understanding that NOAA is obligated to release information regarding a peer review if it receives a Freedom of Information Act request, unless such information satisfies the criteria for a FOIA exemption.

This new FOIA request seeks disclosure of all:

> "NOAA climate science-related peer review files" (hereinafter referred to as "NOAA Peer Review Records" ("NPRRs") and defined in Section III of this FOIA Request) created, transmitted, stored and/or archived from January 1, 2005 through December 31, 2011, substantiating the specific measures NOAA had taken, consistent with the most rigorous and least discretionary standards applicable to "highly influential scientific assessments" ("HISAs") and "influential scientific information" ("ISI") imposed by the Information Quality Act ("IQA")[4] and relevant Office of Management and Budget ("OMB")[5] and NOAA IQA-implementing guidelines,[6] to ensure the quality, integrity and reliability of all NOAA (including NOAA-established federal advisory committee)-developed climate science-related assessments and reports, including those containing NOAA and third party-developed computer models and related datasets and specific applications thereof, that the US Global Change Research Program/Climate Change Science Program ("USGCRP/CCSP", including its subsidiary bodies) or the National Research Council of the National Academies of Science ("NRC"[7]) had peer reviewed, and that the Environmental Protection Agency ("EPA")-developed Technical Support Document ("EPA-TSD") accompanying the EPA Administrator's Clean Air Act Section 202(a)(1) greenhouse gas ("GHG") Endangerment and Cause or Contribute Findings ("EPA's CAA Section 202(a)(1) Findings") had designated directly and indirectly (at Table 1.1, p. 6 thereof)[8] as "core reference documents",[9] which assessments and reports NOAA *knew or had reason to know* the EPA Administrator would evaluate and use in reaching its CAA Section 202(a)(1) Findings."[10]

The records NOAA is to disclose in response to this FOIA Request are relevant for purposes of establishing the degree to which NOAA third-party-contractors' peer review of specific NOAA-developed climate assessments legally conformed with the Information Quality Act's highest and least discretionary peer review, transparency, objectivity/bias, independence and conflicts-of-interest standards applicable to highly influential scientific assessments ("HISAs"). In addition, NOAA's disclosure of such records also serves another legal purpose: to provide an evidentiary chain of evidence establishing the degree to which EPA's endorsement, adoption, use and public dissemination of NOAA-developed climate assessments as the scientific foundation for its 2009 CAA Section 202(a)(1) GHG Endangerment Findings legally conformed with such IQA standards. ITSSD previously discussed the relevance of this (then forthcoming) NOAA FOIA Request in the Explanation and Analysis sections of "Category #2 Records" within the new FOIA Request ITSSD filed with EPA on June 30, 2014.[11]

1. NOAA Bore 'Lead Agency' Development Responsibilities and Legal IQA Compliance Obligations for USGCRP/CCSP SAPs and Assessments and Agency Climate Reports the

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Satisfaction of Which NOAA *Knew or Had Reason to Know* the USGCRP/CCSP Would Rely Upon as the Basis for Approving their Public Dissemination

The scope of this new NOAA FOIA Request encompasses NOAA peer review records covering ten (10) critical NOAA-developed documents for which NOAA had borne "lead agency" development, peer review and IQA legal compliance responsibilities under the USGCRP/CCSP, and upon which the EPA Administrator had relied as the scientific foundation for its 2009 CAA Section 202(a)(1) GHG Endangerment Findings. NOAA had developed at least seven (7) climate science-related assessments and reports that the EPA-TSD accompanying said Findings had designated as "core reference documents". NOAA also had developed three (3) additional climate science related assessments which the EPA-TSD had *not* designated as core reference documents, but which NOAA, nevertheless, had incorporated-by-reference within one of the seven (7) EPA-TSD-designated "core reference documents."

More specifically, Table 1.1 of the EPA-TSD designated five (5) synthetic assessment reports ("SAPs") that NOAA had developed under the auspices of the USGCRP/CCSP as "core reference documents." As set forth in Appendix 1A[12] accompanying this new FOIA Request, these SAPs included: SAP1.1/CCSP(2006);[13] SAP1.3/CCSP(2008g);[14] SAP2.4/CCSP(2008h);[15] SAP3.2/CCSP(2008d);[16] and SAP3.3/CCSP(2008i).[17]

Appendix 1A also shows that the USGCRP/CCSP had delegated NOAA "lead agency" responsibility for the development of three additional SAPs which the EPA-TSD did not designate as "core reference documents". These documents include: SAP2.2/CCSP(2007);[18] SAP5.2/CCSP(2009);[19] and SAP5.3/CCSP(2008).[20]

Furthermore, Appendix 1A identifies two other DOC-NOAA-developed reports and assessments – *Global Climate Change Impacts in the United States* (herein referred to as the Second National Climate Assessment) or ("NCA2-2009")[21] and *State of the Climate in 2008* ("SOC-2008")[22] – that Table 1.1 of the EPA-TSD also had designated as "core reference documents. NOAA had prepared NCA2-2009, which had been a synthesis of and "largely based on results of the U.S. Global Change Research Program (USGCRP),"[23] under the auspices of the USGCRP/CCSP. NOAA had, for good measure, ensured that *all* of the USGCRP/CCSP SAPs (including the three the EPA-TSD had not designated as core reference documents (SAPs 2.2, 5.2 and 5.3)) were incorporated-by-reference within said report.

In all, NOAA had developed ten (10) climate science-related assessments/reports that the EPA-TSD directly and indirectly designated as "core reference documents" because they all served as primary scientific support for the EPA Administrator's CAA Section 202(a)(1) GHG Endangerment Findings.

As previously noted, NOAA, as a participating federal agency in the interagency USGCRP/CCSP, had been designated as "lead development agency" for the development, peer review, production, release and dissemination of ten (10) NOAA-developed documents, including eight (8) synthetic assessment products ("SAPs") and one other national climate assessment/report. According to the still valid interagency "Guidelines for Producing CCSP Synthesis and Assessment Products",[24] any participating federal agency the USGCRP/CCSP had designated as a "lead development agency" for a synthesis and assessment product(s) bore full responsibility for not only for the development, peer review and production/release of such product(s), but also for the Information Quality Act legal compliance of each such product(s). This means, for all intents and purposes, that the USGCRP/CCSP considered each lead development agency as the disseminator of the SAPs for IQA purposes.

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> "One or more designated CCSP agency(ies) or department(s) will take the lead in *producing* each product. The lead agency(ies) will be responsible for developing an open and transparent process for soliciting user input, author nomination and selection, expert peer review and public comment, and *production/release of the products*, as described in these guidelines […] Any agency sponsoring or contributing to the development of a product *must certify that the agency's contribution satisfies its Information Quality Guidelines*" (emphasis added).[25]

These guidelines correspondingly limited the responsibility of the USGCRP/CCSP with respect to such products to a mere production *oversight* role.[26] Consequently, the guidelines, as subsequently clarified, emphasized that the USGCRP/CCSP Interagency Committee and President's Council on Environment, Natural Resources and Sustainability (CENRS) clearance determination "*will rely* on the lead agency's certification regarding compliance with CCSP's 'Guidelines for Producing Synthesis and Assessment Products,' FACA, and IQA (including the Bulletin for Peer Review) (emphasis added)."[27] To this end, the guidelines required the 'lead agency' certification to be accompanied by "a memorandum briefly indicating that

> *"the product was prepared in compliance with CCSP's Guidelines for Producing Synthesis and Assessment Products, the Information Quality Act (Section 515) and [LEAD AGENCY'S] corresponding IQA guidelines; and the Federal Advisory Committee Act [when applicable]"*(emphasis in original).[28]

The interagency USGCRP/CCSP guidelines, in other words, strongly suggest that NOAA *knew or had reason to know* the USGCRP/CCSP would rely upon the certifications of IQA compliance that NOAA would submit as the "public dissemination agency" with respect to the SAPs (SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, 5.3) and the assessment (NCA2-2009) for which NOAA had borne "lead agency" USGCRP/CCSP development responsibilities. NOAA also knew such IQA legal compliance obligation was commensurate with that which NOAA also bore at the agency level with respect to the *State of the Climate in 2008* (SOC-2008) report it had developed and disseminated to the public.

2. NOAA *Knew or Had Reason to Know* the EPA Administrator Would Evaluate and Rely, in Part, Upon These Agency-Developed USGCRP/CCSP SAPs and Assessment and its SOC-2008 Report as the Scientific Foundation for EPA's CAA Section 202(a)(1) GHG Endangerment Findings

The following discussion sets forth evidence countering three statements made by NOAA Office of General Counsel ("NOAA-OGC") representative Roxie Allison-Holman during the NOAA-ITSSD June 12, 2014 conference call.

During that conference call, NOAA-OGC representative Allison-Holman had expressed confusion to ITSSD regarding why ITSSD had included the italicized language above in its prior FOIA Request Clarification of May 5, 2014. She remarkably stated (as reproduced above from contemporaneous ITSSD notes taken during this conference call) that *"NOAA doesn't know what EPA does or doesn't do"* and that *"NOAA had no idea that NOAA assessments would be used by EPA."* Also, during said conference call, ITSSD had responded by pointing out that senior NOAA officials Thomas Karl and Susan Solomon had been integrally involved with the development of multiple synthetic assessment products for which NOAA had been delegated lead agency development responsibilities by the interagency USGCRP/CCSP that the EPA ultimately used as support for the Administrator's Final CAA Section 202(a)(1) Endangerment Findings.

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In addition, ITSSD had responded that these senior DOC-NOAA officials had participated as members of an interagency team of "expert reviewers" that had peer reviewed the EPA-TSD, which had designated most of these documents as "core reference documents". Nevertheless, NOAA's Ms. Allison-Holman responded that *"Susan Solomon would not know EPA would use [those assessments] for the endangerment finding."*

Had NOAA-OGC representative Ms. Allison-Holman been permitted to be more truthful, ITSSD would not now be placed in the uncomfortable position of having to directly discredit her quoted statements.

a. *NOAA's Key Role in the USGCRP/CCSP and as the De Facto Lead U.S. Federal Agency on Climate Change Science*

NOAA, a leading participant in the White House operated U.S. Global Change Research Program/Climate Science Program ("USGCRP/CCSP"), and the *de facto* lead U.S. federal agency on climate change science,[29] also *knew or had reason to know* the EPA Administrator would use these documents in undertaking the required CAA Section 202(a)(1) GHG endangerment analysis, as determined by the U.S. Supreme Court in *Massachusetts v. EPA*,[30] and as scientific support for the positive endangerment findings EPA ultimately reached. EPA's GHG Endangerment Findings have since served as the scientific basis for wave after wave of federal register-notified economically significant and burdensome GHG emissions control regulations, including: 1) GHG tailpipe emissions rules;[31] 2) prevention of significant deterioration and Title V GHG tailoring rules for stationary source facilities;[32] 3) proposed new source performance standards for CO2 emissions potentially applicable to new "fossil fuel-fired electric utility generating units;"[33] and 4) proposed carbon pollution emission guidelines for existing electric utility general units.[34]

The USGCRP/CCSP is lodged in the Executive Office of the President (i.e., White House). It is: 1) "a confederation of the research arms of 13 Federal agencies,[35] which carry out research and develop and maintain capabilities that support the Nation's response to global change[;]"[36] and 2) "steered by the Subcommittee on Global Change Research (SGCR) of the National Science and Technology Council's Committee on Environment, Natural Resources, and Sustainability (CENRS), and overseen by the White House Office of Science and Technology Policy (OSTP)."[37] The current Chair of the SGCR is Thomas Karl,[38] director of NOAA's National Climatic Data Center. Thomas Karl had previously served as NOAA's Lead Agency Principal Representative to the USGCRP/CCSP and NOAA's Product Lead for the NCA2-2009.[39]

Aside from its key agency role in the USGCRP/CCSP during 2005-2009, NOAA also had "sponsored and participated in…the [2010] America's Climate Choices (ACC) study…conducted by the National Research Council."[40] Indeed, "[b]ased on the leadership roles that NOAA ha[d] held in the past, the White House [has] continue[d] to turn to NOAA to fill leadership appointments on interagency climate committees and working groups."[41]

NOAA's Science Advisory Board ("SAB")[42] and this Administration have long expressed interest in reorganizing NOAA and installing it as the lead federal agency in a proposed U.S. National Climate Service ("NCS");[43] congressional funding for the formation of an NCS, however, has not yet moved forward due to various ongoing concerns.[44] Since at least 2008, NOAA's SAB had identified NOAA as the most logical candidate to head such an effort because it "has more of the attributes and mandates within the domain of the physical climate system to play the lead role."[45] These attributes and mandates include its: "[p]redictive capacity of atmospheric and oceanic changes and long-term observations, which is already recognized as part of NOAA's mission; [a] mandate to operate at both the domestic and international level; [e]stablished relationships that exist with major stakeholders; [s]ophisticated scientific and computational infrastructure that is already in

place; [t]he ability to build on existing capability rather than require a new bureaucracy be developed; [s]trong interest within agency for development of climate service; and [o]ffices well represented regionally, which enhances to ability for extension and outreach, as well as coordination with partners."[46]

b. *NOAA and EPA Have Longstanding Interagency Agreements on Climate Change*

With regard to Ms. Allison-Holman's first two quoted statements (*"NOAA doesn't know what EPA does or doesn't do"* and *"NOAA had no idea that NOAA assessments would be used by EPA"*), minimal due diligence reveals that EPA and NOAA had previously entered into a Memorandum of Understanding (MOU) on Air Quality Research[47] and a parallel Memorandum of Agreement (MOA) on Air Quality Forecasting[48] signed by the Deputy Secretary of Commerce and EPA Administrator on May 6, 2003. These agreements implemented longstanding Interagency Agreements DW13938483 and DW13948634 entered into between EPA and NOAA in 1955.[49] Pursuant to the "Climate Impact on Regional Air Quality (CIRAQ)" project[50] falling under the auspices of these agreements, EPA and NOAA jointly developed computer models for the purpose of not only identifying and assessing the parameters of regional air quality, but also the impacts of climate change on regional air quality.[51]

> "*The objective of this work is to investigate the impact of global climate change on the regional air quality of the United States*. Impacts of climate change on meteorological patterns and primary source emissions are investigated as primary elements influencing future air quality" (emphasis added).[52]

In fact, between 2004 and 2008, NOAA and EPA had conducted a number of joint agency seminars in the United States and Europe discussing their regional air and water quality research findings under the CIRAQ project which included information about EPA's Community Multiscale Air Quality ("CMAQ") modeling system incorporating NOAA, NASA and other climate data inputs.[53] [54] [55] [56] [57] [58] [59] [60] [61] [62] [63] [64]

c. *The Impact that Susan Solomon's Ozone-Hole and Climate Change Research and Findings Have Had Upon Ozone and Climate Policymaking and Diplomacy*

With regard to Mr. Allison-Holman's third quoted statement (*"Susan Solomon would not know EPA would use [those assessments] for the endangerment finding"*), ITSSD provides the following response.

Minimal due diligence reveals that Susan Solomon was formerly a senior NOAA scientist[65] of atmospheric chemistry. While serving as a NOAA employee from 2002-2007, Ms. Solomon also had worked on IPCC matters"[66] [67] as Co-Chair of the Science Working Group I of the Intergovernmental Panel on Climate Change's Fourth Assessment Report ("IPCC-AR4-WGI").[68] [69] Such due diligence also reveals that Susan Solomon currently serves as MIT Professor,[70] University of Colorado Adjunct[71] and CIRES Fellow,[72] and National Academy of Science member.[73]

In addition, minimal due diligence reveals that Dr. Solomon is globally recognized for her prior research and findings suggesting that

> "the Antarctic ozone hole involved reactions on polar stratospheric clouds (PSCs) [that…] release chlorine molecules, which separate and act as catalysts in destroying ozone",[74] and that "the lack of ozone [leading] to increases in ultraviolet radiation […] also impacted on

> climate. In particular, the ozone hole has a clear effect on wind and rain patterns in the southern hemisphere."[75]

Although her ozone-hole research and findings "did not necessitate a precautionary approach" to managing ozone-depleting chemicals' manufacture and use,[76] Professor Solomon's work has long been credited by advocates of the politics, social values and interests-laden, information-framing and language-engineered new paradigm of postmodern *policy*-based "science" premised on the precautionary principle[77] (with its attendant focus on hazard rather than risk assessment and on plausible correlative rather than actual causal proof of harm) as providing *the* catharsis for "'knowledge brokers'" (whose "most important asset is their flair for translating science, often with a 'spin', into language accessible to decision-makers,")[78] to forge a discursive shift that successfully persuaded governments[79] to strengthen the 1985 United Nation Environment Program's Vienna Convention for the Protection of the Ozone Layer via adoption of the "landmark" 1989 Montreal Protocol on Substances that Deplete the Ozone Layer.[80] In fact, the Montreal Protocol[81] was the first international treaty to go into legal force that mandates national "precautionary measures" (without explicitly using the term "precautionary principle") to ensure against possible environmental harm.[82] [83]

Dr. Solomon's ozone-hole research and findings, which became well known amid then current deficient computer models, had been scientifically plausible but inconclusive.[84] [85] Although her research and findings "did not necessitate a precautionary approach" to managing ozone-depleting chemicals manufacture and use,[86] EPA and the State Department used them as the basis for an interagency and administration Montreal Protocol bargaining position "call[ing] for a 95 percent cutback of CFCs and halons by the year 2000."[87] [88] While Dr. Solomon was likely aware of how these agencies were then using her research and findings, she did not object. At least one commentator has emphasized that the U.S. negotiating position had been anchored by the radically new "precautionary orientation" of former EPA Administrator Lee Thomas[89] who supported the "chlorine-loading strategy [authored by] EPA "knowledge broker," John Hoffman, Chairman of the EPA's Stratospheric Protection task force.[90] [91] According to said commentator, the "strategic […] decision to shift the debate from ozone depletion to chlorine concentrations,"[92] based on Susan Solomon's research and findings, effectively served to "*shift[] the focus to the warming issue, and in general to the responsibility to the future*" (emphasis added),[93] which thereby transformed the debate from one of science to one of politics, philosophy and social responsibility.[94]

Clearly, while it had been reported that two of Dr. Solomon's close colleagues, atmospheric scientists Robert Watson and Daniel Albritton, had been "reluctant to commit themselves to concrete policy recommendations before *the [evidentiary] causes* of the Antarctica ozone hole were understood" (emphasis added),[95] it is nowhere recorded that Dr. Solomon, had objected to EPA's framing of the issue in this manner. Considering that such issue framing has since been characterized as "misleading because it implie[d] that all forms of chlorine are equally menacing to the ozone",[96] Dr. Solomon's apparent tacit acceptance of it at that time, for whatever reason (i.e., whether for the sake of interagency coherence or to support the administration's broader precautionary principle-based policy objectives),[97] raises serious questions about her professional commitment to *currently* ensure the integrity of climate science.

Indeed, these questions assume greater saliency today given the influential leadership role Professor Solomon had since exercised as Co-Chair of the IPCC-AR4-WGI in addressing climate change science issues at the global level, and her more recent noted contributions to climate change modeling. Minimal due diligence, for example, also reveals that Dr. Solomon has since been recognized for her contribution to the development of the two-dimensional chemical atmospheric *climate* computer model known as the Middle Atmosphere Model (NOCAR),[98] which "capture[s] the processes important for calculating globally averaged total ozone."[99] It also

reveals that Dr. Solomon has more recently been engaged in the development of an ozone-climate computer model to explain the relationship between carbon dioxide, decreases in tropical ozone and climate change.[100]

As discussed above, Dr. Solomon was likely aware of, but failed to object to EPA's 'spinning' of her inconclusive research and scientific findings to secure political support for the international adoption of the Montreal Protocol which, in turn, enabled subsequent enactment of parallel domestic legislation and EPA implementing regulations curtailing the manufacture and use of ozone-depleting chemicals. In addition, it is clear that Professor Solomon had served as Co-Chair of IPCC-AR4-WGI which produced a dramatic and politically influential report concluding that the global atmospheric concentrations of carbon dioxide had increased to their highest level in recorded human history by a wide margin, it was at least 90 percent certain that the cause of such CO2 increase was anthropogenic activities,[101] and that such CO2 concentrations are likely to lead to more frequent and more intense future hurricanes.[102] Dr. Solomon also had become well aware that IPCC and U.S. policymakers had designs to use this report to call for massive national cuts in greenhouse gas emissions to stabilize global GHG emissions.[103] She had likely became aware of such designs as early as 2001, following the withdrawal of her former NOAA-NMFS colleague and fish and oceans expert, John Everett, from the IPCC AR3 development process on science integrity grounds.[104] Thereafter, in 2005, another former NOAA-ML colleague, Dr. Christopher Landsea, very publicly withdrew as an IPCC-AR4-WGI chapter author, on science integrity grounds,[105] identifying IPCC lead author Kevin Trenberth of NCAR-NSF (mentioned in this new FOIA request) as the source of his concerns about the scientific integrity of the then forthcoming IPCC-AR4-WGI report.[106] And, Dr. Solomon also likely had become aware of other prominent U.S.[107] [108]and foreign[109] [110] scientists who had withdrawn from the IPCC AR2, AR3 or AR4 report development processes on similar alleged grounds.

Furthermore, the evidence clearly shows that, following her tenure as IPCC Co-Chair, Susan Solomon had served as one of only two senior NOAA officials (along with Thomas Karl) who participated as members of an interagency group "of twelve federal experts" charged with reviewing the EPA-TSD. As described above, and as set forth in Appendix 1A accompanying this new FOIA Request,[111] NOAA had developed ten (10) climate assessments and reports that the EPA-TSD directly and indirectly referenced as "core reference documents" supporting the EPA Administrator's CAA Section 202(a)(1) GHG Endangerment Findings. In fact, one of these assessments (SAP5.2/CCSP(2009)) specifically discussed how NOAA, EPA and other federal agencies should use language, decision methods and illustrations to frame and communicate to the public climate science uncertainties[112] and their policy implications, including through use of the postmodern precautionary principle which may be subjectively interpreted.[113] Apparently, SAP5.2's authors had learned from EPA's prior successful public use of discursive language to reframe the scientific uncertainties and policy implications surrounding Dr. Solomon's earlier inconclusive ozone-related research and findings in terms that persuaded others to call for precautionary measures to address the perceived adverse consequences flowing from ongoing manufacture and use of ozone-depleting chemicals.[114] [115]*

d. *The Inescapable Conclusion*

In light of the foregoing evidence, it is beyond credulity for Ms. Allison-Holman to have insisted that Susan Solomon, a senior NOAA official recognized for her expertise in atmospheric chemistry and ozone depleting chemicals' impacts on climate change,[116] "did not know" EPA would evaluate and likely use NOAA's USGCRP/CCSP and other assessments as support for its 2009 Clean Air Act Section 202(a)(1) Findings,[117]* in which findings former EPA Administrator Lisa Jackson interpreted that CAA provision as reflecting the precautionary principle.[118] Ms. Allison-Holman's statement is all the more disingenuous given the various 'peer reviewed' journal articles promoting use of the precautionary principle in NOAA regulations that this

administration's NOAA corporate and office lines have proudly posted on their respective websites.[119] [120] [121] [122] Consequently, the scope of this FOIA request shall focus on the peer review processes NOAA and its third-party contractors employed to validate each of the assessments described in the annotated Addendum accompanying this new FOIA request which NOAA *knew or had reason to know* the EPA Administrator would evaluate and use as scientific support for its CAA Section 202(a)(1) Findings.

II. Specific NOAA Files Requested

As stated more fully in Section I, this FOIA Request seeks specific disclosure of:

All "NOAA climate science-related peer review files" (hereinafter referred to as "NOAA Peer Review Records" ("NPRRs") and defined in Section III of this FOIA Request) created, transmitted, stored and/or archived from January 1, 2005 through December 31, 2011, substantiating the specific measures NOAA had taken, consistent with the most rigorous and least discretionary standards applicable to HISAs imposed by the IQA and relevant OMB and NOAA IQA-implementing guidelines, to ensure the quality, integrity and reliability of all NOAA-developed climate science-related assessments and reports that the USGCRP/CCSP or the NRC had peer reviewed, and that the EPA-TSD accompanying EPA's CAA Section 202(a)(1) Findings had designated as "core reference documents," which assessments and reports NOAA *knew or had reason to know* the EPA Administrator would evaluate and use in reaching its CAA Section 202(a)(1) findings.

Such files, more specifically, include *inter alia*:

1. All NOAA peer review records created, transmitted, stored and/or archived from January 1, 2005 through December 31, 2011, focusing on the IQA compliance of:
    a. Specific and detail peer review charges, instructions and disclosures issued by NOAA, the NAS/NRC and USGCRP/CCSP, *as <u>previously</u> set forth for public availability and access on NOAA websites*, including NOAA *Peer Review Plans* websites, to individual peer review panel members and/or second-level NRC review committee members in connection with such members' review of NOAA-developed climate science-related assessments and reports identified in Section III, including:
        i. Disclosure of information about NOAA's, the NAS/NRC's and the USGCRP/CCSP's peer reviewer selection process, including credentials, transparency and conflict-of-interest requirements;
        ii. Disclosure to prospective and selected peer review panelists of NOAA's, the NAS/NRC's, and the USGCRP/CCSP's requirement to prepare and deliver a peer review report describing the nature and scope of their review and their findings and conclusions, and containing the name of each peer reviewer and a brief description of his or her organizational affiliation, credentials and relevant experiences; and
        iii. Identification of scientific issues for and in-depth discussion of scientific issues with each peer reviewer and peer review panel;
    b. All comments NOAA had received from NAS/NRC and USGCRP/CCSP peer reviewers concerning *inter alia*:
        i. Methods and approaches NOAA could use to address scientific uncertainties and discuss the precautionary principle or precautionary approach within the individual NOAA-developed climate science-related assessments and reports;

ii. Methods, approaches and evidence needed to substantiate author statements within the individual NOAA-developed climate science-related assessments and reports;

c. All NOAA responses to comments made by NAS/NRC and USGCRP/CCSP peer reviewers of NOAA-developed climate science-related assessments and reports referred to above in Section I.1 of this new FOIA Request;

d. All copies of comments made by the appointed reviewers of the NAS/NRC Peer Review Panel Reports evaluating NOAA-developed assessments and reports pursuant to contracts entered into with NOAA and/or with other U.S. federal agencies on NOAA's behalf (e.g., NASA, NSF, DOC) relating to the NAS/NRC's peer review of SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3;

e. All public comments received by NOAA in response to the public draft of SAP2.2, made available for public comment via Federal Register Notice "I.D. 090706A (71 FR 54800, Sept. 19, 2006), identifying each comment submitted by commenter (public reviewer) name and entity affiliation (including government office and agency);

f. All author responses to the NRC Peer Review Panel Reports for SAPs 2.4, 5.2 and 5.3;

g. The peer review reports produced by NOAA and/or the USGCRP/CCSP, in summary and full versions, reflecting the comments, identities, affiliations and credentials of all individual peer reviewers selected to peer review the NOAA-developed and USGCRP/CCSP peer reviewed Unified Synthesis Product (i.e., Second National Climate Assessment – *Global Climate Change Impacts 2009* ("NCA2-2009")) and the NOAA-developed and peer reviewed *State of the Climate in 2008* Report ("SOC-2008"), and:

i. All NOAA comments/responses to peer reviewer comments;

ii. All author responses to NOAA comments/responses;

iii. All public comments received and NOAA and author responses thereto;

h. Selection criteria and identities of all members, including chairs, of each *ad hoc* federal advisory committee that NOAA established, operated and terminated during the period spanning from January 1, 2005 through December 31, 2011, in connection with the NOAA's development of synthetic assessment products under the USGCRP/CCSP, and the peer review, author/report development and/or advisory roles played by each such person, *including, but not limited to, the following*:

i. Climate Change Science Program (CCSP) Product Development Committee for Synthesis and Assessment Product 1.1 ("CPDC-S&A 1.1") (established 2005 and terminated 2006);

ii. Climate Change Science Program CCSP Product Development Committee for Synthesis and Assessment Product 1.3 ("CPDC-S&A 1.3") (established 2006 and terminated 2009);

iii. Climate Change Science Program (CCSP) Product Development Committee for Synthesis and Assessment Product 3.3 ("CPDC–S&A 3.3") (established and terminated 2008);

iv. CCSP Product Development Committee for Synthesis and Assessment Product 5.3 ("CPDC-S&A 5.3") (established 2006 and terminated 2009); and

v. CCSP Unified Synthesis Product Development Committee ("USPDC") (established 2008 and terminated 2009);

i. Records focusing on the processes and procedures NOAA and its third-party peer reviewer contractors (the NAS/NRC and the USGCRP/CCSP) employed to constitute

panels to peer review drafts of SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, 5.3, SOC-2008 and NCA2-2009, including:

i. Criteria used and actions taken to identify and assess the professional credentials and relevant experience of prospective peer reviewers;

ii. Tests and reviews performed to evaluate the adequacy of peer reviewer candidates' prior peer reviews;

iii. Criteria used and actions taken to identify, assess, disclose and resolve apparent and actual individual and institutional financial[123] and non-financial conflicts-of-interest potentially and actually arising from:

A. Prospective peer reviewers' employment at or consulting arrangements with NOAA and other federal agency joint developers of SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, 5.3, SOC-2008 and NCA2-2009 from January 1, 2005 through December 31, 2011;

B. The affiliations that the prospective and selected peer reviewers of SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, 5.3, SOC-2008 and NCA2-2009 had with universities (e.g., tenured and tenure-track faculty, non-tenured and non-tenure-track faculty, adjunct faculty, research faculty), nonprofit institutes (e.g., office/staff, board of directors, advisory board), private and/or public companies (e.g., equity, board member, officer, employee) that had participated in "NOAA grant-funded climate science research-related programs" from January 1, 2005 through December 31, 2011, including those identified and described in Section I.2.a. of the Annotated Addendum accompanying and incorporated by reference within this new FOIA Request;

C. The affiliations that the prospective and selected peer reviewers of SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, 5.3, SOC-2008 and NCA2-2009 had with SAP authors from the same universities, (tenured and tenure-track faculty, non-tenured and non-tenure-track faculty, adjunct faculty, research faculty) nonprofit institutes (e.g., office/staff, board of directors, advisory board), and private and/or public companies (e.g., equity, board member, officer, employee), from January 1, 2005 through December 31, 2011;

iv. Tests and reviews performed to evaluate the adequacy of the intellectual independence and subject matter objectivity of prospective and selected peer reviewers of SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, 5.3, SOC-2008 and NCA2-2009, if:

A. They had been employed by or had consulted with NOAA or other federal agency joint developers of SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, 5.3, SOC-2008 and NCA2-2009 from January 1, 2005 through December 31, 2011;

B. They had been affiliated with universities, nonprofit institutes and private and/or public companies participating in "NOAA grant-funded climate change research-related programs" from January 1, 2005 through December 31, 2011;

C. They had contributed to and/or reviewed the Working Groups I, II and III portions of the IPCC Fourth Assessment Report;

v. Tests and reviews performed to evaluate the adequacy of peer review panel balance based on the expertise and diversity of subject-relevant scientific experience and perspectives of prospective and selected panel members;

vi. Safeguards used to prevent the repeated use of the same peer reviewer in multiple NOAA-developed assessments;

vii. Safeguards used to prevent the selection and retention of peer reviewers harboring biases, intellectual dependencies, and conflicts-of-interest (individual and/or institutional), including by means of:

A. Mandatory vetting and monitoring of prospective and selected peer reviewer candidates via internet background searches to identify potential individual and institutional conflicts-of-interest and appearances of bias or partiality;

B. Mandatory monitoring of prospective and selected panelists via internet search and written questionnaires of any changes in their conflict-of-interest status;

C. Mandatory written or internet disclosure by prospective and selected peer reviewers (self-reporting) of nationality, past and present U.S. government affiliations, past and present service on US agency-established federal advisory committees, past and present affiliations with universities, nonprofit institutes, and public and private companies in "NOAA grant-funded climate science research-related programs";

D. Mandatory written recertification (self-reporting) from prospective and selected panelists during the entire term a peer review panel is convened stating that their responses to the internet or written questionnaire(s) have not changed;

E. Mandatory self-reporting by peer reviewers of any changes that may impact their conflict of interest, independence or impartiality status during the entire course of the peer review process;

F. Mandatory NOAA oversight of the peer review management and oversight practices of NOAA-hired third-party peer review contractors to ensure they follow NOAA peer review contractual and IQA guidelines;

2. Copies of all NOAA and other federal agency climate science-related agreements NOAA had entered into with United Nations agencies, offices and/or programs, alone and/or with other federal agencies, to contribute to and/or review Intergovernmental Panel on Climate Change assessments and reports, as identified in Section III.5.a.i of this new FOIA Request;

3. Copies of all interagency climate science-related agreements NOAA had entered into with other federal agencies pursuant to which such other agencies had helped to develop and/or perform peer review services with respect to the ten (10) NOAA-developed assessments, as identified in Section III.5.a.ii of this new FOIA Request;

4. Copies of all NOAA and other federal agency climate science-related agreements commissioning the NAS/NRC to perform peer reviews of NOAA-developed SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3, as identified in Section III.5.a.iii.A-E of this new FOIA Request, and commissioning the NAS/NRC to develop climate science assessments, as identified in Section III.5.a.iii.F-H of this new FOIA Request;

5. Copies of all NOAA climate science-related agreements NOAA had entered into with the USGCRP/CCSP to peer review two (2) of the ten (10) NOAA-developed climate assessments (SAP2.2 and NCA2-2009), of the types described in Section III.5.a.iv of this new FOIA Request;

6. Copies of all Memorandums of Agreement ("MOA"s) NOAA had entered into with, and/or grant/award contracts NOAA had issued to, universities and nonprofit institutes that NOAA had

selected to establish, reestablish and/or expand NOAA-grant-funded Cooperative Institute Programs, as described in Section III.5.b.i-xxii of this new FOIA Request;

7. All NOAA peer review records created, transmitted, stored and/or archived from January 1, 2005 through December 31, 2011, including those focusing on and describing NOAA, USGCRP/CCSP Interagency Committee ("IAC"), and/or Committee on Environment and Natural Resources ("CENR") of the President's National Science and Technology Council ("NSTC") deliberations and final conclusions, concerning the Information Quality Act compliance of the final peer reviews performed and peer review processes employed by the USGCRP/CCSP and NRC with respect to SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, 5.3, SOC-2008 and NCA2-2009 submitted by NOAA, *for purposes of*:
   a. Securing final NOAA agency-level product clearance; and
   b. Securing final product clearances at the USGCRP/CCSP IAC-level and the CENR/NSTC-level, based, in part, on NOAA's submission to the USGCRP/CCSP and CENR/NSTC of the required certification of each such product's IQA compliance in the form of a memorandum briefly indicating that "the product was prepared in compliance with CCSP's Guidelines for Producing Synthesis and Assessment Products, the Information Quality Act (Section 515) and NOAA's corresponding IQA guidelines," along with evidence substantiating said compliance;
8. All NOAA peer review records created, transmitted, stored and/or archived from January 1, 2005 through December 31, 2011, focusing on the IQA compliance of NOAA's then contemporaneous use of its agency website(s) to provide the public with up-to-date, readily accessible, understandable and link-operable information about the peer review processes in which NOAA, the USGCRP/CCSP and the NRC, on NOAA's behalf, had engaged to ensure the quality, objectivity, utility and integrity of the eight (8) NOAA-developed SAPs, SOC-2008 and NCA2-2009 identified by NOAA as HISAs, that the EPA-TSD had designated directly and indirectly as "core reference documents" supporting the EPA Administrator's 2009 CAA Section 202(a)(1) GHG Endangerment Findings.

III. Definition of "NOAA Climate Science-Related Peer Review Files" (shorthand – "NOAA Peer Review Records")

1. "NOAA" -

The term "NOAA" as referred to above, includes, but is not limited to:

   a. NOAA National Headquarters Office ("NOAA-HQ") Offices, including:
      i. Office of the NOAA Administrator ("the Administrator");
      ii. Office of International Affairs ("OIA") and the International Affairs Council
      iii. National Ocean Service ("NOS"), including the NOS Office of Ocean and Coastal Resource Management ("OCRM") and the National Centers for Coastal Ocean Science ("NCCOS");
      iv. Office of Oceanic and Atmospheric Research ("OAR"), including the OAR Climate Program Office ("CPO") and NOAA's eight (8) research laboratories;
      v. National Environmental Satellite, Data and Information Service ("NESDIS"), including its three national data centers and international and interagency affairs division;

Institute for Trade, Standards and Sustainable Development (ITSSD)
P.O. Box 223 Princeton Junction, New Jersey USA 08550
(609) 658-7417 www.itssd.org

vi. National Marine Fisheries Service ("NMFS"), including its Office of Science and Technology;
vii. National Weather Service ("NWS");
viii. Office of General Counsel ("OGC")
ix. All current NOAA National Headquarters Office employees (including directors, associate/assistant directors, program directors, staff, etc.), as well as, all former National Office employees previously employed from January 1, 2005 through December 31, 2011.

b. NOAA Regional Collaboration Teams ("NOAA-CRCT", "NOAA-GLRCT", "NOAA-NARCT", "NOAA-PIRT", "NOAA-SECART" and "NOAA-WRCT") Offices, including:
i. All Regional and related local branches offices with offices, departments, programs corresponding to those of the NOAA-HQ Offices identified above;
ii. All current Regional and related local office employees (including directors, associate/assistant directors, program directors, staff, etc.), as well as all former Regional Office and related local office employees previously employed from January 1, 2005 through December 31, 2011.

2. "Climate Science-Related" -

The term "climate science-related", as used above, refers:

Directly or indirectly to assessments, reports, studies, literature, information, files, etc. explaining observations of past, current and projected future changes in the Earth's climate, the impacts of such climate change on humans and the environment, and approaches for adapting and mitigating such change.[124]

3. "NOAA Climate Science-Related Files" -

"NOAA Climate science-related files" *include, but are not limited to*:

Any and all NOAA climate science-related data, records, statistics, models, assumptions, correspondences, communications, etc., including finals, drafts and notes, whether in current, stored and/or archived printed, digital, electronic (email including attachments), magnetic, internet or other form, originated, transmitted (dispatched and/or received), stored and/or archived by means of office email, personal email, internet, etc. accounts, wherever held, *including but not limited to*:

a. By NOAA-HQ and NOAA Regional Collaboration Team and correspondent NOAA 'line' offices at NOAA office premises and at other NOAA on-site locations;
b. By current and former NOAA employees (including science advisory board employee members and agency federal advisory committee members) at:
i. NOAA office premises and other NOAA on-site locations;
ii. Non-NOAA office premises and other non-NOAA off-site locations (including, but not limited to, their personal premises);
c. By current and former NOAA third-party records retention, internet, and/or cloud service providers at:

i. NOAA third-party service provider owned or leased business premises and other NOAA third-party service provider on-site locations;
ii. Other non-NOAA off-site locations;

d. By current and former non-NOAA science advisory board employee members at NOAA office premises and at other NOAA on-site locations;

e. By current and former non-NOAA-employee federal advisory committee members at NOAA office premises, at other NOAA on-site locations, and non-NOAA off-site locations.

Such files include all those originated, transmitted, stored and/or archived by NOAA during the period spanning from January 1, 2005 through December 31, 2011.

4. NOAA Climate Science-Related Peer Review Files" -

"NOAA climate science-related peer review files" include all climate science-related files noted above discussing or referring directly or indirectly to NOAA or NOAA-hired third-party contractors (USGCRP/CCSP and NRC), *including those files* reflecting that NOAA had acted pursuant to an "NOAA climate science-related agreement" to ensure the development and peer review of the NOAA-developed assessments/reports referenced in Table 1.1 of the Environmental Protection Agency's Technical Support Document ("EPA-TSD") accompanying the EPA Administrator's 2009 CAA Section 202(a)(1) GHG Endangerment Findings and which the EPA-TSD designated directly and indirectly as "core reference documents." The assessments/reports subject to such agreements *include, but are not limited to,* those NOAA-developed assessments/reports:

a. Designated directly in Table 1.1 of the EPA-TSD as "core reference documents, including those containing computer models and related datasets and specific applications thereof, and which qualified under the OMB Peer Review Bulletin as "highly influential scientific assessments" ("HISAs") or influential scientific information ("ISI"):"[125]
   i. SAP1.1/CCSP(2006) (HISA);
   ii. SAP1.3/CCSP(2008g) (HISA);[126]
   iii. SAP2.4/CCSP(2008h) (HISA);[127]
   iv. SAP3.2/CCSP(2008d) (HISA);[128]
   v. SAP3.3/CCSP(2008i) (HISA);[129]
   vi. *Global Climate Change Impacts in the United States* ("NCA2-2009") (HISA); and
   vii. *State of the Climate in 2008* ("SOC-2008") (ISI);[130]

b. NOAA-developed HISAs, including those containing computer models and related datasets and specific applications thereof, not designated in Table 1.1 of the EPA-TSD as "core reference documents", but otherwise incorporated-by-reference within NCA2-2009 - a NOAA-developed HISA the EPA-TSD designated as a "core reference document; (i.e., the EPA-TSD indirectly designated the following assessments as "core reference documents"):
   i. SAP2.2/CCSP(2007);
   ii. SAP5.2/CCSP(2009); and
   iii. SAP5.3/CCSP(2008);

c. NOAA-developed assessments as identified in (a) and (b) above containing computer models and datasets or applications thereof, including those addressing atmospheric,

oceanic, air quality, land, water, and/or sea ice interactions developed by NOAA and other agencies and entities, such as:

i. The DOE-funded World Climate Research Programme Coupled Model Intercomparison Project (CMIP3)[131]
ii. The NASA Goddard Institute for Space Studies (GISS) Model II' (two prime) model assuming the IPCC Special Report on Emission Scenarios (SRES) A1B 'business as usual' emission scenario[132] and the GISS Model E;[133]
iii. The NASA Modern Era-Retrospective Analysis for Research and Applications (MERRA);[134]
iv. The NOAA Geophysical Fluid Dynamics Laboratory (GFDL) AM2.0 and AM2.1 models;[135]
v. The National Corporation for Atmospheric Research (NCAR)/Department of Energy (DOE) Community Climate System Model (CCSM3);[136]
vi. The Pennsylvania State/National Center for Atmospheric Research (NCAR) Mesoscale Model (MM5);[137]
vii. The Weather Research and Forecasting (WRF) Model;[138]
viii. The Environ Corp. Comprehensive Air Quality Model With Extensions (CAMx) (open source);[139]
ix. The Model for the Assessment of Greenhouse Gas Induced Climate Change (MAGICC);[140]
x. The DOE Energy Information Administration (EIA)[141] National Energy Modeling System (NEMS);[142]
xi. The EPA Community Multiscale Air Quality (CMAQ) modeling system;[143] [144] and/or
xii. University modeling funded by the EPA National Center for Environmental Assessment STAR Program.[145] [146]

5. NOAA Climate Science-Related Agreements" –

NOAA Climate science-related agreements" for which disclosure is sought pursuant to this FOIA Request include all:

a. Climate science-related contractual or other reciprocal arrangements entered into between NOAA and third parties, including other federal agencies, interagency entities (e.g., USGCRP/CCSP) and intergovernmental organizations/bodies (e.g., United Nations Environment Program ("UNEP"), World Meteorological Organization ("WMO"), Intergovernmental Panel on Climate Change ("IPCC"), etc.):
   i. Pursuant to which NOAA performed climate science-related report development and/or peer review services (substantive peer review, peer review management and/or peer review oversight) jointly or solely on behalf of any such third parties with respect to any of the climate science-related assessments, reports and studies referenced in EPA-TSD Table 1.1 (e.g., IPCC-AR4-WGI and/or WGII assessments), in exchange for some form of consideration, which agreements include but are not limited to:
      A. The NOAA-WMO Memorandum of Understanding ("MOU") (2008);[147]
      B. The EPA-UNEP Memorandum of Understanding ("MOU") (2011);[148]

ii. Sub-agreements pursuant to which another federal agency (e.g., EPA, DOI, DOE, etc.) performed climate science-related report development and/or peer review services (substantive peer review, peer review management and/or peer review oversight) jointly with NOAA or on NOAA's behalf with respect to any of the climate science-related assessments, reports and studies referenced in EPA-TSD Table 1.1 in exchange for some form of consideration, which agreements had been executed in implementation of one or more of the following:

A. The NOAA-EPA Memorandum of Understanding (MOU) on Air Quality Research (2003);[149]

B. The NOAA-EPA Memorandum of Agreement (MOA) on Air Quality Forecasting (2003);[150]

C. The NOAA-DOE Memorandum of Understanding (MOU) for High Performance Computing (2008);[151]

D. The NOAA-DOI Memorandum of Understanding (MOU) (2010);[152]

E. The NOAA-EPA Memorandum of Agreement (MOA) (2011);[153]

iii. Entered into by NOAA, or by another federal agency on NOAA's behalf, pursuant to which the NAS/NRC performed climate science-related report development and/or peer review services (substantive peer review, peer review management and/or peer review oversight) jointly or solely for NOAA, with respect to NOAA-developed USGCRP/CCSP SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3, which EPA-TSD Table 1.1 directly and indirectly designated as "core reference documents," in exchange for some form of consideration, *including but not limited to*:

A. NAS Proposal No. 04-DELS-385-01, commissioning the NAS/NRC to perform a peer review of NOAA-developed SAP1.1; [154]

B. NSF grant number ATM-0455946, commissioning the NAS/NRC to perform a peer review of three (3) NOAA-developed SAPS: SAP1.3, SAP3.2 and SAP5.2; [155]

C. NOAA Contract No. DG133R07SE2247, commissioning the NAS/NRC to perform a peer review of NOAA-developed SAP2.4; [156]

D. NOAA Grant No. DG133R-04-CQ-009, TO#27, commissioning the NAS/NRC to perform a peer review of NOAA-developed SAP3.3; [157]

E. DOC Contract/Grant No. DG133R07SE2248, National Aeronautics and Space Administration (Contract No. NNH07CC79B) and National Science Foundation (Grant No. 0436369) commissioning the NAS/NRC to perform a peer review of NOAA-developed SAP5.3; [158]

F. NOAA Contract No. NASW-01008, commissioning the NAS/NRC to develop an assessment/report on climate forcing agents (i.e., on radiative forcings);[159]

G. NOAA Contract No. FC133CO5SE6428, commissioning the NRC to develop an assessment/report on mitigating shore erosion;[160]

H. Contract No. 50-DKNA-7-90052 pursuant to which NOAA and NASA collectively commissioned the NRC to develop an assessment/report on abrupt climate change.

iv. Entered into by NOAA, or by another federal agency on NOAA's behalf, pursuant to which the USGCRP/CCSP or one of its subsidiary bodies (e.g., the Agency Executive Committee (a subcommittee of the Carbon Cycle Interagency

Working Group (CCIWG)), performed climate science-related report development and/or peer review services (substantive peer review, peer review management and/or peer review oversight) jointly with NOAA or on NOAA's behalf, with respect to NOAA-developed USGCRP/CCSP SAP2.2, which EPA-TSD Table 1.1 directly and indirectly designated as a "core reference document," in exchange for some form of consideration, *including but not limited to*:

A. Economy Act (31 U.S.C. §1535) Agreements;[161]

B. Standard Department of Commerce Interagency Agreements Pursued Under Various Federal Government, Agency, and Office Statutory Authorities;[162]

b. Specific Memorandums of Agreement ("MOA"s) and/or grant/award contracts NOAA entered into with universities and nonprofit institutes NOAA had selected to establish, reestablish and/or expand NOAA-grant-funded Cooperative Institute Programs, as identified in Appendix 3E: "Approximate Reported Funding NOAA Cooperative Institute Programs FYs 2004-2010" accompanying this new FOIA Request, *including but not limited to*:

i. Cooperative Institute for Climate Science at Princeton Univ. (CICS-P) - NOAA CI Contract No. NA08OAR4320752; CI Shadow Award No. NA08OAR4320915;

ii. Cooperative Institute for Climate and Studies at Univ. of Maryland (CICS-M) - NOAA CI Contract No. NA17EC1483;

iii. Cooperative Institute for Climate and Satellite Studies at the Univ. of Maryland (CICS-M) - NOAA CI Contract Nos. NA17EC1483; NA09NES0006;

iv. Cooperative Institute for Research in the Atmosphere (CIRA) at Colorado State Univ. - NOAA CI Contract Nos. NA17RJ1228; NA09OAR4320074;

v. Cooperative Institute for Meteorological Satellite Studies (CIMSS) at the Univ. of Wisconsin-Madison - NOAA CI Contract Nos. NA06NES4400002; NA10NES4400013;

vi. Cooperative Institute for Arctic Research (CIFAR - I) at the Univ. of Alaska-Fairbanks - NOAA CI Contract No. NA17RJ1224;

vii. Cooperative Institute for Alaskan Research (CIFAR - II) at the Univ. of Alaska-Fairbanks - NOAA CI Contract No. NA08OAR4320751; CI Shadow Contract No. NA08OAR4320870;

viii. Cooperative Institute for Climate Applications and Research (CICAR) at Columbia Univ. - NOAA CI Contract Nos. NA03OAR4320179 and NA08OAR4320754; CI Shadow Grant No. NA08OAR4320912;

ix. Cooperative Institute for Limnology and Ecosystems Research (CILER) at the Univ. of Michigan - NOAA CI Contract No. NA07OAR4320006;

x. Cooperative Institute for Marine and Atmospheric Studies (CIMAS) at the Univ. of Miami - NOAA CI Contract No. NA17RJ1226; CI Continuation Award NA08OAR4320892; CI Shadow Award NA08OAR4320889;

xi. Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) at the Univ. of Oklahoma - NOAA CI Contract No. NA17RJ1227; CI Extension Agreement NA08OAR4320904; CI Shadow Agreement NA08OAR4320886;

xii. The undisclosed CI Agreement(s) NOAA entered into with the Cooperative Institute for Oceanographic Satellite Studies (CIOSS) at Oregon State Univ. (if different from the CI Agreements NOAA entered into with CIMRS);

xiii. Cooperative Institute for Marine Resources Studies (CIMRS) at Oregon State Univ. – NOAA CI Contract Nos. NA17FE2705; NA17FE1167; NA17RJ1362; NA06NMF4550286;
xiv. Cooperative Institute for Research in Environmental Sciences (CIRES) at the Univ. of Colorado-Boulder - NOAA CI Contract No. NA17RJ1229;
xv. Joint Institute for Marine and Atmospheric Research (JIMAR) at the Univ. of Hawaii – NOAA CI Contract Nos. NA17RJ1230; NA080AR4320910; NA09OAR4320075;
xvi. Cooperative Institute for Pacific Island Research at the Joint Institute for Marine and Atmospheric Research (JIMAR/CIPIR) at the Univ. of Hawaii - NOAA CI Contract Nos. NA09OAR4320075; NA11NMF4320128;
xvii. Joint Institute for the Study of the Atmosphere and Ocean (JISAO) at the Univ. of Washington - NOAA CI Contract No. NA10OAR4320148;
xviii. North Gulf Institute (NGI) at Mississippi State Univ. - NOAA CI Contract No. NA06OAR4320264;
xix. Joint Institute for Marine Observations (JIMO) at UC San Diego Scripps Institution - NOAA CI Contract Nos. NA17RJ1231; NA08OAR4320894;
xx. Cooperative Institute for Marine Ecosystems and Climate (CIMEC) at UC San Diego - NOAA CI Contract No. NA10OAR4320156;
xxi. Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT) at Florida Atlantic Univ. - NOAA CI Contract No. NA09OAR4320073; and
xxii. Cooperative Institute for the North Atlantic Region (CINAR) at Woods Hole Oceanographic Institution - NOAA CI Contract No. NA09OAR4320129.

IV. Explanation of the Relevant Applicable IQA, OMB and NOAA Statutory and Administrative Guideline Requirements

1. The IQA and Relevant Applicable OMB IQA Guidelines

This FOIA Request seeks disclosure of NOAA Peer Review Records ("NOAA climate science-related peer review files", as defined in Section III of this FOIA Request) identified above. Disclosure of these records is necessary because many of them remain publicly unavailable and inaccessible on NOAA websites.

The Information Quality Act ("IQA")[163] directed OMB to issue guidelines "that provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies in fulfillment of the purposes and provisions of…the Paperwork Reduction Act."[164] The IQA also required OMB to ensure that such guidelines "*shall* apply to the sharing by Federal agencies of, and access to, information disseminated by Federal agencies" (emphasis added),[165] *and* that such guidelines "*require* that each Federal agency issue [their own] guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by the agency" (emphasis added).[166]

Detailed OMB IQA-implementing Guidelines[167] have interpreted this directive as requiring U.S. federal agencies, *including NOAA*, to issue their own guidelines that ensure the peer review of all scientific information it uses and disseminates to the public. OMB's Peer Review Bulletin, which elaborates upon the OMB IQA Guidelines, more specifically provides that all scientific information that qualifies as either "influential

scientific information" ("ISI") or a "highly influential scientific assessment"[168] ("HISA") must be subject to peer review.

OMB's Peer Review Bulletin[169] provides additional guidelines that further interpret the IQA. Since OMB's Peer Review Bulletin, like OMB's IQA Guidelines, was issued through the Administrative Procedure Act's notice and comment process,[170] it, too, authoritatively interprets the IQA.[171]

Section I.5 of OMB's Peer Review Bulletin defines the term "scientific information" as

> "*factual inputs, data, models, analyses*, technical information, or scientific assessments based on the behavioral and social sciences, public health and medical sciences, life and earth sciences, engineering, or physical sciences. This includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual forms" (emphasis added).[172]

Section I.6 of OMB's Peer Review Bulletin defines the term "influential scientific information" ("ISI") as

> "scientific information the agency reasonably can determine will have or does have *a clear and substantial impact on important public policies or private sector decisions* […] *Information dissemination can have a significant economic impact even if it is not part of a rulemaking*. For instance, the economic viability of a technology can be influenced by the government's characterization of its attributes. Alternatively, *the federal government's assessment of risk can directly or indirectly influence the response actions of state and local agencies* or international bodies" (emphasis added).[173]

Section I.7 of OMB's Peer Review Bulletin defines the term "scientific assessment" as

> "an evaluation of a body of scientific or technical knowledge that typically *synthesizes multiple factual inputs, data, models, assumptions, and/or applies best professional judgment to bridge uncertainties* in the available information*…includ[ing]…integrated assessment models*" (emphasis added).[174]
>
> "…These assessments include, but are not limited to, *state-of-science reports*; technology assessments; weight-of-evidence analyses; meta-analyses; health, safety, or ecological risk assessments; toxicological characterizations of substances; *integrated assessment models*; hazard determinations; or exposure assessments. Such assessments often draw upon knowledge from multiple disciplines."[175]

Section III.1 of OMB's Peer Review Bulletin defines the term "highly influential scientific assessment" ("HISA") as

> "influential scientific information [ISI] that the agency or the Administrator determines to be a scientific assessment that…(i) could have a potential impact of more than $500 million in any year, or (ii) is novel, controversial, or precedent-setting or has significant interagency interest". [176]

The Preamble further explains how agency dissemination of HISAs can impose downstream economic impacts via the costs or benefits of regulations.

> "One of the ways *information can exert economic impact* is *through the costs or benefits of a regulation based on the disseminated information*. The qualitative aspect of this definition may be most useful in cases where it is difficult for an agency to predict the potential economic effect of dissemination. In the context of this Bulletin, *it may be either the approach used in the assessment or the interpretation of the information itself that is novel or precedent-setting*" (emphasis added). [177]

a. *OMB Peer Review Procedure Guidelines*

HISAs are subject to a higher and more robust level of peer review, conflict-of-interest, independence/bias, balance and transparency standards than is ISI.[178] OMB's IQA Guidelines, which were issued through the Administrative Procedure Act's notice and comment process,[179] authoritatively interpret the IQA. NOAA's IQA Guidelines, largely mirror this distinction.[180]

NOAA certified that nine (9) of the ten (10) climate assessments and reports it developed which the EPA-TSD subsequently designated (directly and indirectly) as "core reference documents" supporting the EPA Administrator's CAA Section 202(a)(1) GHG Endangerment Findings qualified as HISAs, while only one (i.e., SOC-2008) qualified as ISI.

Section III.2 of OMB's IQA Guidelines, in particular, provides that federal agencies, *including NOAA,*

> "*shall* develop a process for reviewing the quality (including the objectivity, utility, and integrity) of information *before* it is disseminated. Agencies *shall treat information quality* as *integral to every step* of an agency's development of information, including creation, collection, maintenance, and dissemination. This process *shall enable the agency to substantiate* the quality of the information it has disseminated through documentation or other means appropriate to the information" (emphasis added).[181]

OMB has interpreted the objectivity of disseminated scientific and economic information as an indispensable element of data quality that NOAA is required to substantiate. Section V.3.b of OMB's IQA Guidelines defines "objectivity" as

> "involv[ing] a focus on ensuring accurate, reliable, and unbiased information. In a scientific, financial, or statistical context, the original and supporting data *shall* be generated, and the analytic results *shall* be developed, using sound statistical and research methods" (emphasis added).[182]

According to Section V.3.b.i of the OMB IQA Guidelines, while an agency's ostensible peer review of scientific or technical information prior to its dissemination shall be presumed to fulfill the data quality element of objectivity, such presumption may be rebutted with persuasive contrary evidence.

> "If data and analytic results have been subjected to formal, independent, external peer review, the information *may generally be presumed* to be of acceptable objectivity. However, *this*

> *presumption is rebuttable* based on a persuasive showing by the petitioner in a particular instance" (emphasis added).[183]

Arguably, said presumption may be rebutted if it can be demonstrated that the peer review an agency's third-party contractor had performed of a HISA or ISI the agency developed *was compromised*.

Furthermore, Section V.3.b.ii of the OMB IQA Guidelines requires agencies to ensure public transparency of the data and methods supporting disseminated influential scientific or technical information, including highly influential scientific assessments.

> "If an agency is responsible for disseminating influential scientific, financial, or statistical information, agency guidelines shall include a high degree of transparency about data and methods to facilitate the reproducibility of such information by qualified third parties."[184]

Yet, not all disseminated data must be made publicly transparent.

> "[While] reproducibility of data is an indication of transparency about research design and methods…all disseminated data [need not] be subjected to a reproducibility requirements[; rather, a]gencies may identify, in consultation with the scientific and technical communities, those particular types of data that can practicabl[y] be subjected to a reproducibility requirement, given ethical, feasibility, or confidentiality constraints."[185]

Nevertheless,

> "[w]ith regard to *analytic results* [related to data and methods from either a single study or from multiple studies], agency guidelines *shall* generally require sufficient transparency about data and methods that an independent reanalysis could be undertaken by a qualified member of the public" (emphasis added).[186]

While other compelling interests, such as privacy, trade secrets, other intellectual property and confidentiality protections, override this transparency requirement,[187]

> "Agency guidelines *shall*, however, *in all cases*, require a disclosure of the specific data sources that have been used and *the specific quantitative methods and assumptions* that have been employed" (emphasis added).[188]

The Preamble of OMB's Peer Review Bulletin reaffirms the importance of peer review to ensure the quality of scientific and technical information that federal agencies publicly disseminate.

> "Peer review is *one of the important procedures* used to ensure that the quality of published information meets the standards of the scientific and technical community. It is a form of deliberation involving an exchange of judgments about the appropriateness of methods [,assumptions, *modeling* parameters, etc.] and the strength of the author's inferences. Peer review involves the review of a draft product for quality by specialists in the field *who were not involved in producing the draft*" (emphasis added).[189]

The Preamble of OMB's Peer Review Bulletin also describes the nature and purpose of a peer review report and the integral role that it serves in the IQA's data quality framework.

> "The *peer reviewer's report* is an evaluation or critique that is used by the authors of the draft to improve the product. *Peer review typically evaluates* the clarity of hypotheses, the validity of the research design, the quality of data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypotheses being tested, the extent to which the conclusions follow from the analysis, and the strengths and limitations of the overall product" (emphasis added).[190]

Furthermore, Section II.5 of the OMB Peer Review Bulletin prescribes the following requirements for creating and publishing peer review reports:

> "The agency -- or entity managing the peer review -- *shall* instruct peer reviewers to prepare a report that describes the nature of their review and their findings and conclusions. The peer review report *shall* either (a) include a verbatim copy of each reviewer's comments (either with or without specific attributions) or (b) represent the views of the group as a whole, including any disparate and dissenting views. The agency *shall* disclose the names of the reviewers and their organizational affiliations in the report. Reviewers shall be notified in advance regarding the extent of disclosure and attribution planned by the agency. The agency *shall* disseminate the final peer review report *on the agency's website* along with all materials related to the peer review (any charge statement, the peer review report, and any agency response). The peer review report *shall* be discussed in the preamble to any related rulemaking and included in the administrative record for any related agency action" (emphasis added).[191]

Section III.4 of the OMB Peer Review Bulletin requires that,

> "[t]he agency -- or entity managing the peer review -- *shall* provide the reviewers with sufficient information -- including background information about *key studies or models* -- to enable them to understand the data, analytic procedures, and assumptions used to support the key findings or conclusions of the draft assessment" (emphasis added).[192]

It is significant that, while Section IX.4 of the OMB Peer Review Bulletin exempts from peer review "an agency regulatory impact analysis or regulatory flexibility analysis subject to interagency review under Executive Order 12866," it does *not* exempt from peer review, the "underlying data and analytical models used."

Unfortunately, NOAA has not yet publicly substantiated how it and its contractors had subjected to peer review the many climate computer models and applications thereof referenced in the many NOAA-developed USGCRP/CCSP climate assessments (that ultimately served as the basis for EPA's 2009 CAA GHG Endangerment Findings), in satisfaction of this IQA transparency requirement.

Section III.5 of the OMB Peer Review Bulletin provides that

> "Whenever feasible and appropriate, the agency *shall* make the draft scientific assessment available to the public for comment at the same time it is submitted for peer review (or during

> the peer review process) and sponsor a public meeting where oral presentations on scientific issues can be made *to the peer reviewers* by interested members of the public. When employing a public comment process as part of the peer review, the agency *shall*, whenever practical, provide peer reviewers with access to public comments that address significant scientific or technical issues. To ensure that public participation does not unduly delay agency activities, the agency shall clearly specify time limits for public participation throughout the peer review process" (emphasis added).[193]

NOAA also has *not* yet publicly substantiated how it and its contractors had satisfied this IQA transparency requirement.

Section III.6 of the OMB Peer Review Bulletin subjects all agencies not only to these records requirements, but also to the following additional peer review records requirements:

> "In addition to the requirements specified in II(5), which *shall* apply to all reviews conducted under Section III, the peer review report *shall* include the charge to the reviewers and a short paragraph on both the credentials and relevant experiences of each peer reviewer. The agency *shall* prepare a written response to the peer review report explaining (a) the agency's agreement or disagreement with the views expressed in the report, (b) the actions the agency has undertaken or will undertake in response to the report, and (c) the reasons the agency believes those actions satisfy the key concerns stated in the report (if applicable). The agency *shall* disseminate its response to the peer review report *on the agency's website* with the related material specified in Section II(5)" (emphasis added).[194]

NOAA, however, has *not* yet publicly substantiated how it or its third-party contractors (i.e., the USGCRP/CCSP and the NRC) had satisfied this IQA requirement.

Moreover, Section III.3.a of OMB's Peer Review Bulletin sets forth certain requirements relating to the review and selection of prospective peer reviewers and the establishment of peer review panels with respect to HISAs that must be made publicly available and accessible. For example,

> "[p]eer reviewers *shall* be selected based on expertise, experience and skills, including specialists from multiple disciplines, as necessary. The group of reviewers *shall* be sufficiently broad and diverse to fairly represent the relevant scientific and technical perspectives and fields of knowledge" (emphasis added).[195]

NOAA, however, has *not* yet publicly substantiated how it or its third-party contractors (i.e., the USGCRP/CCSP and the NRC) had satisfied this IQA requirement.

In addition, Section III.3.b of OMB's Peer Review Bulletin sets forth standards *to ensure peer reviewer independence and to prevent conflicts-of-interest*. It generally "instructs agencies to consider barring participation by scientists with a conflict of interest."[196]

More specifically, this provision provides that

> "[t]he agency – or the entity selecting the peer reviewers – *shall* (i) ensure that those reviewers serving as federal employees (including special government employees) comply

> with applicable federal ethics requirements; (ii) in selecting peer reviewers who are not government employees, adopt or adapt the National Academy of Sciences' policy for committee selection with respect to evaluating the potential for conflicts (e.g., those arising from investments; agency, employer, and business affiliations; *grants*, contracts and consulting income). For scientific assessments relevant to specific regulations, a reviewer's financial ties to regulated entities (e.g., businesses), other stakeholders, *and the agency shall* be examined" (emphasis added).[197]

Section III.3.c of OMB's Peer Review Bulletin "instructs agencies to ensure that reviewers are independent of the agency sponsoring the review."[198] To this end, it precludes "[s]cientists employed by the sponsoring agency […from] serv[ing] as reviewers for highly influential scientific assessments."[199] There is only one exception to such ban. The scientists would need to be "employed by a different agency of the Cabinet-level department than the agency that is disseminating the scientific assessment."[200] In addition, such scientist must have expertise, experience and skills that are essential but cannot be obtained elsewhere."[201] Nevertheless, this exception is available only if the government scientist did "*not* have had *any* part in the development *or* prior review of the scientific information *and* [does] *not* hold a position of managerial or policy responsibility" (emphasis added).[202] If any one of these requirements is not satisfied, the exception will not be available. Moreover, the agency's determination regarding eligibility for this exception must be documented in writing and be approved by the Secretary or Assistant Secretary prior to the government scientist's appointment.[203]

The OMB-PRB, furthermore, notes that federal agencies should remain aware of how the selection of reviewers "receiv[ing] a substantial amount of research funding from the agency sponsoring the review," based on *other than* "investigator-initiated, competitive, peer reviewed proposals" (i.e., based on *agency solicited research*) could give rise independence or conflict-of-interest issues.[204] As defined by the U.S. National Institutes of Health, the term "investigator-initiated research" means "[r]esearch funded as a result of an investigator, on his or her own, submitting a research application[; a]lso known as *unsolicited* research" (emphasis added).[205] In other words, the OMB-PRB recognizes that substantial research grants awarded to recipients on the basis *federal agency-solicited research proposals that are not subject to competitive bidding, such as broad agency announcements ("BAAs")* (discussed in Section V.2 below)[206] have the real potential to adversely affect the independence of peer reviewers and to trigger individual, if not, institutional conflicts-of-interest.

According to Sections II.3.c, II.3.d and III.2 of the OMB Peer Review Bulletin, not only[207] must Agencies ensure that "peer reviewers *shall not* have participated in development of the work product" (emphasis added),[208] but Agencies also "*shall* avoid repeated use of the same reviewer on multiple assessments *unless* his or her participation is essential and cannot be obtained elsewhere" (emphasis added).[209] NOAA also has not publicly substantiated how it and its contractors had satisfied these particular requirements.

Indeed, Section III.3.c of the OMB Peer Review Bulletin provides that, "the agency -- or entity selecting the reviewers -- *shall* bar participation of scientists employed by the sponsoring agency unless the reviewer is employed only for the purpose of conducting the peer review (i.e., special government employees)."[210] NOAA also has not publicly substantiated how it and its contractors had satisfied this IQA requirement or had ensured that particular selected peer reviewers had qualified for the narrow exception available.[211]

In addition, Section VII of the OMB Peer Review Bulletin obliges agencies that "rel[y] on influential scientific information or a highly influential scientific assessment[s] in support of a regulatory action […to] include in the administrative record for that action a certification that explains how the agency has complied with the requirements of this Bulletin and the Information Quality Act."[212]

Moreover, the Preamble to OMB's Peer Review Bulletin provides that, although the Bulletin "does not directly cover information supplied to the government by third parties (e.g., studies […]),"[213] such third party studies shall fall subject to OMB Peer Review Bulletin requirements if an agency plans to disseminate such third party information as its own as the basis for a factual determination and the dissemination is "influential".[214]

Lastly, Section IV of the OMB *Peer Review Bulletin* admonishes EPA and other federal agencies not to treat the typical APA public notice and comment process, at the *pre*-dissemination phase, as an approved alternative to scientific peer review.

> "The mere existence of a public comment process (e.g., notice-and-comment procedures under the Administrative Procedure Act) does not constitute adequate peer review or an 'alternative process,' [under Section IV of the OMB-PRB] because it does not assure that qualified, impartial specialists in relevant fields have performed a critical evaluation of the agency's draft product."[215]

In other words, NOAA could not have relied on the public comments it had solicited via the federal register as a method to peer review the ten (10) assessments it had developed.

b. *IQA and OMB Administrative Review/Correction Guidelines*

Section 515(b)(2)(B) of the IQA (Public Law 106-554, 44 U.S.C. § 3516, note) required NOAA

> "to establish administrative mechanisms allowing affected persons to seek and obtain correction of information maintained and disseminated by the agency that does not comply with the [OMB] guidelines".[216]

Section III.3 of OMB's IQA Guidelines explain that,

> "To facilitate public review, agencies *shall establish* administrative mechanisms allowing affected persons to seek and obtain, where appropriate, timely correction of information maintained and disseminated by the agency that does not comply with OMB or agency guidelines. These administrative mechanisms *shall be* flexible, appropriate to the nature and timeliness of the disseminated information, and *incorporated into agency* information resources management and *administrative practices*" (emphasis added).[217]

Once the application of the IQA has been triggered, Section III.3.i of OMB's IQA Guidelines requires NOAA to limit its review of stakeholder IQA RFCs to an appropriate time period (generally, 60 calendar days), and to notify stakeholders of any corrections made.[218] If stakeholders disagree with NOAA's initial decisions regarding their RFCs, Section III.3.ii requires NOAA to provide those stakeholders with the opportunity to appeal (i.e., to secure NOAA's reconsideration of) those Agency decisions and to obtain resolution of their requests within an appropriate limited period of time[219] (generally 60 calendar days).[220]

Therefore, Section III.3 of OMB's IQA Guidelines directs NOAA to ensure that such an administrative review mechanism would be readily available and accessible to stakeholders following the Agency's "dissemination" (i.e., "initiated or sponsored distribution") to the public[221] of the HISAs the Agency had developed and the

NAS/NRC, USGCRP/CCSP or NOAA itself had peer reviewed. In other words, Congress had intended for this mechanism to serve as a specialized *post*-dissemination review mechanism offering stakeholder protections above and beyond ordinary APA notice and comment procedures if necessary to adequately address highly technical and complex stakeholder comments.

The availability of this *post*-dissemination review mechanism is especially critical where stakeholders have not ordinarily been afforded the opportunity to contest the accuracy of the scientific information contained in *final* versions of the HISAs that NOAA had developed but had not yet disseminated to the public.[222] Up until the moment of dissemination, the *pre*-dissemination exemption provided by OMB IQA Guideline Section III.2[223] and OMB Peer Review Bulletin Section I[224] [225] continued to apply. This effectively shielded NOAA-developed HISAs from IQA challenge in order to facilitate the completion of the scientific peer review process which, in part, entailed the solicitation of public comments, agency and author responses, and HISA revision, if necessary.[226]

Indeed, as discussed below in Section I.1.b of the Addendum, the public had been unaware that many of the completed NOAA-developed HISAs, at the time of their dissemination, would be used to support a major NOAA rulemaking. Certainly, the public had not suspected that such NOAA-developed assessments would be used to support as monumental an *EPA* rulemaking as the EPA Administrator's CAA Section 202(a)(1) GHG Endangerment Findings! And, this public disclosure had not occurred until July 2008 when NOAA-developed SAP1.1 had appeared in the then current draft version of the Technical Support Document accompanying EPA's Advance Notice of Proposed Rulemaking.[227] Aside from this brief revelation, stakeholders had not become fully aware that all of the NOAA-developed SAPs, NCA2-2009 and SOC-2008 would be used to support the EPA Administrator's CAA Section 202(a)(1) Findings, until *EPA* had issued its Proposed CAA Section 202(a)(1) Findings in April 2009.[228]

An OMB memorandum issued approximately seven months following the release of OMB's IQA Guidelines clarified the special nature of the *post*-dissemination review mechanism. It provided that,

> "[only] where existing public comment procedures – for rulemakings, adjudications other agency actions…provide well-established procedural safeguards that allow affected persons to contest information quality on a timely basis", may agencies "use those [notice and comment] procedures to respond to information quality complaints."[229]
>
> "Recommended Language: 'In cases where the agency *disseminates* a study, analysis, or other information *prior* to the final agency action or information product, requests for correction will be considered *prior* to the final agency action or information product in those cases where the agency has determined that an earlier response would not *unduly* delay issuance of the agency action or information product *and* the complainant has shown a reasonable likelihood of suffering actual harm *from the agency's dissemination* if the agency dos not resolve the complaint prior to the final agency action or information product'" (emphasis added).[230]

2. Relevant NOAA IQA Guidelines and IQA-Implementing Peer Review Guidelines

As noted above, NOAA has issued its own IQA Guidelines,[231] in an effort to implement the IQA's mandates *as interpreted by OMB*. They expressly state that disseminated "information that has been determined to meet the threshold for ISA or HISA *must be documented* per the [OMB] Peer Review Agenda" (emphasis added).[232]

In other words,

> "'Influential scientific information' or 'highly influential scientific assessments' that the agency intends to disseminate are subject to OMB's Final Information Quality Bulletin for Peer Review (OMB Peer Review Bulletin) […] Peer review of these information products *will be conducted in accordance with that Bulletin*" (emphasis added).[233]

A "dissemination" of information is deemed to occur when the Agency initiates or sponsors the "distribution […] or release of information to the public."[234] An Agency-initiated dissemination is deemed to occur when the information the Agency distributes or releases "reflects, represents, or forms *any part of the support of the policies of the Agency*" (emphasis added). [235]

The NOAA IQA Guidelines also provide that NOAA's use, distribution and/or release of third-party-prepared (external) information also can constitute an Agency-initiated 'dissemination.'

> "[I]f the Agency, as an institution, distributes or releases information prepared by an outside party *in a manner that reasonably suggests that the Agency agrees with the information*, this would be considered Agency initiated distribution and hence Agency dissemination *because of the appearance of having the information represent Agency views*" (emphasis added).[236]

This section of the NOAA IQA Guidelines corresponds to the third party information rule set forth in the OMB Peer Review Bulletin's Preamble, as noted above.

The NOAA IQA Guidelines, furthermore, specifically cover "synthesized products" and "interpreted products" derived from original and third-party information.

> "Synthesized [p]roducts are those that have been developed through analysis of original data [using…] well documented and routine […] methods of analysis [such as…] statistical methods; *model* interpolations, extrapolations, and simulations; and combinations of multiple sets of original data […These products] include […] weather statistics, *model* outputs, data display through Geographical Information System techniques, and satellite-derived maps" (emphasis added).[237]

> "Interpreted [p]roducts are those that have been developed through interpretation of original data and synthesized products. […Such] information is subject to scientific interpretation, evaluation, and judgment […because it] incorporates additional contextual and/or normative data, standards, or information that puts original data and synthesized products into larger spatial, temporal, or issue contexts […These products] include journal articles, scientific papers, technical reports, and production of and contributions to integrated assessments."[238]

As noted above, the NOAA IQA Guidelines also cover third party information that NOAA uses in the synthesized products and interpreted products it disseminates to the public.

> "[T]hird-party information from both domestic and international sources […] when used by NOAA to develop information products or to form the basis of a decision or policy, must be of known quality and *consistent with NOAA's information quality guidelines*. When such

> information is used, any limitations, assumptions, collection methods, or uncertainties concerning it will be taken into account and disclosed."[239]

a. *NOAA Peer Review Procedure Guidelines*

The NOAA IQA Guidelines, furthermore, focus on how the Agency can ensure the objectivity, validity and credibility of the synthesized and interpreted products it develops and uses. This may be achieved with respect to synthesized products by: 1) "using data of known quality, applying sound analytical techniques, and reviewing the products or processes used to create them before dissemination;"[240] and 2) identifying or making data and information sources, including "the methods by which synthesized products are created when they are disseminated," available upon request.[241] Similarly, this may be achieved with respect to interpreted products by: 1) "using data of known quality or from sources acceptable to the relevant scientific and technical communities and reliable supporting products, applying sound analytical techniques, presenting the information in the proper context, and reviewing the products before dissemination;"[242] and 2) by identifying and properly referencing data and information sources, or making "the methods by which interpreted products are created when […] disseminated […] available upon request."[243]

In particular, the NOAA IQA Guidelines require the Agency to ensure that interpreted products are properly peered reviewed "by technically qualified individuals."

> "*Peer reviews*, ranging from internal peer review by staff *who were not involved in the development of the product* to formal, independent, external peer review, *are [to be] conducted* at a level commensurate with the scientific information in the interpreted product" (emphasis added).[244]

NOAA must also ensure, consistent with OMB's Peer Review Bulletin, that,

> "[i]n selecting peer reviewers who are not government employees, NOAA has adapted the National Academy of Sciences policy for committee selection with respect to evaluating the potential for conflicts *and will use* the adapted policy" (emphasis added).[245]

NOAA's Policy on Conflicts of Interest for Peer Review states that it is intended to "protect the individual, other peer reviewers, NOAA, and the public interest."[246]

To this end, such policy precludes the selection of individuals as peer reviewers of ISI or HISAs that NOAA intends to publicly disseminate if they may be "compromised by any significant conflict of interest."[247]

> "*Except for* those situations in which NOAA determines that a conflict of interest is *unavoidable and promptly and publicly discloses the conflict of interest*, **no individual can be appointed to review documents subject to the OMB Bulletin if that individual has a conflict of interest that is relevant to the functions to be performed**" (emphasis added).[248]

The NOAA Policy on Conflicts of Interest for Peer Review sets forth the following definition of conflict-of-interest:

> "[T]he term 'conflict of interest' means any financial or other interest which conflicts with the service of the individual on the review panel because it (1) could significantly impair the

> individual's objectivity or (2) could create an unfair competitive advantage for any person or organization."[249]
>
> According to said policy, the term "conflicts of interest" ordinarily refers to a "current" financial interest "that could be directly affected by the work of the peer reviewers."[250] The term "financial interest" can entail the "personal financial interests of [an] individual," as well as, "*the interests of others with whom the individual has substantial common financial interests* if these interests are relevant to the functions to be performed" (emphasis added).[251]

"Thus, in assessing an individual's potential conflicts of interest […] in connection with [his/her…] service as a peer reviewer […] consideration must be given not only to the interests of the individual but also to the interests of the […] the individual's employer […] and others with whom the individual has substantial common financial interests […] [P]articular attention will be given to […] [e]mployment relationships (including private and public sector employment [;…] *[s]ervice provided in exchange for honorariums and travel expense reimbursements* [;]Research funding and other forms of research support [; and] *[f]inancial ties* to entities regulated by NOAA, *other stakeholders and NOAA itself* […] if they are relevant to the functions to be performed" (emphasis added).[252]

The NOAA Conflict of Interest Policy for Peer Review, moreover, limits the ability of peer reviewers to critically review their own work or the work of their immediate employers.

> "[A]n individual should not serve as a peer reviewer when a critical review and evaluation of the individual's own work, *or that of his or her immediate employer*, is a central purpose of the review, because that would constitute a conflict of interest" (emphasis added).[253]

To prevent actual or apparent conflicts-of-interest from arising during the peer review of ISI or HISAs, said policy requires NOAA, or the entity commissioned by NOAA to manage the peer review process, to secure from selected peer reviewers "certain background information and information regarding conflicts of interest."[254] Peer reviewers may submit this information by completing NOAA's 'Background Information and Confidential Conflict of Interest Disclosure' form.[255] This policy subjects peer reviewers to a "*continuing obligation* for the duration of the peer review process for which" such disclosure form was prepared to report changed or new information promptly to NOAA or its third-party contractor.[256]

Where the peer review of a HISA is involved, NOAA's Conflict of Interest Policy for Peer Review requires the Agency, consistent with the OMB-Peer Review Bulletin, to disclose the names, affiliations, credentials and relevant experiences of each peer reviewer "in a report of findings and conclusions prepared by the peer reviewers [which…] will be posted on the Department of Commerce Information Quality web site."[257]

Lastly, NOAA's Conflict of Interest Policy for Peer Review explicitly forbids NOAA from appointing an individual to serve or to continue serving on a panel

> "as a peer reviewer […] of information subject to the OMB Bulletin if the individual has a conflict of interest that is relevant to the peer review to be performed [unless…] the agency determines that a conflict of interest is unavoidable and promptly and publicly discloses the conflict of interest." [258]

NOAA may find a conflict-of-interest to be 'unavoidable' where

> "the individual's qualifications, knowledge, and experience are particularly valuable to the peer review in question *and* the agency is unable to identify another individual with comparable qualifications, knowledge, and experience who does not also have a conflict of interest" (emphasis added).[259]

The NOAA office managing the peer review or NOAA's third-party peer review contractor must make this determination jointly with the Office of NOAA General Counsel.[260]

b. *NOAA Administrative Review/Correction Guidelines*

Part III of the NOAA IQA Guidelines enables 'affected persons' to seek "timely correction of disseminated information that does not comply with applicable information quality guidelines."[261] An 'affected person' is "an individual or entity that uses, benefits from, or is harmed by the disseminated information at issue."[262]

Assuming a requester has properly identified itself and the request for correction is properly addressed and directed to the correct official, an initial request for correction of disseminated information will be accepted if: 1) it concerns a matter involving 'information'; 2) that has actually been disseminated; 3) the correction of such information would serve a useful purpose;[263] 4) there is a clear explanation of how the requester is 'affected'; and 4) "a specific statement of how the information at issue fails to comply with applicable guidelines and why the requester believes that the information is not correct."[264]

Furthermore, the NOAA IQA Guidelines do not provide a separate administrative review mechanism for purposes of seeking correction of complex scientific or technical information. Rather, the guidelines direct the Agency to treat any properly prepared request for correction filed during the pendency of an Administrative Procedure Act public notice and comment period as a public comment filed with respect to such proposed rulemaking.[265]

To further elaborate upon how these IQA, OMB and NOAA guidelines apply to the ten (10) NOAA climate assessments that are the subject of this new FOIA Request, ITSSD has prepared the following Annotated Addendum which is hereby incorporated herein.

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ITSSD FOIA REQUEST
ANNOTATED ADDENDUM

I. Analysis of the IQA Compliance of NOAA-Developed & Third Party Peer Reviewed HISAs and ISI Supporting EPA's CAA Section 202(a)(1) GHG Endangerment Findings

The following analysis focuses on the IQA compliance of the peer review processes and procedures NOAA third-party contractors had employed to validate the climate science findings contained in the ten (10) NOAA-developed HISAs and ISI for which NOAA had borne 'lead agency' development and IQA compliance responsibilities, at the agency and interagency levels. It establishes that the certifications of IQA compliance NOAA had submitted to the interagency USGCRP/CCSP were substantively and procedurally deficient. It also shows that the EPA Administrator's consequent decision to rely, in part, on the NOAA-developed SAPs and assessments covered by such certifications, and on NOAA's 2008 report (self-reported as having been IQA-compliant), as scientific support for EPA's 2009 CAA Section 202(a)(1) GHG Endangerment Findings had been misplaced *and must be reexamined*.

1. NOAA Did Not Satisfy IQA Third-Party Data Quality Validation Standards or IQA Transparency and Reporting Requirements

a. *NOAA Failed to Validate IPCC Peer Review Processes and Procedures Reported as Flawed that Had Been Employed to Vet the AR3 and AR4 Upon Which NOAA-Developed and Publicly Disseminated HISAs and ISI Referencing Them Relied*

i. InterAcademy Council Reports Flaws in IPCC Peer Review Processes and Procedures

Reasonable persons would have expected that, if the U.S. government had directed several hundred of its best scientists to make author contributions to and/or to review the WGI and/or WGII portions of the IPCC Third and Fourth Assessment Reports (AR3 (2001) and AR4 (2007)), then the U.S. government had invested significant capital and resources in developing these IPCC reports, had stood firmly behind the findings of these IPCC reports *and accepted them as if they were its own findings*, and would go to great lengths to ensure that the processes and procedures employed to peer review them would comply with highest and least discretionary standards of the federal Information Quality Act.

Appendix 2B[266] accompanying this new FOIA Request confirms that the U.S. government had dedicated the services of two-hundred eleven (211) federal agency scientists to make author-contributions to and/or to review the IPCC's AR3-WGI and/or WGII reports; and sixty-three (63) of those scientists (approximately 30%) had been employed by NOAA – the *de facto* lead federal agency on climate change. Appendix 2A[267] accompanying this new FOIA Request confirms that the U.S. government had dedicated the services of two-hundred ten (210) federal agency scientists to make author contributions to and/or to review the IPCC's AR4-WGI and/or WGII reports; and eighty-two (82) of those scientists (approximately 39%) had been employed by NOAA. These data strongly suggest that the prior administration had invested significant resources in the development of the IPCC AR3 and AR4 such that they 'owned' and are accountable to the American people for them.

The facts, however, do not confirm that NOAA, with prior administration assistance, had substantiated that the IPCC peer review processes and procedures employed to validate the science underlying the IPCC-AR3 and

IPCC-AR4 findings had satisfied the highest and least discretionary IQA standards. Although, as Appendix 14[268] accompanying this new FOIA Request reveals, *the U.S. government had adopted, embraced and otherwise disseminated the IPCC-AR3 and IPCC-AR4 findings as if they were its own* via NOAA's development and dissemination of ten (10) NOAA-developed USGCRP-CCSP SAPs, NCA2-2009 and SOC-2008 which extensively referenced them, along with other IPCC assessments, NOAA, had failed to ensure that the peer review of IPCC findings incorporated-by-reference within these NOAA-developed assessments had fully conformed with IQA standards. NOAA had been obliged to ensure such conformance *as a matter of U.S. law*.

Indeed, a 2010 United Nations ("UN") Secretary General and IPCC Chair-commissioned report prepared by the Inter-Academy Council ("IAC") that had reviewed the IPCC's peer review processes and procedures had revealed systemic flaws in those processes and procedures.[269] The IAC-2010 report found that the Third and Fourth IPCC Assessment Reports ("AR3", "AR4") had been developed amidst numerous systemic IPCC process and procedure failures in the critical areas of peer review, reviewer independence/ conflict-of-interest, lead author selection, assessment scoping, and assessment communication transparency, which required correction.[270]

The IAC-2010 Report disclosed that established IPCC processes for flagging, critically assessing and listing unpublished or non-peer-reviewed sources had often been ignored, leading to AR4 lead-author review errors.[271] The Report also revealed that 16%, 41%, and 64% of the approximately 14,000 IPCC references that Working Groups ("WG") I, II and III, respectively, cited in AR3 consisted of non-peer-reviewed journal articles.[272] This estimate appears reasonable, especially with respect to WG-III whose AR3 contribution had relied mostly on gray literature. Two of the three editors of WG-III's AR4 report (Metz and Davidson) had been lead-authors in WG III's AR3 report, strongly suggesting that no significant change in the use of non-peer-reviewed sources had taken place.[273] These systemic peer review process flaws go beyond the specific errors that had previously been identified by stakeholders.[274]

The IAC-2010 Report also found that the IPCC lacks institutional and scientific independence. As an intergovernmental subsidiary panel of the World Meteorological Organization ("WMO") and the United Nations Environment Program ("UNEP"), the IPCC is overseen by WMO and UNEP and must report to the UNEP, the WMO, the UN Framework Convention on Climate Change, and the UN General Assembly.[275] The IAC-2010 Report, furthermore, expressed concern about the "lack of a conflict-of- interest and disclosure policy for IPCC leaders and Lead Authors".[276] It stated, that the IPCC "does not have a conflict-of-interest or disclosure policy for its [own] senior leadership (i.e., IPCC Chair and Vice Chairs), Working Group Co-chairs and authors, or the staff of the Technical Support Units".[277] Rather, "IPCC Secretariat…professional staff members…are employees of WMO and/or UNEP and are subject to their disclosure and ethics policies."[278] However, the report also revealed that "WMO and UNEP ha[d] not established conflict-of- interest or disclosure policies for experts who serve[d] on most WMO and UNEP assessment teams."[279] This strongly suggests that IPCC senior leadership was not subject to any conflict-of-interest rules at all. Given "the nature of the IPCC's task (i.e., in presenting a series of expert judgments on issues of great societal relevance)", the Report's authors emphasized the need for the IPCC to "pay special attention to issues of independence and bias to maintain the integrity of, and public confidence in, its results."[280] These systemic independence/conflict-of-interest flaws go beyond the specific errors previously raised surrounding the matters relating to the East Anglia University email scandal.[281]

IPCC peer review processes, moreover, suffered from transparency failures. The author selection process lacked formal criteria which rendered the AR4 susceptible to political influence.[282] And, IPCC leaders and

spokespersons often strayed into policy advocacy in violation of the organization's mandate.[283] These systemic transparency flaws go beyond the specific errors previously raised by stakeholders.[284]

These numerous systemic IPCC process and procedure failures raise serious doubts about the quality of the IPCC assessments and the DOC-NOAA-generated USGCRP/CCSP assessments that reference and incorporate them, upon which the EPA Administrator's Final endangerment and cause or contribute Findings primarily rely.[285] Such misplaced reliance on flawed IPCC processes, however, severely undermined NOAA's ability to satisfy the IQA's statutory mandate and the OMB and NOAA IQA-implementing guidelines' highest and most rigorous level peer review standards applicable to HISAs. These are precisely the very failures the IQA and the OMB and NOAA IQA-implementing guidelines are meant to guard against.

Nevertheless, in spite of these findings, the IPCC Review Committee appointed by the IAC Board[286] had somehow managed to conclude that the IPCC-AR3 and IPCC-AR 4 "assessment process[es] ha[d] been successful overall".[287] Reasonable persons are entitled to express skepticism about this result and to raise additional questions. For example, is it more than possible that NOAA's funding of universities and nonprofit institutes with which four (4) of twelve (12) (33.33% of) IPCC Committee members were then likely affiliated had influenced the Committee's findings? The facts reveal that four (4) IAC IPCC Review Committee members had been affiliated with universities and nonprofit institutes then participating in NOAA grant-funded climate science research-related programs: Harold Shapiro and Syukuro Manabe of Princeton Univ., Maureen Cropper of the Univ. of Maryland, and Mario Molino of UC-Irvine & the Scripps Institution of Oceanography.[288] Such affiliations strongly suggest that these four IAC Committee members were neither truly independent from NOAA nor objective concerning the subject matter reviewed at the time they had conducted their investigation.

ii. NOAA Did Not Have Quality Control Mechanisms in Place Covering the Use of External Environmental Data to Detect Federal Agency Computer Modeling Flaws or IPCC Peer Review Process and Procedure Flaws

Minimal due diligence reveals that during NOAA's development of the eight (8) SAPs (1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2 and 5.3), SOC-2008 and NCA2-2009, NOAA did not have in place any formal agency-wide policy covering the use of ***external*** (third-party-developed) environmental data that approached the level a data quality management system such as the ISO 9001 Quality Management System.[289] Nor did NOAA have in place at that time, ***as a supplement to peer review***, a data quality control mechanism such as EPA's Council for Regulatory Environmental Modeling (CREM) guidelines, [290] EPA's Quality Manual for Environmental Programs,[291] or EPA's 2002 Quality Assurance ("QA") Project Plan Guidelines.[292] Assuming arguendo, that EPA had followed its own quality control guidelines and programs, which, unfortunately, it did not do,[293] EPA would have been required to ***validate*** and not merely verify the peer review processes and procedures employed by the IPCC to vet the assessments incorporated in their reports which NOAA had incorporated into its assessments (including underlying datasets and computer modeling and applications thereof) upon which the EPA Administrator had relied and publicly disseminated as its own. In other words, NOAA, like EPA, had accepted as valid and true IPCC-developed climate assessments (developed, in large part by U.S. government scientists) which NOAA incorporated into its own climate assessments, without having *validated* the peer review processes of these organizations.

While ISO9001 experts have lamented the frequent failure of those in industry employing the ISO9001 management system to recognize the critical distinction between verification and validation,[294] NOAA is no mere market participant. Rather, NOAA is the 'sophisticated' and 'savvy' lead U.S. government agency on

climate science held legally responsible under the Information Quality Act for undertaking all measures necessary to ensure the accuracy and correctness (i.e., "ensuring and maximizing the quality, objectivity, utility and integrity") of third party-developed highly influential scientific assessments and influential scientific information, including underlying data and computer models, it uses, adopts and disseminates to the public. NOAA's legal obligation to adhere to the IQA's most rigorous and least discretionary peer review standards is *especially critical if* the assessments in question are novel and controversial, and serve as the basis for regulations promulgated by another federal agency (i.e., EPA) NOAA has worked with under the auspices of an interagency program operated from the inner sanctum of the White House (i.e., the USGCRP/CCSP) having an economically significant impact on the U.S. economy at large.

Apparently, it was not until the Fall of 2009, *well after* NOAA had publicly disseminated the climate science-related SAPs, assessments and reports it had developed under the auspices of the USGCRP/CCSP (and shortly before EPA's finalization of the EPA Administrator's 2009 CAA Section 202(a) GHG Endangerment Findings), that NOAA first established an Environmental Data Management Committee (EDMC). The purpose of the EDMC had been "to strengthen lifecycle management of the data collected from [NOAA] observing systems."[295] The creation of an EDMC, in turn, was part of a larger agency-wide effort to "strengthen [p]olicies and [d]irectives" for purposes of defining a "NOAA Environmental Data Management Framework"[296] that included eventual establishment of a NOAA metadata standard accompanied by detailed implementation guidance.[297] And, it was not until early 2010 that NOAA's Office of the Chief Administrative Officer (OCAO) issued NOAA Administrative Order 212-15 – "Management of Environmental Data and Information,"[298] which establishe[d] the Department of Commerce (DOC) National Oceanic and Atmospheric Administration (NOAA) Environmental Data Management Policy. NAO212-15 stated that,

> "[t]his policy provides high-level direction that guides procedures, decisions, and actions regarding environmental data and information management throughout NOAA. Further guidance on how this policy is to be implemented will be provided in procedural directives that address the full data lifecycle of all domains of NOAA environmental information and records. [...] *This NAO applies to all NOAA environmental data and to the personnel and organizations that manage these data*, unless exempted by statutory or regulatory authority. […] This order supersedes NOAA Administrative Order 212-15, Management of Environmental and Geospatial Data and Information, dated December 2, 2008" (emphasis added).[299]

NAO212-15 defined the term "environmental data" rather broadly to include all

> "recorded and derived observations and measurements of the physical, chemical, biological, geological, and geophysical properties and conditions of the oceans, atmosphere, space environment, sun, and solid earth, as well as correlative data, such as socioeconomic data, related documentation, and metadata."[300]

It also defined the term "data management" as a

> "a comprehensive end-to-end process including movement of data and information from the observing system sensors to the data user. This process includes the acquisition, *quality control*, metadata cataloging, *validation*, reprocessing, storage, retrieval, *dissemination*, and archival of data" (emphasis added).[301]

The first two expressly stated "primary reference materials related to this Order" included OMB's IQA Guidelines and NOAA's Information Quality Guidelines.[302] The NAO first became effective only on November 4, 2010,[303] and NOAA's Chief Information Officer was responsible for ensuring its implementation.[304]

In November, 2011, the NOAA Science Advisory Board (SAB) Data Archive and Access Requirements Working Group (DAARWG) presented to the SAB a report entitled "Assessing the Use of Data from Non-NOAA Sources."[305] The report's objective was to

> "provide[] *guidelines for developing a NOAA policy on the use of environmental data from external sources for various mission purposes*. It aims to provide the basis for creating a NOAA policy that can aid in deciding whether or not to acquire data from non-NOAA sources and proposes standards to be applied to such acquisitions. […] The intent of this document is to inform a potential NOAA policy *that would apply particularly when external data are relied upon for operational purposes or decision-making*" (emphasis added).[306]

The report emphasized the importance of ensuring that the policy developed pursuant to such guidelines be employed where non-NOAA sourced data would be used agency-wide or in a manner that could affect "life, property *or highly influential scientific assessments [HISAs]*" (emphasis added).[307] It also recommended that such "data policy guidelines should be applied *prior to* obtaining environmental data from non-NOAA sources" (emphasis added).[308] Furthermore, the SAB DAARWG recommended that NOAA should establish a "procedure for certifying data sources" as "reliable".[309]

The SAB subsequently approved the report and endorsed its recommendations for "developing and implementing NOAA-wide guidelines and identified specific elements to be included therein."[310] Following its review of the recommendations, NOAA leadership directed the Environmental Data Management Committee to develop a response to the NOAA SAB by Spring 2013.[311] Two key points raised in the EDMC response warrant mention. First, the recommended practices are to be applied only to "*new uses* of external data. Existing projects that already use external data should review the Worksheet in Appendix A to ensure they have considered the matters therein."[312] Second, it ceded full discretion to NOAA line and staff offices regarding whether and how to enforce and monitor the recommended practice taking into account the "appropriate level of sensitivity or risk of the programs and projects concerned."[313] Notwithstanding these limitations, if NOAA had had an *external* environmental data use and management system in place during NOAA-OAR's development of such HISAs and ISI, it would likely have detected the shortcomings in the IPCC peer review processes and procedures and would have more thoroughly tested the reliability of IPCC AR3 and AR4 scientific data it had chosen to incorporate within these ten (10) agency-developed scientific information products.

b. *NOAA Failed to Satisfy IQA Peer Review Reporting and Transparency Requirements Which Further Compromised Agency Use of and Reliance Upon IPCC (External) Environmental Climate Science Data & Assessments*

As the following discussion shows, NOAA had failed to address Agency peer review process and procedure flaws which further compromised the quality, objectivity, utility and integrity of the IPCC scientific data incorporated within the ten (10) NOAA-developed SAPs, assessments and reports that are the subject of this FOIA Request.

Granted, NOAA could ostensibly claim that it had complied with the transparency and reporting requirements of OMB-PRB Sections II.5 and III.6, by virtue of NRC peer review reports, author response documents, peer

review panel charges and most other related materials for SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2 and 5.3 having been made *currently* accessible and available on the USGCRP/CCSP website.[314] However, many public stakeholders could credibly and successfully disagree.

Stakeholders have long argued that NOAA had failed to make these documents accessible and available on NOAA *agency* websites during their development, and at the very least, *at the time they were finalized and released*. Stakeholders also have long argued that such failure had denied them sufficient opportunity to meaningfully review, understand and respond to these documents utilizing the administrative review processes and procedures afforded by the Information Quality Act. For example, stakeholders had complained in August 2008, at the time NOAA had solicited public comments in response to a draft version of the Unified Synthesis Product ("USP") which later became known as the Second National Climate Assessment ("NCA2-2009"), that they had been unable to access the eight of twenty-one (21) USGCRP/CCSP SAPs then completed which had served as the tentative scientific foundation for the USP.

> "On July 17, 2008, the National Oceanic and Atmospheric Administration published a Synthesis Report notice of availability and request for public comment in the Federal Register and announced a 28-day public comment period. The Synthesis Report is an integrative summary of the 21 Synthesis and Assessment Products (SAPs) of the Climate Change Science Program (CCSP), as well as the recent IPCC Fourth Assessment Report, and other recent results that have appeared in the scientific literature. However, as many of the underlying SAPs have not yet been produced, the public cannot presently judge the reliability and objectivity of Synthesis Report, *because the public cannot access the underlying documents on which the Synthesis Report is based…[T]he Synthesis Report is heavily dependent on the findings and information contained in the CCSP SAPs. However, only eight of the CCSP SAPs have so far been completed*" (emphasis added).[315]

According to stakeholders, NOAA's failure to satisfy the letter and spirit of these indispensable IQA reporting and transparency requirements had engendered the Agency's apparent disregard for stakeholder due process rights.

> "This problem clearly raises the question of how the public can possibly assess the reliability and objectivity of the Synthesis Report when in fact many of the major reports on which the Synthesis Report relies have not yet even been completed—some of the SAPs are not even scheduled to be completed until October 2008. For this reason, the Synthesis Report lacks transparency, and therefore it does not comply with the Information Quality Act or Guidelines—for as the SAPs on which it relies have not yet been produced, there is no way for public commenters to assess the objectivity of the report as the underlying information is not available…In sum, the Synthesis Report lacks transparency owing to the unavailability of the underlying documents on which it relies and therefore fails to comply with objectives that are set out in the Information Quality Act and Information Quality Guidelines." [316]

NOAA's prior failure to respect stakeholder due process rights has become more apparent following ITSSD's April and May 2014 filings of its original NOAA FOIA Request No. 2014-000714 and its subsequent Clarification thereof. In fact, it has been the White House-overseen USGCRP/CCSP, rather than NOAA, that has steadily disclosed more of these critical documents which are now publicly accessible and available on the USGCRP/CCSP, *not* NOAA, website.

NOAA, furthermore, could ostensibly claim that it had complied with OMB-PRB Section III.5's public transparency and inclusion requirements by virtue of NOAA's previously issued (2006-2009) federal register notices soliciting public comments on drafts of SAPs 1.1,[317] 1.3,[318] 2.2,[319] 2.4,[320] 3.2,[321] 3.3,[322] 5.2,[323] and 5.3,[324] and NCA2-2009.[325] However, even these peer review-related federal register notices had not been made readily accessible and available to the public until recently, *on the USGCRP/CCSP website*.[326] Clearly, "public commentators [could not] possibly [have] assess[ed] the "objectivity and reliability [of the USP, properly classified as a "HISA",[327] [328]]" at the time NOAA had solicited public comments "in the absence of such foundational documents."[329]

The USGCRP/CCSP website, and *not the NOAA website*, apparently *now* serves as the national repository for all NOAA (and other federal agency)-developed USGCRP/CCSP scientific information products that served as the scientific foundation for the EPA Administrator's 2009 CAA Section 202(a)(1) GHG Endangerment Findings. The USGCRP/CCSP website also catalogues many, if not, most of the peer review files relating to these SAPs, assessments and reports, *except for those relating to the Second National Climate Assessment – NCA2-2009* of which this FOIA Request now seeks immediate and uncensored disclosure.

Notwithstanding such disclosures, a close review of the public comments and author responses received with respect to NOAA-developed and NRC peer reviewed SAPs (1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3) reveals that few members of the public, aside from employees of federal government agencies including NOAA, had submitted public comments that generated author responses.[330] [331] [332] [333] [334] [335] [336] In particular, a review of the public comments and author responses received in connection with the USGCRP/CCSP peer review of NOAA/DOE-developed SAP2.2 reveals that only one (1) of the twelve (12) or thirteen (13) identified public reviewers had been designated by name, *without* reference to affiliation.[337] All other identified public reviewers had been designated by ID#s.[338] Perhaps this lack of public transparency with respect to the identities of the public reviewers of SAP2.2 can be attributed to the cabinet level or Executive Office of the President ("EOP") placement of such commenters who had successfully ensured their anonymity. Indeed, these commentators may likely have been affiliated with the USGCRP/CCSP Subcommittee on Global Change Research (SGCR) of the National Science and Technology Council's Committee on Environment, Natural Resources, and Sustainability (CENRS), which is overseen by the White House Office of Science and Technology Policy (OSTP).[339]

Arguably, the dearth of comments received from public stakeholders other than federal agency and EOP personnel, particularly comments of a scientific or technical nature, can be attributed to NOAA's failure to apprise the public of the true purpose(s) for which these SAPs were then being developed. Were these SAPs to be used by NOAA and/or other federal agency "decisionmakers" for purely internal or interagency science development and administrative purposes? Or, were they instead to be used for regulatory policymaking and/or regulatory action purposes?

A review of the Climate Change Science Program (CCSP) prospectuses prepared for each NOAA-developed SAP reveals that the White House-overseen CCSP had represented to the public that the SAPs would *not* be used for regulatory policymaking and/or regulatory action purposes:

> "The document *does not express any regulatory policies* of the United States or any of its agencies, *or make any findings of fact* ***that could serve as predicates for*** *regulatory action*" (emphasis added).[340]

Furthermore, a review of all federal register notices NOAA had issued during 2007-2009[341] soliciting public comments on each NOAA-developed SAP[342] and the NCA2-2009[343] incorporating them (pursuant to the Administrative Procedure Act ("APA") and relevant USGCRP/CCSP SAP-development guidelines)[344] reveals that NOAA had then represented to the public that the SAPs did *not* reflect an Agency regulatory policy or determination:

> "This draft document is being released solely for the purpose of pre-dissemination peer review under applicable information quality guidelines. This document has not been formally disseminated by NOAA. *It does not represent and should not be construed to represent* ***any Agency policy or determination***" (emphasis added).[345]

Consequently, it is now apparent that the American public had remained largely unaware of (i.e., had been deceived by NOAA regarding) the true regulatory policy and action purposes for which these SAPs, NCA2-2009 incorporating them and SOC-2008 had long been intended and would be utilized. As noted above, the public had only first become aware that such assessments would be used for purposes of conducting a U.S. Clean Air Act Section 202(a)(1) endangerment analysis *that would result in positive findings and the triggering of planned regulatory actions* when the prior administration *EPA* had finally referenced them in Table 1.1 of the draft EPA-TSD[346] and supporting documentation[347] accompanying the issuance of its July 2008 Advance Notice of Proposed Rulemaking,[348] which the current administration EPA later supplemented in the updated EPA-TSD[349] accompanying the issuance of its April 2009 Notice of Proposed Rulemaking.[350] In fact, it was only in January 2009 that all of remaining incomplete USGCRP/CCSP SAPs had been "completed,"[351] and that by June 2009, the USP (NCA2-2009) had been completed and released.[352]

Moreover, NOAA's representation that the draft assessments were being circulated only for "pre-dissemination peer review" purposes denied public stakeholders the ability, during the Administrative Procedure Act notice and comment periods provided, to invoke the IQA administrative review mechanism that otherwise would have empowered them to request agency (NOAA) correction of the science contained therein.

Public stakeholders were first permitted to invoke IQA administrative review procedures *only* upon *this administration EPA's* issuance of its April 2009 Notice of Proposed Rulemaking. The prior administration EPA's Advanced Notice of Proposed Rulemaking only hinted at the possibility that regulations governing GHG emissions could be enacted.[353]

According to EPA's IQA Guidelines,

> "when EPA issues a notice of *proposed* rulemaking supported by studies and other information described in the proposal or included in the rulemaking docket, it disseminates this information within the meaning of the Guidelines. The public may then raise issues in comments regarding the information" (emphasis added).[354]

And, even in such instance, public stakeholders had been afforded fewer than eight (8) months (until the December 2009 issuance of the EPA Administrator's Final Endangerment Findings) to develop sufficient and credible substantive peer reviewed scientific evidence capable of satisfying the burden of persuading NOAA, as developer of those assessments, to correct them consistent with such evidence in accordance with NOAA IQA-implementing guidelines.[355]

In light of these revelations, how can NOAA substantiate the IQA-conformance of the public notice and comment procedures the Agency had employed in conjunction with the peer review processes undertaken by the NRC (NOAA's peer review contractor) with respect to each NOAA-developed SAP? In other words, how can NOAA now credibly argue that such notice and comment procedures had been sufficiently open, transparent, inclusive, objective, and balanced to afford interested public stakeholders *other than* government agency and EOP personnel a meaningful opportunity to be heard, both under the APA and the IQA, as the relevant OMB and NOAA IQA-implementing guidelines require, where NOAA officials *knew or had reason to know* the ultimate regulatory purposes for those assessments? And, how can NOAA thereby substantiate the validity of the IQA compliance certifications it drafted for purposes securing USGCRP/CCSP and NSTC/CENR clearance for SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2, 5.3 and NCA2-2009?[356]

2. NOAA Ignored its Legal Obligation to Satisfy IQA Peer Review Independence and Conflict-of-Interest Standards

a. *NOAA Had Solicited Research Proposals From Universities and Nonprofit Institutes, Often in Connection With its Many Grant-Funded Climate Science Research-Related Programs, to Promote Agency and Administration Climate Change Policy Priorities*

During NOAA's development, and the NRC's and USGCRP/CCSP's peer review, of SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2 and 5.3, SOC-2008, and NCA2-2009, NOAA had maintained a number of lucrative agency grant-funded programs supporting climate research, assessment, adaptation, mitigation, and the development of other climate-related services, etc. (hereinafter referred to as "NOAA grant-funded climate science research-related programs").

These programs, which were intended to advance, promote or otherwise help to achieve NOAA and administration climate change policies, include the following: 1) the NOAA Cooperative Institutes Program;[357] [358] 2) the NOAA Modeling, Analysis, Predictions, and Projections ("MAPP") Program;[359] 3) the NOAA Earth System Science ("ESS") Program;[360] 4) the NOAA Climate and Societal Interactions ("CSI") Program, including six (6) subprograms: a) the Coastal and Ocean Climate Applications ("COCA") Program[361] and related funded projects;[362] b) the Regional Integrated Sciences and Assessments ("RISAs") Program[363] and related funded projects;[364] c) the International Research and Applications Project ("IRAP");[365] d) the Sectoral Applications Research Program ("SARP");[366] e) the National Integrated Drought Information System ("NIDIS") Program;[367] and f) the Cooperative Program for Climate & Weather Impacts on Society and the Environment ("CWISE");[368] 5) the NOAA National College Sea Grant Program,[369] featuring thirty-three (33) subprograms;[370] 6) the NOAA Center for Atmospheric Sciences' Educational Partnership Program with Howard Univ. ("NCAS");[371] 7) the NOAA Coral Reef Conservation Program ("CRCP"), [372] which supported recently established Coral Reef Institutes operated in at least three different U.S. universities;[373] and 8) the more recent NOAA Regional Ocean Partnership Funding Program ("ROPFP").[374]

i. Broad Agency/Area Announcements of Funding Opportunity ("BAAs")

In furtherance of these programs and Agency and administration climate change policies, NOAA had issued broad agency/area announcements of federal funding opportunities ("BAAs"). In other words, NOAA had *solicited* proposals for grant-funded climate science-related research, assessment, etc. from universities and nonprofit institutes during the past seven (7) federal fiscal years (FYs ended 2004-2010, roughly corresponding to the NOAA SAP development and NRC peer review activities that are the subject of this FOIA Request.[375]

NOAA asserted at least eight (8) statutory 'assistance' authorities as support for the issuance of these BAAs.[376] [377] These authorities included the Secretary of Commerce/NOAA's authority to: 1) enter into cooperative agreements with nonprofits to promote agency/NOAA programs (15 U.S.C §1540);[378] 2) establish a National Climate Program Office and "to work [(i.e., enter into contracts, grants or cooperative agreements)] with the National Academy of Sciences and other private, academic, State, and local groups" to undertake climate-related activities (15 U.S.C §2901 et seq.);[379] 3) assist federal and state agencies in "the collection analysis and dissemination of scientific data necessary to manage marine fishery resources, marine mammals, endangered species, and their habitats," consistent with the US Fish & Wildlife Coordination Act (16 U.S.C §661);[380] 4) "enter into contracts or other arrangements with qualified persons to provide technical assistance and management-oriented research necessary to support development and implementation of state coastal management programs," consistent with the Coastal Zone Management Act (16 U.S.C 1456c);[381] 5) conduct surveys to collect basic data for engineering and scientific purposes to provide charts and related information for safe navigation of marine and air commerce (33 U.S.C §883a-d);[382] 6) "establish a coordinated program of ocean, coastal, Great Lakes, and atmospheric research and development, in collaboration with academic institutions and other nongovernmental entities", focusing on the development of advanced technologies and analytical methods, and their application, that will promote United States leadership in ocean and atmospheric science (33 U.S.C §893a(a));[383] 7) "initiate a comprehensive and continuing program of research with respect to the possible long-range effects of pollution, overfishing, and man-induced changes of ocean ecosystems" (33 U.S.C §1442);[384] and 8) "promote and support research projects in meteorology through the use of private and governmental research facilities" for purposes of developing meteorological science capable of promoting safety and efficiency in air navigation (42 U.S.C §44720).[385]

For example, for FY2006, NOAA issued a BAA that identified thirty-three (33) different programs with opportunity for federal funding offered by five (5) NOAA office lines, including the National Environmental Satellite, Data, and Information Service ("NESDIS"), the National Marine Fisheries Service ("NMFS"), the National Ocean Service ("NOS"), the National Weather Service ("NWS"), and the Office of Oceanic and Atmospheric Research ("OAR"). These grant programs, in part, addressed climate science research-related issues.[386]

For FY2007[387] and FYs2008-2009,[388] NOAA issued "BAAs" "request[ing] proposals for special projects and programs associated with the Agency's strategic plan and mission goals," including improvement of public understanding of climate variability and change and enhancement of society's ability to plan and respond thereto.[389] NOAA issued a similar BAA for FYs 2010-2011.[390] For FYs2012-2013,[391] and 2014-2015,[392] however, NOAA BAAs identified climate adaptation and mitigation as *the primary* program priority.

For FY2009, NOAA issued a BAA that highlighted twenty-four (24) different grant programs with opportunity for federal funding offered by three (3) NOAA office lines, including the National Marine Fisheries Service ("NMFS"), the National Ocean Service ("NOS"), and the Office of Oceanic and Atmospheric Research ("OAR"). These grant programs, in part, addressed climate science research-related issues.[393]

Apparently, the purpose of the BAA mechanism has been "to encourage research, innovative projects, or sponsorships that are *not* normally funded through [NOAA] competitive discretionary programs" (emphasis added).[394] The Federal Acquisition Regulations ("FAR") further describe the purpose of BAAs:

> "[T]he broad agency announcement (BAA) with Peer or Scientific Review […is a procedure] for the *acquisition of basic and applied research* and that part of development not related to the development of a specific system or hardware procurement […] BAA's may be used by

> agencies *to fulfill their requirements for scientific study and experimentation directed toward advancing the state-of-the-art or increasing knowledge or understanding* rather than focusing on a specific system or hardware solution. The BAA technique shall only be used when meaningful proposals with varying technical/scientific approaches can be reasonably anticipated" (emphasis added).[395]
>
> "[…] The notice must be published no less frequently than annually […] Proposals received as a result of the BAA shall be evaluated in accordance with evaluation criteria specified therein through a peer or scientific review process […] *proposals need not be evaluated against each other* since they are not submitted in accordance with a common work statement. […] *The primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability*" (emphasis added).[396]

Thus, according to the FAR, the broad agency/area announcement is, in effect, a "general solicitation" from a federal agency identifying specific areas of research interest and including "criteria for selecting proposals." Indeed, soliciting federal agencies identify specific program substantive requirements ("needs") to which prospective applicants are directed to respond. Furthermore, these BAAs, "*solicit[] the participation of all offerors capable of satisfying the Government's needs* [and a peer or scientific review" (emphasis added). [397] BAAs are subject to the Competition in Contracting Act (CICA) of 1984.[398]

ii. More Tailored NOAA Announcements of Federal Funding Opportunity

Specific NOAA office lines and programs had also issued their own more tailored federal announcements of funding opportunity (i.e., solicitations for funding proposals).

Besides the above-cited statutory 'assistance' authorities, NOAA has variably asserted at least six (6) additional authorities as the basis for any one or more of these more tailored funding announcements. These include the Secretary of Commerce's authority to: 1) ensure the "taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States" (15 U.S.C §313);[399] 2) "provide, through the [National Climate Program] Office, financial assistance, in the form of contracts or grants or cooperative agreements, for climate-related activities which are needed to meet the goals and priorities of the program" (15 U.S.C. §2904);[400] 3) "work with academic, State, industry, and other groups conducting global change research to provide for periodic public and peer review of the [U.S. Global Change Research] Program [,…] to consider and utilize, as appropriate, reports and studies conducted by federal agencies, and departments, the National Research Council, or other entities […, and] to consult with academic, State, industry, and environmental groups and representatives" in developing "a National Global Change Research Plan for implementation of the Program" (15 U.S.C §2931-2934);[401] 4) "enter into cooperative agreements with colleges and universities […] and with nonprofit organizations relating to cooperative research units […] [f]or the purpose of developing adequate, coordinated cooperative research and training programs for fish and wildlife resources" (16 U.S.C. 753a);[402] 5) "conduct research, including cooperative research with fishing industry participants, on deep sea corals and related species, and on survey methods […and] to monitor activity in locations where deep sea corals are known or likely to occur […] in consultation with appropriate regional fishery management councils and in coordination with other federal agencies and educational institutions" (16 U.S.C. 1884);[403] and 6) "enter into an agreement with a nonprofit organization that promotes coral reef conservation" authorizing the NOAA Administrator "to transfer funds appropriated to carry out" coral research conservation "to such organization to receive, hold, and administer [such…] funds," with such grant program remaining subject to [NOAA] Administrator review (16 U.S.C. 6406).[404]

For example, for FY 2007, the Climate Program Office ("CPO") of NOAA's Office of Oceanic and Atmospheric Research (OAR) issued an announcement of federal funding opportunity seeking research proposals that promote NOAA Climate Program Office priorities.[405] These priorities include the CPO: 1) Atmospheric Composition and Climate (ACC) program;" 2) "Climate Change Data and Detection (CCDD) program;" 3) "Climate Test Bed (CTB) […] projects under the Climate Dynamics and Experimental Prediction (CDEP) program;" 4) "Climate Prediction Program for the Americas (CPPA);" 5) "Climate Variability and Predictability (CVP) program;" 6) "Global Carbon Cycle (GCC) program;" 7) "Regional Integrated Sciences and Assessments (RISA) program;" 8) "Sector Applications Research Program (SARP);" 9) "Scientific Data Stewardship (SDS) program;" and/or 10) "Transition of Research Applications to Climate Services (TRACS) Program."[406] The announcement indicated that NOAA had anticipated federal funding for FY 2007 in the amount of "$6M in [the] first year funding," covering 40 - 60 awards, and "that the annual cost of most funded projects [would] fall between $50,000 and $200,000 per year."[407]

Also, for FY 2007, NOAA's Office of Oceanic and Atmospheric Research (OAR) issued an announcement of federal funding opportunity soliciting research proposals that could be used to establish two different Cooperative Institutes (CIs). One CI would "study environmental issues associated with Alaska and related Arctic regions," (a proposed "CIFAR-II") while the other would "focus[] on the development and use of Earth System Modeling applied to climate applications with timescales of decadal or longer."[408] The announcement indicated NOAA had anticipated that "approximately $2-3M [would] be available […] for the Alaska CI […] in the first year of the award", while "approximately $3M [would] be available […] for the proposed Earth System Modeling CI […] in the first year of the award."[409]

In addition, for FY 2007, NOAA's National Climatic Data Center, Coastal Services Center, and Climate Program Office issued a collective announcement of federal funding opportunity soliciting research project proposals focusing *inter alia* on "practical applications of climate and extreme weather event research for coastal communities," in connection with the establishment of four-year cooperative agreements with the agency under the Climate and Weather Impacts on Society and the Environment ("NOAA-CWISE") program.[410] The announcement indicated NOAA had anticipated that funding would be "up to $600,000 per year for the term of the cooperative agreement."[411]

Furthermore, for FY2007, NOAA's National Ocean Service and National Oceanic and Atmospheric Administration collectively issued an announcement for federal funding opportunity soliciting research proposals to assist NOAA in better understanding "the underlying processes that regulate coral reefs and associated ecosystems," which research NOAA could later use "to directly support resource management decisions (i.e., potential regulations) to protect healthy coral reef ecosystems and to reverse decline in degraded ones."[412] In particular, "[e]ach proposal must […] [d]evelop tools, such as ecological forecasting models and/or data syntheses for decision making, to assist resource managers in predicting ecosystem health as a result of certain ecological impacts (*e.g. climate change*, coastal land-use, invasive species, extreme events, contaminants, etc.)" (emphasis added).[413] NOAA had anticipated that funds would be available to support two projects, which amounts, respectively, "should typically not exceed $1,000,000 per year" with a project duration of 3-5 years," and "$500,000 per year with a project duration of up to 3 years."[414]

For FY 2009, NOAA's Climate Program Office had issued announcements of federal funding opportunity (i.e., solicitations for climate research proposals) exclusively with respect to process research, observations and modeling, and application and assessment activities that would be covered by nine different NOAA climate atmospheric research-related cooperative programs, including the NOAA RISA, SARP, MAPP, ESS, COCA,

NIDIS and IRAP programs. For example, NOAA had anticipated that the identified programs, which were designed to endure for "up to three years in length [,would] cost between $50,000 and $200,000 per year" per award recipient.[415] For FY 2011, NOAA had anticipated that they would cost up to $10 million, and up to "$80 million […] [o]ver a 5-year period."[416] For FY 2012, NOAA anticipated that such programs would provide "total available funding ranging from $900,000 - $1,500,000 for 6 - 11 ["NOAA-RISA and other cooperative program-related] projects ranging from $75,000 - $200,000 each."[417] And, for FY 2013, NOAA anticipated that such proposals could provide up to "$14.5 million […] for approximately 115 new awards […] most […] at a funding level between $50,000 and $200,000 per year."[418]

For FY 2011, NOAA's Office of Oceanic and Atmospheric Research ("OAR") issued an announcement of federal funding opportunity soliciting research proposals "that identify and address the vulnerabilities a coastal community may face in adapting to climate change."[419] NOAA anticipated that the Sea Grant Program would "have available up to $1,000,000 for climate adaptation efforts for FY 2012-2013, pending Congressional appropriation,"[420] and advised that individual proposals not exceed $100,000 in federal funding for a project period ending January 31, 2014."[421]

b. *NOAA Climate Science Research-related Grants Funded Numerous University and Nonprofit Entity Cooperative Institute Established, Reestablished or Expanded in Response to NOAA Funding Solicitations*

For example for FY 2006, NOAA's Office of Oceanic and Atmospheric Research (OAR) issued a broad announcement of federal funding opportunity soliciting research proposals for establishing a Northern Gulf of Mexico (NGOM) Cooperative Institute which would "focus[] on the priorities in the northern Gulf of Mexico (NGOM)," including the detection and prediction of climate variability.[422] The announcement indicated that "NOAA expect[ed] that approximately $6.3 M [would] be available for the CI in the first year of the award. Of this amount, $650,000 ($130K per year for 5 years) [would] be applied to cover Task I base funding for the entire five-year award period."[423] This announcement's timing and description corresponds with the establishment of the Northern Gulf Institute ("NGI") hosted at Mississippi State Univ. with Univ. of Southern Mississippi, Florida State Univ. and Louisiana Univ. as partners.[424]

For FY 2009, NOAA's National Environmental Satellite Data and Information Service (NESDIS) issued an announcement of federal funding opportunity soliciting research proposals that could be used to establish a Cooperative Institute for Satellite Climate Studies domiciled in the Washington, DC region that would "focus on 1) climate and satellite research and applications, 2) climate and satellite observations and monitoring, and 3) climate research and modeling."[425] The announcement cited NOAA's need to sponsor a long-term (5-10 year) collaborative partnership with one or more outstanding non-Federal, non-profit research institutions,"[426] and indicated that the program would interface with other NOAA programs, including other Cooperative Institutes and the Sea Grant Program.[427] The announcement indicated "NOAA [had] expect[ed] that approximately $13M [would] be available for the CI in the first year of the award."[428] The announcement's timing and description correspond with the continuation and expansion of the Univ. of Maryland-hosted Cooperative Institute for Climate and Satellite Studies ("CICS-M") program which now includes the North Carolina University System. This change and a new NOAA grant contract were identified and described in the CICS-M annual report for FY 2010.[429]

For FY 2009, the Cooperative Institutes Program Office of NOAA's OAR issued an announcement of federal funding opportunity soliciting proposals to establish for an initial period of up to five-years a North Atlantic Regional Cooperative Institute.[430] The CI would focus *inter alia* on marine ecosystem-related "climate

research."[431] NOAA anticipated that "approximately $7M [would] be available for the CI in the first year of the award," including up to a $350,000 Task 1 budget.[432] The timing and description of this announcement correspond with the establishment of the Cooperative Institute for the North Atlantic Region ("CINAR") at the Woods Hole Oceanographic Institution during July 2009,[433] followed by the December 2011 execution of a Memorandum of Agreement between the parties bearing a term of 2.5 years.[434]

For FY 2009, the Cooperative Institutes Program Office of NOAA's OAR issued an announcement of federal funding opportunity soliciting proposals to establish a cooperative institute (CI) that would inter alia "[e]xplore and research continental shelf frontier ecosystems [and] advance the state of knowledge of both shallow and deep coral ecosystems under U.S. jurisdiction," focusing on NOAA's priorities for the living and non-living marine resources within and beyond the eastern U.S. Continental Shelf.[435] This announcement's timing and description correspond with the establishment of the Cooperative Institute for Ocean Exploration, Research and Technology ("CIOERT") at Florida Atlantic University. CIOERT focuses, in part, on "translat[ing] and incorporat[ing] discovery and knowledge into decisions regarding ocean resource management, ecosystem health, and nature and impacts of climate change," and this is reflected in its first annual report for FY 2010.[436]

For FY 2010, NOAA's Office of Oceanic and Atmospheric Research issued an announcement of federal funding opportunity soliciting research proposals that could be used to establish a Cooperative Institute "to improve mesoscale and stormscale high impact weather forecasts, watches, and warnings through the use of, and enhancement of, weather radar."[437] NOAA anticipated that "up to approximately $15M [would] be available annually for this CI [of which] approximately $300,000-$400,000 [would] be available per year for Task I."[438] The announcement specified that the research institute would be "located within a commuting distance to NOAA's facilities in Norman, Oklahoma that provides for direct interactions on a regular basis."[439] This announcement's timing and description correspond with the continuation and expansion of the Univ. of Oklahoma's Cooperative Institute for Mesoscale Meteorological Studies ("CIMMS") to focus, in part, on the "impacts of climate change related to extreme weather events." This change and a new NOAA grant contract were identified and described in the CIMMS annual report for 2012.[440]

For FY 2010, the Cooperative Program Office of NOAA's OAR and the National Marine Fisheries Service (NMFS) jointly issued an announcement of federal funding opportunity soliciting proposals for establishing a Cooperative Institute to Support NOAA Research Facilities in the Pacific Northwest. The announcement specified that the CI should primarily focuses *inter alia* on climate research and impacts, and should be located "within a daily commuting distance to the Pacific Northwest NOAA facilities in Seattle, Washington." [441] NOAA had anticipated that "up to approximately $20M [would] be available annually for this CI, […] approximately $500,000 of which [would] be available per year for Task I."[442] This announcement's timing and description corresponds with the reestablishment of the Joint Institute for the Study of the Atmosphere and Ocean ("JISAO") at the University of Washington.[443]

For FY 2010, the Cooperative Program Office of NOAA's OAR and the National Marine Fisheries Service (NMFS) jointly issued an announcement of federal funding opportunity soliciting proposals for establishing a Cooperative Institute in the southwestern U.S. that primarily focuses *inter alia* on climate research and impacts on marine ecosystems.[444] The announcement specified that the CI would be "located within a daily commuting distance to NOAA's facilities in La Jolla, California."[445] This announcement's timing and description correspond with the establishment of the Cooperative Institute for Marine Ecosystems and Climate ("CIMEC") at the University of California, San Diego. NOAA had anticipated that the initial funding amount would be no less than $500,000.[446] The CI's formation and initial NOAA grant contract were identified and described in the CIMEC's first annual report for FY 2011.[447]

For FY 2011, NOAA's National Marine Fisheries Service (NMFS) and Oceanic and Atmospheric Research (OAR) issued an announcement of federal funding opportunity soliciting proposals for establishing a Cooperative Institute for the Pacific Islands Region.[448] "Climate [r]esearch and [i]mpacts" were identified as among the CI's primary focus areas.[449] NOAA anticipated that "approximately $17-19M [would] be available annually" for this CI of which…] a minimum estimated amount of $200,000 [would] be available per year for Task I" administration and education/outreach activities.[450] The timing and description of this announcement correspond with the Univ. of Hawaii's establishment of a second Pacific Islands-focused CI under the name of the Joint Institute for Marine and Atmospheric Research/Cooperative Institute for the Pacific Island Region ("JIMAR/CIPIR"). This change and a new NOAA grant contract were identified and described in the JIMAR annual report for FY 2011.[451]

For FY 2012, NOAA's Oceanic and Atmospheric Research (OAR) issued an announcement of federal funding opportunity soliciting proposals to establish a Cooperative Institute (CI) "to help meet NOAAs strategic goals in the areas of Climate Adaptation and Mitigation and Weather Ready Nation."[452] The announcement specifies that the CI will work inter alia to "improve understanding of climate variability and change, stratospheric ozone, weather, and space weather processes and impacts [and] improve air quality and weather forecasts and climate prediction."[453] It also specifies that the CI would be "located within a daily commuting distance to the NOAA's Earth System Research Laboratory (ESRL) facilities in Boulder, Colorado."[454] Furthermore, NOAA anticipated that "*up to $32M may be available annually* for the CI based on Congressional Appropriations. Of that amount, up to $750 K will be available per year for Task 1" (emphasis added).[455] This announcement's timing and description correspond with the approval by the NOAA Cooperative Institute Program's approval, in August 2012, "of a new cooperative agreement with a five-year term and a scope of work matching that of CIRES [the Cooperative Institute for Research in Environmental Sciences at the Univ. of Colorado, Boulder] in recent years."[456]

For FY 2012, NOAA issued an announcement of federal funding opportunity in connection with the NOAA Coastal Centers' NOAA Regional Ocean Partnership Funding Program (ROPFR).[457] This NOAA funding solicitation sought proposals for activities contributing to the achievement of Regional Ocean Partnership priorities and the advancement of the national ocean policy, and to the "[d]evelopment and governance support for administration and operations of existing and new ROPs."[458] It specifically addressed climate adaptation and mitigation activities.[459] It was anticipated that total awards could amount to as much as $3,000,000 for FY 2012, concentrating on two focus areas – with individual award amounts of "$500,000 to $750,000 over two years" and "approximately $100,000 to $250,000 for the first year of funding," respectively.[460]

A close review of several the NOAA Cooperative Institute programs identified above reveals that NOAA scientists have played a close and constructive role in working with CI principal investigators as assigned "program managers",[461] [462] "collaborators,"[463] [464]"other participating researchers,"[465] "other personnel,"[466] "technical contacts,"[467] or "collaborating NOAA investigators"[468] during the course of their research projects. And, in some cases, NOAA scientists have even led their own research projects on CI premises, as principal investigators, either alone or with the assistance of CI scientists.[469] [470] [471]This strongly suggests that NOAA has continued to closely steward the funds it dispenses to the CI programs in promotion of Agency and administration policy priorities which, at the very least, raises questions about the intellectual independence and subject matter bias of CI program scientists.

Appendix 3E[472] below sets forth an approximate accounting of reported NOAA grant contracts and awards issued to universities participating in the NOAA Cooperative Institute Program during FYs ended 2004-2010,

(i.e., during the period of NOAA's development and the NRC/NAS' peer review of the U.S. Global Change Research Program/Climate Change Science Program ("USGCRP/CCSP) SAPs, assessments and report which are the subject of this FOIA Request.). These data provide an illustrative example, during this period, of the aggregate NOAA funding dollars $$ (at the very least, $785,496,242 – more than ¾ of $1 billion) that flowed from NOAA office lines to the sixteen (16) different universities/nonprofit institutes hosting seventeen (17) Cooperative Institute Programs, in which an additional forty-one (41) universities had participated as subcontractor/partners. It is notable that such funding data relates to only one (1) of seven (7) NOAA grant-funded climate change research-related programs identified above, and that the hosting and participating universities and nonprofit institutes also likely had received funding from other federal agencies' programs supporting climate change-related science research, assessment and monitoring activities during this period.

It also is notable that only one (1) of the sixteen (16) universities/nonprofit institutes hosting an Cooperative Institute Program – Columbia University – had failed to publicly disclose the amounts of NOAA CI funding it had received during these years in the annual CI reports filed with NOAA. The university, nevertheless, to disclosed three NOAA CI grant funding contracts: NA03OAR4320179 (the "main institutional award"); NA08OAR4320754 (the "extension to institutional award"[473]) and NA08OAR4320912 (the "shadow award"[474]).[475] As Appendix 3E[476] accompanying this new FOIA Request indicates, the Department of Commerce grants-online website reveals that the Trustees of Columbia University had received $47,584,236 in NOAA *non*-CI climate change-related grant awards during these years.

Taking these data into account, the following discussion provides examples of numerous apparent, if not actual, incidences of non-independence, conflicts-of-interest and bias at the institutional level that inflicted the National Academies of Science/National Research Council ("NAS/NRC") peer reviews of seven (7) NOAA-developed USGCRP/CCSP SAPs and the USGCRP/CCSP's peer review of the NOAA-developed NCA2-2009. Apparently, neither the NAS/NRC nor the USGCRP/CCSP seriously considered and addressed OMB's admonition, as set forth in the Preamble to the OMB Peer Review Bulletin implementing the Information Quality Act. As noted in Section IV.1 above, OMB effectively warned that the selection of peer reviewers directly or indirectly benefiting from a substantial amount of research funding that an entity affiliated with the peer reviewer received from the agency sponsoring the peer review (i.e., NOAA) as the result of agency-initiated and solicited grant proposals, could give rise to reviewer independence or conflict-of-interest issues.

c. *NOAA Overlooked the NAS/NRC's Failure to Identify IQA Peer Reviewer Independence and Institutional Conflicts-of-Interest Violations Notwithstanding Reported and Observable NAS/NRC Improprieties*

In an effort to fulfill the relevant Information Quality Act requirements to which it was subject under the Information Quality Act and applicable OMB and NOAA IQA-implementing guidelines, NOAA had relied upon the National Research Council ("NRC") of the National Academy of Sciences to perform external peer reviews of early drafts of seven (7) NOAA-developed USGCRP/CCSP SAPs: 1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3. The NAS/NRC process engendered the establishment of *ad hoc* Peer Review Panels to review each such SAP, Review Committees to review the respective Peer Review Panel reports, and general institutional oversight of the peer review processes assumed by two NRC advisory boards: the Board of Atmospheric Sciences and Climate ("BASC")[477] and the Board on Environmental Change and Society ("BECS").[478]

Section IV of the OMB Peer Review Bulletin implementing the Information Quality Act, with which NOAA (and EPA) must comply, provides that, "[a]s an alternative to complying with Sections II and III of this Bulletin [relating to "influential scientific information" ("ISI") and "highly influential scientific assessments"

("HISAs")], an agency may instead…(2) commission the National Academy of Sciences to peer review an agency draft scientific information product…"[479] The OMB Peer Review Bulletin provides, furthermore, that because "[t]he procedures of the NAS are generally quite rigorous…agencies should presume that major findings, conclusions, and recommendations of NAS reports meet the performance standards of this Bulletin."[480] Clearly, as noted above in Section IV, NOAA regards each of these SAPs as a "highly influential scientific assessment" ("HISA") warranting the highest and least discretionary level of IQA scrutiny.

Notwithstanding the presumption of validity that NAS peer review procedures enjoy, commentators have noted how the independent experts the NAS/NRC has commissioned to prepare peer reports of federal agency studies are neither infallible nor always political accountable. For example, allegations of NAS/NRC improprieties have been reported in several cases where politicians and federal agencies had sought advice on environmental and/or natural resource-related science-policy issues that were politically controversial and divisive.[481]

In addition, NRC/NAS improprieties also have been reported in connection with NAS' prior development of studies in the field of toxicology. Based on recently uncovered historical evidence revealed in the July 2014 issue of the peer reviewed journal *Archives of Toxicology*, a renowned toxicologist has alleged that the members of the NAS Biological Effects of Atomic Radiation I (BEAR I) Genetics Panel had been previously "motivated by self-interest to exaggerate risks to promote their science and personal/professional agenda," and in "found[ing]…the linear-no-threshold (LNT) model for cancer risk assessment […] on ideological grounds."[482] This author argues that, "such activities have profound implications for public policy and may have had a significant impact on the adoption of the LNT model for cancer risk assessment"[483] during the past fifty years.

If improprieties of this magnitude can be shown to have permeated as "prestigious" an institution as the NRC/NAS, which at least cabinet official in this administration recently referred to as the "gold standard" of American science while applauding its support of IQA noncompliant climate (NOAA and EPA) climate assessments,[484] Congress must immediately take action to ensure the credibility and reliability of the peer review processes federal agencies employ recognizing, simultaneously, their inherent limitations. According to one commentator, while "[o]utside peer review should be employed when there is strong reason to doubt the scientific integrity or credibility of an agency decision with important conservation or economic consequences…it should not be considered a panacea."[485]

That the usefulness and reliability of external peer review has remained the subject of ongoing debate[486] only seems to have exacerbated the risk of future episodes of NAS/NRC improprieties or negligence. Although external peer review (of the type provided by the NAS/NRC) can and does help to ensure scientific integrity, commentators have noted that "it is an imperfect tool for that purpose. At its best, peer review bears only an indirect relationship to scientific integrity, which is an individual and unverifiable virtue"[487] *not* susceptible to regulation – an issue with which NOAA officials[488] and the White House Office of Science, Technology and Policy[489] [490]continue to struggle. The ability of a peer reviewer to discern whether scientists' (authors') judgments fall within acceptable norms depends on whether the peer reviewer devotes sufficient time and effort, possesses "requisite expertise and actively practice[s] the virtues of objectivity and skepticism."[491]

This is especially true where the research results to be peer reviewed involve as politically controversial and divisive[492] and financially lucrative[493] an issue such as climate change.[494] The NRC/NAS proclaims its ostensible objectivity "as a private nonprofit membership organization" serving the government as "an independent advisor on scientific matters."[495] However, recent evidence shows that NOAA, like EPA, in apparent fealty to prior and current administration climate policy objectives, have suborned the NRC/NAS'

independence and scientific integrity concerning the very same climate change-related science subject matters these federal agencies effectively charged the NRC/NAS to referee/review.[496]

Indeed, during the same period NOAA had engaged the NAS/NRC to perform peer reviews of seven (7) NOAA-developed USGCRP/CCSP SAPs (i.e., between 2001 and 2008 - during the prior administration), it also had entered into financially lucrative contracts with the NRC to develop other climate related assessments/reports. For example, NOAA and the NAS/NRC entered into Contract No. NASW-01008 which commissioned the NAS/NRC to develop an assessment/report on climate forcing agents (i.e., on radiative forcings).[497] In addition, NOAA, in part, funded the NAS/NRC to develop an assessment/report on abrupt climate change pursuant to Contract No. 50-DKNA-7-90052,[498] and an assessment on mitigating shore erosion pursuant to Contract No. FC133CO5SE6428.[499] And, as recent comments ITSSD filed with EPA in response to its proposed existing power plant rule reveal, NOAA has continued this practice during the current administration. For example, during 2010-2011, NOAA had entered into three (3) financially lucrative contracts/grant awards (Contract #s: DG133R08CQ0062; RA133R-09-SE-4232; and WC133R-11-CQ-0048) with NRC/NAS for the latter to develop thirteen (13) reports[500] in alignment with the very same agency and administration climate change policies and findings discussed in the Third National Climate Assessment ("NCA3-2014"), which NOAA had contracted with the NAS/NRC to peer review (pursuant to NOAA contract - # NNH07CC79B TO #5).[501]

Clearly, the NAS/NRC had a significant financial stake in supporting NOAA and administration climate change policies through the development of NOAA-funded assessments and the peer review of NOAA-developed assessments the EPA Administrator primarily relied upon as support for its 2009 Clean Air Act ("CAA") Section 202(a)(1) GHG Endangerment Findings. This raises serious questions concerning the objectivity of the NAS/NRC during its peer review of these seven (7) SAPs, and the intellectual independence of NOAA and other federal agency author-contributors to those assessments. In addition, it is very likely that the process two NRC oversight Boards (i.e., the Board on Atmospheric Sciences and Climate and the Board on Environmental Change and Society) had employed in selecting the members of the Peer Review Panels and Report Review Committees for each SAP had been compromised as the result the incestuous relationships existing between the NAS/NRC Board members, NOAA officials and scientists, and the universities and nonprofit institutes participating in NOAA grant-funded climate change research-related programs.

These improprieties undermined the usefulness of the NAS/NRC conducting external peer reviews of the seven (7) NOAA-developed SAPs that served as primary scientific support for the EPA Administrator's 2009 CAA Section 202(a)(1) GHG Endangerment Findings, which continue to trigger economically significant proposed and final GHG emissions control regulations. They also militate against accepting the NAS/NRC's peer review processes as inherently valid and error-free. In other words, the government's longstanding absolute presumption in favor of NAS/NRC peer review processes referenced in the IQA-implementing OMB Peer Review Bulletin, can no longer be justified, and therefore, should be considered rebuttable.

The relevant NAS/NRC conflict-of-interest policy rule governing that organization's peer review of these assessments states the following:

> "For any committee that will be used by the institution in the development of one or more reports to be provided by the institution to a sponsoring agency for use in a government regulatory process, *the focus of the conflict of interest inquiry is on the identification and assessment of any interests that may be directly affected by the use of such reports in the regulatory process*. For example, if the institution were conducting a study of proposed

> modifications in [a] government regulation […] the focus of the conflict of interest inquiry would be on the identification and assessment of any interests that would be directly affected by that regulatory process if the institution's report were to provide the basis for regulatory action or inaction" (italicized emphasis in original; underlined emphasis added).[502]
>
> "…Receiving current research funding from a party that would be directly affected by the regulatory process would constitute a conflict of interest (1) if the research funding could be directly affected by the outcome of the regulatory process or (2) the research is directly related to the subject matter of the regulatory process and the investigator's right to independently conduct and publish the results of the research is limited or controlled by the sponsor" (emphasis added).[503]

The rationale underlying this rule is apparently the "concern…that if an individual (or others with whom the individual has substantial common financial interests) has specific interests (primarily financial) that could be directly affected by the regulatory process, the individual's objectivity could be impaired."[504]

According to this rule, financial interests 'of concern' include research funding potentially affected by the outcome of the regulatory process or otherwise directly related to the subject matter of the regulatory process and controlled by the sponsor:

> "*Receiving current research funding from a party that would be directly affected by the regulatory process would constitute a conflict of interest* (1) if the research funding could be directly affected by the outcome of the regulatory process or (2) the research is directly related to the subject matter of the regulatory process and the investigator's right to independently conduct and publish the results of the research is limited or controlled by the sponsor" (emphasis added).[505]

These NAS/NRC conflict of interest rules appear broad enough to cover real and apparent individual (researcher) *as well as institutional conflicts-of-interest*.

A review of the literature discussing these conflict-of-interest categories identifies some of the relationships that may exist between universities, their employees (including academics/scientists) and government agencies. For example, it is not uncommon for university employees, including scientists, to work not only at the university, but also at federally-funded government labs managed by the university. Such university employees also may be assigned temporarily to federal agencies[506] for an initial period of two years which may be extended up to an additional two years.[507] Likewise, federal agency employees may be assigned temporarily to universities under the terms of various types of cooperation agreements. Furthermore, it is not uncommon for university employees, including scientists to be asked by the university or a government agency to perform a peer review of the research of other university employees or of other government agency contractors, no matter whether they work at a university campus or at a university-managed government laboratory.[508]

Moreover, a university employee, including a scientist, also may serve as a consultant to a federal agency or for a government contractor in the same technical field as his/her research project. In that instance, the university employee must avoid rendering "advice that may be of questionable objectivity because of its possible bearing on his other interests, and should fully disclose those interests "to the university and to the contractor insofar as they may appear to relate to the work at the university or for the contractor."[509] When a university "staff

member engaged in government-sponsored research also serves as a consultant to a federal agency, such conduct is subject to the conflict-of-interest provisions in the Federal Criminal Code (18 U.S.C. Sec. 202 et seq.) and the conflict-of-interest regulations adopted by the National Institutes of Health, the Public Health Service, and the National Science Foundation."[510] While the NSF individual conflict-of-interest rules require disclosure of all "significant financial interests", they exclude from this definition "income from service on advisory committees or review panels for public or nonprofit entities."[511]

According to a 2011 report issued by the Department of Human Health and Services ("DHHS") Office of Inspector General ("OIG"), the National Institutes of Health grant research policy provides that "an institutional conflict of interest may arise when an institution's own financial interests (e.g., royalties, equity, stockholdings, and gifts) or those of its senior officials pose a risk of undue influence on decisions involving the institution's research."[512] The report contained the results of a survey DHHS-OIG conducted of 250 NIH grantee institutions. It found that fifty-nine (59) of the one hundred fifty-six (156) responding institutions had "defined in writing what constitutes an institutional conflict." These institutions typically defined institutional conflicts as "*financial interests that could affect the research, decisionmaking, loyalty, or objectivity of either the institution or individuals*" (emphasis added).[513] Fifteen (15) of the fifty-nine (59) institutions which also had written conflict of interest policies and processes and had identified the existence of actual financial conflicts-of-interest, found that the "most common type of institutional conflict was institutions' holding equity in non-publicly held companies. For institutions that identified institutional conflicts, the strategy most often used to address them was disclosure."[514]

In the absence of "[f]ederal regulations requir[ing] grantee institutions to identify and report institutional conflicts to NIH", and the consequent inability of NIH to discern "the number of institutional conflicts that exist among its grantee institutions and the impact these conflicts may have on NIH-sponsored research" (i.e., biased research results),[515] the DHHS-OIG recommended that NIH: 1) should "[p]romulgate regulations that address institutional financial conflicts of interest;"[516] 2) should continue to "require grantee institutions to identify, report, and address institutional conflicts in a consistent and uniform manner to NIH";[517] and 3) "should encourage grantee institutions to develop policies and procedures regarding institutional financial interests and conflicts" until such regulations are enacted."[518]

The DHHS-OIG report findings are compelling insofar as they indicate that an institutional conflict-of-interest can be rather broad in scope and involve the direct *as well as* indirect financial interests of *the institution*. This is reflected, for example, in Northwestern University's conflicts-of-interest policy. It defines an "institutional conflict-of-interest in research" as engendering "[a] situation in which an Institutional Research Interest [e.g., ensuring the "integrity in the conduct of research"] may be affected – or could reasonably appear to be affected – by Institutional Financial Interests."[519] Institutional financial interests are defined as "[p]ayments to the University for, or resulting from the conduct of, research at or under the auspices of the University which exceed $100,000 (either per transaction or in the aggregate) [and…] *include income from sponsored research projects*" (emphasis added).[520]

These findings, furthermore, underscore the urgency for both government agencies and universities to address institutional as well as individual researcher conflicts-of-interest to maintain the credibility of the scientific peer review process, and American science more generally. As the author of a recent Wall Street Journal op-ed article lamented, the corruption of the peer review process at many prestigious scientific journals is harming scientific credibility. In particular, he discussed the growing trend of scientist-authors exploiting the peer review processes employed by many scientific publishers to ensure that their papers secured a positive review for placement in their journals.[521] Consequently, this author admonished the public concerning the genuine risk

that errors in the peer review process at scientific journals "can have serious consequences if bad science leads to bad [government] policy."[522] As support for this proposition, he emphasized how such practices also have permeated and pervaded the National Academy of Science.[523]

Regrettably, it is highly likely that even fewer of the universities the DHHS-OIG surveyed during 2010-2011 had adopted and maintained, let alone articulated an intelligible policy covering the concept of "institutional conflicts-of-interest" during the earlier period in question within this FOIA Request.

3. The IQA Non-Compliance of NOAA-Developed and NAS/NRC Peer Reviewed USGCRP/CCSP SAPs 1.1, 1.2, 3.2, 3.3, 3.4 5.2 and 5.3

The following discussion assumes that NOAA and/or the USGCRP/CCSP has classified all seven (7) of these NOAA-developed SAPs as "highly influential scientific assessments" ("HISAs"), within the meaning of Section III.1 of the OMB Peer Review Bulletin. This means that they should have been subject to the most rigorous and least discretionary peer review, transparency, objectivity, independence, and conflicts-of-interest standards imposed by the OMB's IQA-implementing Peer Review Bulletin.

a. *Extensive Involvement of NOAA Scientists in IPCC AR3 and AR4 Development & Review and of Scientists Affiliated with NOAA Grant-Funded Climate Science Research-Related Programs Strongly Suggests Subject Matter Bias and Lack of Intellectual Independence*

A close review of the two-stage peer process employed by the NAS/NRC reveals that NOAA and other U.S. federal agency scientists who had been involved in the development of these assessments had made author-contributions to and/or had reviewed the Working Group I and/or Working Group II portions of the IPCC-AR4 and/or IPCC-AR3. Such a review also reveals that numerous scientists affiliated with universities and/or nonprofit institutes then participating in NOAA grant-funded climate science research-related programs had similarly participated in the IPCC AR3 and AR4 development processes. As the previous discussion also made clear, NOAA and other federal agency scientists from NCAR-NSF, NASA, DOE, etc. had served as principal, collaborating investigators and/or technical contacts in connection with projects undertaken at the NOAA grant-funded Cooperative Institutes Programs that had been established in sixteen (16) different universities. It is therefore difficult for reasonable persons to believe that these scientists and academics had been free from subject matter bias or had been intellectually independent from NOAA and other the federal agencies that had employed them or had served as their benefactors. To the contrary, the involvement of these scientists and academics in such endeavors strongly suggested subject matter bias and lack of intellectual independence.

As Appendices 3A-3B[524] accompanying this new FOIA Request reveal, approximately one-hundred sixty-six (166) persons affiliated with thirty-four (34) universities, nonprofit institutes and for-profit companies participating in one or more of the abovementioned NOAA grant-funded climate science research-related programs during the development and peer review of SAPs 1.1, 1.3, 2.2, 2.4, 3.2, 3.3, 5.2, and 5.3, SOC-2008 and NCA2-2009, had made author contributions to and/or had reviewed the Working Group I ("WGI") and/or Working Group II ("WGII") portions of the IPCC-AR4. Appendix 3C[525] accompanying this new FOIA Request reveals that a number of such scientists had previously done so with respect to the IPCC-AR3. One-hundred three (103) such persons (approximately 62%) had been affiliated with the following ten (10) universities: twenty-four (24) persons had been affiliated with the Univ. of Washington; fifteen (15) persons had been affiliated with Penn State Univ.; thirteen (13) persons had been affiliated with Columbia Univ.; nine (9) persons each had been affiliated with the Scripps Institution of Oceanography and the Univ. of Colorado; eight (8) persons had been affiliated with the Univ. of Maryland; seven (7) persons had been affiliated with

Ohio State Univ.; and six (6) persons each had been affiliated with the Univ. of Alaska-Fairbanks, the Univ. of Michigan and Colorado State Univ.

As Appendix 3D[526] accompanying this new FOIA Request reveals, one-hundred twenty-one (121) persons affiliated with forty-two (42) universities, nonprofit institutes and for-profit companies participating in one or more of the abovementioned NOAA grant-funded climate science research-related programs had made author contributions to eight (8) of the ten (10) NOAA-developed SAPs and assessments/reports (SAPs 1.2, 1.3, 2.2, 3.3, 5.2, 5.3; SOC-2008; and NCA2-2009) that the EPA Administrator had subsequently relied upon as scientific support for its 2009 CAA Section 202(a)(1) GHG Endangerment Findings. Sixty-four such persons (approximately 53%) had been affiliated with the following ten (10) universities and nonprofit institutes: eight (8) persons each had been affiliated with the Univ. of Alaska-Fairbanks and Woods Hole Oceanographic; seven (7) persons each had been affiliated with Ohio State Univ., Oregon State Univ. and Univ. of Washington; six (6) persons each had been affiliated with the Univ. of Colorado, Univ. of Maryland and Univ. of Wisconsin; five (5) persons had been affiliated with the Univ. of Arizona; and four (4) persons had been affiliated with Penn State Univ.

Appendices 3A and 3B collectively reveal that six (6) universities had accounted for one-hundred seven (107) of two-hundred eighty-seven (287) persons (approximately 37%) who had, in the aggregate, contributed to the NOAA-developed SAPs and assessments/reports *and* had contributed to and/or reviewed IPCC-AR4-WGI and/or WGII. These one-hundred-seven persons broke down as follows: Thirty-one (31) persons from the Univ. of Washington; nineteen (19) persons from Penn State Univ.; fifteen (15) persons from the Univ. of Colorado; and fourteen (14) persons each from Ohio State Univ., the Univ. of Alaska-Fairbanks and the Univ. of Maryland.[527]* Appendices 3A and 3C, moreover, collectively reveal that seventeen (17) persons affiliated with thirteen (13) entities then participating in one or more of the abovementioned NOAA grant-funded climate science research-related programs also had made contributions to and/or had reviewed the WGI and/or WGII portions of the IPCC-AR4, with eight (8) of the seventeen (17) persons (approximately 47%) having been affiliated (two each) with the following four (4) universities: Ohio State Univ., Univ. of Arizona, Univ. of Maryland and Univ. of Michigan.

This information strongly suggests that the views and behaviors of numerous authors of NOAA-developed SAPs and assessment/reports who had been affiliated with universities, nonprofit institutes and for-profit companies then participating in one or more of the NOAA climate science research-related grant-funded programs described above had likely *not* been financially or intellectually independent from and had likely been influenced by NOAA's issuance of grant awards to such entities.

b. *Extensive Affiliations Between NOAA, SAP Authors, Universities/Nonprofits and NAS/NRC Peer Review Panels, Report Review Committees and Oversight Boards and Committees Strongly Suggests Subject Matter Bias, Lack of Intellectual Independence and Institutional Conflicts-of-Interest*

In an effort to fulfill the statutory requirements to which it was subject under the Information Quality Act and applicable OMB and NOAA IQA-implementing guidelines, NOAA had secured the services and relied upon the expertise of a third-party contractor to conduct external peer reviews of the USGCRP/CCSP SAPs it had developed. To this end, between 2005 and 2008, NOAA entered into seven (7) contracts with the NAS/NRC commissioning the latter,[528] to perform peer reviews of the following NOAA-developed SAPs: SAP1.1/CCSP(2006); SAP1.3/CCSP(2008g); SAP2.4/CCSP(2008h); SAP3.2/CCSP(2008d); SAP3.3/CCSP(2008i); (SAP5.2/CCSP(2009); (SAP5.3/CCSP(2008). The NAS/NRC peer review process

entailed establishment of a separate Peer Review Panel to review an early draft of each of the above-referenced SAPs and the establishment of a separate Report Review Committee to review the Peer Review Panel's report. As the following discussion will show, the peer reviews the NAS/NRC performed for each of these NOAA-developed assessments failed to satisfy the most rigorous and least discretionary objectivity, independence and conflicts-of-interest IQA standards applicable to "highly influential scientific assessments" ("HISAs"), and consequently, had rendered NOAA's IQA compliance certifications upon which the USGCRP/CCSP and EPA had relied, legally untrue and invalid.

i. The Facts Surrounding NAS/NRC's Peer Review of USGCRP/CCSP SAP1.1 [529]

A. Author Team Composition

In 2005, NOAA established, on an *ad hoc* basis, the Climate Change Science Program (CCSP) Product Development Committee for Synthesis and Assessment Product 1.1 ("CPDC-S&A1.1") as a federal advisory committee,[530] pursuant to the provisions of the Federal Advisory Committee Act ("FACA").[531] The CPDC-SA&A1.1 had been charged with developing SAP1.1. NOAA commissioned the NAS/NRC to peer review an early draft of this report in acceptance of NAS Proposal No. 04-DELS-385-01[532] later that year. NOAA terminated the CPDC-SA&A1.1 in 2006 following its revision of the report in response to NAS/NRC comments.[533]

Appendix 4A[534] accompanying this new FOIA Request shows that the SAP1.1 author team had been comprised of thirty-two (32) authors, twenty (20) of whom consisted of the chief editor, convening lead authors and lead authors and served on the CPDC-SA&A1.1.[535] Twenty-two (22) of the authors had been affiliated with governments, including three (3) from the UK Met Office (Chris Follard, Peter Thorne and David Parker), and nineteen (19) from four different U.S. federal agencies (DOE, NASA, NOAA and NCAR-NSF). Five (5) of those U.S. government authors (26%) had worked for NCAR-NSF, four (4) of whom (80%) had made author-contributions to and/or reviewed the IPCC-AR4-WGI - Tom Wigley, James Hurrell, Gerald Meehl and William Collins. Nine (9) of those U.S. government authors (47%) had been employed by NOAA. They included V Ramaswamy, John Lazante, Dian Seidel, Thomas Peterson, Russell Vose, Richard Reynolds, Keith Dixon, Thomas Delworth and Norman Grody.

Eight (8) members of the author team had been affiliated with universities, one of whom had been affiliated with the University of East Anglia – Phil Jones. Seven (7) of these eight (8) members (87.5%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs: John Christy and Roy Spencer of the University of Alabama; Min Cai of Florida State University, Eugenia Kalmay and Konstantin Vinnikov of University of Maryland, Christ Forest of the Massachusetts Institute of Technology and Joyce Penner of the University of Michigan.

Two (2) of the thirty-two (32) authors (6%) had been affiliated with private companies then participating in NOAA grant-funded climate science research-related programs. These included Carl Mears and Frank Wentz of Remote Sensing Systems, Inc.

B. Peer Review Panel Composition

Appendix 4B[536] accompanying this new FOIA Request shows that the NAS/NRC-established panel to peer review SAP1.1 was comprised of nine (9) members, seven (7) of whom (78%) had been affiliated with universities. Five (5) of those members (71%) had been affiliated with universities then participating in NOAA

grant-funded climate science research-related programs: Dennis Hartmann and John Wallace of the University of Washington; Kenneth Kunkel of the University of Illinois- Urbana-Champaign; Richard Smith of the University of North Carolina; and Richard Lindzen of Massachusetts Institute of Technology, who had been affiliated with SAP1.1 author, Chris Forest of the Massachusetts Institute of Technology. In other words, these five members had effectively been charged with reviewing an assessment partially developed by scientists employed by the very agency (NOAA) which had issued significant grants funding ongoing programs operated by the universities with which they had then been affiliated.

In addition, two (2) of the nine (9) peer review panel members had worked at NCAR-NSF. William Randel and Junhong Wang of NCAR-NSF had been affiliated with five (5) SAP1.1 authors who also had then worked with NCAR-NSF: Tom Wigley, James Hurrell, Gerald Meehl, Adam Phillips and William Collins.

C. NAS/NRC Report Review Committee Composition

Appendix 4C[537] accompanying this new FOIA Request reveals that the second-level Report Review Committee NAS/NRC established to evaluate the SAP1.1 Peer Review Panel report had been comprised of six (6) reviewers. Two (2) of those reviewers (33.33%) had been affiliated with universities, one (1) of which (50%) had then been participating in NOAA grant-funded climate science research-related programs - Richard Levine of San Diego State University, a participant in NOAA's RISA-CNAP Program.

Appendices 4A and 4B collectively reveal that four (4) of the six (6) members of the Report Review Committee (66.67%) had worked for U.S. government agencies, three (3) of whom (75%) had been affiliated institutionally with SAP1.1 authors. Report Review Committee member, NOAA scientist James Angell, was affiliated with ten (10) NOAA scientists who served as SAP1.1 authors: V. Ramswamy; John Lazante; M. Daniel Schwarzkopf; Thomas Peterson; Russell Vose; Keith Dixon; Thomas Delworth; Dian Seidel; Richard Reynolds; and Norman Grody. All but the last two of these authors also had made author-contributions to or reviewed IPCC-AR4-WGI. In addition, Report Review Committee members Jerry Mahlman and Kevin Trenberth had been affiliated with five (5) NCAR-NSF scientists who served as SAP1.1 authors and had made author-contributions to or reviewed IPCC-IPCC-AR4-WGI and WGII: Tom Wigley, James Hurrell, Gerald Meehl, Adam Phillips and William Collins. Furthermore, Appendices 4B and 4C collectively reveal that Report Review Committee members Jerry Mahlman and Kevin Trenberth had been affiliated with two members of the SAP1.1 Peer Review Panel – William Randal and Junhong Wang.

D. NAS/NRC Oversight Board on Atmospheric Sciences and Climate Composition

The Climate Research Committee[538] of the NAS/NRC Board of Atmospheric Sciences and Climate ("BASC")[539] had assumed "institutional oversight" responsibility for the development of the NAS/NRC Peer Review Panel report for SAP1.1.[540] Appendix 4D[541] accompanying this new FOIA Request reveals that this NAS/NRC Board Committee had been comprised of fifteen (15) members during the NAS/NRC peer review of SAP1.1.

Seven (7) of fifteen (15) Board Committee members (47%) had been affiliated with universities and nonprofit institutes then participating in NOAA grant-funded climate science research-related programs: James Coakley of Oregon State University; Julia Cole and James Shuttleworth of the University of Arizona; David Karoly of the University of Oklahoma; Lynne Talley of the UC San Diego Scripps Institution of Oceanography; Antonio Busalacchi, Jr. of the University of Maryland; Peter Rhines of the University of Washington. Appendix 6D

shows that Board Committee member Antonio Busalacchi, Jr. also had been affiliated with two (2) SAP1.1 authors – Eugenia Kalmay and Konstantin Vinnikov of the University of Maryland. Appendix 6D also shows that Board Committee member Peter Rhines of the University of Washington had been affiliated with two (2) members of the SAP1.1 Peer Review Panel – Dennis Hartmann and John Wallace of the University of Washington.

Appendix 4D, furthermore, shows that three (3) of fifteen (15) Board Committee members (20%) had worked for a U.S. government agency – NCAR-NSF – Clara Deser, Linda Mearns and Gerald Meehl. Not only had these Board Committee members been affiliated with four (4) SAP1.1 authors (Tom Wigley, James Hurrell, Adam Phillips and William Collins), but Board Committee member *Gerald Meehl also had served as a SAP1.1 author*, reflecting affiliations with a total of five (5) SAP1.1 authors! In addition, these Board Committee members had been affiliated with two (2) members of the SAP1.1 Peer Review Panel (William Randel and Junhong Wang) and (2) members of the Report Review Committee (Jerry Mahlman and Kevin Trenberth).

E. Conclusion Re: IQA Compliance of SAP1.1

The NAS/NRC had functioned as NOAA's peer review contractor for the two-stage peer review conducted, and therefore, should have paid closer attention to whether and how the relationships then existing between the agencies, Peer Review Panel and Report Review Committee members and Board of Atmospheric Science and Climate members had apparently, if not actually, influenced the outcome of the SAP1.1 peer review process. It should have acknowledged and disclosed the general need for federal agencies to assure consistency of intra-agency and interagency policy positions, and more specifically, NOAA's need to develop and advance national climate science research and policies consistent with administration climate science policy priorities developed with the assistance of NOAA-funded university climate science research-related programs. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA's grant funding of those programs, as well as, the economic and reputational benefits the NAS/NRC derived from ongoing NOAA peer review and assessment development contracts.

It is difficult for reasonable persons to believe that it had been necessary and indispensable to secure as a Peer Review Panel member a Massachusetts Institute of Technology scientist who had been affiliated with a single SAP1.1 author. Similarly, it is difficult for reasonable persons to believe that it had been necessary and indispensable to secure as Peer Review Panel members scientists from the very same agency whose other scientists had made author contributions to SAP1.1 - NCAR-NSF. Had no competently qualified surrogates then been available to prevent a situation where one-third (33.33%) of Peer Review Panel members had been affiliated institutionally with the SAP1.1 author team? It also is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to secure as Report Review Committee members scientists from two federal agencies (NOAA and NCAR-NSF) who had been affiliated with almost half of the author-contributors to SAP1.1, and with members of the SAP1.1 Peer Review Panel. already call upon a University of Michigan scientist who had already served on the Report Review Committee and Peer Review Panel for two other related NAS/NRC-managed peer review projects. Moreover, it is difficult for reasonable persons to believe that members of the NAS/NRC Board on Atmospheric Sciences and Climate could not find sufficient justification to recuse themselves from the Board during the peer review of SAP1.1, when it had become apparent that they had been affiliated with members of the SAP1.1 Peer Review Panel and Report Review Committee, and with universities that had received program funding from the very agency (NOAA) whose assessment had been under NAS/NRC contract for peer review, and especially where one Board member had also served as an author-contributor to SAP1.1!

The NAS/NRC's failure to address these relationships and incentives constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA Request *inter alia* seeks disclosure of all NOAA and NAS/NRC records revealing how both entities had dealt with these issues.

ii. The Facts Surrounding NAS/NRC's Peer Review of USGCRP/CCSP SAP1.3 [542]

A. Author Team Composition

In 2006, NOAA established, on an *ad hoc* basis, the Climate Change Science Program CCSP Product Development Committee for Synthesis and Assessment Product 1.3 ("CPDC-S&A1.3") as a federal advisory committee, pursuant to the provisions of the Federal Advisory Committee Act ("FACA").[543] The CPDC-S&A 1.3 had been charged with developing SAP1.3. In 2007 or 2008, NOAA and NSF commissioned the NAS/NRC to peer review an early draft of this report via NSF grant number ATM-0455946.[544] NOAA terminated the CPDC-S&A 1.3 in 2009.[545]

Appendix 5A[546] accompanying this new FOIA Request shows that the SAP1.3 author team had been comprised of twelve (12) authors. Since all of the authors had been designated as "convening lead author" or as "lead author" they also served on the CPDC-SA&A1.3.

Appendix 5A also shows that seven (7) authors had worked for two U.S. government agencies – three (3) for NASA and four (4) for NOAA – Randall Dole, Martin Hoerling, Arun Kumar, and Roger Pulwarty. Five (5) authors (42%) had been affiliated with universities, all of which had then participated in NOAA grant-funded climate change research-related programs. Three (3) (60%) authors had been affiliated with the University of Maryland – Phil Arkin, James Carton and Eugenia Kalnay. One (1) author each (20%) had been affiliated with the University of Oklahoma (David Karoly) and Duke University (Gabrielle Hegerl), and these two authors had reviewed, respectively, IPCC-AR4-WGI and IPCC-AR4-WGII.

B. Peer Review Panel Composition

Appendix 5B[547] accompanying this new FOIA Request reveals that the NAS/NRC-established panel to peer review SAP1.3 had been comprised of seven (7) members. One (1) member each (14% x 2) had been affiliated, respectively with a private company and nonprofit institute, and one (1) member (14%) had been employed by a U.S. government agency – NCAR-NSF (Aiguo Dai). The four (4) remaining members (57%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs. They included: David Bromwich of Ohio State University, who also had revised IPCC-AR4-WGI; John Nielsen-Gammon of Texas A&M University; Benjamin Kirtman of the University of Miami; and Robert Miller of Oregon State University. These four members had effectively been charged with reviewing an assessment partially developed by scientists employed by the very agency (NOAA) which had issued significant grants funding ongoing programs operated by the universities with which they had then been affiliated.

C. Report Review Committee Composition

Appendix 5C[548] accompanying this new FOIA Request shows that the Report Review Committee NAS/NRC established to review the Peer Review Panel's report had been comprised of five (5) members, one (1) (20%) of which had been affiliated with a private company. The remaining four (4) members (80%) had been affiliated

with universities and nonprofit institutes then participating in NOAA grant-funded climate science research-related programs. These members included: Mary Anne Carroll of the University of Michigan; Joellen Russell of the University of Arizona; Andrew Solow of Woods Hole Oceanographic Institution; and Elizabeth Malone of the University of Maryland. Mary Anne Carroll also had served as a member of the Report Review Committee for SAP2.4, and as a member of the SAP3.2 Peer Review Panel. Elizabeth Malone, who had made author-contributions and reviewed IPCC-AR4-WGII, had been affiliated with three (3) SAP1.3 authors: Phil Arkin, James Carton and Eugenia Kalnay of the University of Maryland.

D. NAS/NRC Oversight Board on Atmospheric Sciences and Climate Composition

The NAS/NRC Board of Atmospheric Sciences and Climate ("BASC") had assumed "institutional oversight" responsibility for the development of the NAS/NRC Peer Review Panel report for SAP1.3. Appendix 5D[549] accompanying this new FOIA Request shows that the Board had been comprised of ten (10) members.

Seven (7) of ten (10) Board members (70%) had been affiliated with universities participating in NOAA grant-funded climate science research-related programs. They included: F. Sherwood Roland of UC-Irvine; Carol Anne Clayson of Florida State University; Kerry Emanuel of the Massachusetts Institute of Technology; Dennis Hartmann of the University of Washington; Thomas Vonder Haar of Colorado State University; Rosina Bierbaum of the University of Michigan; and Anthony Busalacchi, Jr. of the University of Maryland. Appendix 5D also reveals that two (2) of these Board Members (29%) had been affiliated with SAP1.3 authors and/or with members of the SAP1.3 Report Review Committee. Rosina Bierbaum had been affiliated with a member of the SAP1.3 Report Review Committee – Mary Anne Carroll of the University of Michigan. (Ms. Bierbaum also had served as a Clinton administration appointee to the Office of Science and Technology Policy (OSTP), and has served as a member of the President's Council of Advisors on Science and Technology since 2009.)[550] Anthony Busalacchi, Jr. of the University of Maryland had been affiliated with SAP 1.3 Peer Review Panel member, Elizabeth Malone of the University of Maryland and with three (3) SAP1.3 authors (Phil Arkin, James Carton and Eugenia Kalnay) of the University of Maryland.

E. Conclusion Re: IQA Compliance of SAP1.3

The NAS/NRC had functioned as NOAA's peer review contractor for the two-stage peer review conducted, and therefore, should have paid closer attention to whether and how the relationships then existing between the agencies, Peer Review Panel and Report Review Committee members and Board of Atmospheric Science and Climate members had apparently, if not actually, influenced the outcome of the SAP1.3 peer review process. It should have acknowledged and disclosed the general need for federal agencies to assure consistency of intra-agency and interagency policy positions, and more specifically, NOAA's need to develop and advance national climate science research and policies consistent with administration climate science policy priorities developed with the assistance of NOAA-funded university climate science research-related programs. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA's grant funding of those programs, as well as, the economic and reputational benefits the NAS/NRC derived from ongoing NOAA peer review and assessment development contracts.

It is difficult for reasonable persons to believe that it had been necessary and indispensable to secure as a Report Review Committee member a University of Maryland scientist who had been affiliated with several SAP1.3 authors and had participated in the IPCC-AR4-WGII review process – i.e., that no competently qualified surrogate had then been available. It also is difficult for reasonable persons to believe that it had been

necessary and indispensable for the NAS/NRC to call upon a University of Michigan scientist who had already served on the Report Review Committee and Peer Review Panel for two other related NAS/NRC-managed peer review projects. Moreover, it is difficult for reasonable persons to believe that members of the NAS/NRC Board on Atmospheric Sciences and Climate could not find sufficient justification to recuse themselves from the Board during the peer review of SAP1.3, when it had become apparent that they had been affiliated with members of the SAP1.3 Peer Review Panel, Report Review Committee and with universities that had received program funding from the very agency (NOAA) whose assessment had been under NAS/NRC contract for peer review.

The NAS/NRC's failure to address these relationships and incentives constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA Request *inter alia* seeks disclosure of all NOAA and NAS/NRC records revealing how both entities had dealt with these issues.

iii. The Facts Surrounding NAS/NRC's Peer Review of USGCRP/CCSP SAP2.4 [551]

A. Author Team Composition

The administrative record does not reflect that NOAA had established a federal advisory committee to develop SAP2.4.

Instead, Appendix 6A[552] accompanying this new FOIA Request reveals that the SAP2.4 author team had consisted exclusively of sixteen (16) U.S. government agency scientists. Five (5) of the sixteen (16) authors (31%) worked for NOAA and had made author-contributions or reviewed IPCC-AR4-WGI. They included A. Ravishankara, John Daniel, David Fahey, Stephen Montzka and V. Ramaswamy. Seven (7) of the sixteen (16) authors (44%) worked for NASA. They included Michael Kurylo, Jay Herman, Paul Newman, Anne-Marie Schmoltner, Richard Stolarski, Anne Douglass and Malcolm Ko, the last two of whom had reviewed IPCC-AR4-WGI. Two (2) of the sixteen (16) authors worked for EPA, and they included Jeff Cohen and Terry Keating. The two (2) remaining authors (one each or 6.3%) worked, respectively, for USDA (Kenneth Vick) and the U.S. Naval Research Lab (Richard Bevilaqua).

Sometime in 2007, NOAA commissioned the NAS/NRC to peer review an early draft of this assessment via DOC/NOAA Contract No. DG133R07SE2247.[553]

B. Peer Review Panel Composition

Appendix 6B[554] accompanying this new FOIA Request reveals that the NAS/NRC-established Panel to peer review SAP2.4 consisted of nine (9) members. Two (2) members (11% each) had been affiliated with public and private companies. Six (6) of nine (9) members (67%) had been affiliated with universities, two (2) of which (33%) had been participating in NOAA grant-funded climate science research-related programs. These members included Margaret Tolbert of the University of Colorado and Donald Wuebbles of the University of Illinois-Urbana-Champaign. <u>These two members had effectively been charged with reviewing an assessment partially developed by scientists employed by the very agency (NOAA) which had issued significant grants funding ongoing programs operated by the universities with which such members had then been affiliated</u>.

The remaining Peer Review Panel member (11%) had been employed by a U.S. government agency – Michelle Santee of NASA. Ms. Santee had been affiliated with seven (7) of the sixteen (16) (or 44% of) SAP2.4 authors – all fellow NASA employees - Michael Kurylo, Jay Herman, Paul Newman, Anne-Marie Schmoltner, Richard Stolarski, Anne Douglass and Malcolm Ko.

C. Report Review Committee Composition

Appendix 6C[555] accompanying this new FOIA Request shows that the Report Review Committee NAS/NRC established to review the SAP2.4 Peer Review Panel report had been comprised of six (6) members, three (3) of whom (50%) had been affiliated with foreign entities – two (2) German-based nonprofit institutes and one (1) Canadian government agency. The remaining three (3) members (50%) had been affiliated with universities, two (2) of which (67%) had then been participating in NOAA grant-funded climate science research-related programs. These two (2) members included Ross Salawitch of the University of Maryland and Mary Anne Carroll of the University of Michigan. Appendices 8C and 7C collectively show that Ms. Carroll had thus served on two Report Review Committees – one for the SAP2.4 Peer Review Panel report and one for the SAP1.3 Peer Review Panel report.

D. NAS/NRC Oversight Board on Atmospheric Sciences and Climate Composition

The NAS/NRC Board of Atmospheric Sciences and Climate ("BASC") had assumed "institutional oversight" responsibility for the development of the NAS/NRC Peer Review Panel report for SAP2.4. Appendix 6D[556] accompanying this new FOIA Request shows that the Board had been comprised of twelve (12) members.

Three (3) of the twelve (12) members (25%) had been affiliated with private companies. The remaining nine (9) members of the Board had been affiliated with universities that had been participating in NOAA grant-funded climate science research-related programs. These persons included: F. Sherwood Roland of UC Irvine; Michael Bender of Princeton University; Carol Anne Clayson of Florida State University; Kerry Emanuel of Massachusetts Institute of Technology; Dennis Hartmann of the University of Washington; Vernon Morris of Howard University; Thomas Vonder Haar of Colorado State University; Rosina Bierbaum of the University of Michigan and Anthony Busalacchi, Jr. of the University of Maryland.

Rosina Bierbaum had been affiliated with a member of the SAP2.4 Report Review Committee – Mary Anne Carroll of the University of Michigan. This was the second time a pairing of these scientists had occurred. (Ms. Bierbaum also had served as a Clinton administration appointee to the Office of Science and Technology Policy (OSTP), and has served as a member of the President's Council of Advisors on Science and Technology since 2009). Anthony Busalacchi, Jr., as well, had been affiliated with a member of the SAP2.4 Report Review Committee – Ross Salawitch of the University of Maryland.

E. Conclusion Re: IQA Compliance of SAP2.4

The NAS/NRC had functioned as NOAA's peer review contractor for the two-stage peer review conducted, and therefore, should have paid closer attention to whether and how the relationships then existing between the agencies, Peer Review Panel and Report Review Committee members and Board of Atmospheric Science and Climate members had apparently, if not actually, influenced the outcome of the SAP2.4 peer review process. It should have acknowledged and disclosed the general need for federal agencies to assure consistency of intra-agency and interagency policy positions, and more specifically, NOAA's need to develop and advance national

climate science research and policies consistent with administration climate science policy priorities developed with the assistance of NOAA-funded university climate science research-related programs. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA's grant funding of those programs, as well as, the economic and reputational benefits the NAS/NRC derived from ongoing NOAA peer review and assessment development contracts.

It is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to secure a NASA scientist as a Peer Review Panel member when seven NASA scientists had been members of the author team, and that no competent surrogates had then been available. It also is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to call upon a person that had already served on the Report Review Committee for another related NAS/NRC-managed peer review project – i.e., to evaluate the Peer Review Panel report for SAP1.3. Moreover, it is difficult for reasonable persons to believe that members of the NAS/NRC Board on Atmospheric Sciences and Climate could not find sufficient justification to recuse themselves from the Board during the peer review of SAP2.4, when it had become apparent that they had been affiliated with members of the SAP2.4 Report Review Committee and with and with universities that had received program funding from the very agency (NOAA) whose assessment had been under NAS/NRC contract for peer review.

The NAS/NRC's failure to address these relationships and incentives constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA Request *inter alia* seeks disclosure of all NOAA and NAS/NRC records revealing how both entities had dealt with these issues.

iv. The Facts Surrounding NAS/NRC's Peer Review of USGCRP/CCSP SAP3.2 [557]

A. Author Team Composition

The administrative record does not reflect that NOAA had established a federal advisory committee to develop SAP3.2.

Instead, Appendix 7A[558] accompanying this FOIA Request reveals that the SAP3.2 author team had consisted nine (9) members. One (1) author (11%) had been affiliated with a private company, and eight (8) authors (89%) had been employed by U.S. government agencies. Of these eight (8) authors, one (1) each had been employed by NASA and by UCAR-NSF and two (2) had been employed by NCAR-NSF (Tom Wigley, an IPCC-AR4-WGI contributor, and Jean-Francois Lamarque). The four (4) remaining government scientist authors (50%) had been employed by NOAA. They included Hiram Levy, Alice Gilliland, M. Daniel Schwarzkopf, an IPCC-AR4-WGI contributor, and Larry Horowitz.

Sometime in 2007, NOAA had commissioned the NAS/NRC to peer review an early draft of this assessment via NSF grant number ATM-0455946. [559]

B. Peer Review Panel Composition

Appendix 7B[560] accompanying this new FOIA Request reveals that the NAS/NRC-established SAP3.2 Peer Review Panel had been comprised of eight (8) members. Five (5) of eight (8) members (63%) had been affiliated with universities, and four (4) of those five (5) (80%) universities had been participating in NOAA

grant-funded climate science research-related programs. These persons included Lisa Sloan of UC Santa Cruz, Joellen Russell of the University of Arizona who also had served on the SAP1.3 Report Review Committee, and James Edmonds and Mary Anne Carroll of the University of Maryland. Ms. Carroll also had served on the SAP1.3 and SAP2.4 Report Review Committees. In other words, these four Peer Review Panel members had effectively been charged with reviewing an assessment largely developed by scientists employed by the very agency (NOAA) which had issued significant grants funding ongoing programs operated by the universities with which such members had then been affiliated.

Appendix 7B also shows that the remaining Peer Review Panel member – Philipp Rasch - had been employed by NCAR-NSF. Mr. Rasch, in other words, had been affiliated with two (2) SAP3.2 authors who also had been employed by NCAR-NSF – Tom Wigley and Jean-Francois Lamarque.

C. Report Review Committee Composition

Appendix 7C[561] accompanying this new FOIA Request shows that the NAS/NRC-established Report Review Committee for SAP3.2 had been comprised of five (5) members affiliated with universities. Four (4) of five (5) members (80%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs. These persons included: Radford Byerly, Jr. of the University of Colorado; Sonia Kreidenweiss of Colorado State University; Chien Wang of the Massachusetts Institute of Technology; and Donald Wuebbles of the University of Illinois at Urbana-Champaign, who also had served as a member of the SAP2.4 Peer Review Panel.

The fifth and remaining Report Review Committee member, Judith Curry of the Georgia Institute of Technology, had been affiliated with a member of the SAP3.2 Peer Review Panel – Armistead Russell of the Georgia Institute of Technology.

D. NAS/NRC Oversight Board on Atmospheric Sciences and Climate Composition

The NAS/NRC Board of Atmospheric Sciences and Climate ("BASC") had assumed "institutional oversight" responsibility for the development of the NAS/NRC Peer Review Panel report for SAP3.2. Appendix 7D[562] accompanying this new FOIA Request shows that the Board had been comprised of twelve (12) members three (3) of which (25%) had been affiliated with private companies. Nine (9) members had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs. The first six (6) of these members included: F. Sherwood Roland of UC-Irvine; Michael Bender of Princeton University; Rosina Bierbaum of the University of Michigan (Ms. Bierbaum also had served as a Clinton administration appointee to the Office of Science and Technology Policy (OSTP), and has served as a member of the President's Council of Advisors on Science and Technology since 2009); Carol Ann Clayson of Florida State University, Dennis Hartmann of the University of Washington; and Vernon Morris of Howard University.

The remaining three (3) members had affiliations with SAP3.2 Report Review Committee and Peer Review Panel members. For example, Board member Thomas Vonder Haar of Colorado State University had been affiliated with Report Review Committee member, Sonia Kreidenweiss of Colorado State University. Similarly, Board member Kerry Emanuel of the Massachusetts Institute of Technology had been affiliated with Report Review Committee member, Chieng Wang of the Massachusetts Institute of Technology. Meanwhile, Board member Anthony Busalacchi, Jr. of the University of Maryland had been affiliated with two SAP3.2 Peer Review Panel Members – James Edmonds and Mary Anne Carroll of the University of Maryland.

E. Conclusion Re: IQA Compliance of SAP3.2

The NAS/NRC had functioned as NOAA's peer review contractor for the two-stage peer review conducted, and therefore, should have paid closer attention to whether and how the relationships then existing between the agencies, Peer Review Panel and Report Review Committee members and Board of Atmospheric Science and Climate members had apparently, if not actually, influenced the outcome of the SAP3.2 peer review process. It should have acknowledged and disclosed the general need for federal agencies to assure consistency of intra-agency and interagency policy positions, and more specifically, NOAA's need to develop and advance national climate science research and policies consistent with administration climate science policy priorities developed with the assistance of NOAA-funded university climate science research-related programs. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA's grant funding of those programs, as well as, the economic and reputational benefits the NAS/NRC derived from ongoing NOAA peer review and assessment development contracts.

It is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to secure a NCAR-NSF scientist as a Peer Review Panel member when other NCAR-NSF scientists had already made author-contributions to SAP3.2. Similarly, it is difficult for reasonable persons to believe that it had been necessary and indispensable to secure as Peer Review Panel members scientists affiliated with the Universities of Arizona and Maryland who also had served as Report Review Committee members in other related NAS/NRC peer review projects. It also is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to have secured as members of the Report Review Committee one university scientist who also had served on a Peer Review Panel for another related NAS/NRC-managed peer review project, and another university science affiliated with a SAP3.2 author. Had no competent surrogates then been available? Moreover, it is difficult for reasonable persons to believe that members of the NAS/NRC Board on Atmospheric Sciences and Climate could not find sufficient justification to recuse themselves from the Board during the peer review of SAP3.2 when it had become apparent they had been affiliated with members of the SAP3.2 Peer Review Panel and Report Review Committee, and with universities that had received program funding from the very agency (NOAA) whose assessment had been under NAS/NRC contract for peer review.

The NAS/NRC's failure to address these relationships and incentives constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA Request *inter alia* seeks disclosure of all NOAA and NAS/NRC records revealing how both entities had dealt with these issues.

v. The Facts Surrounding NAS/NRC's Peer Review of USGCRP/CCSP SAP3.3 [563]

A. Author Team Composition

In 2006, NOAA established, on an *ad hoc* basis, the Climate Change Science Program (CCSP) Product Development Committee for Synthesis and Assessment Product 3.3 ("CPDC-S&A3.3") as a federal advisory committee,[564] pursuant to the provisions of the Federal Advisory Committee Act ("FACA"). The CPDC-SA&A3.3 had been charged with developing SAP3.3.[565] In 2007, NOAA commissioned the NAS/NRC to peer review an early draft of this report via NOAA grant number DG133R-04-CQ-009, TO#27.[566] NOAA later terminated CPDC-S&A3.3 in 2008 following the report's completion.[567]

Appendix 8A[568] accompanying this new FOIA Request shows that the SAP3.3 author team had been comprised of forty-five (45) authors, thirty-one (31) of whom consisted of the chief editor, convening lead authors and lead authors and served on the CPDC-SA&A3.3. Three (3) authors (6.7%) had been affiliated with private companies.

Seventeen (17) members (37.8%) had been affiliated with universities, twelve (12) of which (71%) had then been participating in NOAA grant-funded climate science research-related programs. These persons included: Kenneth Kunkel and Stanley Changnon of the University of Illinois at Urbana-Champaign; Susan Cutter and Melanie Gall of the University of South Carolina; Peter Bromirski of the UC San Diego Scripps Institution of Oceanography; Kerry Emanuel of the Massachusetts Institute of Technology; Paul Komar of Oregon State University; Richard Smith of the University of North Carolina; Kam-biu Liu of Louisiana State University; Gabrielle Hegerl of Duke University; and Robert Trapp of Purdue University.

Appendix 8B also reveals that twenty-five (25) members (55.56%) of the SAP3.3 author team had been affiliated with U.S. and foreign government agencies. Six (6) of these members (24%) had been employed by the UK, Canadian and Mexican Met Offices and/or environmental agencies, while one (1) member (4%) had been affiliated with the Oregon state government. Eighteen (18) of these members (72%) had been employed by U.S. federal agencies, including one (1) (5.6%) by the DOE (Michael Wehner). Four (4) of these members (22%) had been employed by NCAR-NSF. They included Pavel Groisman (IPCC-AR4-WGI contributor & reviewer), Linda Mearns (IPCC-AR4-WGI contributor), Gerald Meehl (IPCC-AR4-WGI contributor) and Gregg Holland.

Thirteen (13) of these members (72%) had been employed by NOAA. They included: Thomas Karl (IPCC-AR4-WGI contributor & reviewer); Thomas Peterson (IPCC-AR4-WGI contributor); David Easterling (IPCC-AR4-WGI reviewer); David Anderson (IPCC-AR4-WGI reviewer); Roger Pulwarty (IPCC-AR4-WGII contributor & reviewer); Harold Brooks (IPCC-AR4-WGI reviewer); Thomas Knutson (IPCC-AR4-WGI contributor & reviewer); David Levinson (IPCC-AR4-WGI contributor & WGII reviewer); Jay Lawrimore (IPCC-AR4-WGI contributor & WGII reviewer); Ronald Stouffer (IPCC-AR4-WGI contributor & reviewer); Christopher Miller, Tamara Houston, and Raymond Assel.

B. Peer Review Panel Composition

Appendix 8B[569] accompanying this new FOIA Request reveals that the panel NAS/NRC had established to peer review SAP3.3 had been comprised of eight (8) members. One (1) member (12.5%) had been affiliated with a public company. Five (5) members (6.3%) had been affiliated with U.S. and Canadian universities. Three (3) (60%) of these five (5) members had been affiliated with U.S. universities then participating in NOAA grant-funded climate science research-related programs. These members included Hugh Willoughby of Florida State University, Gregory Jenkins of Howard University, and David Karoly of the University of Oklahoma. In other words, these three Peer Review Panel members had effectively been charged with reviewing an assessment largely developed by scientists employed by the very agency (NOAA) which had issued significant grants funding ongoing programs operated by the universities with which such members had then been affiliated.

Two (2) of the eight (8) members (25%) had been employed by a U.S. government agency – NCAR-NSF. These members included Richard Rotunno and Claudia Tebaldi, and they had been affiliated with four SAP3.3 authors also employed by NCAR-NSF: Pavel Groisman, Linda Mearns, Gerald Meehl and Gregg Holland.

C. Report Review Committee Composition

Appendix 8C[570] accompanying this new FOIA Request shows that the Report Review Committee NAS/NRC established to review the SAP3.3 Peer Review Panel report had been comprised of five (5) members. One (1) (20%) of these members had been affiliated with a private company. The four (4) remaining members (80%) had been affiliated with universities. Three (3) of these members (75%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs. They included: Robert Maddox of the University of Arizona; John Molinari of SUNY Albany; and Roland Madden of the UC San Diego Scripps Institution of Oceanography. Mr. Madden also had been affiliated with one SAP3.3 author – Peter Bromirski of UC San Diego Scripps Institution of Oceanography.

D. NAS/NRC Oversight Board on Atmospheric Sciences and Climate Composition

The NAS/NRC Board of Atmospheric Sciences and Climate ("BASC") had assumed "institutional oversight" responsibility for the development of the NAS/NRC Peer Review Panel report for SAP3.3. Appendix 8D[571] accompanying this new FOIA Request shows that the Board had been comprised of twelve (12) members.

Three (3) members of the Board (25%) had been affiliated with private companies. One (1) of these members (33.33%) had also served as a member of the SAP3.3 Report Review Committee – Walter Dabberdt of Vaisala, Inc.

The remaining nine (9) Board members (75%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs. They included: F. Sherwood Roland of UC Irvine; Michael Bender of Princeton University; Rosina Bierbaum of the University of Michigan; Carol Ann Clayson of Florida State University; Dennis Hartmann of the University of Washington; Thomas Vonder Haar of Colorado State University; Anthony Busalacchi, Jr. of the University of Maryland; Vernon Morris of Howard University, who had been affiliated with a member of the SAP3.3 Peer Review Panel – Gregory Jenkins of Howard University; and Kerry Emanuel of the Massachusetts Institute of Technology, who had also served as a SAP3.3 author.

E. Conclusion Re: IQA Compliance of SAP3.3

The NAS/NRC had functioned as NOAA's peer review contractor for the two-stage peer review conducted, and therefore, should have paid closer attention to whether and how the relationships then existing between the agencies, Peer Review Panel and Report Review Committee members and Board of Atmospheric Science and Climate members had apparently, if not actually, influenced the outcome of the SAP3.3 peer review process. It should have acknowledged and disclosed the general need for federal agencies to assure consistency of intra-agency and interagency policy positions, and more specifically, NOAA's need to develop and advance national climate science research and policies consistent with administration climate science policy priorities developed with the assistance of NOAA-funded university climate science research-related programs. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA's grant funding of those programs, as well as, the economic and reputational benefits the NAS/NRC derived from ongoing NOAA peer review and assessment development contracts.

It is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to secure two NCAR-NSF scientists as Peer Review Panel members when other NCAR-NSF scientists had already

made author-contributions to SAP3.3. Similarly, it is difficult for reasonable persons to believe that it had been necessary and indispensable to secure as Peer Review Panel members scientists affiliated with the University of Oklahoma, Florida State University and Howard University, which had benefitted from NOAA grant-funded climate science research-related programs. It also is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to have secured as Report Review Committee members scientists who had been affiliated with the University of Arizona, UC San Diego Scripps and SUNY Albany, which had benefited from NOAA grant-funded climate science-research related programs, especially where one such member also had been affiliated with a SAP3.3 author. Had no competent surrogates then been available? Moreover, it is difficult for reasonable persons to believe that members of the NAS/NRC Board on Atmospheric Sciences and Climate could not find sufficient justification to recuse themselves from the Board during the peer review of SAP3.3, when it had become apparent they had been affiliated with members of the SAP3.3 Peer Review Panel and Report Review Committee, and with universities that had received program funding from the very agency (NOAA) whose assessment had been under NAS/NRC contract for peer review.

The NAS/NRC's failure to address these relationships and incentives constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA Request *inter alia* seeks disclosure of all NOAA and NAS/NRC records revealing how both entities had dealt with these issues.

vi. The Facts Surrounding NAS/NRC's Peer Review of USGCRP/CCSP SAP5.2 [572]

A. Author Team Composition

The administrative record does not reflect that NOAA had established a federal advisory committee to develop SAP5.2.

Instead, Appendix 9A[573] accompanying this new FOIA Request shows that the SAP5.2 author team had consisted eight (8) members. Two (2) authors (25%) had been affiliated with public or private companies. Five (5) authors (63%) had been affiliated with universities, one (1) of which (20%) had been then participating in NOAA grant-funded climate science research-related programs – Sandra McBride of Duke University. The remaining author had been employed by a U.S. government agency – Thomas Wilbanks of DOE, who also had contributed to IPCC-AR4-WGI.

Sometime in 2007 NOAA had commissioned the NAS/NRC to conduct a peer review of SAP5.2 via NSF grant number ATM-0455946.[574]

B. Peer Review Panel Composition

Appendix 9B[575] accompanying this new FOIA Request reveals that the panel NAS/NRC had established to conduct a peer review of SAP5.2 had been comprised of twelve (12) members. Two (2) members had been affiliated with a public or private company and/or with a trade association, while one (1) member had been affiliated with a city government.

Nine (9) members (75%) had been affiliated with universities and nonprofit institutes. One (1) such member, Jennifer Phillips of Bard College, (11%) also had served as a member of the SAP3.3 Peer Review Panel. In addition, six (6) of these members (66.67%) had been affiliated with universities and nonprofit institutes then

participating in NOAA grant-funded climate science research-related projects. In other words, these six Peer Review Panel members had effectively been charged with reviewing an assessment largely developed by scientists employed by the very agency (NOAA) which had issued significant grants funding ongoing programs operated by the universities with which such members had then been affiliated.

These members included: Ann-Margaret Esnard of Florida International University; Henry Pollock of the University of Michigan; Radford Byerly, Jr. of the University of Colorado, who also had served as a member of SAP3.2 Report Review Committee; Andrew Solow of Woods Hole Oceanographic Institution, who also had served as a member of the SAP1.3 Report Review Committee; Carol Anne Clayson of Florida State University, who served simultaneously as a member of the NAS/NRC oversight Board of Atmospheric Sciences and Climate; and Elizabeth Malone who had been designated as having been both employed by DOE and affiliated with the University of Maryland, and consequently, had been affiliated with SAP5.2 author and DOE employee Thomas Wilbanks. Ms. Malone also had served as a member of the SAP3.3 Report Review Committee.

C. Report Review Committee Composition

Appendix 9C[576] accompanying this new FOIA Request reveals that the Report Review Committee NAS/NRC had established to review the SAP5.2 Peer Review Panel report had been comprised of seven (7) members. Four (4) of seven (7) members (57%) had been affiliated with universities, three (3) of which (75%) had then been participating in NOAA grant-funded climate science research-related programs. These members included Joe Arvai of Michigan State University, Christopher Costello of UC Santa Barbara and Mort Webster of the University of North Carolina.

Three (3) of seven (7) members (43%) had been employed by a U.S. government agency – NCAR-NSF. They included William Randel, Linda Mearns (an IPCC-AR4-WGI contributor), and Claudia Tebaldi (an IPCC AR4-WGI and WGII contributor), who had served on the SAP3.3 Peer Review Panel.

D. NAS/NRC Oversight Board on Atmospheric Sciences and Climate Composition

The NAS/NRC Board of Atmospheric Sciences and Climate ("BASC") had assumed "institutional oversight" responsibility for the development of the NAS/NRC Peer Review Panel report for SAP5.2. Appendix 9D[577] accompanying this new FOIA Request shows that the Board had been comprised of twelve (12) members.

Three (3) Board members (25%) had been affiliated with private or public companies. Nine (9) members (75%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related projects. These members included: F. Sherwood Roland of UC Irvine; Michael Bender of Princeton University; Dennis Hartmann of the University of Washington; Thomas Vonder Haar of Colorado State University; Kerry Emanuel of the Massachusetts Institute of Technology; Vernon Morris of Howard University; Rosina Bierbaum of the University of Michigan who had been affiliated with SAP5.2 Peer Review Panel member Henry Pollack of the University of Michigan; Anthony Busalacchi, Jr. of the University of Maryland, who had been affiliated with SAP5.2 Peer Review Panel member, Elizabeth Malone of the University of Maryland and DOE, who had been affiliated with a SAP5.2 author; and Carol Anne Clayson of Florida State University who also served as a member of the SAP5.2 Peer Review Panel.

E. Conclusion Re: IQA Compliance of SAP5.2

The NAS/NRC had functioned as NOAA's peer review contractor for the two-stage peer review conducted, and therefore, should have paid closer attention to whether and how the relationships then existing between the agencies, Peer Review Panel and Report Review Committee members and Board of Atmospheric Science and Climate members had apparently, if not actually, influenced the outcome of the SAP5.2 peer review process. It should have acknowledged and disclosed the general need for federal agencies to assure consistency of intra-agency and interagency policy positions, and more specifically, NOAA's need to develop and advance national climate science research and policies consistent with administration climate science policy priorities developed with the assistance of NOAA-funded university climate science research-related programs. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA's grant funding of those programs, as well as, the economic and reputational benefits the NAS/NRC derived from ongoing NOAA peer review and assessment development contracts.

It is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to secure a Bard College scientist who also had served on the SAP3.3 Peer Review Panel. Similarly, it is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to secure scientists from the University Colorado and Woods Hole Oceanographic Institute who also had served, respectively on the SAP3.2 and 1.3 Report Review Committees. It also is difficult for reasonable persons to believe that it had been necessary and indispensable to secure as a Peer Review Panel member a DOE/University of Maryland scientist who had been affiliated with a fellow DOE scientist SAP5.2 author. Furthermore, it is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to have secured as Peer Review Panel members scientists who had been affiliated with the University of Colorado, Florida International University, the University of Michigan, the University of Maryland, and Woods Hole Oceanographic Institution, and as Report Review Committee members scientists who had been affiliated with Michigan State University, UC Santa Barbara and the University of North Carolina, ALL of which had been entities benefiting from NOAA grant-funded climate science-research related programs. Had no competent surrogates then been available? Moreover, it is difficult for reasonable persons to believe that members of the NAS/NRC Board on Atmospheric Sciences and Climate could not find sufficient justification to recuse themselves from the Board during the peer review of SAP5.2, when it had become apparent they would simultaneously serve on the SAP5.2 Peer Review Panel, or had been affiliated with other members of the SAP5.2 Peer Review Panel and with universities that had received program funding from the very agency (NOAA) whose assessment had been under NAS/NRC contract for peer review.

The NAS/NRC's failure to address these relationships and incentives constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA Request *inter alia* seeks disclosure of all NOAA and NAS/NRC records revealing how both entities had dealt with these issues.

vii. The Facts Surrounding NAS/NRC's Peer Review of USGCRP/CCSP SAP5.3 [578]

A. Author Team Composition

In 2006, NOAA established, on an *ad hoc* basis, the Climate Change Science Program (CCSP) Product Development Committee for Synthesis and Assessment Product 1.1 ("CPDC-S&A5.3")[579] as a federal advisory committee, pursuant to the provisions of the Federal Advisory Committee Act ("FACA"). The CPDC-SA&A5.3 had been charged with developing SAP1.1. In 2007 or 2008, NOAA commissioned the NAS/NRC to

peer review an early draft of this report via Department of Commerce Contract/Grant No. DG133R07SE2248.[580] NOAA terminated the CPDC-SA&A5.3 in 2009 following the report's completion.[581]

Appendix 10A[582] accompanying this new FOIA Request shows that the SAP5.3 author team had been comprised of twenty-four (24) members, sixteen (16) of which had been designated as "convening lead author" or as "lead author," and thus, served on the CPDC-SA&A5.3.

Three (3) authors (13%) had been affiliated with private companies. Five (5) authors (21%) had been employed by U.S. government agencies – two (2) from NOAA (Pedro Restrepo and Robin Webb), one (1) from USDA, one (1) from NASA (Cynthia Rosenzweig) and one (1) from DOE (Michael Sale). Sixteen (16) authors (67%) had been affiliated with universities. Thirteen (13) of these sixteen (16) authors (81%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs.

Five (5) of these thirteen (13) authors (38%) had been affiliated with the University of Arizona – Helen Ingram, Gregg Garfin, Holly Hartmann, Barbara Moorehouse and Connie Woodhouse. Two (2) of these thirteen (13) members (15%) had been affiliated with the University of Washington – Nathan Mantua and Andrew Wood. The remaining six (6) authors had been affiliated with UC Irvine (David Feldman), UC San Diego Scripps Institution of Oceanography (Michael Dettinger), Penn State University (Brent Yarnell), the University of Colorado (Brad Udall), the University of Michigan (Maria Carmen Lemos) and the University of Nevada Desert Research Institute (Kelly Redmond).

B. Peer Review Panel Composition

Appendix 10B[583] accompanying this new FOIA Request reveals that the panel NAS/NRC established to peer review SAP5.3 had been comprised of seven (7) members. One (1) of seven (7) members (14%) had been affiliated with a private company. Six (6) of seven (7) members (86%) had been affiliated with universities.

Four (4) of these six (6) universities (67%) had been participating in NOAA grant-funded climate science research-related programs. In other words, these four Peer Review Panel members had effectively been charged with reviewing an assessment largely developed by scientists employed by the very agency (NOAA) which had issued significant grants funding ongoing programs operated by the universities with which such members had then been affiliated. They included Kirstin Dow of the University of South Carolina; Lisa Goddard of Columbia University; Denise Lach of Oregon State University; and Soroosh Sorooshian of UC Irvine. Mr. Sorooshian also had been affiliated with SAP5.3 author, David Feldman of UC Irvine.

C. Report Review Committee Composition

Appendix 10C[584] accompanying this new FOIA Request reveals that the Report Review Committee that NAS/NRC had established to review the SAP5.3 Peer Review Panel report had been comprised of three (3) members. One (1) of these three (3) members (33%) had been affiliated with a university then participating in NOAA grant-funded climate science research-related programs.

D. NAS/NRC Oversight Committee on Human Dimensions of Global Change Composition

The NAS/NRC Committee on Human Dimensions of Global Change ("CHDGC") had assumed "institutional oversight" responsibility for the development of the NAS/NRC Peer Review Panel report for SAP5.3. In 2012, the CHDGC evolved into the Board of Environmental Change and Society ("BECS").[585]

Appendix 10D[586] accompanying this new FOIA Request shows that the CHDGC had been comprised of twelve (12) members. One (1) member (8%) had been affiliated with a nonprofit institute. Three (3) of twelve (12) members (25%) had been employed by U.S. government agencies. They included Thomas Wilbanks of DOE, Linda Mearns of NCAR-NSF, and Cynthia Rosenzweig of NASA. Ms. Rosenzweig simultaneously served as a SAP5.3 author.

Eight (8) of twelve (12) committee members (67%) had been affiliated with universities. Three (3) of those eight (8) committee members (38%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs. They included Richard Andrews of the University of North Carolina, Alexander Pfaff of Duke University, and Edward Miles of the University of Washington. Mr. Miles also had been affiliated with two SAP5.3 authors affiliated with the University of Washington - Nathan Mantua and Andrew Wood.

E. Conclusion Re: IQA Compliance of SAP5.3

The NAS/NRC had functioned as NOAA's peer review contractor for the two-stage peer review conducted, and therefore, should have paid closer attention to whether and how the relationships then existing between the agencies, Peer Review Panel and Report Review Committee members and Board of Atmospheric Science and Climate members had apparently, if not actually, influenced the outcome of the SAP5.3 peer review process. It should have acknowledged and disclosed the general need for federal agencies to assure consistency of intra-agency and interagency policy positions, and more specifically, NOAA's need to develop and advance national climate science research and policies consistent with administration climate science policy priorities developed with the assistance of NOAA-funded university climate science research-related programs. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA's grant funding of those programs, as well as, the economic and reputational benefits the NAS/NRC derived from ongoing NOAA peer review and assessment development contracts.

It is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to secure as a SAP5.3 Peer Review Panel member a UC-Irvine scientist who had been affiliated with another UC-Irvine scientist who served as a SAP5.3 author. Similarly, it is difficult for reasonable persons to believe that it had been necessary and indispensable for the NAS/NRC to secure as SAP5.3 Peer Review Panel members scientists who had been affiliated with the University of South Carolina, Columbia University, Oregon State University and UC-Irvine, which had benefited from NOAA grant-funded climate science-research-related programs. Had no competent surrogates then been available? Moreover, it is difficult for reasonable persons to believe that members of the NAS/NRC Committee on the Human Dimensions of Global Change could not find sufficient justification to recuse themselves from the Committee during the peer review of SAP5.3, when it had become apparent they had been affiliated with two SAP5.3 authors, had themselves served as a SAP5.3 author(s), and had been affiliated with universities that had received program funding from the very agency (NOAA) whose assessment had been under NAS/NRC contract for peer review.

The NAS/NRC's failure to address these relationships and incentives constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA

Request *inter alia* seeks disclosure of all NOAA and NAS/NRC records revealing how both entities had dealt with these issues.

4. The IQA Non-Compliance of NOAA & CCSP-Developed and Peer Reviewed SAP2.2 and NCA2-2009

As previously discussed, NOAA did not contract with the NAS/NRC to peer review SAP2.2 or NCA2-2009. Rather, the administrative record reflects that NOAA had utilized the services of the CCSP both to develop and to peer review SAP2.2.

The following discussion assumes that NOAA and/or the USGCRP/CCSP had classified both of these climate assessments as "highly influential scientific assessments" ("HISAs"),[587] within the meaning of Section III.1 of the OMB Peer Review Bulletin. This means that they should have been subject to the most rigorous and least discretionary peer review, transparency, objectivity, independence, and conflicts-of-interest standards imposed by the IQA-implementing Peer Review Bulletin.

a. *The Facts Surrounding the NOAA and CCSP Peer Review of USGCRP/CCSP SAP2.2* [588]

The administrative record does not reflect that NOAA had established a federal advisory committee to develop SAP2.2. Rather, it reveals that the Agency Executive Committee (AEC), a subcommittee of the interagency U.S. Climate Change Science Program ("CCSP")'s Carbon Cycle Interagency Working Group (CCIWG) had facilitated and overseen the development of SAP 2.2."[589] Apparently, although NOAA had been designated by the USGCRP/CCSP as the 'lead agency' developer of this report, it was DOE which had been charged with producing it.[590] As the Prospectus for SAP2.2 reveals,

"*For legal purposes only, including those of the Information Quality Act (IQA) and Federal Advisory Committee Act (FACA)*, NOAA has been designated the single lead agency for SAP 2.2 and, as such, is responsible for ensuring compliance with NOAA's Information Quality Guidelines […] and the Office of Management and Budget's Information Quality Bulletin for Peer Review." [591]

i. Author Team Composition

Appendix 11A[592] accompanying this new FOIA Request shows that the AEC had secured an author team comprised of eighty-eight (88) members. Thirty-four of the eighty-eight (88) members (39%) had been affiliated with U.S. and foreign government agencies. Two (3) authors had been affiliated with Canadian government agencies, while one (1) author had been affiliated with an international agency.

Thirty (30) of these thirty-three (33) authors (91%) had been employed by U.S. government agencies. These included: ten (10) authors employed by DOE: ten (10) authors employed by the USDA Forest Service; two three (3) authors employed by NCAR-NSF (Susan Moser, Patricia Romero-Lankao, and Lisa Dilling); (2) authors employed by NOAA (Rik Wannikohf and Richard Feeley); one (1) authored employed each (x3) by NASA, EPA and DOI.

Fifty-four (54) of eighty-eight (88) authors (61%) had been affiliated with U.S. and foreign universities, nonprofit institutes and private firms. Two (2) of fifty-four (54) authors (4%) had been affiliated with U.S. and Canadian companies. Ten (10) of fifty-four (54) authors (19%) had been affiliated with institutes (two (2) from

Canada, two (2) from Mexico and six (6) from the U.S.). Eleven (11) of fifty-four (54) authors (20%) had been affiliated with foreign universities (five (5) from Canada, five (5) from Mexico and one (1) from Germany).

Thirty-one (31) of fifty-four (54) authors (57%) had been affiliated with U.S. universities. Two (2) of thirty-one (31) authors (7%) had not been reported as having been affiliated with universities benefiting from NOAA or DOE grant-funded programs. Nineteen (19) of thirty-one (31) authors (61%) had been affiliated with universities participating in NOAA and DOE grant-funded climate science research-related programs. They included: Lisa Dilling and Myanna Lahsen of the University of Colorado; Jorge Sarmiento, Stephen Pacala, and Robert Socolow of Princeton University; Burke Hales, Christine Broniak, Mark Harmon, and Beverly Law of Oregon State University; Richard Conant, Keith Paustian and Donald Johnson of Colorado State University; Kenneth Davis, Richard Ready and Adam Rose of Penn State University; Jay Grigg of the University of Maryland; Diane Pataki of UC-Irvine; Taro Takahashi of Columbia University; and Wei-Jun Cai of the University of Georgia.

Six (6) of thirty-one (31) authors (19%) had been affiliated with universities participating only in NOAA grant-funded climate science research-related programs. They included: Richard Houghton of Woods Hole Oceanographic Institution; Scott Bridgham of the University of Oregon; Jennifer Jenkins of the University of Vermont; Stacey VanDeveer of the University of New Hampshire; Kurt Pregitzer of Michigan State University and Chien-Lu Ping of the University of Alaska-Fairbanks. Four (4) of thirty-one (31) authors (13%) had been affiliated with universities participating only in DOE grant-funded climate science research-related programs. They included: Robert Andies and London Losey of the University of North Dakota; Marilyn Brown of the Georgia Institute of Technology; and Erika Marin-Spiotta of UC Berkeley.

ii. Peer Review Panel Composition

Appendix 11B[593] accompanying this new FOIA request reveals that the SAP2.2 Peer Review Panel was comprised of thirty-one (31) members. Three (3) of the thirty-one (31) members (9.7%) had been employed by U.S. and foreign government agencies and one intergovernmental organization. The sole U.S. government member had been employed by NCAR-NSF – peer reviewer David Schimel. *Mr. Schimel had been affiliated with three (3) SAP2.2 authors – Susan Moser, Patricia Romer-Lankao and Lisa Dilling of NCAR-NSF*.

Thirteen (13) of the thirty-one (31) SAP2.2 Peer Review Panel members (42%) had been affiliated with universities, eleven (11) of which (85%) had been U.S. universities. Eight (8) of those eleven (11) members (73%) had been affiliated with U.S. universities then participating in *both* NOAA *and* DOE grant-funded climate science research-related programs. They included: James Bockheim and Christopher Kucharik of the University of Wisconsin-Madison; Kevin Gurney of Purdue University; Dale Johnson of the University of Nevada Desert Research Institute; Jeffrey Richey of the University of Washington; Jonathan Rubin of the University of Maine; Joshua Schimel of UC Santa Barbara; and Richard Jahnke of the University of Georgia. *Mr. Jahnke also had been affiliated with a SAP2.2 author – Wei-Jun Cai of the University of Georgia*.

Two (2) of those eleven (11) SAP2.2 Peer Review Panel members (18%) had been affiliated with universities then participating in only DOE grant-funded climate science research-related programs. They included Loren Lutzenhiser of Portland State University and Robert Dickenson of the Georgia Institute of Technology. *Mr. Dickenson also had been affiliated with a SAP2.2 author – Marilyn Brown of the Georgia Institute of Technology*.

One (1) of those eleven (11) members (9%) had been affiliated with a nonprofit institute then participating in only a NOAA grant-funded climate science research-related program – Patrick Gonzalez of The Nature Conservancy.

iii. Conclusion Re: IQA Compliance of SAP2.2

NOAA and the Agency Executive Committee ("AEC") of the CCSP CCIWG should have paid closer attention to whether and how the relationships then existing between the agencies (NOAA and DOE), SAP2.2 authors, and the SAP2.2 Peer Review Panel members had apparently, if not actually, influenced the outcome of the SAP2.2 peer review process. It should have acknowledged and disclosed that NOAA and DOE, as federal agencies, needed to ensure the consistency of their intra-agency and interagency policy positions, as well as, their need to develop and advance national climate science research and policies consistent with administration climate science policy priorities developed with the assistance of NOAA and DOE-funded university climate science research-related programs. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA and DOE grant funding of those programs, as well as, the economic and reputational benefits the CCSP's AEC derived from undertaking the peer review of this and other assessments.

It is difficult for reasonable persons to believe that it had been necessary and indispensable for NOAA and the AEC to secure as a SAP2.2 Peer Review Panel member an employee of NCAR-NSF who had been affiliated with three other NCAR-NSF employees that had served as SAP2.2 authors. Similarly, it is difficult for reasonable persons to believe that it had been necessary and indispensable for NOAA and the AEC to secure as SAP5.3 Peer Review Panel members two scientists affiliated, respectively, with the University of Georgia and the Georgia Institute of Technology, who had been affiliated with different SAP2.2 authors from the same universities. Had no competent surrogates then been available?

NOAA and the AEC's failure to address these relationships and incentives constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA Request *inter alia* seeks disclosure of all NOAA records revealing how both entities had dealt with these issues.

b. *The Facts Surrounding the Peer Review of NCA2-2009* [594]

In 2008, NOAA established, on an *ad hoc* basis, the Unified Synthesis Product Development Committee ("USPDC")[595] as a federal advisory committee, pursuant to the provisions of the Federal Advisory Committee Act ("FACA"). The USPDC had been established at the request of the U.S. Global Change Research Program ("USGCRP") and the Subcommittee on Global Change Research of the Committee on Environment and Natural Resources ("CENR")[596] of the White House Office of Science and Technology Policy ("OSTP")'s National Science and Technology Council.[597] The USPDC had been charged with developing the Unified Synthesis Product which eventually became known as the second national climate assessment[598] entitled, *Global Climate Change Impacts in the United States*.[599] NOAA terminated the USPDC in 2009 following the report's completion. [600]

i. Author Team Composition

Appendix 12A[601] accompanying this new FOIA Request shows that the author team for NCA2-2009 had been comprised of thirty-one (31) members. These included the three co-chairs and editors-in-chief.[602]

The thirty-one members of the author team broke down as follows. Sixteen (16) of thirty-one (31) authors (52%) had been affiliated with government agencies. One (1) of the sixteen (16) authors (6%) had been affiliated with a Canadian government agency, while fifteen (15) of those sixteen (16) authors (94%) had been affiliated with U.S. federal agencies. Nine (9) of the fifteen (15) U.S. government employed authors (60%) had been affiliated with federal agencies other than NOAA. They included DOE (5), and one (1) each from NASA, DOI-USGS, DOT and USDA.

Six (6) of the fifteen (15) U.S. government-employed authors (40%) had been affiliated with NOAA. They included: Eileen Shea, David Anderson (reviewer of IPCC-AR4-WGI), Jay Lawrimore (author-contributor to IPCC-AR4-WGI and reviewer of IPCC-AR4-WGII), Roger Pulwarty (author-contributor and reviewer of IPCC-AR4-WGII), Thomas Karl (co-editor-in-chief and author-contributor and reviewer of IPCC-AR4-WGI) and Thomas Peterson (co-editor-in-chief and author-contributor to IPCC-AR4-WGI).

The remaining fifteen (15) of thirty-one (31) members of the author team consisted of one (1) member who had been affiliated with a consulting firm (7%), one (1) member (7%), a co-editor-in-chief who had been affiliated with a nonprofit institute,[603] and thirteen (13) members (86%) who had been affiliated with universities. Of these remaining thirteen (13) members, nine (9) members (69%) had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs. These members included: Donald Boesch of the University of Maryland; Lynne Carter of Louisiana State University; A. David McGuire and John Walsh of the University of Alaska-Fairbanks; Edward Miles of the University of Washington; Jonathan Overpeck of the University of Arizona; Jonathan Patz of the University of Wisconsin; Bradley Udall of the University of Colorado; and Donald Wuebbles of the University of Illinois at Urbana-Champaign.

ii. Peer Review Panel Composition

The Peer Review Plan NOAA had developed for this assessment indicates that NOAA had been responsible for selecting the members of the NCA2-2009 Peer Review Panel.[604] Appendix 12B[605] accompanying this new FOIA Request reveals that the NCA2-2009 Peer Review Panel had been comprised of eleven (11) members. One (1) of the eleven (11) members (9.1%) had been affiliated with a consulting firm, and four (4) of the eleven (11) members (36.3%) had been affiliated with nonprofit institutes.

In addition, three (3) of the eleven (11) members (27.3%) had been affiliated with universities, two (2) of which (67%) had then been affiliated with NOAA grant-funded climate science research-related programs. These members included Robert Duce of Texas A&M University and John Reilly of the Massachusetts Institute of Technology.

The three (3) remaining NCA2-2009 Peer Review Panel members (27.3%) had been employed by U.S. government agencies. Two (2) of these three (3) members (67%) had been employed by NCAR-NSF: Linda Mearns and Gerald Meehl. *The final member of the eleven (11) member NCA2-2009 Peer Review Panel had been employed by NOAA; her name was Susan Solomon. Ms. Solomon had been not only an author-contributor to and reviewer of IPCC-AR4-WGI, but also one of its three coordinating lead authors and a Co-Chair of the Working Group I*. Ms. Solomon also had been affiliated with (6) NCA2-2009 authors then employed by NOAA!

iii. Conclusion Re: IQA Compliance of NCA2-2009

NOAA should have paid closer attention to whether and how the relationships then existing between it, the authors of NCA2-2009, and the NCA2-2009 Peer Review Panel members had apparently, if not actually, influenced the outcome of the NCA2-2009 peer review process. It should have acknowledged and disclosed that NOAA needed to ensure the consistency of intra-agency and interagency policy positions, so that they aligned with and advanced, with the assistance of NOAA-funded university climate science research-related programs, the national climate science research and policy priorities of the administration. It also should have identified and disclosed university economic and non-economic reputation-related incentives to maintain NOAA grant funding of those programs.

It is difficult for reasonable persons to believe that it had been necessary and indispensable for NOAA, as convener, manager and overseer of the NCA2-2009 Peer Review Panel, to secure a NOAA scientist and senior agency official as a member of such panel, where six (6) of the authors had been NOAA employees, including one (1) senior agency official who served as editor-in-chief (Thomas Karl). Similarly, it is difficult for reasonable persons to believe that it had been necessary and indispensable for NOAA to secure as NCA2-2009 Peer Review Panel members two scientists affiliated with universities then participating in NOAA grant-funded climate science research-related programs. Had no competent surrogates then been available?

NOAA's failure to address these relationships and the incentives and benefits they conferred on the agency, authors and peer review panel members, constituted clear but unidentified, unexplained and unaddressed violations of the OMB Peer Review Bulletin and NOAA IQA Guideline independence, subject matter objectivity/bias and institutional conflicts-of-interest standards. Thus, this FOIA Request *inter alia* seeks disclosure of all NOAA records revealing how both entities had dealt with these issues.

5. The IQA Non-Compliance of NOAA Developed and Peer Reviewed SOC-2008

The following discussion assumes that NOAA had classified SOC-2008 as "influential scientific information",[606] within the meaning of the Preamble and Section I.6 of the OMB's Peer Review Bulletin.[607] Assuming, arguendo, this classification was actually correct, unlike the other climate assessments discussed in this FOIA Request, SOC-2008 need not have been subject to the most rigorous and least discretionary peer review, transparency, objectivity, independence and conflicts-of-interest standards applicable to "highly influential scientific assessments" ("HISAs").

a. *The Facts Surrounding the Peer Review of SOC-2008* [608]

The facts reveal that NOAA had performed its own internal agency peer review of SOC-2008. This means that it did not employ the services of a third-party such as the USGCRP/CCSP or the NAS/NRC to conduct such work.

i. Author Team Composition

A letter dated November 2008 drafted on DOC-NOAA letterhead and designated as a "Statement to Peer Reviewers" from the "State of the Climate Development Team," indicates that the SOC-2008 report had been "prepared by a team of NOAA editors working with more than 225 contributing authors."[609] Appendix 13[610] accompanying this new FOIA Request indicates that five author-contributors had identified themselves as having been affiliated with three NOAA grant-funded climate science research-related programs. They included: Steven Ackerman, Ralf Bennartz and Michael Foster of the University of Wisconsin-Madison CIMMS Cooperative Institutes Program; W. Meier of the University of Colorado CIRES Cooperative Institutes

Program; and M. Wang of the University of Washington JISAO Cooperative Institute Program. Aside from these authors, fifty-three other authors had been affiliated with universities then participating in NOAA grant-funded climate science research-related programs, including the many Cooperative Institute Programs established in response to the numerous NOAA announcements of agency funding opportunity described above. Arguably, reasonable persons can discern that NOAA had secured the consensus of scientists who had agreed with the agency's asserted climate change-related observations and conclusions well before the SOC-2008 had been developed.

ii. Peer Review Panel Composition

The DOC-NOAA letter referenced above also stated that the "analyses contained in the report [had been] restricted to previously peer-reviewed and widely accepted methods, data sets, and monitoring techniques […] [t]o ensure its timely completion […] As such, the peer review of this report is not expected to be time consuming or difficult."[611] In addition, the letter stated that the reviewers had been selected based on their "expertise specialty, and ability to conduct the review within the timelines set by American Meteorological Society publication deadlines."[612]

The NOAA website does not contain any further information concerning the peer review of SOC-2008. The SOC-2008 report editors, however, did acknowledge their "sincere appreciation for *the many anonymous reviewers* who worked under tight deadlines and whose insights made this and future issues of the State of the Climate better" (emphasis added).[613]

At a very minimum, the peer review of SOC-2008 failed to adhere to Section II.5 of the OMB Peer Bulletin which applies to the dissemination of "influential scientific information". Section II.5 required that NOAA make publicly available the SOC-2008 peer review report, including a "verbatim copy of each reviewer's comments" or a summary of "the views of the group as a whole, including any disparate and dissenting views."[614] In addition, Section II.5 required that NOAA "disclose the names of the reviewers and their organizational affiliations in the report."[615] Furthermore, Section II.5 required that NOAA "disseminate the final peer review report on the agency's website along with all materials related to the peer review (any charge statement, the peer review report and any agency response)." As of the date of this filing, only information regarding the charge statement is publicly available, and the public is left only to guess the identity of the ten (10) or more reviewers that had conducted the peer review of SOC-2008. Based on NOAA's pervasive failure to ensure that the peer reviews of SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2, 5.3, 2.2 and NCA2-2009 had satisfied the conflict of interest standards of the OMB Peer Review Bulletin, NOAA IQA Guidelines and the National Academy of Sciences/National Research Council, reasonable persons are left to doubt that the peer review of SOC-2008, as well, had met these standards.

6. Conclusion Regarding NOAA's Peer Review of SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2, 5.3, NCA2-2009, and SOC-2008

This new FOIA Request's investigation and analysis of the peer reviews performed by NOAA and NOAA third party contractors (including the USGCRP/CCSP and the NAS/NRC) reveals the existence of an "Agency-Academic Regulatory Complex" engendering an entire network of contracts and flows of money and resources among and between members of Congress, NOAA, members of the Executive Branch, individuals, universities and nonprofit institutes, and the National Academy of Sciences.[616]

In other words, there appears to have been a virtuous (actually, "unvirtuous") circle of institutional conflicts-of-interest impacting the individual performances of numerous parties including scientists. NOAA (and other federal agencies such as EPA, DOE, NASA, etc.) continues to issue broad and more narrowly tailored agency announcements of funding opportunity that specify Agency interest in and need for universities and nonprofit institutes to engage in particular areas of desired research and assessment, including those climate change-related, for which NOAA will dedicate congressionally appropriated and discretionary agency funds over periods spanning from three-to-five years at a time, with the prospect of renewal. These generous NOAA grant-funded climate science research-related facilities prompted or otherwise assisted in the development and maintenance of significant university and nonprofit institute-based Cooperative Institutes and other NOAA climate programs and projects that helped to promote and advance NOAA agency as well as administration domestic and international climate change policy.

These entities and persons had been all-too-eager to participate in such programs and projects and to provide climate science research findings, often appearing in the form of peer-reviewed scientific journal publications in exchange therefor, given the lucrative financial, reputational and travel benefits such contracts often engender. The NRC/NAS also derives financial and reputational benefits from the contracts it secures and maintains with NOAA and other federal agencies, such as to peer review these and other SAPs that had been developed by NOAA scientists and federal advisory committee members, DOE scientists and NOAA-funded university scientists in satisfaction of U.S. Global Change Research Program ("USGCRP") statutory obligations and EPA's need to reach greenhouse gas endangerment findings pursuant to the Clean Air Act for regulatory purposes. Assuming the peer review work of the NRC/NAS meets with the approval of these federal agency clients, the NRC/NAS derives further financial benefits from entering into separate contracts with NOAA and other federal agencies (e.g., EPA) to originate/develop climate science-related assessments which such agencies may use as the scientific foundation for their planned, proposed and/or amended regulation-related activities. To this end, the NRC/NAS's Expert Committee to Advise the USGCRP, Report Review Committee, and oversight boards (e.g., the Board on Atmospheric Sciences & Climate and the Committee on Human Dimensions of Global Change Composition) are all incentivized to promote an outcome that is 'positive' for their federal agency clients.

While these activities may not flow in the precise sequence herein described they nevertheless mutually reinforce each other at one or more levels. Simultaneously, university and nonprofit institute research staff, individual scientists, NRC/NAS staff, federal agency staff, scientists and officials operating the USGCRP/CCSP, and their politically motivated congressional liaisons derive tangible as well as intangible benefits by fostering and maintaining these institutional relationships which further incentives all the parties involved to keep this 'gravy train' operating at peak performance.

Moreover, it should not be overlooked that NOAA had failed to accord public stakeholders the procedural right to secure adequate administrative review of their IQA-filed requests for correction of the NOAA-disseminated SAPs, NCA2-2009 and SOC-2008 that Congress had guaranteed to them in the Information Quality Act's administrative review provision. The administrative record also reveals that, prior thereto, during the pre-dissemination period, stakeholders had, for all intents and purposes, become aware that the final versions of each of the NOAA-developed assessments that are the subject of this FOIA Request would be used as a predicate for regulation, contrary to NOAA assurances that they would not be so utilized, only upon *EPA's* issuance of Proposed CAA Section 202(a) GHG Endangerment Findings in April 2009 and the Technical Support Document accompanying it. As a result, few public comments, other than those received from NOAA scientists, other federal agencies' scientists and White House Executive Office of the President personnel had

been filed with the Agency during the pre-dissemination peer review APA public notice and comment periods provided for each such assessment.

Clearly, NOAA had failed to satisfy its IQA legal obligation to ensure that ALL ten (10) NOAA-developed climate assessments that had been peer reviewed by NOAA, USGCRP/CCSP and the NAS/NRC had satisfied the IQA's most rigorous and least discretionary peer review, transparency, objectivity/bias, independence and conflicts-of-interest standards applicable to HISAs and ISI. What is more, it does ***not*** appear that NOAA can proffer any evidence at this point in time to refute the evidence of NOAA's IQA non-compliance contained in this new FOIA Request.

Most significantly, NOAA's failure to meet its IQA legal obligations with respect to the prior peer reviews of these climate assessments breaks the critical chain of evidence necessary to substantiate the legal justification for enabling EPA to use those assessments as the scientific foundation for its 2009 CAA Section 202(a) GHG Endangerment Findings. This was extensively discussed and explained in new FOIA Request No. EPA-HQ-2014-008026 ITSSD filed with EPA on June 30, 2014.[617] Consequently, unless and until it can be verified and validated that NOAA has peer reviewed these ten (10) scientific assessments *anew* in conformance with the IQA's most rigorous and least discretionary peer review, transparency, objectivity/bias, independence and conflicts-of-interest standards, EPA is legally precluded from using those assessments as the scientific foundation for not only its 2009 Endangerment Findings, but also the current and proposed EPA GHG emissions regulations the Endangerment Findings have since triggered that explicitly reference them.

ITSSD recently identified and raised similar issues regarding the IQA non-compliance of the NAS/NRC's peer review of the NOAA-developed Third National Climate Assessment ("NCA3-2014") which, in addition to these assessments, serves as the scientific foundation for EPA's proposed existing power plant rule.[618] In public comments filed with EPA, ITSSD provided evidence showing that NOAA had failed to ensure that the NCA3-2014 it had developed which EPA now cites as primary scientific support for its proposed power plant rule did not engender conflicts-of-interest and other infirmities in violation of the Information Quality Act and applicable binding administrative guidance. As a result, ITSSD argued that Section 2.2.17 of EPA's Peer Review Handbook dictates that another peer review of the NCA3-2014 is required.

END

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III. APPENDICES

1. NOAA-Developed & Funded Assessments Supporting EPA GHG Endangerment Findings

Appendix 1A:
NOAA-Developed USGCRP/CCSP Assessments
Supporting EPA GHG Endangerment Findings*

Science Body-Author	U.S. Agency 'Lead'	Assessment/Report Title EPA-TSD Designated "Core Reference Documents"	Year
NOAA	DOC-NOAA	*State of the Climate in 2008* – SOC(2008)[619]	2009
USGCRP/CCSP	DOC-NOAA	*Global Climate Change Impacts in the United States* – NCA2-2009 [620]	2009
USGCRP/CCSP	DOC-NOAA	SAP1.1/CCSP(2006): *Temperature Trends in the Lower Atmosphere* [621]	2006
USGCRP/CCSP	DOC-NOAA	SAP1.3/CCSP(2008g): *Re-analyses of Historical Climate Data* [622]	2008
USGCRP/CCSP	DOC-NOAA	SAP2.4/CCSP(2008h): *Trends in Ozone-Depleting Substances* [623]	2008
USGCRP/CCSP	DOC-NOAA	SAP3.2/CCSP(2008d): *Climate Projections* [624]	2008
USGCRP/CCSP	DOC-NOAA	SAP3.3/CCSP(2008i): *Weather and Climate Extremes in a Changing Climate* [625]	2008
		Assessment/Reports Incorporated-By-Reference Within NCA2-2009 (an EPA-TSD-Designated "Core Reference Document")	
USGCRP/CCSP	DOC-NOAA	SAP2.2/CCSP(2007): *North American Carbon Budget* [626]	2007
USGCRP/CCSP	DOC-NOAA	SAP5.2/CCSP(2009): *Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking* [627]	2009
USGCRP/CCSP	DOC-NOAA	SAP5.3/CCSP(2008): *Decision Support Experiments and Evaluations* [628]	2008

***** These include EPA-TSD Designated "Core Reference Documents" & Assessments Incorporated-By-Reference in NCA2-2009. This table reproduces and annotates a portion of Table 1.1 on p. 6 of the EPA-TSD.

Appendix 1B:
NOAA-Funded NRC-Developed Assessments
Supporting EPA GHG Endangerment Findings*

Science Body-Author	U.S. Agency 'Lead'	Assessment/Report Title EPA-TSD Designated "Core Reference Documents"	Year
NRC	NOAA-funded	NAS - *Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties* (NRC2005)[629]	2005
NRC	NOAA-funded in part	NAS - *Mitigating Shore Erosion Along Sheltered Coasts* (NRC2006a)[630]	2007
NRC	NOAA-funded in part	NAS - *Abrupt Climate Change: Inevitable Surprises* [631]	2002

***** These include EPA-TSD Designated "Core Reference Documents." This table reproduces and annotates a portion of Table 1.1 on p. 6 of the EPA-TSD.

2. U.S. Government-Wide Scientists Involved in IPCC-AR4 and IPCC-AR3 Development

Appendix 2A:
U.S. Government-Employed Scientists
Author-Contributors/Reviewers
IPCC-AR4-WGI/WGII

Scientist	US Agency -Employed	Author-Contributor To WGI	Reviewer Of WGI	Editor Of WGI	Author-Contributor To WGII	Reviewer Of WGII
Dan Walker	EOP-OSTP					x
Shira Yoffe	DOS					x
Michael Alexander	NOAA		x			
David Anderson	NOAA		x			
John Antonov	NOAA	x				
John Austin	NOAA	x				
Kristen Averyt	NOAA		x	x*		
Timothy Bates	NOAA		x			
Suzanne Bolton	NOAA					x
Tim Boyer	NOAA	x				
Harold Brooks	NOAA		x			
John Calder	NOAA					x
Ralph Cantral	NOAA					x
Thomas Conway	NOAA	x				
Ned Cyr	NOAA					x
John Daniel	NOAA		x			
Thomas Delworth	NOAA	x				
Henry Diaz	NOAA		x			
Keith Dixon	NOAA	x	x			
Ed Dlugokenky	NOAA	x				x
Mark Dyurgerov	NOAA				x	x
Leo Donner	NOAA		x			
Elsworth Dutton	NOAA		x			
David Easterling	NOAA	x	x			
James Elkins	NOAA	x				
David Fahey	NOAA	x	x			
Richard Feely	NOAA	x	x			
Graham Feingold	NOAA		x			
Melissa Free	NOAA	x				
Kevin Gallo	NOAA		x			
Hernan Garcia	NOAA	x	x			
Byron Gleason	NOAA	x				
A. Gnanadesikan	NOAA		x			x
Pavel Groisman	NOAA	x	x			
Richard Gudgel	NOAA	x				
Isaac Held	NOAA	x	x			
Thomas Karl	NOAA	x	x			
George Kiladis	NOAA	x				
Thomas Knutson	NOAA	x	x			

John Lanzante	NOAA	x				
Istvan Laszlo	NOAA		x			
Ngar-Cheung Lau	NOAA	x				
Jay Lawrimore	NOAA	x	x			x
Ruby Leung	NOAA	x				
David Levinson	NOAA	x	x			x
Sydney Levitus	NOAA	x				
Brent Lofgren	NOAA		x			x
Edward Lovejoy	NOAA		x			
Martin Manning	NOAA	x	x	x*		
Melinda Marquis	NOAA		x	x*		
Ken Masarie	NOAA	x				
Michael McPhaden	NOAA	x				
H. LeRoy Miller Jr	NOAA			x		
John B. Miller	NOAA	x				x
Laury Miller	NOAA		x			
Robert Molinari	NOAA	x	x			
Steve Montzka	NOAA	x				x
Daniel Murphy	NOAA		x			
Claudia Nierenberg	NOAA					x
Tsung-Hung Peng	NOAA	x				
Thomas Peterson	NOAA	x				
Roger Pulwarty	NOAA				x	x
V. Ramaswamy	NOAA	x	x			
A.R. Ravishankara	NOAA		x			
George Reid	NOAA	x				
Anthony Rosati	NOAA	x				
Karen Rosenlof	NOAA	x				
Christopher Sabine	NOAA	x	x			
Ted Scambos	NOAA					x
Dan Schwarzkopf	NOAA	x				
Franklin Schwing	NOAA		x			x
Dian Seidel	NOAA		x			
Susan Solomon	**NOAA**	**x**	**x**	**x***		
William Stern	NOAA	x				
Ronald Stouffer	NOAA	x	x			
Juli Trtanj	NOAA					x
N. Vallette-Silver	NOAA					x
Russell Vose	NOAA	x				
Rick Wanninkhof	NOAA	x				
Robert Webb	NOAA		x			
Michael Winton	NOAA		x			
David Wuertz	NOAA	x				
Bruce Wyman	NOAA	x				
Xuepeng Zhao	NOAA		x			
Richard Anthes	NCAR-NSF		x			
Caspar Ammann	NCAR-NSF	x				
Julie Arblaster	NCAR-NSF	x			x	
David Baker	NCAR-NSF	x				
Gordon Bonan	NCAR-NSF	x				
Esther Brady	NCAR-NSF	x				

Guy Brasseur	NCAR-NSF	x				
Frank Bryan	NCAR-NSF		x			
Lawrence Buja	NCAR-NSF	x				
Michael Coffey	NCAR-NSF		x			
William Collins	NCAR-NSF	x	x			
Aiguo Dai	NCAR-NSF	x	x			
Clara Deser	NCAR-NSF	x				
John Fasullo	NCAR-NSF	x				
Peter Gent	NCAR-NSF	x	x			
Michael Glantz	NCAR-NSF					x
Alex Guenther	NCAR-NSF	x				
Robert Harris	NCAR-NSF					x
Elisabeth Holland	NCAR-NSF	x				
Marika Holland	NCAR-NSF	x				
Aixvue Hu	NCAR-NSF	x	x			
James Hurrell	NCAR-NSF	x				
Robert Katz	NCAR-NSF	x				
David Lawrence	NCAR-NSF	x				
Jerry Mahlman	NCAR-NSF		x			
Natalie Mahowald	NCAR-NSF		x			
Steven Massie	NCAR-NSF		x			
Linda Mearns	NCAR-NSF	x				
Gerald Meehl	NCAR-NSF	x				
Kathleen Miller	NCAR-NSF				x	
Bette Otto-Bliesner	NCAR-NSF	x	x			
Patricia Romero Lankao	NCAR-NSF				x	
Dennis Shea	NCAR-NSF	x				
Julia Lee-Taylor	NCAR-NSF	x				
Claudia Tebaldi	NCAR-NSF	x			x	
Haiyan Teng	NCAR-NSF	x				
Kevin Trenberth	NCAR-NSF	x	x			x
Tom Wigley	NCAR-NSF	x				
Waleed Abdalati	NASA					x
Robert Adler	NASA	x				
Lahouari Bounoua	NASA				x	
Mark Chandler	NASA	x				
Ben Chao	NASA	x				
Mian Chin	NASA		x			
Josefino Comiso	NASA	x				x
Roger Davies	NASA		x			
A. Delgenio	NASA		x			
Anne Douglass	NASA		x			
Joan Feynman	NASA		x			
Vivian Gornitz	NASA		x			
James Hansen	NASA	x				
Yoram Kaufman	NASA		x			
Malcolm Ko	NASA		x			
Randal Koster	NASA	x				
Ron Kwok	NASA	x				
Andrew Lacis	NASA		x			
Yangang Liu	NASA		x			

Nancy Maynard	NASA					x
Charles Miller	NASA		x			
Ron Miller	NASA		x			
Patrick Minnis	NASA		x			
Raimund Muscheler	NASA	x	x			
Claire Parkinson	NASA					x
David Rind	NASA	x	x			x
Franklin Robinson	NASA	x				
Cynthia Rosenzweig	NASA					x
Garg Russell	NASA	x				
Gavin Schmidt	NASA		x			
David Schimel	NASA		x			x
Ed Sheffner	NASA					x
Drew Shindell	NASA		x			
Yuhe Song	NASA	x				
Robert Thomas	NASA					x
George Tselioudis	NASA	x				
Compton Tucker	NASA					x
Ellsworth Wenton	NASA		x			
Bruce Wielicki	NASA	x	x			
Josh Willis	NASA	x				
Takmeng Wong	NASA	x				
Hongbin Yu	NASA		x			
Krishna Achutarao	DOE	x				
P. Cameron-Smith	DOE		x			
Curt Covey	DOE	x				
Virginia Dale	DOE					x
William Emanuel	DOE					x
Steven Ghan	DOE		x			
Peter Gleckler	DOE	x				
Paul Hanson	DOE					x
Elizabeth Hunke	DOE	x				
Anthony Janetos	DOE				x	
Stephen Klein	DOE	x				
Elizabeth Malone	DOE				x	x
Surabi Menon	DOE	x				
Evan Mills	DOE				x	x
Thomas Phillips	DOE	x				
Eric Rignot	DOE	x	x			
Norman Rosenberg	DOE					x
Ben Santer	DOE	x				
Stephen Schwartz	DOE	x	x			
Michael Scott	DOE				x	
Karl Taylor	DOE	x				
Thomas Wilbanks	DOE				x	
Virginia Burkett	DOI-USGS					x
Donald Cahoon	DOI-USGS					x
Indur Goklany	DOI					x
Glenn Guntenspergen	DOI-USGS					x
Harry Lins	DOI-USGS					x
Gregory McCabe	DOI-USGS					x

Chris Milly	DOI-USGS	x	x			x
Daniel Muhs	DOI-USGS	x				
Sara Shafer	DOI-USGS					x
Robert Thompson	DOI-USGS		x			
Ben D'Angelo	EPA					x
John Furlow	EPA					x
Mary Gant	EPA					x
Jane Leggett	EPA					x
Steven Rose	EPA					x
Joel Scheraga	EPA					x
Allen Solomon	EPA					x
James Titus	EPA					x
Darrell Winner	EPA					x
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Jon Padgham	USAID					x
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Lourdes Maurice	FAA		x			

**Edited as Well as Contributed to or Reviewed IPCC-AR4-WGI.*

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Appendix 2B:
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Catriona Rogers	USGCRP		WGII
Mark Anderson	OSTP		WGII
Sam Baldwin	OSTP		WGII
Rosina Bierbaum	OSTP		WGII
Thomas Muir	OSTP		WGII
Martin Offutt	OSTP		WGII
Allen M. Solomon	OSTP		WGII
Larry Weber	OSTP		WGII
Phillip Antweiler	DOS		WGII
Lauren Flejzor	DOS		WGII
Jeff Miotke	DOS		WGII
D.L. Albritton	NOAA	WGI	
A. Barnston	NOAA	WGI	
J. Bates	NOAA	WGI	
Suzanne Bolton	NOAA		WGII
A. Broccoli	NOAA	WGI	
H. Brooks	NOAA	WGI	
Earle Buckley	NOAA		WGII
James Buizer	NOAA		WGII
W. Cooke	NOAA	WGI	
M. Crowe	NOAA	WGI	
Margaret Davidson	NOAA		WGII
T. Delworth	NOAA	WGI	
K. Dixon	NOAA	WGI	
E. Dlugokencky	NOAA	WGI	
J. Daniel	NOAA	WGI	
D. Easterling	NOAA	WGI	
R.E. Eskridge	NOAA	WGI	
John Everett	NOAA		WGII
James Fahn	NOAA		WGII
Lisa Farrow	NOAA		WGII
Joshua Foster	NOAA		WGII
M. Free	NOAA	WGI	
D. Gaffen	NOAA	WGI	
K. Gallo	NOAA	WGI	
S.M. Griffies	NOAA	WGI	
Pavel Groisman	NOAA	WGI	
G. Gutman	NOAA	WGI	
I. Held	NOAA	WGI	
Sally Kane	NOAA		WGII
Thomas Karl	NOAA	WGI	

R. Knight	NOAA	WGI	
T. Knutson	NOAA	WGI	
Chris Landsea	NOAA	WGI	WGII
Jay Lawrimore	NOAA	WGI	
Clement Lewsey	NOAA		WGII
R. Livezey	NOAA	WGI	
Richard Mieremet	NOAA		WGII
Stephen Montzka	NOAA	WGI	
D. Murphy	NOAA	WGI	
Claudia Nierenberg	NOAA		WGII
J. Norris	NOAA	WGI	
J. Overpeck	NOAA	WGI	
T. Owen	NOAA	WGI	
R. Quayle	NOAA	WGI	
P. Quinn	NOAA	WGI	
T Peterson	NOAA	WGI	
Stephen R. Piotrowicz	NOAA		WGII
Roger Pulwarty	NOAA		WGII
V. Ramaswamy	NOAA	WGI	
R. Reynolds	NOAA	WGI	
R. Ross	NOAA	WGI	
Russ Schnell	NOAA		WGII
M.D. Schwartzkopf	NOAA	WGI	
Caitlin Simpson	NOAA		WGII
S. Solomon	NOAA	WGI	
D.J. Stensrud	NOAA	WGI	
Macol Stewart	NOAA		WGII
R. Stouffer	NOAA	WGI	
Tonna-Marie Surgeon	NOAA		WGII
Juli M. Trtanj	NOAA		WGII
Stan Wilson	NOAA		WGII
M. Winton	NOAA	WGI	
S.P. Xie	NOAA	WGI	
G.B. Bonan	NCAR-NSF	WGI	
L. Buja	NCAR-NSF	WGI	
A. Dai	NCAR-NSF	WGI	
P.R. Gent	NCAR-NSF	WGI	
Michael Glantz	NCAR-NSF		WGII
A. Guenther	NCAR-NSF	WGI	
M. Holland	NCAR-NSF	WGI	
L. Horowitz	NCAR-NSF	WGI	
James Hurrell	NCAR-NSF	WGI	
R. Katz	NCAR-NSF	WGI	WGII
J. Kiehl	NCAR-NSF	WGI	
T. Kittel	NCAR-NSF	WGI	
D. Koch	NCAR-NSF	WGI	
W.G. Large	NCAR-NSF	WGI	
K. Lindsay	NCAR-NSF	WGI	
S. Madronich	NCAR-NSF	WGI	
Linda Mearns	NCAR-NSF	WGI	WGII
Gerald Meehl	NCAR-NSF	WGI	

Kathleen Miller	NCAR-NSF		WGII
P. Rasch	NCAR-NSF	WGI	
X. Tie	NCAR-NSF	WGI	
Kevin Trenberth	NCAR-NSF	WGI	WGII
T. Wigley	NCAR-NSF	WGI	
D. Williamson	NCAR-NSF	WGI	
Rachelle D. Hollander	NSF		WGII
Michael Ledbetter	NSF		WGII
Frances C. Li	NSF		WGII
A. Ackerman	NASA	WGI	
A. Arking	NASA	WGI	
Assaf Anyamba	NASA		WGII
R. Bindschadler	NASA	WGI	
Antonio Busalacchi	NASA		WGII
M. Chin	NASA	WGI	
A. Del Genio	NASA	WGI	
W.B. DeMore	NASA	WGI	
R. Friedl	NASA	WGI	
P. Ginoux	NASA	WGI	
Per Gloersen	NASA		WGII
V. Gornitz	NASA	WGI	
L. Grenfell	NASA	WGI	
J. Hansen	NASA	WGI	
Paul Houser	NASA		WGII
Mare Imhoff	NASA		WGII
C. Jackman	NASA	WGI	
Y. Kaufman	NASA	WGI	
M. Kurylo	NASA	WGI	
William K.M. Lau	NASA		WGII
Elizabeth Middleton	NASA		WGII
M. Mishchenko	NASA	WGI	
C.L. Parkinson	NASA	WGI	
Kim Partington	NASA		WGII
Jonathan Pundsack	NASA		WGII
D. Rind	NASA	WGI	
Cynthia Rosenzweig	NASA		WGII
G.L. Russell	NASA	WGI	
David Schimel	NASA		WGII
P.J. Sellers	NASA	WGI	
R.W. Spencer	NASA	WGI	
Peter Stone	NASA		WGII
George Teslioudisand	NASA		WGII
A. Thompson	NASA	WGI	
Dorothy Zukor	NASA		WGII
H.J. Zwally	NASA	WGI	
K. Caldeira	DOE	WGI	
Jeffrey S. Amthor	DOE		WGII
Mitchell Baer	DOE		WGII
Terence Blasing	DOE		WGII
C. Covey	DOE	WGI	
C. Chuang	DOE	WGI	

James J. Dooley	DOE		WGII
P. Duffy	DOE	WGI	
Sylvia Edgerton	DOE		WGII
W.L. Gates	DOE	WGI	
S. Ghan	DOE	WGI	
P.J. Hanson	DOE		WGII
M.A. Huston	DOE		WGII
Julie D. Jastrow	DOE		WGII
D. Kaiser	DOE	WGI	
L.R. Leung	DOE	WGI	
Elizabeth Malone	DOE		WGII
S.B. McLaughlin	DOE		WGII
N.L. Miller	DOE	WGI	WGII
R.M. Miller	DOE		WGII
Evan Mills	DOE		WGII
Richard Moss	DOE		WGII
T. Phillips	DOE	WGI	
G.L. Potter	DOE	WGI	
K. Achuta Rao	DOE	WGI	
B. Santer	DOE	WGI	
Michael Scott	DOE		WGII
S. Schwartz	DOE	WGI	
S. Smith	DOE	WGI	
A.B. Sullivan	DOE		WGII
K. Taylor	DOE	WGI	
T.O. West	DOE		WGII
Tom Wilbanks	DOE		WGII
Stan Wullschleger	DOE		WGII
Virginia Burkett	DOI-USGS		WGII
Patrick Gonzalez	DOI-USGS		WGII
Stephen Guptill	DOI-USGS		WGII
L. Hay	DOI-USGS	WGI	
H. Lins	DOI-USGS	WGI	
C. Milly	DOI-USGS	WGI	
J. Slack	DOI-USGS	WGI	
L.H. Allen, Jr.	USDA		WGII
Roy Darwin	USDA		WGII
A.S. Heagle	USDA		WGII
Daniel Hellerstein	USDA		WGII
Kevin Ingram	USDA		WGII
Carol Jones	USDA		WGII
Bruce Kimball	USDA		WGII
Jack A. Morgan	USDA		WGII
Daniel Mullarkey	USDA		WGII
Wayne Polley	USDA		WGII
David Schimmelpfennig	USDA		WGII
Steven Shafer	USDA		WGII
Benjamin DeAngelo	EPA		WGII
John Furlow	EPA		WGII
Janet Gamble	EPA		WGII
Mary Gant	EPA		WGII

Suzanne Giannini-Spohn	EPA		WGII
Anne Grambsch	EPA		WGII
Wanda Haxton	EPA		WGII
Susan Herrod Julius	EPA		WGII
Jim Lazorchak	EPA		WGII
John McCarty	EPA		WGII
James Titus	EPA		WGII
Elizabeth Wilson	EPA		WGII
Darrell Winner	EPA		WGII
Christina Wright	EPA		WGII
Richard Zepp	EPA		WGII
Jeff Brokaw	USAID		WGII
Jane Kinsel	NIH		WGII
Mark Pineda	NIH		WGII
Karen Marsh	FEMA		WGII
J. Lean	Nav. Res Lab	WGI	

3. NOAA and University/Nonprofit Institute Grant-Funded Scientists Involved in IPCC-AR4 and IPCC-AR3 Development

Appendix 3A:
Scientists Affiliated With NOAA Grant-Funded Entities
Author Contributors/Reviewers
IPCC-AR4-WGI

Scientist	University/Institutional Affiliation	Author-Contributor AR4-WGI	Reviewer AR4-WGI	University Participation in DOC-NOAA- Funded Cooperative Institutes Program
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David Thompson	Colorado State Univ.		x	Coop. Institutes (CIRA); (CICS-M)
Thomas Vonder Haas	Colorado State Univ.		x	Coop. Institutes (CIRA); (CICS-M)
Edward Cook	Columbia Univ.	x		Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Beate Lipert	Columbia Univ.	x		Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
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Michael Lavine	Duke Univ.	x		Coop. Institutes (CICS-M)
Thomas Crowley	Duke Univ.		x	Coop. Institutes (CICS-M)
Fred Semazzi	North Caroline State Univ.	x		Coop. Institutes (CICS-M); RISA Program (SECC), (CISA); Sea Grant Program
Jason Box	Ohio State Univ.	x		Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program
David Bromwich	Ohio State Univ.		x	Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program
C.K. Shum	Ohio State Univ.	x		Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program
Ellen Mosely-Thompson	Ohio State Univ.	x		Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program
Lonnie Thompson	Ohio State Univ.	x		Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program
Anne Nolin	Oregon State Univ.		x	Coop. Institutes (CICS-M), (CIOSS), (CIMRS); COCA Program; RISA Program (CIRC); Sea Grant Program
Richard Alley	Penn State Univ.	x	x	Coop. Institutes (CILER); SARP Program; Sea Grant Program
Klaus Keller	Penn State Univ.		x	Coop. Institutes (CILER); SARP Program; Sea Grant Program
Michael Mann	Penn State Univ.		x	Coop. Institutes (CILER); SARP Program; Sea Grant Program
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				Program; NJ Sea Grant Program
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Alan Robock	Rutgers Univ.		x*	Coop. Institutes (CINAR); RISA Program (CCRUN); NJ Sea Grant Program
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Bjorn Stevens	UC-Los Angeles		x	Coop. Institutes (CIMEC); Calif. Sea Grant
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Henry Pollack	Univ. of Michigan	x		Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program
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Steven Emerson	Univ. of Washington	x		Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program
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Terrence Joyce	Woods Hole Oceanographic	x	x	Coop. Institutes (CINAR); Sea Grant Program
Andrey Proshutinsky	Woods Hole Oceanographic	x		Coop. Institutes (CINAR); Sea Grant Program
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**Also Contributed to or Reviewed IPCC-AR4-WGII*

Appendix 3B:
Scientists Affiliated With NOAA Grant-Funded Entities
Author Contributors/Reviewers
IPCC-AR4-WGII

Scientist	University/Institutional Affiliation	Author-Contributor WG II	Reviewer WG II	University Participation in DOC-NOAA- Funded Cooperative Institutes Program [632] [633]
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Roger Pieltke	Colorado State Univ.		x	Coop. Institutes (CIRA), (CICS-M)
Vivien Gornitz	Columbia Univ.	x	x	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Patrick Kinney	Columbia Univ.		x	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Kim Knowlton	Columbia Univ.		x	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
David Major	Columbia Univ.	x	x	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Peter Neofotis	Columbia Univ.	x		Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Joyce Rosenthal	Columbia Univ.		x	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Madeleine Thompson	Columbia Univ.	x		Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Francesco Tubiello	Columbia Univ.	x	x	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Marta Vicarelli	Columbia Univ.	x		Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
Kevin Vranes	Columbia Univ.		x	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program
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Gabi Hegerl	Duke Univ.		x	Coop. Institutes (CICS-M)
Fitzgerald Booker	North Carolina State Univ.		x	Coop. Institutes (CICS-M); RISA Program (SECC), (CISA); Sea Grant Program; CWISE
David Campbell	Michigan State Univ.		x	Coop. Institutes (CILER); RISA Program (GLISA)
Kimberly Hall	Michigan State Univ.		x	Coop. Institutes (CILER); RISA Program (GLISA)
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Pieere-Andre Jacinthe	Ohio State Univ.		x	Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program
Douglas Southgate	Ohio State Univ.		x	Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program
Patricia Craig	Penn State Univ.	x		Coop. Institutes (CILER); SARP Program; Sea Grant Program
Judith Cranage	Penn State Univ.	x		Coop. Institutes (CILER); SARP Program;

				Sea Grant Program
Paul Desanker	Penn State Univ.		x	Coop. Institutes (CILER); SARP Program; Sea Grant Program
William Easterling	Penn State Univ.	x		Coop. Institutes (CILER); SARP Program; Sea Grant Program
Klaus Keller	Penn State Univ.	x		Coop. Institutes (CILER); SARP Program; Sea Grant Program
Greg Knight	Penn State Univ.		x	Coop. Institutes (CILER); SARP Program; Sea Grant Program
Susan Mann	Penn State Univ.	x		Coop. Institutes (CILER); SARP Program; Sea Grant Program
Christopher Pfeiffer	Penn State Univ.	x		Coop. Institutes (CILER); SARP Program; Sea Grant Program
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Terry Chapin	Univ. of Alaska-Fairbanks		x	Coop. Institutes (CICS-P), (CIFAR); RISA Program (ACCAP); Sea Grant Program
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David Carr	UC-Santa Barbara		x	Coop. Institutes (CIMEC); Calif. Sea Grant
Stephen De Canio	UC-Santa Barbara		x	Coop. Institutes (CIMEC); Calif. Sea Grant
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Robert Wilkinson	UC-Santa Barbara		x	Coop. Institutes (CIMEC); Calif. Sea Grant
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Maria-Carmen Lemos	Univ. of Michigan	x		Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program
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**Also Contributed to or Reviewed IPCC-AR4-WGI*

Appendix 3C:
Scientists Affiliated With NOAA Grant-Funded Entities
Author Contributors/Reviewers
IPCC-AR3-WGI/WGII

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Mark Cane	Columbia Univ.	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program	WGI	
Ed Cook	Columbia Univ.	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program	WGI	
Vivien Gornitz	Columbia Univ.	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program		WGII
Geoffrey Heal	Columbia Univ.	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program		WGII
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K. Emanuel	Massachusetts Ins. Tech.	Sea Grant Program	WGI	WGII
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David Campbell	Michigan State Univ.	Coop. Institutes (CILER); RISA Program (GLISA)		WGII
David Bromwich	Ohio State Univ.	Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program		WGII
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Brent Sohngen	Ohio State Univ.	Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program		WGII
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R. Alley	Penn State Univ.	Coop. Institutes (CILER); SARP Program; Sea Grant Program	WGI	WGII
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B. Soden	Princeton Univ.	Coop. Institutes (CICS-M), (CICS-P); NIDIS Program; NJ Sea Grant Program	WGI	
D. Robinson	Rutgers Univ.	Coop. Institutes (CINAR); RISA Program (CCRUN); NJ Sea Grant Program	WGI	
A. Robock	Rutgers Univ.	Coop. Institutes (CINAR); RISA Program (CCRUN); NJ Sea Grant Program	WGI	WGII
Walter Oechel	San Diego State Univ.	RISA Program (CNAP)		WGII
H. Fischer	Scripps Inst. Oceanogra UC San Diego)	Coop. Institutes (CIMEC); RISA Program (CNAP); Calif. Sea Grant Program	WGI	
S. Piper	Scripps Inst. Oceanogra (UC San Diego)	Coop. Institutes (CIMEC); RISA Program (CNAP)	WGI	
W. White	Scripps Inst. Oceanogra (UC San Diego)	Coop. Institutes (CIMEC); RISA Program (CNAP) Calif. Sea Grant Program	WGI	
Kevin R. Arrigo	Stanford Univ.	Calif. Sea Grant Program		WGII
Robert B. Dunbar	Stanford Univ.	Calif. Sea Grant Program		WGII
Kristin Kuntz-Duriseti	Stanford Univ.	Calif. Sea Grant Program		WGII
P. Matson	Stanford Univ.	Calif. Sea Grant Program	WGI	
Stephen Schneider	Stanford Univ.	Calif. Sea Grant Program		WGII
M. Geller	SUNY Stonybrook	Coop. Institutes (CILER); Sea Grant Program	WGI	
T. Crowley	Texas A&M Univ.	SARP Program	WGI	
G.C. Hegerl	Texas A&M Univ.	SARP Program	WGI	
James W. Mjelde	Texas A&M Univ.	SARP Program		WGII
G. North	Texas A&M Univ.	SARP Program	WGI	
J.R. Christy	Univ. of Alabama	RISA Program (SECC); Mississippi-Alabama Sea Grant Commission	WGI	
Terry Chapin III	Univ. of Alaska-Fairbanks	Coop. Institutes (CICS-P), (CIFAR); RISA Program (ACCAP); Sea Grant Program		WGII
K. Tschelmeyer	Univ. of Alaska-Fairbanks	Coop. Institutes (CICS-P), (CIFAR); RISA Program (ACCAP); Sea Grant Program	WGI	
A.D. McGuire	Univ. of Alaska-Fairbanks	Coop. Institutes (CICS-P), (CIFAR); RISA Program (ACCAP); Sea Grant Program	WGI	

R.E. Dickinson	Univ. of Arizona	RISA Program (CLIMAS); SARP	WGI	
M.K. Hughes	Univ. of Arizona	RISA Program (CLIMAS); SARP	WGI	
M. Prather	UC Irvine	Coop. Institutes (CICS-M)	WGI	
M.L. Goulden	UC Irvine	Coop. Institutes (CICS-M)	WGI	
Y. Xue	UC Los Angeles	Coop. Institutes (CIMEC); Calif. Sea Grant Program	WGI	
C.D. Keeling	UC San Diego	Coop. Institutes (CIMEC); Calif. Sea Grant Program	WGI	
R.F. Keeling	UC San Diego	Coop. Institutes (CIMEC); Calif. Sea Grant Program)	WGI	
A.C. Manning	UC San Diego	Coop. Institutes (CIMEC); Calif. Sea Grant Program	WGI	
T. Whorf	UC San Diego	Coop. Institutes (CIMEC); Calif. Sea Grant Program	WGI	
Stephen Decanio	UC Santa Barbara	Coop. Institutes (CIMEC); Calif. Sea Grant Program		WGII
Raymond Smith	UC Santa Barbara	Coop. Institutes (CIMEC); Calif. Sea Grant Program		WGII
R.G. Barry	Univ. of Colorado	Coop. Institutes (CIRES); RISA Program (WWA)	WGI	
Ronald Brunner	Univ. of Colorado	Coop. Institutes (CIRES); RISA Program (WWA)		WGII
J. Cole	Univ. of Colorado	Coop. Institutes (CIRES); RISA Program (WWA)	WGI	
Charles Howe	Univ. of Colorado	Coop. Institutes (CIRES); RISA Program (WWA)		WGII
A.H. Lynch	Univ. of Colorado	Coop. Institutes (CIRES); RISA Program (WWA)	WGI	
Ted Scambos /NOAA	Univ. of Colorado	Coop. Institutes (CIRES); RISA Program (WWA)		WGII
M. Serreze	Univ. of Colorado	Coop. Institutes (CIRES); RISA Program (WWA)	WGI	WGII
S.-P. Xie	Univ. of Hawaii	Coop. Institutes (CIPIR), (JIMAR); RISA Program (Pacific); Sea Grant Program	WGI	
S. Changnon	Univ. of Illinois-Urbana	Coop. Institutes (CILER); Illinois-Indiana Sea Grant Program	WGI	
A.K. Jain	Univ. of Illinois-Urbana	Coop. Institutes (CILER); Illinois-Indiana Sea Grant Program	WGI	
J. Walsh	Univ. of Illinois-Urbana	Coop. Institutes (CILER); Illinois-Indiana Sea Grant Program	WGI	WGII
D. Wuebbles	Univ. of Illinois-Urbana	Coop. Institutes (CILER); Illinois-Indiana Sea Grant Program	WGI	
R. Dickerson	Univ. of Maryland	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program	WGI	
B. Douglas	Univ. of Maryland	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program	WGI	
Victor Kennedy	Univ. of Maryland	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program		WGII
K. Pickering	Univ. of Maryland	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program	WGI	
L. Pitelka	Univ. of Maryland	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program	WGI	
Tom Schelling	Univ. of Maryland	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program		WGII
K. Vinnikov	Univ. of Maryland	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program	WGI	
R. Bradley	Univ. of Massachusetts	RISA Program (CCRUN)	WGI	
D. Hardy	Univ. of Massachusetts	RISA Program (CCRUN)	WGI	
Peter M. Haas	Univ. of Massachusetts	RISA Program (CCRUN)		WGII

B. Sun	Univ. of Massachusetts	RISA Program (CCRUN)	WGI	
M. Vuille	Univ. of Massachusetts	RISA Program (CCRUN)	WGI	
J. Prospero	Univ. of Miami	Coop. Institutes (CICS-M), (CIMAS); RISA Program (SECC)	WGI	
D. Savoie	Univ. of Miami		WGI	
Paul Edwards	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program		WGII
Y. Feng	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program	WGI	
Kimberly Hall	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program		WGII
M. Herzog	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program	WGI	
S. Huang	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program	WGI	
Joyce Penner	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program	WGI	
H. Pollack	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program	WGI	
Terry Root	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program		WGII
Yang Zhang	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program	WGI	
B. Moore, III	Univ. of New Hampshire	Sea Grant Program	WGI	
D. Hegg	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	WGI	
C. Leovy	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	WGI	
Edward Miles	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		WGII
James Morison	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		WGII
W.J. Thompson	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	WGI	
J.M. Wallace	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	WGI	
S. Warren	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	WGI	
E.P. Salathe	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	WGI	
Amy Snover	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		WGII
J. Kutzbach	Univ. of Wisconsin	Coop. Institutes (CIMSS), (CILER); Sea Grant Program	WGI	
John J. Magnuson	Univ. of Wisconsin	Coop. Institutes (CIMSS), (CILER); Sea Grant Program		WGII
R.A. Houghton	Woods Hole Oceanographic	Coop. Institutes (CINAR); Sea Grant Program	WGI	
J. Hughen	Woods Hole Oceanogra	Coop. Institutes (CINAR); Sea Grant Program	WGI	
J.M. Melillo	Woods Hole Oceanogra	Coop. Institutes (CINAR); Sea Grant Program	WGI	
R.W. Schmitt	Woods Hole Oceanogra	Coop. Institutes (CINAR); Sea Grant Program	WGI	

Appendix 3D:
Scientists Affiliated With Entities Participating in
NOAA Grant-Funded Climate Science-Research-Related Programs -
Contributors to NOAA-Developed USGCRP/CCSP SAPs, NCA2-2009, SOC-2008

Scientist	University Affiliation	NOAA Grant-Funded Programs/Projects In Which University/Entity Participates	SAP 1.1, 2.2, 3.3, 5.2, 5.3, NCA2-2009, SOC-2008 Contributions	Contribution to/Review of IPCC AR4 WGI /WGII
M. Tedesco	City College of NY, CUNY	Coop. Institutes (CICS-M); RISA Program (CCRUN)	SOC-2008	
Richard Conant Keith Paustian Donald Johnson	Colorado State Univ.	Coop. Institutes (CIRA), (CICS-M)	SAP2.2 SAP2.2 SAP2.2	
Suzanna Camargo Taro Takahashi	Columbia Univ.	Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program	SOC-2008 SOC-2008; SAP2.2	
Gabriele Hegerl Dandra McBride	Duke Univ.	Coop. Institutes (CICS-M)	SAP1.1; SAP3.3 SAP5.2	WGII
Ming Cai	Florida State Univ.	Coop. Institutes (CIMAS), (NGI); RISA Program (SECC)	SAP1.1	
Kam-biu Liu Lei Wang Lynne Carter	Louisiana State Univ.	Coop. Institutes (NGI); RISA Program (SCIPP); Sea Grant Program	SAP3.3 SOC-2008 NCA2-2009	
Chris Forest Kerry Emanuel	Massachusetts Inst. of Tech.	Sea Grants Program	SAP1.1 SAP3.3	
Kurt Pregitzer	Michigan State Univ.	Coop. Institutes (CILER); RISA Program (GLISA)	SAP2.2	
Kenneth Davis Richard Ready Adam Rose Brent Yarnell	Penn State Univ.	Coop. Institutes (CILER); SARP Program; Sea Grant Program	SAP2.2 SAP2.2 SAP2.2 SAP5.3	
L.S. Bai R. Benson I. Bhattacharya J.E. Box David Bromwich D. Decker	Ohio State Univ.	Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program	SOC-2008 SOC-2008 SOC-2008 SOC-2008 SOC-2008 SOC-2008	 WGI WGI

Sheng-Hung Wang			SOC-2008	
Christine Broniak Burke Hales Mark Harmon Beverly Law Paul Konar Michael Behrenfeld Robert O'Malley	Oregon State Univ.	Coop Institutes (CICS-M), (CIOSS), (CIMRS); COCA Program; RISA Program (CIRC); Sea Grant Program	SAP2.2 SAP2.2 SAP2.2 SAP2.2 SAP3.3 SOC-2008 SOC-2008	
Stephen Pacala Jorge Sarmiento Robert Socolow	Princeton Univ.	Coop. Institutes (CICS-M), (CICS-P); NIDIS Program; NJ Sea Grant Program	SAP2.2 SAP2.2 SAP2.2	
Robert Trapp Laura Bowling	Purdue Univ.	Sea Grant Program	SAP3.3 SOC-2008	
Carl Mears Frank Wentz	Remote Sensing Systems, Inc.	Coop. Institutes (CICS-M)	SAP1.1 SAP1.1	WGI
David Robinson	Rutgers Univ.	Coop. Institutes (CINAR); RISA Program (CCRUN); NJ Sea Grant Program	SOC-2008	WGI
Peter Bromirski Michael Dettinger	Scripps Inst. of Oceanography (UC San Diego)	Coop. Institutes (CIMEC); RISA Program (CNAP); Calif. Sea Grant Program	SAP3.3 SAP5.3	
Hongxing Liu Di Long	Texas A&M Univ.	SARP Program	SOC-2008 SOC-2008	
John Christy Roy Spencer	Univ. of Alabama	RISA Program (SECC); Mississippi-Alabama Sea Grant Commission	SAP1.1; SOC-2008 SAP1.1	
Chien-Lu Ping A. Kholodov S. Marchenko M.K. Raynolds V. Romanovsky D.A. Walker T. Weingartner A. David McGuire John Walsh	Univ. of Alaska-Fairbanks	Coop. Institutes (CICS-P), (CIFAR); RISA Program (ACCAP); Sea Grant Program	SAP2.2 SOC-2008 SOC-2008 SOC-2008 SOC-2008 SOC-2008 SOC-2008 NCA2-2009 NCA2-2009	 WGI WGII
Helen Ingram Gregg Garfin Barbara Morehouse Connie Woodhouse Jonathan Overpeck	Univ. of Arizona	RISA Program (CLIMAS); SARP Program	SAP5.3 SAP5.3 SAP5.3 SAP5.3 NCA2-2009	 WGI WGI
Diane Pataki	Univ. of Calif. Irvine	Coop. Institutes (CICS-M)	SAP2.2	

David Feldman			SAP5.3	
Andrew Dickson	Univ. of Calif. San Diego	Coop. Institutes (CIMEC); RISA Program (CNAP); Calif. Sea Grant Program	SOC-2008	
Stephanie Maritorena David Siegel	Univ. of Calif. Santa Barbara	Coop. Institutes (CIMEC); Calif. Sea Grant	SOC-2008 SOC-2008	
Sharon Stammerjohn	Univ. of Calif. Santa Cruz	Coop. Institutes (CIMEC); Calif. Sea Grant	SOC-2008	
Lisa Dilling Myanna Lahsen Bradley Udall W. Meier Steven Nerem Ted Scambos	Univ. of Colorado	Coop. Institutes (CIRES); RISA Program (WWA)	SAP2.2 SAP2.2 SAP5.3; NCA2-2009 SOC-2008 SOC-2008 SOC-2008	 WGI
Wei Jun T. Mote	Univ. of Georgia	RISA Program (SECC); Sea Grant Program	SAP2.2 SOC-2008	
Mark Merrifield	Univ. of Hawaii	Coop. Institutes (CIPIR), (JIMAR); RISA Program (Pacific); Sea Grant Program	SOC-2008	
Stanley Changnon Kenneth Kunkel Donald Wuebbles	Univ. of Illinois-Urbana	Coop. Institutes (CILER); Sea Grant Program	SAP3.3 SAP3.3 NCA2-2009	
Eugenia Kalnay Konstantin Vinnikov Phil Arkin James Carton Jay Grigg Donald Boesch	Univ. of Maryland	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program	SAP1.1; SAP1.3 SAP1.1 SAP1.3 SAP1.3 SAP2.2 NCA2-2009	 WGI WGII
Lisa Beal John Williams	Univ. of Miami	Coop. Institutes (CICS-M), (CIMAS); RISA Program (SECC)	SOC-2008 SOC-2008	
Joyce Penner Maria Carmen Lemos	Univ. of Michigan	Coop. Institutes (CILER); RISA Program (GLISA); Sea Grant Program	SAP1.1 SAP5.3	WGI WGII
Kelly Redmond	Univ. of Nevada (DRI)	RISA Program (CNAP)	SAP5.3	
Stacey VanDeveer Richard Lammers A. Shiklomanov	Univ. of New Hampshire	Sea Grant Program	SAP2.2 SOC-2008 SOC-2008	
Richard Smith	Univ. of North Carolina	Coop. Institutes (CICS-M), (CIOERT); RISA Program (CISA); SARP Program	SAP3.3	
David Karoly	Univ. of Oklahoma	RISA Program (SCIPP)	SAP1.3	WGI
Scott Bridgham	Univ. of Oregon	RISA Program (CIRC)	SAP2.2	
Susan Cutter Melanie Gall	Univ. of South Carolina	COCA Program; RISA Program (CISA); SC Sea Grant Program	SAP3.3 SAP3.3	

Gary Mitchum	Univ. of South Florida	Coop. Institutes (CIMAS)	SOC-2008	
Jennifer Jenkins	Univ. of Vermont	Sea Grant Program	SAP2.2	
Nathan Mantua Andrew Wood J. Morison M. Steele M. Wang R. Woodgate Ed Miles	Univ. of Washington	Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	SAP5.3 SAP5.3 SOC-2008 SOC-2008 SOC-2008 SOC-2008 NCA2-2009	 WGII
James Kossin Steven Ackerman Ralf Bennartz Michael Foster Andrew Heidinger Jonathan Patz	Univ. of Wisconsin	Coop. Institutes (CIMSS), (CILER); Sea Grant Program	SAP3.3 SOC-2008 SOC-2008 SOC-2008 SOC-2008 NCA2-2009	 WGII
Richard Houghton R. Krishfield Alison Macdonald A. Proshutinsky M.L. Timmerman Robert Weller Lisan Yu	Woods Hole Oceanographic	Coop. Institutes (CINAR); Sea Grant Program	SAP2.2 SOC-2008 SOC-2008 SOC-2008 SOC-2008 SOC-2008 SOC-2008 SOC-2008	 WGI

Appendix 3E:
Approximate Reported Funding
NOAA Cooperative Institute Programs FYs2004-2010

NOAA Cooperative Institute Programs	2003-2004 $Funding	2004-2005 $Funding	2005-2006 $Funding	2006-2007 $Funding	2007-2008 $Funding	2008-2009 $Funding	2009-2010 $Funding
CICS-P Princeton Univ. NOAA Contract No. NA08OAR4320752; Shadow Award No. NA08OAR4320915	$2,927,098[634]*	$3,930,638[635]*	$4,426,013[636]*	$2,138,251[637]*	$3,094,549[638]*	$4,236,175[639]	5,710,409[640]
CICS-M Univ. of Maryland NOAA Contract No. NA17EC1483	$2,500,000[641]	$3,500,000[642]	$0.00[643]*	$110,043[644]*	$0.00[645]* (no $ amount disclosed)	$0.00 (no $ amount disclosed)	$12,000,000 NOAA Contract No. NA17EC1483 (3yrs ended 2010)[646] $3,899,540 NOAA Contract No. NA09NES0006[647]
CIRA Colo. State Univ. NOAA Contract No. NA17RJ1228	$7,724,700[648]	$0.00[649] (no $ amount disclosed)	$0.00[650] (no $ amount disclosed)	$9,253,300[651]*	$9,725,200[652]*	$9,722,200[653]* New NOAA Contract No. NA09OAR4320074	$0.00[654] (no $ amount disclosed)
CIMSS Univ. of Wisconsin NOAA Contract No. NA06NES4400002			$0.00[655] (no $ amount disclosed)	$0.00[656] (no $ amount disclosed)	$ 8,496,000[657]*	$9,226,000[658]*	$5,649,879[659]*
CIFAR - I U. Alaska-Fairbanks NOAA Contract No. NA17RJ1224	$2,449,548[660]*	$3,995,627[661]*	$5,308,025[662]*	$3,167,037[663]*	$1,494,500[664]*	$0.00[665]* (no $ amount disclosed)	$0.00[666]* (no $ amount disclosed)
CIFAR – II U. Alaska-Fairbanks NOAA Contract No. NA08OAR4320751 Shadow Contract No. NA08OAR4320870						$1,926,176[667]*	$2,068,741[668]*
CICAR Columbia Univ.	[672]* (no $ amount	(no $ amount disclosed)	[673]* (no $ amount	[674]* (no $ amount	[675]* (no $ amount	[676]* (no $ amount	[677]* (no $ amount

NOAA Contract No. NA03OAR4320179 7-1-03 thru 6-30-09[669] Contract No. NA08OAR4320754 7-1-08 thru 6-30-13[670]* Shadow Grant No. NA08OAR4320912 (7-1-08 thru 6-30-13)*[671]	disclosed)		disclosed)	disclosed)	disclosed)	disclosed)	disclosed)
CILER Univ. of Mich. July 2007 NOAA Contract No. NA07OAR4320006[678]	(no $ amount disclosed)	(no $ amount disclosed)	(no $ amount disclosed)	(no $ amount disclosed)	(no $ amount disclosed)	(no $ amount disclosed)	$3,700,000 FY 10; $7,410,278 (3yr. total thru 3/10)[679]
CIMAS Univ. of Miami NOAA Contract No. NA17RJ1226	$7,301,000[680]	$8,550,000[681]*	$ 7,018,000[682]*	$10,584,000[683]*	$ 9,911,000[684]*	$ 10,489,000[685]*	$ 13,602,000[686]* NOAA Contract No. NA17RJ1226, Continuation Award NA08OAR4320892 and Shadow Award NA08OAR4320889
CIMMS Univ. of Oklahoma NOAA Contract No. NA17RJ1227	$ 6,814,009[687]*	$7,047,940[688]*	$7,690,555[689]*	$7,325,893[690]*	$6,850,742[691]	$8,418,185[692]	$9,365,779[693] NOAA Contract No. NA17RJ1227 Extension Agreement NA08OAR4320904 Shadow Agreement NA08OAR4320886
CIOSS Oregon State Univ.	$900,000[694]	$1,100,000[695]	$2,276,102[696]*	$3,648,300[697]*	$1,797,000[698]*	$839,400[699]	$1,010,800[700]* $878,000[701]*
CIMRS Oregon State Univ. NOAA Contract No: NA17FE2705 NA17FE1167 NA17RJ1362	$1,777, 363 $104,639 $2,042,609[702]*	$1,560,013 $105,872 $819,420[703]	(no $ amount disclosed)	$1,299,618 NOAA Contract No. NA06NMF4550286 $1,299,319 NOAA Contract No. NA17RJ1362[704]	$1,365,791 NOAA Contract No. NA06NMF4550286 $1,706,266 NOAA Contract No. NA17RJ1362[705]	$1,183,826 NOAA Contract No. NA06NMF4550286 $1,002,919 NOAA Contract No. NA17RJ1362[706]	$997,835 $1,792,710 NOAA Contract No. NA17RJ1362[707]
CIRES	$20,486,086[708]	$21,989,557[709]	$22,521,519[710]*	$23,432,561[711]*	$24,698,145[712]*	$25,603,572[713]*	$28,040,167[714]

Univ. of Colorado NOAA Contract No. NA17RJ1229							
JIMAR Univ. of Hawaii NOAA Contract No. NA17RJ1230	$27,947,965[715]	$12,728,899[716]	$13,265,935[717]	$14,355,171[718]	$14,995,777[719]	$13,722,155[720] NOAA Contract Nos. NA17RJ1230 & NA080AR4320910	$14,022,932[721] NOAA Contract Nos. NA17RJ1230, NA09OAR4320075 & NA08OAR4320910
JIMAR/CIPIR Univ. of Hawaii (Est. 2011) NOAA Contract No. NA09OAR4320075 NA11NMF4320128[722]							
JISAO Univ. of Washington NOAA Contract No. NA10OAR4320148	$10,257,168[723]	$46,972,954 (funding for [3]yrs ended '05-incl. '04)[724]	$13,311,178[725]	$15,697,910[726]	$12,870,832[727]	$14,036,175[728]	$14,617,622[729]
NGI Mississippi State Univ. NOAA Contract No. NA06OAR4320264				(no $ amount disclosed)[730]	(no $ amount disclosed)[731]	(no $ amount disclosed)[732]	$8,475,470[733]
JIMO UC San Diego Scripps Institution NOAA Contract No. NA17RJ1231	(no $ amount disclosed)[734]	$10,340,369[735]	$20,537,172[736]	$12,040,068[737]	$14,376,063[738]	$15,103,250 NOAA Contract Nos. NA17RJ1231 NA08OAR4320894[739]	$18,050,412 NOAA Contract Nos. NA17RJ1231 NA08OAR4320894[740]
CIOERT Florida Atlantic Univ. (Est. 2009) NOAA Contract No. NA09OAR4320073[741]							$1,300,000[742]
CIMEC UC San Diego (Est. 2010) NOAA Contract No. NA10OAR4320156[743]							*NOAAA Funds received beginning in FY2011[744]
CINAR							$3,600,005[746]

Woods Hole Oceano. (Est. 2009) NOAA Contract No. NA09OAR4320129[745]							
SUMMARY OF PARTICIPATING UNIVERSITIES & INSTITUTES							**TOTAL NOAA $$ FUNDING RECEIVED**
							FY 2004-2010
$$ Totals have been calculated by aggregating or disaggregating the $$ amounts disclosed							**Cooperative Institutes Program Only (Individual Grants *Not* Included)**
CICS-P Univ. of Princeton							$26,463,133
CICS-M Univ. of Maryland							$18,100,043
CIRA Colo. State Univ.							$36,425,400
CIMSS Univ. of Wisconsin							$23,371,879
CIFAR - I U. Alaska-Fairbanks							$16,414,736
CIFAR – II U. Alaska-Fairbanks							$3,994,917
CICAR Columbia Univ.							(no $ amount disclosed)
CILER Univ. of Mich.							$11,110,278
CIMAS Univ. of Miami							$67,455,000
CIMMS Univ. of Oklahoma							$53,513,103
CIOSS Oregon State Univ.							$12,449,602
CIMRS							$17,058,230

Oregon State Univ.							
CIRES Univ. of Colorado							$166,771,607
JIMAR Univ. of Hawaii							$111,038,834
JISAO Univ. of Washington							$117,506,671
NGI Mississippi State U.							$8,475,470
JIMO UC SD Scripps Inst.							$90,447,334
CIOERT Florida Atlantic Univ.							$1,300,000
CINAR Woods Hole Oceano.							$3,600,005
TOTAL							**$785,496,242**

Appendix 3F:
Trustees of Columbia University
NOAA Non-Cooperative Institute Program Grant Funding
2004-2010

Contract Award #	Amount	Subject	From	To	Principal Investigator
NA16GP2029[747] (TOTAL) (Initial) (Amendment) (Amendment)	**$166,394.00** $51,677.00 $56,053.00 $58,664.00	Predictability of onset and character of warm season rains in Tropical South America using a nested modeling system	12/1/01	11/30/05	Anji Seth
NA16GP2990[748] (TOTAL) (Initial) (Amendment) (Amendment)	**$596,048.00** $201,259.00 $192,464.00 $202,325.00	Building Interactive Hierarchies of Data and Models to Assess Carbon Cycle and Climate Feedbacks Due to Agriculture and Forestry Practices in the Conterminous U.S. and China	9/1/02	8/31/06	Christoper Shashkin, Francesco Tubiello
NA03OAR4310064[749] (TOTAL) (Initial) (Amendment) (Amendment)	**$388,081.00** $123,797.00 $132,635.00 $131,649.00	ENSO Prediction in the Western Tropical Pacific: The Roles of Surface Heat and Freshwater Fluxes	3/1/03	2/28/07	Dake Chen
NA03OAR4310058[750] (TOTAL) (Initial) (Amendment) (Amendment)	**$322,500.00** $107,499.00 $107,499.00 $107,502.00	IRI Participation in the NOAA/CDEP Applied Research Centers	3/1/03	2/28/06	David Dewitt
NA04OAR4310122[751] (TOTAL) (Initial) (Amendment) (Amendment)	**$287,366.00** $94,440.00 $94,542.00 $98,384.00	Anthropogenic Carbon in the Ocean Estimated Using Transit-Time Distribution	5/1/04	4/30/07	Timothy Hall
NA04OAR4310185[752] (TOTAL) (Initial) (Amendment)	**$642,067.00** $433,255.00 $208,812.00	Climate Variability, Air Quality, and Human Health: Measuring Regional Vulnerability for Improved Decision-Making	9/1/04	8/31/09	Patrick Kinney
NA05OAR4311004[753] (TOTAL) (Initial) (Amendment) (Amendment) (Amendment) (Amendment)	**$45,181,780.00** $9,036,356.00 $9,036,356.00 $9,036,356.00 $9,036,356.00 $9,036,356.00	The International Research Institute for Climate Prediction: 2005-2010	7/1/05 7/1/05 7/1/06 7/1/07 7/1/08 7/1/09	6/30/11 6/30/10 6/30/07 6/30/08 6/30/09 6/30/10	Laura Barry-Biss, Stephen Zebiak
TOTAL	**$47,584,236**				

4. Development and Peer Review of USGCRP/CCSP SAP1.1

Appendix 4A:
Author-Contributors
USGCRP/CCSP SAP1.1

USG Scientist/Agency Scientist/Other Gov't	Scientist/Entity Affiliation	NOAA Grant-Funded Program	Fed'l Advisory Comm. Role(s) [754]; NRC/NAS Role	IPCC-AR4-WGI or WGII Author-Contributor
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Norman Grody/DOC-NOAA (Chap. 3, Contrib. Author)				
Michael Wehner/DOE Chap. 5, Contrib. Author)				
David Parker/**UK Met Office** (Chap. 6, Contrib. Author)				

Appendix 4B:
NRC *Ad Hoc* Peer Review Panel
USCRP/CCSP SAP1.1

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI or WGII	Peer Reviewer IPCC-AR4-WGI or WGII	Entity Participation in NOAA Grant-Funded Programs	Affiliated With Author-Contributor To SAP1.1	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
William Randel	NCAR-NSF				(Affiliated With Author of SAP1.1)	
Judith Curry	Georgia Institute of Technology					
Dennis Hartmann	Univ. of Washington			Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		
Phil Jones	Univ. of East Anglia					
Kenneth Kunkel	Univ. of Illinois-Urbana			Coop. Institutes (CILER); Sea Grant Program		
Richard Lindzen	Massachusetts Institute of Technology			Sea Grant Program	(Affiliated With Author of SAP1.1)	
Richard Smith	Univ. of North Carolina			Coop. Institutes (CICS-M), (CIOERT); RISA Program (CISA); SARP Program		
John Wallace	Univ. of Washington			Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		
Junhong Wang	NCAR-NSF				(Affiliated With Author of SAP1.1)	

Appendix 4C:
NRC Report Review Committee
SAP1.1

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI or WGII	Peer Reviewer IPCC-AR4-WGI or WGII	Entity Participation in NOAA Grant-Funded Programs	Affiliated With Author-Contributor To SAP1.1	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
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Richard Levine	San Diego State Univ.			RISA Program (CNAP)		
Jerry Mahlman	NCAR-NSF				(Affiliated With Authors of SAP1.1 & Peer Reviewer of SAP1.1)	IPCC-AR4-WGI reviewer
Steve Running	Univ. of Montana					
Siegfried Schubert	NASA					
Kevin Trenberth	NCAR-NSF				(Affiliated With Authors & Peer Reviewer of SAP1.1)	IPCC-AR4-WGI contributor/reviewer IPCC-AR4-WGII reviewer

Appendix 4D:
NRC Oversight Committee on Climate Change Research
(Of Board on Atmospheric Sciences & Climate)
During Work of *Ad Hoc* NRC Peer Review Panel for SAP1.1

Board Member	University/Entity Affiliation	NOAA Grant-Funded Institution	University/Entity Affiliated Colleague Author-Contributor to SAP1.1
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Lee Branscome	Climatological Consulting Cooperation		
James Coakley, Jr.	Oregon State Univ.	Coop Institutes (CICS-M), (CIOSS), (CIMRS); COCA Program; RISA Program (CIRC); Sea Grant Program	
Julia Cole	Univ. of Arizona	RISA Program CLIMAS); SARP Program	
Clara Deser	NCAR-NSF		(Affiliated With Authors of SAP1.1, SAP1.1 Peer Review Panel Member & Reviewers of SAP1.1 Peer Review Report)
David Karoly	Univ. of Oklahoma	RISA Program (SCIPP)	
Robert Lempert	Rand Corp.		
Linda Mearns	NCAR-NSF		(Affiliated With Authors of SAP1.1, SAP1.1 Peer Review Panel Member & Reviewers of SAP1.1 Peer Review Report)
Gerald Meehl	NCAR-NSF		(Affiliated With Authors of SAP1.1, SAP1.1 Peer Review Panel Member & Reviewers of SAP1.1 Peer Review Report)
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Hassan Virji	International START Secretariat		
Yuk Yung	California Institute of Technology		

5. Development and Peer Review of USGCRP/CCSP SAP1.3

Appendix 5A:
Author-Contributors
USGCRP/CCSP SAP1.3

USG Scientist/Agency Scientist/Other Gov't	Scientist/Entity Affiliation	NOAA Grant-Funded Program	Fed'l Advisory Comm. Role(s); NRC/NAS Role	IPCC-AR4-WGI or WGII Author-Contributor
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Appendix: 5B
NRC *Ad Hoc* Peer Review Panel
SAP1.3

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI	Peer Reviewer IPCC-AR4-WGI	University Participation in NOAA- Funded Cooperative Institutes Program	Affiliated With Author-Contributor To SAP1.3	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
David Bromwich	Ohio State Univ.		x	Coop. Institutes (CIRA), (CICS-M); COCA Program; RISA Program (GLISA); Sea Grant Program		IPCC-AR4-WGI reviewer
Aiguo Dai	NCAR-NSF					IPCC-AR4-WGI contributor/reviewer
Ioana Dima	Air Worldwide Corp.					
John Nielsen-Gammon	Texas A&M Univ.			SARP Program		
Benjamin Kirtman	Univ. of Miami			Coop. Institutes (CICS-M), (CIMAS); RISA Program (SECC)		
Robert Miller	Oregon State Univ.			Coop. Institutes (CICS-M), (CIOSS), (CIMRS); COCA Program; RISA Program (CIRC); Sea Grant Program		
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Appendix: 5C
NRC Report Review Committee
SAP1.3

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI or WGII	Peer Reviewer IPCC-AR4-WGI or WGII	Entity Participation in NOAA Grant-Funded Programs	Affiliated With Author-Contributor To SAP1.3	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
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Elizabeth L. Malone*	Joint GCRI-DOE/ Univ. of Maryland	IPCC-AR4-WGII	IPCC-AR4-WGII	Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program	(Affiliated with SAP1.3 Authors)	IPCC-AR4-WGII contributor/reviewer
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Andrew R. Solow*	Woods Hole Oceanographic			Coop. Institutes (CINAR); Sea Grant Program		

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Appendix: 5D
NRC Oversight Board on Atmospheric Sciences & Climate[755]
During Work of *Ad Hoc* NRC Peer Review Panel - SAP1.3

Board Member	University/Entity Affiliation	NOAA Grant-Funded Institution	University/Entity Affiliated Colleague Author-Contributor to SAP1.3
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Carol Anne Clayson	Florida State Univ.	Coop. Institutes (CIMAS), (NGI); RISA Program (SECC)	
Walter Dabberdt	Vaisala Inc.,		
Kerry Emanuel	Massachusetts Institute of Technology	Sea Grant Program	
Dennis Hartmann	Univ. of Washington	Coop. Institutes JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	
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Thomas Vonder Haar	Colorado State Univ.	Coop. Institutes (CIRA), (CICS-M)	
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6. Development and Peer Review of USGCRP/CCSP SAP 2.4

Appendix 6A:
Author-Contributors
USGCRP/CCSP SAP2.4

USG Scientist/Agency Scientist/Other Gov't	Scientist/Entity Affiliation	NOAA Grant-Funded Program	Fed'l Advisory Comm. Role(s); NRC/NAS Role	IPCC-AR4-WGI or WGII Author-Contributor
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Jeff Cohen/EPA (Exec. Summ., Chap. 2, Lead Author)				
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Appendix 6B:
NRC *Ad Hoc* Peer Review Panel
SAP2.4

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI	Peer Reviewer IPCC-AR4-WGI	Entity Participation in NOAA Grant- Funded Programs	Affiliated With Author-Contributor To SAP2.4	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
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Mac McFarland	Dupont					
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** Served also as an NRC Peer Reviewer or as a Reviewer of another NRC Peer Review Panel Report*

Appendix 6C:
NRC Report Review Committee
SAP2.4

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI or WGII	Peer Reviewer IPCC-AR4-WGI or WGII	Entity Participation in NOAA Grant-Funded Programs	Affiliated With Author-Contributor To SAP2.4	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
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Appendix 6D:
NRC Oversight Board on Atmospheric Sciences & Climate
During Work of *Ad Hoc* NRC Peer Review Panel
SAP2.4

Board Member	University/Entity Affiliation	NOAA Grant-Funded Institution	University/Entity Affiliated Colleague Author-Contributor to SAP2.4, or Peer Review Panel Member, or Peer Review Panel Report Reviewer
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Michael Bender	Princeton Univ.	Coop. Institutes (CICS-M), (CICS-P); NIDIS Program; NJ Sea Grant Program	
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Walter Dabberdt	Vaisala, Inc.		
Kerry Emanuel	Massachusetts Institute of Technology	Sea Grant Program	
Dennis Hartmann	Univ. of Washington	Coop. Institutes JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program	
Peter Leavitt	Weather Information, Inc.		
Vernon Morris	Howard Univ.	(NCAS)	
Thomas Vonder Haar	Colorado State Univ.	Coop. Institutes (CIRA), (CICS-M)	
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7. Development and Peer Review of USGCRP/CCSP SAP3.2

Appendix 7A:
Author-Contributors
USGCRP/CCSP SAP3.2

USG Scientist/Agency Scientist/Other Gov't	Scientist/Entity Affiliation	NOAA Grant-Funded Program	Fed'l Advisory Comm. Role(s); NRC/NAS Role	IPCC-AR4-WGI or WGII Author-Contributor
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Alice Gilliland/NOAA (Exec. Summ., Chaps. 1, 3&4, Lead Author)				
M. Daniel Schwartzkopf/NOAA (Exec. Summ., Chaps. 1&3, App. C-D, Lead Author)				IPCC-AR4-WGI contributor
Larry Horowitz/NOAA (Exec. Summ., Chaps. 1&3, App. C-D, Lead Author)				
Tom Wigley/NCAR-NSF (Chap. 2, App. A-C, Contributing Author)				IPCC-AR4-WGI contributor
Jean-Francois Lamarque/NCAR-NSF (Chap. 3, App. C-D, Contributing Author)				
Yi Ming/UCAR-NSF (Chap. 3, Contributing Author)				
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Appendix 7B:
NRC *Ad Hoc* Peer Review Panel
SAP3.2

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI	Peer Reviewer IPCC-AR4-WGI	Entity Participation in NOAA Grant-Funded Programs	Affiliated With Author-Contributor To SAP3.2	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
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Raymond Arritt	Iowa State Univ.					
Loretta Mickley	Harvard Univ.					
James Edmonds	Joint GCRI-DOE/ Univ. of Maryland			Coop. Institutes (CICS-M), (CINAR); COCA Program; Howard Univ. (NCAS); Sea Grant Program		
Philipp Rasch	**NCAR-NSF**				**(Affiliated with Authors of SAP3.2)**	x
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JoEllen Russell*	Univ. of Arizona			RISA Program (CLIMAS); SARP		x
Lisa Sloan	UC Santa Cruz			Coop. Institutes (CIMEC)		x

** Served also as an NRC Peer Reviewer of or as a Reviewer of an NRC Peer Review Panel Report*

Appendix 7C:
NRC Report Review Committee
SAP3.2 Peer Review Panel Report

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** Served also as an NRC Peer Reviewer or as a Reviewer of an NRC Peer Review Panel Report*

Appendix 7D:
NRC Oversight Board on Atmospheric Sciences & Climate
During Work of *Ad Hoc* NRC Peer Review Panel
SAP3.2

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8. Development and Peer Review of USGCRP/CCSP SAP3.3

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USGCRP/CCSP SAP3.3

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Appendix 8B:
NRC Peer Review Panel
SAP3.3

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** Served also as an NRC Peer Review Panel Member or as a Reviewer of another NRC Peer Review Panel Report*

Appendix 8C:
NRC Report Review Committee
SAP3.3

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Appendix 8D:
NRC Oversight Board on Atmospheric Sciences & Climate
During Work of *Ad Hoc* NRC Peer Review Panel
SAP3.3

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Michael Bender	Princeton Univ.	Coop. Institutes (CICS-M), (CICS-P); NIDIS Program; NJ Sea Grant Program	
Rosina Bierbaum	Univ. of Michigan	Coop. Institutes CILER); RISA Program (GLISA); Sea Grant Program	
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9. Development and Peer Review of USGCRP/CCSP SAP5.2

Appendix 9A:
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USGCRP/CCSP SAP5.2

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Appendix 9B:
NRC Peer Review Panel
SAP5.2

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Appendix 9D:
NRC Oversight Board on Atmospheric Sciences & Climate
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SAP5.2

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10. Development and Peer Review of USGCRP/CCSP SAP5.3

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SAP5.3

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11. Development and Peer Review of USGCRP/CCSP SAP 2.2

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	Jorge Sarmiento Princeton Univ. (Chap. 2, Lead Author)	**DOC-NOAA:** Coop. Institutes (CICS-M), (CICS-P); NIDIS Program; NJ Sea Grant Program // **DOE:** FY 2006, Div. SC-23.3, SC-22.12;[759]* FY 2007, Div. SC-23.3, 22.12 [760]*		
	Stephen Pacala Princeton Univ.	**DOC-NOAA:** Coop. Institutes (CICS-M),		

	(Chap. 3, Coordinating Lead Author); (Chap. 6, Contrib. Author)	(CICS-P); NIDIS Program; NJ Sea Grant Program // **DOE:** FY 2006, Div. SC-23.3, SC-22.12; FY 2007, Div. SC-23.3, 22.12		
	Robert Socolow Princeton Univ. (Chap. 3, Contrib. Author)	**DOC-NOAA:** Coop. Institutes (CICS-M), (CICS-P); NIDIS Program; NJ Sea Grant Program// **DOE:** FY 2006, Div. SC-23.3, SC-22.12; FY 2007, Div. SC-23.3, 22.12		
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	Burke Hales Oregon State Univ. (Chaps. 2&3, Lead Author); (Chap. 15, Contrib. Author)	**DOC-NOAA:** Coop Institutes (CICS-M), (CIOSS), (CIMRS); COCA Program; RISA Program (CIRC); Sea Grant Program// **DOE:** FY 2006, Div. SC-23.3;[761] FY 2007, Div. SC-23.3 [762]		
	Christine Broniak Oregon State Univ. (Part II Overview, Contrib. Author)	**DOC-NOAA:** Coop Institutes (CICS-M), (CIOSS), (CIMRS); COCA Program; RISA Program (CIRC); Sea Grant Program// **DOE:** FY 2006, Div. SC-23.3;[763] FY 2007, Div. SC-23.3 [764]		
	Mark Harmon Oregon State Univ. (Chap. 11, Contrib. Author)	**DOC-NOAA:** Coop Institutes (CICS-M), (CIOSS), (CIMRS); COCA Program; RISA Program (CIRC); Sea Grant Program // **DOE:** FY 2006, Div. SC-23.3;[765] FY 2007, Div. SC-23.3 [766]		
	Beverly Law Oregon State Univ. (Chap. 11, Contrib. Author)	**DOC-NOAA:** Coop Institutes (CICS-M), (CIOSS), (CIMRS); COCA Program; RISA Program (CIRC); Sea Grant Program // **DOE:**		

		FY 2006, Div. SC-23.3;[767]* FY 2007, Div. SC-23.3 [768]*		
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	Keith Paustian Colorado State Univ. (Chaps. 3&10, Lead Author)	**DOC-NOAA:** Coop. Institutes (CIRA), (CICS-M) // **DOE:** FY 2006, Div. SC-23.3; [771] FY 2007, SC-23.3 [772]		
	Donald Johnson Colorado State Univ. (Chap. 10, Contrib. Author)	**DOC-NOAA:** Coop. Institutes (CIRA), (CICS-M) // **DOE:** FY 2006, Div. SC-23.3; [773] FY 2007, SC-23.3 [774]		
	Kenneth Davis Penn State Univ. (Chap. 3, Lead Author)	**DOC-NOAA:** Coop. Institutes (CILER); SARP Program; Sea Grant Program // **DOE:** FY 2006, SC-23.3;[775]* FY 2007, SC-23.3 [776]*		
	Richard Ready Penn State Univ. (Chap. 4, Contrib. Author)	**DOC-NOAA:** Coop. Institutes (CILER); SARP Program; Sea Grant Program // **DOE:** FY 2006, SC-23.3;[777] FY 2007, SC-23.3 [778]		
	Adam Rose Penn State Univ. (Exec. Summ., Chaps. 1&4, Lead Author)	**DOC-NOAA:** Coop. Institutes (CILER); SARP Program; Sea Grant Program // **DOE:** FY 2006, SC-23.3;[779] FY 2007, SC-23.3 [780]		
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	Stacey VanDeveer Univ. of New Hampshire (Chap. 5, Contrib. Author)	**DOC-NOAA:** Sea Grant Program		
	Robert Andies Univ. of North Dakota (Part II Overview, Contrib. Author)	**DOE:** FY 2006 Div. SC-22.21, SC-22.22;[781] FY 2007 Div. SC-22.21, SC-23.3[782]		
	London Losey Univ. of North Dakota (Part II Overview, Contrib. Author)	**DOE:** FY 2006 Div. SC-22.21, SC-22.22;[783] FY 2007 Div. SC-22.21, SC-23.3[784]		
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	Diane Pataki	**DOC-NOAA:** Coop.		

	UC Irvine (Chap. 14, Lead Author)	Institutes (CICS-M) // **DOE:** FY 2007, Div. SC-23.3 [791]		
	Taro Takahashi Columbia Univ. (Chap. 15, Lead Author)	**DOC-NOAA:** Coop. Institutes (CICS-M), (CICAR); RISA Program (CCRUN); IRAP Program // **DOE:** FY 2006, Div. SC-23.3; [792] FY 2007, Div. 23.3[793]		
	Wei-Jun Cai Univ. of Georgia (Chap. 15, Contrib. Author)	**DOC-NOAA:** RISA Program (SECC); Sea Grant Program // **DOE:** FY 2006 Div. SC-23.3;[794] FY 2007 Div. SC-23.3 [795]		
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Appendix 11B:
USGCRP *Ad Hoc* Peer Review Panel
SAP2.2

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI	Peer Reviewer IPCC-AR4-WGI	Entity Participation in DOC-NOAA and/or DOE Grant-Funded Programs	Affiliated With Author-Contributor To SAP2.2	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
Dominique Blain	Environment Canada					
James Bockheim	Univ. of Wisconsin			**DOC-NOAA:** Coop. Institutes (CIMSS), (CILER); Sea Grant Program // **DOE:** FY 2006 Divs. SC-23.3, SC-23.4;[796] FY 2007 Div. SC-23.3 [797]		
Richard Bourbonniere	Environment Canada					
Josep Canadell	CSIRO Marine & Atmospheric Res.					
Robert Dickenson	**Georgia Institute of Technology**			**DOE:** FY 2006 Div. SC-23.3;[798] FY 2007 Div. SC-23.3 [799]	**(Affiliated With SAP2.2 Author)**	
Phillip Dougherty	MeadWestvaco					
George Eads	CRI International					
William Fang	Edison Electric Inst.					
Christoph Gerbig	Max-Planck Inst. for Biogeochemistry					
Patrick Gonzalez	Nature Conservancy			**DOC-NOAA:** Restoration Program[800]		
Kevin Gurney	Purdue Univ.			**DOC-NOAA:** Illinois-Indiana Sea Grant Program // **DOE:** FY 2006 Div. SC-23.2;[801] FY 2007 Div. SC-23-2 [802]		
Richard Jahnke	**Univ. of Georgia Skidaway Institute of Oceanography**			**DOC-NOAA:** RISA Program (SECC); Sea Grant Program // **DOE:** FY 2006 Div. SC-23.3;[803] FY 2007 Div. SC-23.3 [804]	**(Affiliated With SAP2.2 Author)**	
Dale Johnson	Univ. of Nevada (Desert Research Inst.)			**DOC-NOAA:** RISA Program (CNAP) // **DOE:** FY 2006 Div. SC-23.3;[805] FY 2007 Div. SC-23.3 [806]		

John Kinsman	Edison Electric Inst.					
Christopher Kucharik	Univ. of Wisconsin			**DOC-NOAA:** Coop. Institutes (CIMSS), (CILER); Sea Grant Program // **DOE:** FY 2006 Divs. SC-23.3, SC-23.4; FY 2007 Div. SC-23.3		
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Ingeborg Levin	Univ. of Heidelberg					
Alan Lucier	Nat'l Council for Air & Steam Improvement, Inc.					
Loren Lutzenhiser	Portland State Univ.			**DOE:** FY 2006, Div. SC-23.3; [807]		
Susann Nordrum	Chevron					
Naomi Pena	Pew Center on Climate Change					
Michael Raupach	CSIRO Marine & Atmospheric Res.					
Jeffrey Richey	Univ. of Washington			**DOC-NOAA:** Coop. Institutes (JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program // **DOE:** FY 2006 Div. SC-23.3;[808] FY 2007 Div. [809]		
Jonathan Rubin	Univ. of Maine			**DOC-NOAA:** Sea Grant Program // **DOE:** FY 2006 Div. SC-23.3;[810] FY 2007 Div. 22.21[811]		
David Schimel	**NCAR-NSF**				**(Affiliated With SAP2.2 Authors)**	
Joshua Schimel	UC Santa Barbara			**DOC-NOAA:** Coop. Institutes (CIMEC) // **DOE:** FY 2006 Div. SC-23-3;[812]		
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Jeffrey Tschirley	United Nations Food & Agriculture Organization					
John Trabalka	SENES Oak Ridge Inc.					
Susan Wachter	Univ. of Pennsylvania					
Douglas Wallace	Leibniz-Institut					

12. Development and Peer Review of USGCRP/CCSP Global Change Impacts 2009 (NCA2-2009)

Appendix 12A:
Author-Contributors/Editors
USGCRP/CCSP Global Climate Change Impacts 2009 (NCA2-2009)

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Thomas Peterson/ DOC-NOAA (Editor-in-Chief)			CCSP Unified Synthesis Product Development Committee	IPCC-AR4-WGI contributor
David Anderson/ DOC-NOAA			CCSP Unified Synthesis Product Development Committee	IPCC-AR4-WGI reviewer
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Benjamin Santer/DOE			CCSP Unified Synthesis Product Development Committee	IPCC-AR4-WGI contributor
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	H. Gerry Schwartz Consultant Transportation		CCSP Unified Synthesis Product Development Committee	

Eileen Shea/DOC-NOAA			CCSP Unified Synthesis Product Development Committee	
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Appendix 12B:
USGCRP *Ad Hoc* Peer Review Panel
USCRP/CCSP Global Climate Change Impacts 2009 (NCA2-2009)

Scientist	Entity Affiliation	Author-Contributor IPCC-AR4-WGI	Peer Reviewer IPCC-AR4-WGI	University Participation in NOAA- Grant-Funded Programs	Affiliated With Author-Contributor To SAP1.3	Affiliated With Author-Contributor to IPCC-AR4-WGI or WGII
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Robert Duce	Texas A&M Univ.			SARP Program		
Kristie Ebi	ESS, Ltd.					
Christopher Field	Carnegie Institution					
William Hook	American Meteorological Society					
Michael MacCracken	Climate Institute					
Linda Mearns	NCAR-NSF					IPCC-AR4-WGI contributor
Gerald Meehl	NCAR-NSF					IPCC-AR4-WGI contributor
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13. Development and Peer Review of State of the Climate in 2009 (SOC-2008)

Appendix 13:
Author-Contributors
State of the Climate 2008

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	Michael Foster/ Univ. of Wisconsin-Madison/CIMMS	Coop. Institutes (CIMSS), (CILER); Sea Grant Program		
	Brent Maddox/ Univ. of Wisconsin/Madison	Coop. Institutes (CIMSS), (CILER); Sea Grant Program		
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	David Bromwich/ Ohio State Univ.	Coop. Institutes (CILER); COCA Program; RISA Program (GLISA); Sea Grant Program	x	x
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Sydney Levitus/ NOAA			x	
Joel Levy/ NOAA				
	Hongxing Liu/ Texas A&M Univ.	SARP Program		
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Rick Lumpkin/ NOAA				
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	Steven Nerem/ Univ. of Colorado	Coop. Institutes (CIRES); RISA Program	x	
	Ted Scambos/ Univ. of Colorado/NOAA	Coop. Institutes (CIRES); RISA Program	x	x
Christopher Meinen/ NOAA				
Matthew Menne/ NOAA				
	Mark Merrifield/ Univ. of Hawaii	Coop. Institutes (CIPIR), (JIMAR); RISA Program (Pacific); Sea Grant Program		
Laury Miller/ NOAA			x	
	Gary Mitchum/ Univ. of South Florida	Coop. Institutes (CIMAS)		
Andrew Monaghan/ NCAR-NSF				
Steve Montzka/ NOAA			x	x
	J. Morison/ Univ. of Washington	Coop. Institutes JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		x
	M. Steele/ Univ. of Washington	Coop. Institutes JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		
	M. Wang/ Univ. of Washington/JISAO	Coop. Institutes JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		
	R. Woodgate/ Univ. of Washington	Coop. Institutes JISAO); RISA Program (CNAP), (CIRC); NIDIS Program; Sea Grant Program		
	T. Mote/ Univ. of Georgia	RISA Program (SECC); Sea Grant Program		
Paul Newman/ NASA				
S.V. Nghiem/ NASA				
J. Overland/ NOAA				
Richard Pasch/ NOAA				
	Maury Pelto/ Nichols College			
Thomas Peterson/			x	

NOAA				
Richard Reynolds/ NOAA			x	
	David Robinson/ Rutgers Univ.	Coop. Institutes (CINAR); RISA Program (CCRUN); NJ Sea Grant Program	x	
Christopher Sabine/ NOAA			x	
Jae Schemm/ NOAA				
Claudia Schmid/ NOAA				
Russ Schnell/ NOAA				x
Dian Seidel/ NOAA			x	
Paul Stackhouse/ NASA				
Scott Stephens/ NOAA				
M. Wassila Thiaw/ NOAA				
Junhong Wang/ NCAR-NSF				
	Lei Wang/ Louisiana State Univ.	Coop. Institutes (NGI); RISA Program (SCIPP); Sea Grant Program		
Rik Wannikhof/ NOAA			x	
Bill Ward/ NOAA				
James Weyman/ NOAA				
Joshua Willis/ NASA			x	
Yan Xue/ NOAA				
Liangying Zhang/ NCAR-NSF				

14. IPCC Assessments Referenced in NOAA Assessments

Appendix 14:
NOAA-Developed Climate Assessments/Reports
Referencing IPCC Assessment Reports

NOAA-Developed USGCRP/CCSP SAPs, Climate Assessments/Reports	**Referenced IPCC Assessment Reports**
EPA-TSD-Designated Core Reference Documents:	
SAP1.1/CCSP(2006)	1990, 2001
SAP1.3/CCSP(2008g)	2001, 2007, 2007a, 2007b
SAP2.4/CCSP(2008h)	1999, 2001, 2005, 2007
SAP3.2/CCSP(2008d)	1990, 1992, 1996, 2001, 2001b, 2007a, 2007b
SAP3.3/CCSP(2008i)	2001, 2007, 2007a, 2007b
NCA2-2009	2000, 2007a, 2007b, 2007c, 2007d, 2008(water)
SOC-2008	2007a, 2007b
Non-Core Reference Documents Incorporated by Reference in NCA2-2009:	
SAP2.2/CCSP(2007)	2000 2001, 2007
SAP5.2/CCSP(2009)	2001, 2001a, 2001b, 2004, 2005, 2007
SAP5.3/CCSP(2008)	2007, 2007a, 2007b

ENDNOTES

[1] *See* Institute for Trade, Standards and Sustainable Development, *Re: FOIA Request No. DOC-NOAA-2014-000714*, (March 26, 2014), available at: http://nebula.wsimg.com/1ec660f37bd6e62a136dbf64b95ff247?AccessKeyId=39A2DC689E4CA87C906D&disposition=0&alloworigin=1. This request was one of seven FOIA requests ITSSD originally had filed with DOC-NOAA Headquarters and six NOAA regional collaboration teams: the NOAA Central, Great Lakes, North Atlantic, Pacific Islands, Southeast & Caribbean, and Western Regional Collaboration Teams - designated as "NOAA-CRCT" "NOAA-GRCT", "NOAA-PIRT", "NOAA-NARCT", "NOAA-SECART" and "NOAA-WRCT". DOC-NOAA-HQ subsequently consolidated these seven FOIA requests into a single "consolidated" FOIA Request. *See* FOIAOnline Request Information, *Tracking Number: DOC-NOAA-2014-000714* (Date Submitted: March 26, 2014), available at: https://foiaonline.regulations.gov/foia/action/public/view/request?objectId=090004d28020f236; Institute for Trade, Standards and Sustainable Development, *ITSSD/DOC-NOAA Email Correspondences Re: Filed ITSSD FOIA Request With DOC-NOAA of March 26-27, 2014*, available at: http://nebula.wsimg.com/227da97d0d4347c10f0f0d2902d36c65?AccessKeyId=39A2DC689E4CA87C906D&disposition=0&alloworigin=1.

[2] On June 30, 2014, ITSSD Filed with EPA a new FOIA Request (EPA-HQ-2014-008026, superseding previously filed but withdrawn EPA-HQ-2014-004938) seeking disclosure of "EPA climate science-related peer review files" identifying four distinct categories of agency records for public disclosure which correspond to four levels of Information Quality Act legal compliance obligations to which EPA had been subject in validating the third-party-developed climate science upon which the EPA Administrator had relied in reaching its 2009 Clean Air Action Section 202(a)(1) greenhouse gas ("GHG") Endangerment Findings. See Institute for Trade, Standards and Sustainable Development, *ITSSD New ITSSD FOIA Request Superseding Withdrawn FOIA Request No. EPA-HQ-2014-004938* (*filed* June 30, 2014; *recorded* July 1, 2014), available at: https://foiaonline.regulations.gov/foia/action/public/view/request?objectId=090004d2802cce59; http://nebula.wsimg.com/e155ee64b03ea37237297cdbab7a2854?AccessKeyId=39A2DC689E4CA87C906D&disposition=0&alloworigin=1.

[3] *See* Institute for Trade, Standards and Sustainable Development, *ITSSD FOIA Request Clarification - Re: FOIA Request No. DOC-NOAA 2014-000714* (May 5, 2014), available at: http://nebula.wsimg.com/c25e625aa81981536c980ec0f3307791?AccessKeyId=39A2DC689E4CA87C906D&disposition=0&alloworigin=1.

[4] *See* Treasury and General Government Appropriations Act for Fiscal Year 2001, Pub. L. No. 106-554, 114 Stat. 2763, 2763A-153-154 (2000), §515, codified at 44 U.S.C. § 3516 note, available at: http://www.gpo.gov/fdsys/pkg/PLAW-106publ554/pdf/PLAW-106publ554.pdf; http://codes.lp.findlaw.com/uscode/44/35/I/3516/notes.

[5] *See* Office of Management and Budget, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies* ("OMB IQA Guidelines") 67 FR 8452 (Feb. 22, 2002), available at: http://www.whitehouse.gov/sites/default/files/omb/fedreg/reproducible2.pdf; Office of Management and Budget, *Final Information Quality Bulletin for Peer Review* ("OMB-PRB") (Dec. 16, 2004), available at: http://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2005/m05-03.pdf. OMB-PRB, *supra* (particularly, Preamble, pp. 23-26; Sections I-VII). "Section III requires a more rigorous form of peer review for highly influential scientific assessments…*If information is covered by Section III, an agency is required to adhere to the peer review procedures specified in Section III*" (emphasis added). *Id*., at Preamble, p. 23.

[6] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Information Officer & High Performance Computing and Communications, *Information Quality*, NOAA website (last visited April 4, 2014), available at: http://www.cio.noaa.gov/services_programs/info_quality.html; United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Information Officer & High Performance Computing and Communications, *Information Quality Overview* (July 30, 2010), available at: http://www.cio.noaa.gov/services_programs/pdfs/IQA_Overview_7-30-10-FINAL.pdf. *See also* United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Information Officer & High Performance Computing and Communications, *National Oceanic and Atmospheric Administration Information Quality Guidelines* ("NOAA IQA Guidelines") NOAA website (last visited April 4, 2014), available at: http://www.cio.noaa.gov/services_programs/IQ_Guidelines_011812.html; United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Information Officer & High Performance Computing and Communications, *National Oceanic and Atmospheric Administration Policy on Conflicts of Interest For Peer Review Subject to OMB's Peer Review Bulletin* ("NOAA PRB-COI"), NOAA website (last visited April 4, 2014), available at: http://www.cio.noaa.gov/services_programs/NOAA_PRB_COI_Policy_110606.html; United States Department of Commerce, National Oceanic and Atmospheric Administration National Marine Fisheries Service, *National Marine Fisheries Service Policy Directive PD 04-108 - Science and Technology Policy on the Data Quality Act* (June 27, 2012) ("NMFS-STP/DQA"), available at:

http://www.nmfs.noaa.gov/op/pds/documents/04/04-108.pdf; United States Department of Commerce, National Oceanic and Atmospheric Administration National Marine Fisheries Service, *National Marine Fisheries Service Instruction 04-108-03 - Science and Technology Information Quality Act Section 515 Pre-Dissemination Review and Documentation Guidelines* (Dec 16, 2004) ("NOAA-ST-IQA/PDR"), NOAA website (last visited April 4, 2014), available at: http://www.nmfs.noaa.gov/op/pds/documents/04/108/04-108-03.pdf.

[7] *See* The National Academies, *About the National Research Council*, The National Academies website (last visited April 14, 2014), available at: http://www.nationalacademies.org/nrc/index.html. "[T]he National Research Council…[is]…the operating arm of the National Academy of Sciences and the National Academy of Engineering…[Its] mission is to improve government decision making and public policy, increase public understanding, and promote the acquisition and dissemination of knowledge in matters involving science, engineering, technology, and health." *Id*

[8] *See* United States Environmental Protection Agency, *Technical Support Document ("EPA-TSD") For Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, EPA–HQ–OAR–2009–0472–11292 (Dec. 7, 2009), at Table 1.1 p.6, available at: http://www.epa.gov/climatechange/Downloads/endangerment/Endangerment_TSD.pdf.

[9] As the EPA-TSD clearly states, "Table 1.1 lists the core reference documents for this TSD." *See* EPA-TSD, *supra* at p. 7. Indeed, Table 1.1 is labeled "Core references *relied upon most heavily* in this document" (emphasis added). *Id*., at Table 1.1, p. 7. "This version of the TSD, as well as previous versions of the TSD dating back to 2007, have taken the approach of *relying primarily on these assessment reports* because they 1) are very recent and represent the current state of knowledge on GHG emissions, climate change science, vulnerabilities, and potential impacts; 2) have assessed numerous individual, peer-reviewed studies in order to draw general conclusions about the state of science; 3) *have been reviewed and formally accepted, commissioned, or in some cases authored by U.S. government agencies and individual government scientists*; and 4) they reflect and convey the consensus conclusions of expert authors" (emphasis added). *Id*., at p. 6. EPA-TSD Table 1.1 lists seven (7) "core reference documents" for which DOC-NOAA had 'lead' agency development responsibility. *See also* Appendix 1A: NOAA-Developed USGCRP/CCSP Assessments Supporting EPA GHG Endangerment Findings, *infra*.

[10] United States Environmental Protection Agency, *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 FR 66496 (Dec. 15, 2009), available at: http://www.gpo.gov/fdsys/pkg/FR-2009-12-15/pdf/E9-29537.pdf.

[11] *See* Institute for Trade, Standards and Sustainable Development, *EPA FOIA Request No. EPA-HQ-2014-008026* (filed June 30, 2014; recorded July 1, 2014), available at: https://foiaonline.regulations.gov/foia/action/public/view/request?objectId=090004d2802cce59; http://nebula.wsimg.com/e155ee64b03ea37237297cdbab7a2854?AccessKeyId=39A2DC689E4CA87C906D&disposition=0&alloworigin=1.

[12] *See* "Appendix 1A: NOAA-Developed Assessments Supporting EPA GHG Endangerment Findings - EPA-TSD Designated 'Core Reference Documents' & Assessments Incorporated-By-Reference in NCA2-2009, *infra*.

[13] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences* (SAP1.1/CCSP(2006), National Oceanic and Atmospheric Administration, National Climatic Data Center (Thomas R. Karl, Susan J. Hassol, Christopher D. Miller, and William L. Murray, editors, 2006), available at: http://downloads.globalchange.gov/sap/sap1-1/sap1-1-final-all.pdf.

[14] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change* (SAP1.3/CCSP(2008g)), National Oceanic and Atmospheric Administration, National Climatic Data Center (Randall Dole, Martin Hoerling, and Siegfried Schubert (eds.)) (2008), available at: http://library.globalchange.gov/sap-1-3-reanalysis-of-historical-climate-data-for-key-atmospheric-features-implications-for-attribution-of-causes-of-observed-change.

[15] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Trends in Emissions of Ozone-Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure* SAP 2.4/CCSP(2008h), National Oceanic and Atmospheric Administration, National Climatic Data Center (Ravishankara, A.R., M.J. Kurylo, and C.A. Ennis (eds.)), available at: http://downloads.globalchange.gov/sap/sap2-4/sap2-4-final-all.pdf.

[16] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols* (SAP 3.2/CCSP(2008d)), Department of Commerce, NOAA's National Climatic Data Center (H. Levy II, D.T. Shindell, A. Gilliland, M.D. Schwarzkopf, L.W. Horowitz, (eds.)), available at: http://downloads.globalchange.gov/sap/sap3-2/sap3-2-final-report-all.pdf.

[17] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* (SAP3.3/CCSP(2008i)), Department of Commerce, NOAA's National Climatic Data Center (Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)), available at: http://downloads.globalchange.gov/sap/sap3-3/sap3-3-final-all.pdf.

[18] *See* U.S. Department of Commerce National Oceanographic Administration, *The First State of the Carbon Cycle Report (SOCCR): The North American Carbon Budget and Implications for the Global Carbon Cycle*, (SAP2.2/CCSP(2007)), National Oceanic and Atmospheric Administration, National Climatic Data Center (King, A.W., L. Dilling, G.P. Zimmerman, D.M. Fairman, R.A. Houghton, G. Marland, A.Z. Rose, and T.J. Wilbanks (eds.)), available at: http://downloads.globalchange.gov/sap/sap2-2/sap2-2-final-all.pdf.

[19] *See* U.S. Department of Commerce National Oceanographic Administration, *Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking*, (SAP5.2/CCSP(2009)) (M. Granger Morgan (Lead Author), Hadi Dowlatabadi, Max Henrion, David Keith, Robert Lempert, Sandra McBride, Mitchell Small, and Thomas Wilbanks (Contributing Authors)), available at: http://downloads.globalchange.gov/sap/sap5-2/sap5-2-final-report-all.pdf.

[20] *See* U.S. Department of Commerce National Oceanographic Administration, *Decision Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data: A Focus on Water Resources*, (SAP5.3/CCSP(2008)) (Nancy Beller-Simms, Helen Ingram, David Feldman, Nathan Mantua, Katharine L. Jacobs, and Anne M. Waple (eds.)), available at: http://downloads.globalchange.gov/sap/sap5-3/sap5-3-final-all.pdf.

[21] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *Global Climate Change Impacts in the United States* (Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009), available at: http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf.

[22] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *State of the Climate in 2008*, Bulletin of the Meteorological Society Vol. 90, No. 8 (T.C. Peterson and M.O. Baringer, Eds. 2009), available at: http://www1.ncdc.noaa.gov/pub/data/cmb/bams-sotc/climate-assessment-2008-lo-rez.pdf. *See also* Atmospheric Environmental Research, *AER Seminar with MIT Climate Scientist Susan Solomon* (Nov. 15, 2012), available at: http://www.aer.com/news-events/events/aer-seminar-mit-climate-scientist-susan-solomon ("AER will host a noontime seminar by MIT Professor Susan Solomon on "Emerging Signals of Climate Changes: Where in the World will Climate Change First?". As climate models improve and computing resources increase, decision makers' hopes for accurate local climate predictions are growing. Solomon, recently recruited by MIT to be the Ellen Swallow Richards Professor of Atmospheric Chemistry and Climate Science at MIT, will summarize recent research showing the surprising result that an early onset of significant local warming that exceeds past variability is already emerging or will likely emerge in the next two decades in many tropical countries.") *Id*.

[23] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *Global Climate Change Impacts in the United States* (Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009), supra at p. 7.

[24] *See* Climate Change Science Program, *Guidelines for Producing CCSP Synthesis and Assessment Products*, available at: http://www.globalchange.gov/sites/globalchange/files/sap-guidelines.pdf

[25] *Id.*, at pp. 1-2.

[26] "With respect to the synthesis and assessment products, the CCSP Interagency Committee provides oversight for the process of preparing the products as described in these guidelines." *Id*., at p. 2.

[27] *See* U.S. Climate Change Science Program, *Memorandum from William Brennan, Acting Director, U.S. Climate Change Science Program to CENR and CCSP Principals Re: Clarification of review and clearance process for CCSP Synthesis and Assessment Products* (Aug. 2007), at p. 3, available at: http://www.globalchange.gov/sites/globalchange/files/sap-guidelines-clarification-aug2007.pdf.

[28] *Id*., at p. 2. "This transmittal should include the authors' responses to the peer reviewer comments, as required by OMB's Information Quality Bulletin for Peer Review, as well as descriptions of how the authors addressed the public comments and lead agency's review comments." *Id*.

[29] *See* discussion, *infra*.

[30] See *Massachusetts v. EPA*, 549 U.S. 497 (2007) ("'While the statute does condition the exercise of EPA's authority on its formation of a "judgment,' 42 U. S. C. §7521(a)(1), that judgment must relate to whether an air pollutant 'cause[s], or contribute[s] to, air pollution which may reasonably be anticipated to endanger public health or welfare,' *ibid*. […] If EPA makes a finding of endangerment, the Clean Air Act requires the agency to regulate emissions of the deleterious pollutant from new motor vehicles. *Ibid*. (stating that '[EPA] shall by regulation prescribe…standards applicable to the emission of any air pollutant from any class of new motor vehicles')". *Id*., Slip-Op at 30.

[31] *See* 75 FR 25324 (May 7, 2010), *supra* at 25326, 25328, 25362, 25373, 25397, 25491, 25541, fn#s 6, 8, 149-150, 159, 298, 502.

[32] *See* 75 FR 31514 (June 3, 2010), *supra* at 31519, 31591.

[33] *See* 79 FR 1430 (Jan. 8, 2014), *supra* at 1438, 1456, fn# 20.

[34] *See* United States Environmental Protection Agency, *Notice of Proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units and Solicitation for Public Comments*, 79 FR 34830 et seq. (June 18, 2014), available at: http://www.gpo.gov/fdsys/pkg/FR-2014-06-18/pdf/2014-13726.pdf.

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[35] These thirteen (13) federal agencies include: the U.S. Departments of Commerce/National Oceanic and Atmospheric Administration ("NOAA") and National Institute of Standards and Technology ("NIST"), Defense ("DOD"), Energy ("DOE"), Interior (U.S. Geological Survey) ("DOI-USGS"), State ("DOS"), Transportation ("DOT") and Agriculture ("USDA"); the National Aeronautics and Space Administration ("NASA"); the National Science Foundation ("NSF"); the Smithsonian Institution; and the US Agency for International Development ("USAID"). *See* U.S. Global Change Research Program, *Agencies*, available at: http://www.globalchange.gov/agencies. Included under the NSF is the National Center for Atmospheric Research ("NCAR/NSF"), which "is a federally funded research and development center devoted to service, research and education in the atmospheric and related sciences […] *The National Science Foundation is NCAR's primary sponsor*, with significant additional support provided by other U.S. government agencies, other national governments and the private sector" (emphasis added). *See* National Center for Atmospheric Research, *About NCAR*, available at: http://ncar.ucar.edu/about-ncar. "The National Center for Atmospheric Research, with major sponsorship of The National Science Foundation (NSF), provides research, facilities, and services for the atmospheric and Earth sciences community." *See* The National Center for Atmospheric Research, *NCAR's Clickable Organization Chart*, available at: http://ncar.ucar.edu/org-chart. NCAR is managed by the University Corporation for Atmospheric Research ("UCAR"). *Id*. See also University Corporation for Atmospheric Research, About NCAR and UCAR, available at: http://www2.ucar.edu/about-us ("The University Corporation for Atmospheric Research is a consortium of more than 100 member colleges and universities focused on research and training in the atmospheric and related Earth system sciences. Our members set directions and priorities for the National Center for Atmospheric Research, which UCAR manages with sponsorship by the National Science Foundation.") *Id*.

[36] *See* U.S. Global Change Research Program, *Organization & Leadership*, available at: http://www.globalchange.gov/about/organization-leadership.

[37] *Id*.

[38] *See* National Oceanic and Atmospheric Administration National Climatic Data Center, *Welcome from the Director*, available at: http://www.ncdc.noaa.gov/oa/about/welcomefromdirector.html.

[39] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *Global Climate Change Impacts in the United States* (Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009), supra at p. 2.

[40] *See* National Oceanographic and Atmospheric Administration Science Advisory Board, *Responses to Recommendations From the Climate Working Group Related to Climate Services External Review Report and Options for Developing a National Climate Service Report* (Oct. 2010), NOAA SAB website, at p. 6, available at: http://www.sab.noaa.gov/Reports/RESPONSES%20TO%20RECOMMENDATIONS%20AND%20OPTIONS%20FOR%20NATIONAL%20CLIMATE%20SERVICE_final.pdf.

[41] *Id*. "NOAA agrees…[that it]has been asked by the White House to assume critical leadership roles. These include: NOAA Administrator, Dr. Jane Lubchenco co-chairing both the Interagency Climate Change Adaptation Task Force co-organized by CEQ and OSTP, and the National Science and Technology Council (NSTC) Climate Services Roundtable; the transitional director of NOAA's Climate Service, Thomas Karl, serving as the USGCRP Chair of the Subcommittee on Global Change Research; and NOAA supporting Dr. Katherine Jacobs' role at OSTP to support the National Climate Assessment." *Id*., at p. 7. *See* U.S. Global Change Research Program, *Tom Karl Named Chair of the Subcommittee on Global Change Research*, Agency Science News (May 25, 2010), available at: http://www.globalchange.gov/whats-new/agency-news/413-tom-karl-appointed-as-chair-of-the-subcommittee-on-global-change-research.html. "Tom Karl's appointment as chair of the subcommittee reinforces NOAA's long standing history of contributions to the USGCRP. NOAA is a lead Federal agency in the provision of trusted climate science and information, is a co-chair of the White House Interagency Climate Change Adaptation Task Force, and one of the lead agencies in the ongoing National Assessment process. Tom will take on this new leadership role, while continuing to provide guidance for the development of a proposed Climate Service within NOAA… As director of NOAA's National Climatic Data Center in Asheville, N.C., Tom has helped develop and implement internationally recognized standards for data quality." *Id*.

[42] In July/September 2008, "a 13-member external Review Team under the auspices of" the NOAA Science Advisory Board's Climate Working Group (CWG) issued a report recommending that NOAA "lead an effort, with its partners, to compare and contrast specific national options for the development of climate services". *See* NOAA Science Advisory Board, *A Review of the NOAA Climate Services Strategic Plan Final Report to the National Oceanic and Atmospheric Administration, Final Report* (Sept. 2008), at p. 2, available at: http://www.sab.noaa.gov/Reports/2008/NOAA_SAB_CWG_NCS_Review_Sep08_FINALtoNOAA.pdf. A June 2005 NOAA SAB report had revealed that one of the four options the SAB's Climate Working Group had seriously considered for purposes of creating a National Climate Service called for "a strategic partnership in which NOAA serve[d] as the lead entity." *See* U.S. Department of Commerce National Oceanographic Administration Science Advisory Board Climate Working Group, *Options for Developing a National Climate Service* (June 5, 2009), at p. 53, available at: http://www.sab.noaa.gov/Reports/2009/NCS_Report_FinaltoNOAA_6_5_09-1.pdf. The NCS "would be located in NOAA[] and consistent with NOAA's responsibilities and the perceived comparative advantages of NOAA and that of its expected partners." *Id*.

[43] A "National Climate Service w[ould] assist the nation and the world in understanding, anticipating, and responding to climate, climate change, and climate variability and their impacts and implications. The Service will inform the public through the sustained production and delivery of authoritative, timely, useful information about impacts on local, state, regional, tribal, national, and global scales." *Id*., at p. 54. "On February 8, 2010 the Department of Commerce and NOAA announced their intent to create a Climate Service line office". *See* National Oceanographic and Atmospheric Administration Science Advisory Board, *Responses to Recommendations From the Climate Working Group Related to Climate Services External Review Report and Options for Developing a National Climate Service Report* (Oct. 2010), *supra* at p. 3. Such proposal had been vetted beforehand "with Federal partners and the Administration, including the Office of Science and Technology Policy (OSTP), the Office of Management and Budget (OMB) and the Council on Environmental Quality (CEQ)." *Id*. *See also* National Oceanographic and Atmospheric Administration, *A Climate Service in NOAA: Connecting Climate Science to Decision Making*, Draft Vision and Strategic Framework (Dec. 18, 2010), at Executive Summary, p. 4, available at: http://www.noaa.gov/climateresources/resources/CS_Draft_Vision_Strategic_Framework_v9.0%202010_12_20-1.pdf. *See also* United States Department of Commerce National Oceanographic Administration, *Proposed Climate Service in NOAA* (Feb. 15, 2010), NOAA website, available at: http://www.noaa.gov/climateresources/resources/ProposedClimateServiceinNOAA_Feb15rev.pdf.

[44] *See, e.g.*, Ashley Portero, *Congress Rejects Request for National Climate Service, A Resource for Climate Change Information*, International Business (IB) Times (Nov. 21, 2011), available at: http://www.ibtimes.com/congress-rejects-request-national-climate-service-resource-climate-change-information-373102; David A. Kronig, *House Science Committee Grills NOAA Administrator about Climate Service*, FYI: The AIP Bulletin of Science Policy News, American Institute of Physics (June 30, 2011), available at: http://www.aip.org/fyi/2011/080.html; *Examining NOAA's Climate Service Proposal*, Hearing Before the Committee on Science, Space and Technology of the House of Representatives, 112th Cong. 1, Rpt. No. 112–27 (June 22, 2011), available at: http://www.gpo.gov/fdsys/pkg/CHRG-112hhrg66927/pdf/CHRG-112hhrg66927.pdf; Matthew Berger, *Congress Asks NOAA to Study Setting Up National Climate Service*, InsideClimate News (Dec 16, 2009), available at: http://insideclimatenews.org/print/3803; Roberta Kwok, *US considers a national climate service*, Nature (Feb. 19, 2009), available at: http://www.nature.com/news/2009/090219/full/news.2009.108.html; Rick Piltz, *Congress takes step to create a National Climate Service - but beware of shackles and poison pills*, Climate Science Watch (May 14, 2009), available at: http://www.climatesciencewatch.org/2009/05/14/congress-takes-step-to-create-a-national-climate-service-but-beware-of-shackles-and-poison-pills/.

[45] *See* U.S. Department of Commerce National Oceanographic Administration Science Advisory Board Climate Working Group, *Options for Developing a National Climate Service* (June 5, 2009), *supra* at p. 54.

[46] *Id*., at pp. 54-55.

[47] *See* United States Department of Commerce National Oceanic and Atmospheric Administration, Air Resources Laboratory News, *NOAA-EPA MOU on Air Quality Research* (April 10, 2003), available at: http://www.arl.noaa.gov/airqual_042003.php.

[48] *See* United States Department of Commerce National Oceanic and Atmospheric Administration, Air Resources Laboratory News, *MOU Signed with EPA* (May 9, 2003), available at: http://www.arl.noaa.gov/airqual_052003.php.

[49] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Atmospheric Sciences Modeling Division and Air Resources Laboratory, *Fiscal Year 2005 Summary Report of the NOAA Atmospheric Sciences Modeling Division to the U.S. Environmental Protection Agency*, NOAA Technical Memorandum OAR-ARL-256 (June 2006), at pp. 1-4, 42-49, available at: http://www.arl.noaa.gov/documents/reports/arl-256.pdf ("The relationship between NOAA and EPA began when the Air Pollution Unit of the Public Health Service, which later became part of the EPA, requested the Weather Bureau to provide it with meteorological expertise. Thus, in 1955, a special Weather Bureau air pollution unit was formced, integrated with the Public Health Service, and located in Cincinnati, Ohio, until it moved in 1969 to Raleigh, North Carolina. The unit is now the NOAA ARL ASMD, working ***within the framework of the Memorandum of Understanding and Memorandum of Agreement between the U.S. Department of Commerce and EPA. These agreements are implemented through long-term Interagency Agreements DW13938483 and DW13948634 between EPA and NOAA***" (emphasis added). *Id*., at Preface, p. iii. "[Atmospheric Sciences Modeling] Division a research is focused on five program areas: new developments in air quality modeling; ***climate change and its impact on regional air quality***; multimedia modeling; data management and analysis; and air quality forecasting") (emphasis added) *Id*., at p. 1.

[50] *See* United States Environmental Protection Agency, EPA Science Inventory, *Air Quality and Global Climate Change (Phase 1)* (4/25/03), available at: http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=56093. *See also* Ellen J. Cooter, Alice Gilliland, William Benjey, Robert Gilliam, Jenise Swall, *Overview of the Climate Impact on Regional Air Quality (CIRAQ) Project*, United States Environmental Protection Agency, EPA Science Inventory (2004), available at: http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=85826 and https://www.cmascenter.org/conference/2004/abstracts/Climate%20Multiscale/Cooter_abstract.pdf.

[51] "On March 2-3, 2004, more than 100 EPA and NOAA scientists and managers met in Research Triangle Park, NC to discuss 'Air Quality Research to Guide National Policy and Programs.' This was the first in a series of meetings to be held under the EPA-NOAA

Memorandum of Understanding (MOU) on Air Quality Research and the parallel Memorandum of Agreement (MOA) on Air Quality Forecasting signed by the Deputy Secretary of Commerce and EPA Administrator on May 6, 2003. Future meetings are planned on '***Linking Air Quality Models to Climate Change Models*** (September 2004 in Boulder, Colorado)' and on 'Multimedia and Transboundary Exchange (February 2005 in Annapolis, Maryland).' These meetings will lead to the 'Jubilee Celebration of 50 years of EPA-NOAA Partnership on Air Quality (September 2005 in Research Triangle Park, NC).' The purpose of these meetings is to ensure the two agencies work together to improve existing air quality assessment and prediction capabilities" (emphasis added). *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Air Resources Laboratory, *ARL News - Summary of NOAA-EPA Meeting* (April 8, 2004), available at: http://www.arl.noaa.gov/scientist_042004.php. *See also* Kenneth Schere, *The U.S. EPA CMAQ Modeling System – Future Development Plans*, CMAQ Model Peer Review Meeting (R.T.P., NC, Dec. 17, 2003), available at: https://www.cmascenter.org/r_and_d/first_review/pdf/future_development_plans_for_cmaq_(schere).pdf ("Links with other models [:] – ***Water quality (through deposition)*** – Ecological and human exposure – ***Global climate***, general circulation, global chemistry") (emphasis added) *Id*., at p. 6; United States Department of Commerce, National Oceanic and Atmospheric Administration Air Resources Laboratory, *ARL News - Summary of NOAA-EPA Meeting* (April 8, 2004), available at: http://www.arl.noaa.gov/scientist_042004.php.

[52] *Id*.

[53] Darrell Winner, *Summary of EPA STAR Grants Related to Climate and Air Quality*, United States Environmental Protection Agency, Office of Research and Development and National Center of Environmental Research (2004), available at: http://www.ie.unc.edu/cempd/projects/ICAP/presentations/0.4_Gilliland.ppt ("***Portions of the research presented here were performed under the Memorandum of Understanding between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and under agreement number DW13921548***") (emphasis added). *Id*., at p. 19.

[54] *See* E. Cooter, R.C. Gilliam, A. Gilliland, W.G. Benjey, J. Swall and C. Nolte, *Examining the Impact of Climate Change and Variability of Air Quality Over the United States*, United States Environmental Protection Agency EPA Science Inventory, Presented at Climate Science in Support of Decision-Making (Arlington, VA Nov. 16, 2005), available at: http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=143744 ("The Climate Impact on Regional Air Quality (CIRAQ) project, a collaborative research effort involving multiple Federal Agencies and academic institutions, examines global climate change scenarios as they might affect regional and urban tropospheric air quality in North America for ozone and fine particles. *Global climate simulations have been derived from the NASA Goddard Institute for Space Studies (GISS) version II'(two prime) model assuming the IPCC Special Report on Emission Scenarios (SRES) A1B 'business as usual' emission scenario. Scientists with the Department of Energy (DOE) Pacific Northwest National Laboratory have used these scenarios to provide boundary and initial conditions to a regional climate model (RCM) based on the Fifth Generation Pennsylvania State/National Center for Atmospheric Research (NCAR) Mesoscale Model (MM5)*. Finally, the RCM was used to generate10 years of present (~2000) and future (~2050) hourly climate scenarios for the continental U.S. over a grid of 36km by 36km cells. Results for analyses of RCM surface temperature, surface wind, precipitation and steering level transport patterns on various time scales (e.g., seasonal, annual, inter-annual) have been compared to historical point and gridded reanalysis datasets as well as to the future RCM scenario decade. *These comparisons are used to identify some key model biases and uncertainties on temporal and spatial scales relevant to regional and national air quality assessment*") (emphasis added).

[55] *See* Robert C. Gilliam, Wyat Appel and Sharon Phillips, *The Atmospheric Model Evaluation Tool: Meteorology Module*, United States Environmental Protection Agency, EPA Science Inventory, Presented at 4th Annual CMAS Models-3 Users Conference (Chapel Hill, NC, Sept. 26-28, 2005), available at: http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=139233 and (6/1/05), available at: and (6/1/05) https://www.cmascenter.org/conference/2005/abstracts/6_1.pdf ("*The objectives of this task are to develop, improve, and evaluate EPA's Community Multiscale Air Quality (CMAQ) model, as an air quality management and NAAQS implementation tool*. CMAQ is a multiscale and multi-pollutant chemistry-transport model (CTM) that includes the necessary critical science process modules for atmospheric transport, deposition, cloud mixing, emissions, gas- and aqueous-phase chemical transformation processes, and aerosol dynamics and chemistry") (emphasis added). *Id*.

[56] J. Herwehe, *The NOAA-EPA National Air Quality Forecasting System*, United States Environmental Protection Agency EPA Science Inventory, Presented at East Tennessee Ozone Study 2006 (Oak Ridge, TN (May 17-18, 2006), available at: http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=154624 ("Building upon decades of collaboration in air pollution meteorology research, ***in 2003 the National Oceanic and Atmospheric Administration (NOAA) and the United States Environmental Protection Agency (EPA) signed formal partnership agreements to develop and implement an operational national air quality forecasting (AQF) system***. Utilizing comprehensive state-of-the-science numerical models, the AQF system provides air quality guidance for state and local agencies to determine a local air quality index (AQI). ***The AQF system consists of linking the NOAA National Weather Service (NWS) operational North American Mesoscale (NAM) weather prediction model with the EPA's Community Multiscale Air Quality (CMAQ) modeling system*** to produce next-day hourly surface ozone (O3) forecasts on a horizontal grid spacing of 12 km") (emphasis added) *Id*.

[57] *See* Paula M. Davidson, Nelson Seaman, Jeff McQueen, Rohit Mathur and Chet Wayland, *NOAA-EPA's U.S. National Air Quality Forecast Capability*, U.S. Department of Commerce National Oceanic and Atmospheric Administration and United States Environmental Protection Agency (May 10, 2006), available at: http://narsto.org/sites/narsto-dev.ornl.gov/files/AQForecastingNOAA.pdf; Robin Dennis, *Linking Airsheds and Watersheds: Atmospheric Deposition of Nitrogen to Coastal Estuaries*, Air & Waste Management Association Magazine (Sept. 2006) at pp. 40-41, available at: http://pubs.awma.org/gsearch/em/2006/9/epareshighlights.pdf ("***The research presented here was performed under the Memorandum of Understanding between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA) and under agreement number DW13921548***") (emphasis added). *Id*., at p. 41.

[58] *See* Vlad Isakov, *Air Quality Assessment in USA – Technical Tools and Linkage to Human Health*, United States Environmental Protection Agency and U.S. Department of Commerce National Oceanic and Atmospheric Administration, Presented at Air4EU Final Conference (Nov. 10, 2006), available at: http://www.air4eu.nl/PDF/presentations/Air4EU%20-%20Isakov%20-%20US-EPA.pdf ("**Why is it important to complete the linkage**? • ***To improve estimates of ambient concentrations of air pollutants and the resultant exposures for population groups of concern*** • To improve the design of community health studies and the interpretation of findings derived from them • ***To assist in the development of optimum risk mitigation strategies, which: - Target emissions reductions towards principal sources of pollutants*** - Identify exposure mitigation strategies that reduce personal or population exposures in the relevant microenvironments • To support environmental health accountability programs which demonstrate the public health benefits from emissions control actions") (emphasis added) *Id*., at p. 20.

[59] *See* Paula Davidson, Kenneth Schere, Roland Draxler, Shobha Kondragunta, Richard A. Wayland, James F. Meagher, Rohit Mathur, *Chap 2.15 – Toward a US National Air Quality Forecast Capability Current and Planned Capabilities*, in "Air Pollution Modeling and Its Application XIX" (Eds. Carlos Borrego and Ana Isabel Miranda, Springer 2008), available at: http://link.springer.com/chapter/10.1007%2F978-1-4020-8453-9_25#page-2 and http://link.springer.com/book/10.1007/978-1-4020-8453-9. *See also* Ken Schere, *Global Chemical Modeling – Relevance to Regional Air Quality Management*, U.S. Department of Commerce National Oceanic and Atmospheric Administration and United States Environmental Protection Agency, NOAA Chemical Modeling Workshop (Nov. 10-11, 2007), available at: http://www.esrl.noaa.gov/events/2007/chemworkshop/pdf/Schere_AQRegulatory.pdf ("Summary - Linkage of continental/regional models to global CTMs is desirable for air quality management analyses - Quantify impacts on boundary concentrations from:• Intercontinental and outside-domain transport (discrete events) • Exchange between stratosphere, free troposphere, and lower troposphere (continuous process) • ***Potential climate change impacts on regional/urban air quality (decadal analyses)***" (emphasis added) *Id*., at p. 15.

[60] *See* Rohit Mathur, Jonathan Pleim, George Pouliot, Jeffrey Young, Tanya Otte, Kenneth Schere, Brian Eder, Ann Marie Carlton, Jerry Herwehe, Hsin-Mu Lin, Daiwen Kang, Daniel Tong and Shaocai Yu, *THE COMMUNITY MULTISCALE AIR QUALITY (CMAQ) MODEL: Model Configuration and Enhancements for 2007 Air Quality Forecasting*, United States Environmental Protection Agency and U.S. Department of Commerce National Oceanic and Atmospheric Administration (9/18/07), available at: http://www.nws.noaa.gov/ost/air_quality/2007/AQ%20PDF/9-18-2007_8.45%20am_FocusGrp_2007_Mathur_CMAQ.pdf.

[61] *See* Donna Schwede, Nicholson Collier, Jayne Dolph, Mary Ann Bitz Widing and Thomas Howe, *A New Tool for Analyzing CMAQ Modeling Results: Visualization Environment for Rich Data Interpretation (VERDI)*, United States Environmental Protection Agency Office of Research and Development and U.S. Department of Commerce National Oceanic and Atmospheric Administration /Air Resources Laboratory Atmospheric Modeling Division (2007), available at: http://www.cmascenter.org/conference/2007/ppt/schwede_session8_2007.ppt and https://www.cmascenter.org/conference/2007/abstracts/schwede_session8_2007.pdf ("***The research presented here was performed under the Memorandum of Understanding between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and under agreement number DW13921548***") (emphasis added). *Id*., at p. 6 and p. 3.

[62] *See* Jehn-Yih Juang, Donna Schwede, and Jon Pleim, *Utilizing the Mosaic Approach to Estimate Deposition Velocities in the CMAQ Model*, United States Environmental Protection Agency and U.S. Department of Commerce National Oceanic and Atmospheric Administration, Presented at 2007 Annual CMAS Conference (Chapel Hill, NC, Oct. 1-3, 2007), available at: https://www.cmascenter.org/conference/2007/ppt/juang_session1_2007.ppt ("***The research presented here was performed under the Memorandum of Understanding between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and under agreement number DW13921548. This work constitutes a contribution to the NOAA Air Quality and Global Climate Programs***") (emphasis added). *Id*., at p. 14.

[63] *See* Robert W. Pinder, Sergey L. Napelenok, Alice B. Gilliland and Randall V. Martin, *Use of Space-based Tropospheric NO2 Observations in Regional Air Quality Modeling*, United States Environmental Protection Agency and U.S. Department of Commerce National Oceanic and Atmospheric Administration, Presented at TROPOMI Workshop, KNMI, Utrecht, The Netherlands (March 5-6, 2008), available at: http://www.knmi.nl/omi/documents/presentations/2008/tropomi/TROPOMI_PINDER.ppt ("***The research***

presented here was performed under the Memorandum of Understanding between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and under agreement number DW13921548. This work constitutes a contribution to the NOAA Air Quality Program") (emphasis added). *Id*., at p. 18.

[64] *See* Ping Liua, Yang Zhang, Shaocai Yu and Kenneth L. Schere, *Use of a Process Analysis Tool for Diagnostic Study on Fine Particulate Matter Predictions in the U.S. Part II: Process Analysis and Sensitivity Simulations - Atmospheric Pollution Research* (2010), available at: http://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=500073 ("[T]his paper presents results from process analysis (PA) using the PA tool embedded in CMAQ and subsequent sensitivity simulations to estimate the impacts of major model uncertainties identified through PA. Aerosol processes and emissions are the most important production processes for PM2.5 and its secondary components, while horizontal and vertical transport and dry deposition contribute to their removal. Cloud processes can contribute the production of PM2.5 and SO42- and the removal of NO3- and NH4+...***This work was performed under the National Science Foundation Award No. Atm-0348819, and the Memorandum of Understanding between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and under agreement number DW13921548***" (emphasis added). *Id*, at pp. 2, 21.

[65] *See* National Oceanic and Atmospheric Administration, T*op Ten History Makers, Susan Solomon: Pioneering Atmospheric Scientist*, NOAA website, available at: http://celebrating200years.noaa.gov/historymakers/solomon/welcome.html#understanding.

[66] *See* United States Department of Commerce Office of the Inspector General, *Correspondence to United States Senator James Inhofe Regarding the Examination of Issues Related to the Internet Positing of Email Exchanges Taken from the Climatic Research Unit (CRU) of the University of East Anglia in the United Kingdom* (Feb. 18, 2011) at pp. 15-16, available at: http://www.oig.doc.gov/OIGPublications/2011.02.18-IG-to-Inhofe.pdf. However, Dr. Solomon's resume indicates that she had served as the IPCC-AR4-WGI Co-chair from "*April 2002-September 2008*". *See Susan Solomon CV*, available at: http://www.esrl.noaa.gov/csd/staff/susan.solomon/susan.solomon.cv.pdf.

[67] During Susan Solomon's tenure as IPCC-AR4-WGI Co-Chair, the Department of Commerce's Office of Inspector General ("DOC-OIG") had conducted an investigation of the relationship between DOC-NOAA and the IPCC. Said investigation had been prompted by "the internet posting of email exchanges taken from the Climatic Research Unit (CRU) of the University of East Anglia in the United Kingdom in a reported computer hacking incident on or about November 17, 2009." *Id*., at p. 1. Dr. Solomon had been identified as one of two NOAA scientists whose name appeared frequently in the "289 emails that [the DOC-OIG] identified as relating to NOAA and/or its employees". *Id*., at p. 20. "The two NOAA scientists whose names most frequently appear in the emails30 included the Director of the NCDC and Transitional Director ofNOAA's Climate Service (103 emails); and *a NOAA senior scientist who served as Co-Chair of Working Group 1 (WG1) for the United Nations Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) (108 emails)*" (emphasis added). *Id*. The DOC-OIG had investigated, in part, whether the IPCC, during Dr. Solomon's detail as IPCC-AR4-WGI Co-Chair, had manipulated data related to its high profile climate change report – i.e., whether "the emails allegedly showed that climate change-related data had been manipulated or deleted to support the theory that global warming is caused by human activity." *Id*., at p. 1. In addition, the DOC-OIG investigation also examined whether Dr. Solomon, who had followed the advice of NOAA's Office of General Counsel, had improperly failed to respond to various email-related NOAA FOIA requests forwarded to her during that period. *Id*., at p. 2. While the DOC-OIG had not found any wrongdoing, it recommended, based on the findings of a prior DOC-OIG investigation of NOAA's FOIA-related practices, that NOAA "[c]arry out a proper search for responsive records to the four FOIA requests seeking NOAA records regarding review comments on the Second Order Draft and Final Draft of the IPCC AR4 WG1, and reassess the agency's response to these requests as appropriate," and "should consider whether these issues warrant an overall assessment of the sufficiency of its FOIA process." *Id*., at pp. 3, 17. Furthermore, the DOC-OIG examined whether DOC-NOAA had institutionally failed "to adhere to its peer review procedures prior to its [public] dissemination of [such email] information", and consequently, whether the Agency had failed to comply with its obligations under the Information Quality Act and relevant OMB and agency IQA-implementing guidelines with respect to its handling of such email exchanges. *Id*., at p. 2. The DOC-OIG "found no evidence in the CRU emails to suggest that NOAA failed to adhere to its peer review procedures prior to its dissemination of information" and "no evidence in the CRU emails to suggest that NOAA violated its obligations under the IQA." *Id*., at pp. 11-12.

[68] *See* Intergovernmental Panel on Climate Change Fourth Assessment Report, *Climate Change 2007: Working Group I: The Physical Science Basis*, **Coordinating Lead Authors: Susan Solomon (USA)**, Dahe Qin (China), Martin Manning (USA, New Zealand) (2007), available at: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ts.html.

[69] Like "other NOAA employees who participated in the AR4…the Co-Chair…performed much of [her] IPCC-related work at NOAA offices and/or using NOAA equipment, received [her] pay from NOAA, and […] continued to work on other NOAA matters and remained subject to the supervision of other NOAA employees." *Id*., at p. 15.

[70] *See* Massachusetts Institute of Technology Program in Atmospheres, Oceans and Climate, *People – Susan Solomon*, available at: http://eaps-www.mit.edu/paoc/people/susan-solomon/bio. *See also* Massachusetts Institute of Technology, *Introducing Atmospheric Chemist Susan Solomon*, available at: http://video.mit.edu/watch/introducing-atmospheric-chemist-susan-solomon-8844/. *See* Atmospheric Environmental Research, *AER Seminar with MIT Climate Scientist Susan Solomon* (Nov. 15, 2012), available at:

http://www.aer.com/news-events/events/aer-seminar-mit-climate-scientist-susan-solomon ("AER will host a noontime seminar by MIT Professor Susan Solomon on 'Emerging Signals of Climate Changes: Where in the World will Climate Change First?' As climate models improve and computing resources increase, decision makers' hopes for accurate local climate predictions are growing. Solomon, recently recruited by MIT to be the Ellen Swallow Richards Professor of Atmospheric Chemistry and Climate Science at MIT, will summarize recent research showing the surprising result that an early onset of significant local warming that exceeds past variability is already emerging or will likely emerge in the next two decades in many tropical countries.") *Id*.

[71] *See* Massachusetts Institute of Technology Program in Atmospheres, Oceans and Climate, *People – Susan Solomon*, *supra* ("Professional Experience […] *Professor Adjoint, University of Colorado at Boulder, 1985-present*") (emphasis added). *Id*; Sneha Abraham, *Climate Scientist Susan Solomon Presents 51st Annual Robbins Lecture: "Exploring Our Atmosphere's Climate and Chemistry"*, Pomona College News (Jan. 31, 2013), available at: http://www.pomona.edu/news/2013/01/31-robbins-lecture-solomon.aspx ("Solomon is currently the Ellen Swallow Richards Professor of Atmospheric Chemistry & Climate Science at the Massachusetts Institute of Technology. She was a scientist at the National Oceanic and Atmospheric Administration (NOAA), from 1981 to 2011, and *has been an adjunct professor at the University of Colorado in Boulder since 1982*" (emphasis added). *Id*.

[72] *See* University of Colorado, Cooperative Institute for Research in Environmental Sciences (CIRES), *People – Susan Solomon*, available at: http://cires.colorado.edu/people/solomon/. *See also* Carl Kisslinger, *CIRES, 1967–2002 Cooperative Institute for Research in Environmental Sciences - Pioneering a Successful Partnership* (CIRES 2002), at pp. 33, 119-121, available at: http://cires.colorado.edu/about/history/CIRES1967-2002.pdf.

[73] *See* National Academy of Sciences, *Member Directory - Susan Solomon*, available at: http://www.nasonline.org/member-directory/members/50261.html ("My primary research interest is atmospheric chemistry, particularly depletion of the stratospheric ozone layer, coupling between chemical species and climate change, and tropospheric pollution.") *Id*.

[74] *See* World Meteorological Organization, Bulletin, *Interview with Susan Solomon*, available at: http://www.wmo.int/pages/publications/bulletin_en/interviews/int_solomon_en.html.

[75] *See* PR Newswire, *Susan Solomon Wins the BBVA Foundation Frontiers of Knowledge Award for Establishing the Links Between Atmosphere, Climate and Human Activity*, Digital Journal (Jan. 10, 2013), available at: http://www.digitaljournal.com/pr/1008948 ("The BBVA Foundation Frontiers of Knowledge Award in the Climate Change category goes in this fifth edition to U.S. scientist Susan Solomon for her work on determining how human action alters the composition of the atmosphere and how these changes, in turn, affect the Earth's climate."). *Id*.

[76] *See* Karen T. Liftin, *Framing Science: Precautionary Discourse and the Ozone Treaties*, Millennium: Journal of International Studies, Vol. 24, No. 2 (1995), at pp. 251, 260, available at: http://fa ulty.washington.edu/litfin/research/framingscience.pdf.

[77] *Id*., at pp. 251-253.

[78] *Id*., at pp. 253-254.

[79] "[K]nowledge brokers […] translate and interpret knowledge in accordance with new or pre-existing sets of linguistic practices which entail specific constructions of the world. […] Their influence derives from the plausibility of their interpretations, the loudness of their voices, and the political context in which they act. While they typically operate at low or middle levels of governments and international organizations, they are also found at higher levels, as in the US President's Council of Economic Advisors and the Science Advisor. They may also come from the ranks of nongovernmental organizations (NGOs), which aim their interpretations not just at policy-maker, but at the public through the mass media. *The ability of knowledge brokers to frame and interpret information is a substantial source of power, especially under conditions of scientific uncertainty such as those which characterize environmental problems*. Essentially knowledge brokers serve as channels for discourse and as intermediaries between information and decision-makers, often clothing bare facts with social meaning" (emphasis added). *Id*.

[80] "Superficially, the landmark treaties appear to have been the result of a rigorous process of risk analysis, with sophisticated atmospheric models providing the scientific basis of the negotiations. This is the thesis of Ambassador Richard Benedick, US Chief negotiator for the Montreal Protocol and author of a widely read version of the ozone story. It would be a mistake, however, to conclude that science provided a body of objective and value-free facts from which international cooperation emerged, as the epistemic cooperation hypothesis would suggest. Rather, knowledge was 'brokered', so that questions of value were rendered as questions of fact, with exogenous factors shaping the credibility of alternative discursive strategies: in the Montreal Protocol process, science was *framed* by knowledge brokers (emphasis in original). While [Peter] Haas' reading of the ozone regime as the work of an epistemic community highlights the role of knowledge in shaping interests, his inattentiveness to discourse causes him to neglect the role of values and interests in shaping knowledge claims. *Consequently, he overestimates the role of scientists – information producers – and underestimates the role of knowledge brokers – information framers* (emphasis added). Similarly, he fails to grasp the significance of contextual factors like the Antarctic Ozone hole, which was crucial to the eventual outcome of the negotiation process" (emphasis in original) *Id.*, at pp. 254-255.

[81] "The Montreal Protocol on Substances that Deplete the Ozone Layer, and its subsequent amendments, provide an excellent case for a discursive approach, because of the pivotal role of science. In general, environmental problems are not simply physical events; they are *discursive phenomena* that can be studies as struggles among contested knowledge claims, which become incorporated into

divergent narratives about risk and responsibility. The struggle that ensues is a struggle for meaning in which no meanings are ontologically fixed [fn]" (emphasis added). *Id*., at p. 254, citing Charles J. Fox and Hugh T. Miller, Postmodern Public Administration: Toward Discourse (Beverly Hills, CA; Sage, 1995), pp. 10-11. ("Fox and Miller use Habermas' theory of ideal speech acts to distinguish between authentic and monologic discourse…" *Id*., at fn 18.

[82] The Preamble to the Montreal Protocol on Substances that Deplete the Ozone Layer, which implements the Vienna Convention for the Protection of the Ozone Layer, states as follows: "Determined to protect the ozone layer *by taking precautionary measures* to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge…taking into account technical and economic considerations…*Noting the precautionary measures* for controlling emissions of certain chloroflourocarbons (CFCs) that have already been taken at national and regional levels…" (emphasis added). *See* "Preamble", Montreal Protocol on Substances that Deplete the Ozone Layer, to the Vienna Convention for the Protection of the Ozone Layer.

[83] "The Montreal Protocol process is essentially the story of how a status quo discourse favouring inaction was supplanted by a precautionary discourse. The precautionary principle, an emerging principle of international environmental law, holds that, in the face of scientific uncertainty, regulators should act to prevent harm rather than wait until damage occurs. This premise, which expresses a *philosophical* rather than a *scientific* judgment, entails radically different discursive strategies from those which underlie the premise that chemicals are innocent until proven guilty. **Precautionary discourse […] refers to a set of linguistic practices informed by this principle and embedded in a social network (in this case, a group of knowledge brokers); precautionary action applies this principle to specific policies**" (italicized emphasis in original; boldfaced emphasis added). *Id*., at p. 255.

[84] *See* W. Henry Lambright, *NASA and the Environment: The Case of Ozone Depletion*, National Aeronautics and Space Administration Monographs in Aerospace History No. 38 (2005), available at: http://history.nasa.gov/monograph38.pdf ("In March [1986], Watson, Albritton, and others met in Boulder and decided to conduct a field expedition to Antarctica as soon as possible. With Albritton's help, Watson hurriedly dispatched a 13-member team of scientists to Antarctica during the August–September period when the depletion seemed to be most pronounced. He placed Susan Solomon, a NOAA scientist from Albritton's lab, in charge. Known as NOZE (National Ozone Expedition), the expedition's purpose was to explain the ozone hole and determine which of the various theories accounted for it […] The team took balloon and ground-based measurements and also had the benefit of satellite data. [fn] At the end of NOZE, Solomon held a press conference from Antarctica. ***Although there still was much work to do analyzing the data, the NOZE team felt that public alarm about the ozone hole required them to say something (rather than waiting […] until their work had cleared the lengthy peer-review, publication process). Solomon declared, 'We suspect a chemical process is fundamentally responsible for the formation of the hole.'*** [fn] ***There were caveats, and by no means did Solomon say the data were conclusive. But Solomon's statement about causation received a negative reaction from many scientists*** who favored a meteorological explanation and from industry, which thought the statement much too premature. In November 1986, critics of NOZE aired their views in a special edition of *Geophysical Research Letters*. Many of those who published opinions in the journal wanted a higher standard of proof than existed at the time. [fn] Watson decided that there would have to be a second expedition to settle the scientific questions regarding the cause of ozone depletion." […] *The first expedition obtained satellite and ground data. The data were suggestive but inconclusive*") (emphasis added). *Id*., at pp. 18-19.

[85] "The ozone hole was very much on the minds of negotiators.[fn] The delegates saw the hole over Antarctica as a warning, even though conclusive scientific findings were unavailable. Watson and Albritton told the delegates what they knew, and what they did not know. However, *there were many nonscience issues that still had to be addressed*. […] In September 1987, [Robert] Watson and [Daniel] Albritton flew up to Montreal during the final negotiations to present the participants with the preliminary results of the expedition. However, before the final scientific facts were in from Antarctica, the Montreal Protocol had concluded. […] In October, leaders of the second antarctic expedition studied their results. […]This second expedition also provided the *'smoking gun'* for which participating scientists had been looking—a very clear *'anti-correlation'* between chlorine monoxide (the chemically active form of chlorine in the stratosphere) and ozone. That is, the more chlorine, the less ozone! Critical to this finding were two instruments on the ER-2—the chlorine monoxide instrument from Anderson's group at Harvard, and an ozone instrument from the NOAA Aeronomy Lab" (emphasis added). *Id*., at pp. 20-22.

[86] *See* Karen T. Liftin, *Framing Science: Precautionary Discourse and the Ozone Treaties*, Millennium: Journal of International Studies, Vol. 24, No. 2 (1995), at pp. 251, 260, available at: http://fa ulty.washington.edu/litfin/research/framingscience.pdf.

[87] *See* Karen T. Liftin, *Framing Science: Precautionary Discourse and the Ozone Treaties*, Millennium: Journal of International Studies, Vol. 24, No. 2 (1995), supra at p. 262.

[88] The U.S. delegation ultimately scaled back its position and called only for a 50 percent cutback by 1999. "The final agreement, while falling short of the US position, required scheduled reductions of domestic CFC and halon consumption by up to 50 percent by the year 2000." *Id*., at p. 266. *See also* Karen T. Liftin, *Ozone Discourse: Science and Politics in Global Environmental Cooperation*, (Columbia University Press 1995), at "Chap. 4 - The Employment of Knowledge in the Montreal Protocol Negotiations", *supra*. ("The original 95 percent position was not revoked, primarily because 'it had already been put out on the street' (interview with David

Gibbons). But the U.S. delegation received instructions to press only for a 50 percent reduction in CFCs and a freeze on halons (Doniger 1988:90))." *Id*.

[89] "From the beginning of his tenure as EPA Administrator in 1985, Lee Thomas took a considerable interest in the ozone issue.[fn] He personally announced the EPA's new perspective on ozone at a workshop in March 1986: '[i]n the face of all this scientific uncertainty, one might ask why…not simply adopt a 'wait-and-see' attitude until depletion is actually confirmed? Let me address this question squarely. EPA does not accept, as a precondition for decision, empirical verification that ozone depletion is occurring…*[We] may need to act in the near term to avoid letting today's 'risk' become tomorrow's 'crisis.'*' Rather than the science itself, it was Thomas' *discursive orientation* that drove his decision: his understanding of the problem was rooted in a particular narrative about risk and responsibility in the social world. As Thomas recalls, referring to his disagreement with William Graham, President Reagan's Science Advisor and a staunch opponent of regulation, 'Graham look at it from a purely scientific perspective, whereas I looked at it from more of a policy perspective. Where there was uncertainty, he thought we needed more research and I thought we needed to be cautious. We just looked at the same science and came to two different conclusions'" […] **Rather, it was the EPA's knowledge brokers, with later support from the UNEP and other national environmental agencies, who framed the science in light of the precautionary discourse**" (italicized emphasis in original; boldface emphasis added). *Id.*, at pp. 262-263. See also *See also* Karen T. Liftin, *Ozone Discourse: Science and Politics in Global Environmental Cooperation*, (Columbia University Press 1995), at "Chap. 4 - The Employment of Knowledge in the Montreal Protocol Negotiations", available at: http://www.columbia.edu/dlc/cup/litfin/litfin14.html ("***Rather than the science itself, it was Thomas's interpretation of the science and his own philosophical orientation to the problem of risk that drove his decision***") (emphasis added). *Id*.

[90] *Id*., at p. 269. *See also* Karen T. Liftin, *Ozone Discourse: Science and Politics in Global Environmental Cooperation*, (Columbia University Press 1995), at "Chap. 4 - The Employment of Knowledge in the Montreal Protocol Negotiations", *supra*. ("As John Hoffman argued at the Leesburg meeting, an 85 percent reduction in CFC emissions would be necessary just to keep atmospheric chlorine levels constant (paper 2, UNEP/WG.148/3). His calculations required no modeling, only knowledge about production data and the compounds' atmospheric lifetimes. If the hole was caused by CFCs, *suggesting a radically nonlinear relationship between CFC emissions and ozone depletion*, there was good reason to want at least to freeze atmospheric chlorine concentrations. Hoffman's chlorine-loading argument gained salience from the ozone hole for another reason. Because of the earth's weather patterns, most chemicals penetrate the stratosphere over the tropics. Ozone, however, is much more sensitive to chlorine at the higher latitudes, where at least some of the CFCs decompose because of their long atmospheric lifetimes. Thus, the latitude at which CFCs break apart makes a crucial difference, *but there is no clear sense in the models of when CFCs release their chlorine. The extreme losses over Antarctica suggested that much of the chlorine could be released in the polar regions, which would mean that the models' had underestimated the threat*. As one modeler explains, 'the truth will be between the chlorine-loading perspective and the calculations based on ozone depletion potential, but *the ozone hole gave credence to the chlorine-loading scheme*' (interview with Guy Brasseur). Hoffman's simple calculation received a great deal of publicity in congressional hearings and in the press (United States Senate 1987a:61; Palm Beach Post 1987; Science 1986:928). When the issue was framed in these terms, suddenly a phaseout did not seem like a drastic proposal.") *Id.*

[91] "The papers by John Hoffman […] [were] especially noteworthy for their emphasis on the long atmospheric lifetimes of CFCs. [fn] His primary contribution to the discourse of precautionary action was his 'chlorine-loading' analysis: in order simply to stabilise chlorine concentrations at 1986 levels, the presence of past emissions in the atmosphere required an immediate 85 per cent cutback in DVC emissions. [fn] […] Two factors in particular had considerable significance in shaping the EPA's discursive strategy: first, the discovery of the Antarctic ozone 'hole'[fn] crucially enhanced the credibility of Hoffman's proposal. Second, the discursive proclivities of the EPA were in large part determined by key EPA knowledge brokers' general social orientation towards risk and responsibility." *Id*., at pp. 258-259.

[92] "According to EPA contractor Michael Gibbs, '[t]here was no new information here, just a different way of framing it. We thought: since the hole may be linked to concentrations, let's shift the debate. This also shifts the focus to the warming issue, and in general to the responsibility to the future. It would not have worked one year before; it only worked because of the Antarctic hole." *Id*., at p. 261. *See also* Karen T. Liftin, *Ozone Discourse: Science and Politics in Global Environmental Cooperation*, (Columbia University Press 1995), at "Chap. 4 - The Employment of Knowledge in the Montreal Protocol Negotiations", *supra*.

[93] *Id*.

[94] *Id*. *See also* Karen T. Liftin, *Ozone Discourse: Science and Politics in Global Environmental Cooperation*, (Columbia University Press 1995), at "Chap. 4 - The Employment of Knowledge in the Montreal Protocol Negotiations", *supra*. "*In other words, the hole enhanced the status of a particular mode of scientific framing, one with explicitly political purposes: to promote an environmentalist agenda.* Groups like the NRDC used the chlorine-loading analysis to promote sweeping controls; '85 percent became the line in the sand for environmentalists' (interview with James Losey) (emphasis added).)" *Id.*

[95] *See* Karen T. Liftin, *Framing Science: Precautionary Discourse and the Ozone Treaties*, Millennium: Journal of International Studies, Vol. 24, No. 2 (1995), *supra* at p. 275. "In actuality, very few scientists offered any policy recommendations. Watson, for instance, believed that 'the science didn't justify a 95 per cent cut', expressing concern that the rush could promote unsafe alternatives.

[fn] Daniel Albritton, the other major US scientist advising policy-makers, continued to harbour doubts about the CFC-ozone link.[fn]" *Id*., at p. 263. *See also* Karen T. Liftin, *Ozone Discourse: Science and Politics in Global Environmental Cooperation*, (Columbia University Press 1995), at "Chap. 4 - The Employment of Knowledge in the Montreal Protocol Negotiations", *supra* ("[V]ery few scientists offered any policy recommendations and [] most of those who did thought a 50 percent cut would be enough (interviews with Ralph Cicerone, Nien Dak Sze, and Robert Watson). Watson, for instance, testified before Congress that 'the science doesn't justify a 95 percent cut' and expressed concern that the rush could promote unsafe alternatives (United States Congress 1987b:90). Dr. Daniel Albritton of NOAA, the other major U.S. scientist coordinating ozone research, continued to harbor doubts about the CFC-ozone link (interview with Ralph Cicerone). *Since Watson and Albritton were the two top scientists advising policymakers on the ozone layer*, it is difficult to see how they could have been the 'driving force' behind the U.S. position" (emphasis added)). *Id.*

[96] "Framing the issue in terms of chlorine loading, as Hoffman did, rather than in terms of ozone depletion potential (ODP), as did the atmospheric models, *is somewhat misleading because it implies that all forms of chlorine are equally menacing to ozone*. But, as the discovery in Antarctica demonstrated, the models were also misleading. As one scientist puts it in 1990: *'Chlorine doesn't affect us; ozone does*. ODP is more sophisticated, more complicated. Two years ago, I would have said chlorine loading was a good measure; now I think we should use the state-of-the-art models. At the time the models couldn't account for the Antarctic hole, and now they can' (interview with Nien Dak Sze)" (emphasis added). *Id*., at note 23.

[97] "**Evolution of the U.S. Position** - During the previous summer [1986], the EPA and the State Department's Bureau of Oceans and International Environmental and Scientific Affairs (OES), had convened interagency meetings to develop the U.S. position, but there was little interest from other agencies. [fn] This essentially gave the EPA and OES free reign to devise the position (interview with Richard Benedick). Their draft paper called for a near-term freeze on the consumption [fn] of CFC-11, -12, and -113, as well as Halon-1211 and -1301; a scheduled phaseout of these compounds; and periodic policy reviews based on new scientific knowledge (U.S. Department of State 1986). The U.S. negotiating position grew out of an interesting set of interrelated political and scientific considerations. The EPA was under some pressure to promote stringent controls because of the pending NRDC suit, but the proposed phaseout went beyond what the NRDC had expected and probably further than would have been legally necessary. [fn] According to EPA staff who were deeply involved in working out the position, the NRDC suit was only a secondary consideration (interviews with James Losey and Stephen Seidel). *More important was the belief on the part of the EPA and OES that, despite the scientific uncertainties, the risks demanded precautionary intervention*. *During the debates, both domestic and international, they argued for 'a prudent insurance policy,' even without the Antarctic ozone hole* (Benedick 1987). But the hole clearly and dramatically drew attention to those risks") (emphasis added). *See* Karen T. Liftin, *Ozone Discourse: Science and Politics in Global Environmental Cooperation*, (Columbia University Press 1995), at "Chap. 4 - The Employment of Knowledge in the Montreal Protocol Negotiations", *supra*.

[98] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *Atmospheric Chemistry Modeling Atmospheric Chemistry Modeling An Inventory of Model Platforms in use at NOAA An Inventory of Model Platforms in use at NOAA*, Chemical Workshop (Aug. 2007), available at: http://www.esrl.noaa.gov/events/2007/chemworkshop/pdf/NOAAAtmosChemModeling.pdf ("2-D Middle Atmosphere Model (NOCAR) 1. Brief description of model Coupled dynamical-radiative-chemical two-dimensional model of the middle atmosphere, including detailed ozone chemistry and its interaction with long and short lived gases. 2. Principal applications or customers Evolution of ozone, ozone depletion potentials, lifetimes of source gases. 3. Key participants, lab/organization, effort, contact information Robert Portmann, ESRL/CSD, robert.w.portmann@noaa.gov. Susan Solomon, ESRL/CSD, susan.solomon@noaa.gov […] 8. Description of key outcomes, applications (including literature citations describing work), and other information about modeling capabilities a. Evolution of Ozone: Elucidating the effect of volcanic aerosols on the evolution of ozone and their effect on ozone photochemistry […] b. Role of NOx in the stratosphere: Evaluations of the effect of NOx on stratospheric photochemistry including its effect on other ozone destroying catalytic cycles and ozone trends…") *Id*., at p. 21.

[99] *See* J. S. Daniel, E. L. Fleming, R. W. Portmann, G. J. M. Velders, C. H. Jackman, and A. R. Ravishankara, *Options to Accelerate Ozone Recovery: Ozone and Climate Benefits*, Atmospheric Chemistry and Physics, Vol. 10, 7697–7707 (European Geosciences Union 2010), at 7699, available at: http://www.atmos-chem-phys.net/10/7697/2010/acp-10-7697-2010.pdf.

[100] *See* Jean-Francois Lamarque and Susan Solomon, *Impact of Changes in Climate and Halocarbons on Recent Lower Stratosphere Ozone and Temperature Trends*, American Meteorological Society Journal of Climate Vol. 23 2599-2611 (May 15, 2010), available at: http://acd.ucar.edu/~lamar/PDF/2010JCLI3179.pdf ("In particular, we have shown that much of the lower stratospheric tropical ozone decrease between 1980 and the late 1990s can be attributed to long-term increases in CO2 and sea surface temperatures (through acceleration in the tropical lower stratosphere vertical velocity,) at least for the region between 100 and 50 h.Pa […] We have also shown that the strengthening of the simulated temperature gradient across the Southern Hemisphere subtropical jet was larger when CFCs were allowed to increase over their 1970 levels […] Further, we showed that the decrease in tropical tropopause pressure at most latitudes in our model is associated with changes in CO2 and SSTs […]In our case, we explicitly compute [an ozone change] and have shown that the trends in ozone over much of the tropics are themselves driven by climate change […] Therefore, the results

presented here show that the full understanding and attribution of the impact of recent and future changes in the tropopause region and in the width of the tropics and their implications for global change will require the use of interactive chemistry in climate models to fully capture forcings and feedbacks.") *Id*., at p. 2609.

[101] *See* IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)) (Camb. Univ. Press 2007), at pp. 2-3, available at: https://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf ("Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750, and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture […]The understanding of anthropogenic warming and cooling influences on climate has improved since the TAR, leading to very high confidence [fn7] that the global average net effect of human activities since 1750 has been one of warming […] 7 In this Summary for Policymakers the following levels of confidence have been used to express expert judgements on the correctness of the underlying science: *very high confidence represents at least a 9 out of 10 chance of being correct*; high confidence represents about an 8 out of 10 chance of being correct") (emphasis added). *Id*.

[102] "Based on a range of models, it is likely that future tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and more heavy precipitation associated with ongoing increases of tropical sea surface temperatures." *Id*., at p. 15.

[103] *See, e.g.*, U.S. Senate Committee on Environment and Public Works, *Media Covering Up UN Global Warming Report's Political Agenda*, Senator Inhofe Charges (Jan. 31, 2007), available at: http://www.epw.senate.gov/public/index.cfm?FuseAction=Minority.Blogs&ContentRecord_id=79C41A1E-802A-23AD-40C1-210D91AC6AFE.

[104] On April 17, 2007, Dr. Everett testified before the Committee on Natural Resources, Subcommittee on Fisheries, Wildlife and Oceans of the U.S. House of Representatives, about his author role in the development of IPCC-AR3-WGI. "I will present the results of the work I led for the Intergovernmental Panel on Climate Change from 1988 to 2000, while an employee of NOAA. This is still the most thorough, comprehensive, and broadly reviewed work on the subjects that has been published. The reports were reviewed by hundreds of government and academic scientists as part of the IPCC process. My work included five impact analyses: Fisheries (Convening Lead Author), Polar Regions (Co-Chair), Oceans (Lead Author), and Oceans and Coastal Zones (Co-Chair/2 reports). Since leaving NOAA I have kept abreast of the literature, have talked to many individuals and groups and have maintained these subjects in the UN Atlas of the Oceans, where I am the Chief Editor and Project Manager. While I will present the results from IPCC documents I led or helped write, all opinions are mine alone, and are at the end. I was assigned the climate change duties when I was the National Marine Fisheries Service Division Chief for Fisheries Development in the 1970s. The agency was very concerned about the impact of climate change on the United States fisheries and fishing industry. Global cooling would be devastating to our fisheries and aquaculture. About 1987, the momentum shifted to fears of global warming and with my background, I was tasked to lead our efforts dealing with it. In 1996 I received the NOAA Administrator's Award for 'accomplishments in assessing the impacts of climate change on global oceans and fisheries' […] In this light *I view with grave concern the two latest IPCC Summary for Policy Makers which use truncated data in text and graphics to misrepresent the amount of warming, causing undue alarm. For example, from the most recent SPM, 'The Working Group I Fourth Assessment concluded that most of the observed increase in the globally averaged temperature since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. ….' This is a red flag. It begs the question of why the restriction 'since the mid-20th century'. What is wrong with the full data set back into the 1800s? Is it restricted to 'mid-20th century' because it is too difficult to explain the prior decades of falling temperatures in the face of rising CO2? This demonstration (and there are many others) is typical of what has led many disagreeing scientists to not be invited to IPCC anymore, and others to lose interest. Over 20 years the core IPCC-participating scientists have become more homogeneous. The consensus has become stronger as dissenting scientists have moved to become the 'other consensus', usually called climate skeptics.* The source of the warming or cooling is of little importance to an impacts assessment, except where it provides a clue as to future trends. Most people agree that there has been a warming of 1 degree Fahrenheit in the instrumental record of 150 years. *Those in the 'IPCC-oriented consensus' believe it is due to mankind's increased CO2 and other gas emissions; therefore temperatures are likely to rise as more humans inhabit the earth and economies grow.* This is important information to a specialist in assessments. Also important, though, is staying in touch with other views. Scientists in the "other consensus" believe that, even if the 1 degree change is accurate (and is not just 'noise'), the CO2 rise can, at most, explain a piece of the temperature rise. *Many believe that increased water vapor, solar variations in radiation and magnetic flux, our relative position in the solar system, the tilt of our planet's axis, the clearing of our atmosphere of pollutants which allows more sunlight to reach the ground, or our position in the Milky Way galaxy that affects the amount of radiation reaching our atmosphere and affecting cloud formation, are also important and are not (and cannot be yet) adequately considered in the computer models used by the IPCC consensus. Many believe CO2 may not be the culprit*" (emphasis added). *See Written Statement By Dr. John T. Everett*, Hearing on Wildlife and Oceans in a Changing Climate,

before the Committee on Natural Resources, Subcommittee on Fisheries, Wildlife and Oceans of the U.S. House of Representatives (April 17, 2007), available at: http://www.climatechangefacts.info/ClimateChangeDocuments/StatementJohnEverett.htm. *See also* Climate Change Facts, *John T. Everett*, available at: http://www.climatechangefacts.info/DrJohnEverett.htm ("Dr. Everett's breadth is demonstrated by prior appointments to many NOAA-wide Boards, such as: NOAA High Performance Computing Council, National Review Panel of the National Undersea Research Program, NOAA Environmental Sciences and Data Information Management Program, Sea Grant Science and Technology Committee, US Interagency El Niño Southern Oscillation Systems Council, NOAA Total Quality Management Board; NOAA Quality Council, NOAA Performance Standards Review Board, and Co-Chair of NOAA, EPA and Coast Guard Committee on ocean dumping. From its inception until his leaving NOAA, he was on the Board of directors of the NOAA Program in Climate Change.") *Id*.

[105] In January 2005, Dr. Christopher Landsea, from the Hurricane Research Division of the National Oceanographic and Atmospheric Administration's (NOAA) Atlantic Oceanographic and Meteorological Laboratory, withdrew via written correspondence from participating in the development of the IPCC-AR4-WGI report on science integrity grounds. *See World Climate Report* (Jan. 18, 2005), available at: http://www.worldclimatereport.com/index.php/2005/01/18/2500-less-1-2/ ("Dear colleagues, After some prolonged deliberation, I have decided to withdraw from participating in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). I am withdrawing because I have come to view the part of the IPCC to which my expertise is relevant as having become politicized. In addition, when I have raised my concerns to the IPCC leadership, their response was simply to dismiss my concerns. With this open letter to the community, I wish to explain the basis for my decision and bring awareness to what I view as a problem in the IPCC process. The IPCC is a group of climate researchers from around the world that every few years summarize how climate is changing and how it may be altered in the future due to manmade global warming. I had served both as an author for the Observations chapter and a Reviewer for the 2nd Assessment Report in 1995 and and the 3rd Assessment Report in 2001, primarily on the topic of tropical cyclones (hurricanes and typhoons). My work on hurricanes, and tropical cyclones more generally, has been widely cited by the IPCC. *For the upcoming AR4, I was asked several weeks ago by the Observations chapter Lead Author - Dr. Kevin Trenberth - to provide the writeup for Atlantic hurricanes. As I had in the past, I agreed to assist the IPCC in what I thought was to be an important, and politically-neutral determination of what is happening with our climate. Shortly after Dr. Trenberth requested that I draft the Atlantic hurricane section for the AR4's Observations chapter, Dr. Trenberth participated in a press conference organized by scientists at Harvard on the topic "Experts to warn global warming likely to continue spurring more outbreaks of intense hurricane activity" along with other media interviews on the topic. The result of this media interaction was widespread coverage that directly connected the very busy 2004 Atlantic hurricane season as being caused by anthropogenic greenhouse gas warming occurring today. Listening to and reading transcripts of this press conference and other media interviews, it is apparent the Dr. Trenberth was being accurately quoted and summarized in such statements and was not being misrepresented in the media. These media sessions have the potential to result in a widespread perception that global warming has made recent hurricane activity much more severe.* I found it a bit perplexing that the participants in the Harvard press conference had come to the conclusion that global warming was impacting hurricane activity today. To my knowledge, none of the participants in that press conference had performed any research on hurricane variability, nor were they reporting on any new work in the field. All previous and current research in the area of hurricane variability has shown no reliable, long-term trend up in the frequency or intensity of tropical cyclones, either in the Atlantic or any other basin. The IPCC assessments in 1995 and 2001 also concluded that there was no global warming signal found in the hurricane record. Moreover, the evidence is quite strong and supported by the most recent credible studies that any impact in the future from global warming upon hurricane will likely be quite small. The latest results from the Geophysical Fluid Dynamics Laboratory (Knutson and Tuleya, Journal of Climate, 2004) suggest that by around 2080, hurricanes may have winds and rainfall about 5% more intense than today. It has been proposed that even this tiny change may be an exaggeration as to what may happen by the end of the 21st Century (Michaels, Knappenberger, and Landsea, Journal of Climate, 2005, submitted). It is beyond me why my colleagues would utilize the media to push an unsupported agenda that recent hurricane activity has been due to global warming. *Given Dr. Trenberth's role as the IPCC's Lead Author responsible for preparing the text on hurricanes, his public statements so far outside of current scientific understanding led me to concern that it would be very difficult for the IPCC process to proceed objectively with regards to the assessment on hurricane activity. My view is that when people identify themselves as being associated with the IPCC and then make pronouncements far outside current scientific understandings that this will harm the credibility of climate change science and will in the longer term diminish our role in public policy.* My concerns go beyond the actions of Dr. Trenberth and his colleagues to how he and other IPCC officials responded to my concerns. I did caution Dr. Trenberth before the media event and provided him a summary of the current understanding within the hurricane research community. I was disappointed when the IPCC leadership dismissed my concerns when I brought up the misrepresentation of climate science while invoking the authority of the IPCC. Specifically, the IPCC leadership said that Dr. Trenberth was speaking as an individual, even though he was introduced in the press conference as an IPCC lead author; I was told that that the media was exaggerating or misrepresenting his words, even though the audio from the press conference and interview tells a different story (available on the web directly); and that Dr. Trenberth was accurately reflecting conclusions from the TAR, even though it is quite clear that the TAR stated that there was no connection between global warming and hurricane activity at this time. The IPCC leadership saw nothing to be

concerned with in Dr. Trenberth's unfounded pronouncements to the media, despite his supposedly impartial important role that he must undertake as a Lead Author on the upcoming AR4. […] *I personally cannot in good faith continue to contribute to a process that I view as both being motivated by pre-conceived agendas and being scientifically unsound. As the IPCC leadership has seen no wrong in Dr. Trenberth's actions and have retained him as a Lead Author for the AR4, I have decided to no longer participate in the IPCC AR4*") (emphasis added). *Id*.

[106] *Id*.

[107] For example, MIT Professor of Meteorology, Richard Lindtzen, who had served as chapter author in the IPCC-AR3-WGI, had testified before the Senate Commerce Committee in May 2001 that, "[t]he IPCC does a number of things which encourage misuse: ! Use a summary to misrepresent what scientists say. ! Use language which conveys different meaning to laymen and scientists. ! Exploit public ignorance (and the embarrassment about this ignorance) over quantitative matters. ! Exploit what scientists can agree on in order to support one's agenda. ! Exaggerate scientific accuracy and certainty. ! Exaggerate the authority of undistinguished scientists. ! Pose leading questions (WG II's Impact Report)." *See Testimony of Richard S. Lindzen before the Senate Commerce Committee on 1 May 2001* (May 1, 2001), at pp. 6-8, available at: http://www.lavoisier.com.au/articles/climate-policy/science-and-policy/Lindzen_McCain.pdf.

[108] Roger A. Pielke Sr. is Senior Research Scientist, Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado in Boulder and Professor Emeritus of the Department of Atmospheric Science, Colorado State University, Fort Collins. *See* Cooperative Institute for Research in Environmental Studies (CIRES), *Roger A. Pielke Sr.*, available at: http://cires.colorado.edu/science/groups/pielke/people/pielke.html. "In 1995 [he] was invited to serve as a contributing author to their Chapter which dealt with regional climate modeling. [He] sent in recommended text and papers. All of this material was ignored (as it was in 1992 when [he] was asked to review several chapters in the IPCC supplement report). Subsequently, in 1995 [he] sent the letter below in which [he] resigned from the IPCC." *See* Climate Science: Roger Pielke Sr., *My 1995 Resignation Letter From The IPCC* (Sept. 30, 2011), available at: http://pielkeclimatesci.wordpress.com/2011/09/30/my-1995-resignation-letter-from-the-ipcc/. *See also* Climate Science: Roger Pielke Sr., My Comments For The InterAcademy Council Review of the IPCC (June 16, 2010), available at: http://pielkeclimatesci.wordpress.com/2010/06/16/my-comments-on-questionnaire-on-ipcc-processes-and-procedures/ ("As I have written on in papers and on weblog posts, which I will list some of below, the IPCC involves a top down management of the chapters. The 2007 Statement for Policymakers is a narrowly focused summary which was used to promote the perspective of climate variability and change of the organizers and leadership of the IPCC assessments. […] For the 1992 Supplement to the 1990 IPCC Report […]I was asked to review several Chapters of the draft. I made a number of suggestions, including the need to introduce the role of land use/land cover change as an important regional and global climate forcing. My input was totally ignored without any response. In the 1995 IPCC Report […]I was invited to be a contributing coauthor on the chapter on regional climate. Again, I prepared detailed input for the Report, and again all of my comments were ignored without even a rebuttal. At that point, I concluded that the IPCC Reports were actually intended to be advocacy documents designed to produce particular policy actions, but not as a true and honest assessment of the understanding of the climate system. As a result of this second refusal to include peer reviewed scientific information, I called the IPCC and resigned from any further involvement in this clearly biased assessment process. I was not invited to contribute to the more recent IPCC reports […]The summary of my experience with the IPCC is that it is managed with particular outputs in place before the assessments are even started. The Lead Authors have almost complete control with respect to what is accepted in their Chapter, and what is ignored. The IPCC is actually a relatively small group of individuals who are using the IPCC process to control what policymakers and the public learn about climate on multi-decadal time scales.") *Id*.

[109] For example, Professor Paul Reiter of the Institut Pasteur, Paris, France, and a contributory author of the IPCC Third Assessment Report Working Group II, wrote in a March 31, 2005 memorandum submitted to the British Parliament's House of Lords Select Committee on Economic Affairs of the poor quality science and misrepresentations reflected in the chapter addressing the impact of climate change on mosquite-borne disease. *See* Parliament of the United Kingdom, *Memorandum by Professor Paul Reiter, Institut Pasteur, Paris - THE IPCC AND TECHNICAL INFORMATION. EXAMPLE: IMPACTS ON HUMAN HEALTH* (March 31, 2005), available at: http://www.publications.parliament.uk/pa/ld200506/ldselect/ldeconaf/12/12we21.htm. ("IPCC SECOND ASSESSMENT REPORT, WORKING GROUP II. CHAPTER 18. HUMAN POPULATION HEALTH 11. This chapter appeared at a critical period of the climate change debate. Fully one third was devoted to mosquito-borne disease, principally malaria. The chapter had a major impact on public debate, and is quoted even today, despite the more informed chapter of the Third Assessment Report (see below). 12. The scientific literature on mosquito-borne diseases is voluminous, yet the text references in the chapter were restricted to a handful of articles, many of them relatively obscure, and nearly all suggesting an increase in prevalence of disease in a warmer climate. The paucity of information was hardly surprising: not one of the lead authors had ever written a research paper on the subject! Moreover, two of the authors, both physicians, had spent their entire career as environmental activists. One of these activists has published "professional" articles as an 'expert' on 32 different subjects, ranging from mercury poisoning to land mines, globalization to allergies and West Nile virus to AIDS. 13. Among the contributing authors there was one professional entomologist, and a person who had written an obscure article on dengue and El Niño, but whose principal interest was the effectiveness of motor cycle crash helmets (plus one paper on the health effects of cell phones). 14. The amateurish text of the chapter reflected the limited knowledge

of the 22 authors. Much of the emphasis was on 'changes in geographic range (latitude and altitude) and incidence (intensity and seasonality) of many vector-borne diseases' as 'predicted' by computer models. Extensive coverage was given to these models, although they were all based on a highly simplistic model originally developed as an aid to malaria control campaigns. The authors acknowledged that the models did not take into account 'the influence of local demographic, socioeconomic, and technical circumstances'. 15. Glaring indicators of the ignorance of the authors included the statement that 'although anopheline mosquito species that transmit malaria do not usually survive where the mean winter temperature drops below 16-18ºC, some higher latitude species are able to hibernate in sheltered sites'. In truth, many tropical species must survive in temperature below this limit, and many temperate species can survive temperatures of -25ºC, even in 'relatively exposed' places. 16. The authors also claimed that climate change was already causing malaria to move to higher altitudes (e.g. in Rwanda). They quoted information published by non-specialists that had been roundly denounced in the scientific literature. In the years that followed, these claims have repeatedly been made by environmental activists, despite rigorous investigation and overwhelming counter-evidence by some of the world's top malaria specialists. [85] Moreover, climate models suggest that temperature changes will be relatively small in the tropics, and carefully recorded meteorological data—e.g. in the Brook-Bond tea estates in Kenya—shows no demonstrable warming since the 1920s. The IPCC authors even claimed that 'a relatively small increase in winter temperature' in Kenya (!) 'could extend mosquito habitat and enable …malaria to reach beyond the usual altitude limit of around 2,500m to the large malaria free urban highland populations,' e.g. Nairobi. This despite the fact that in the 1960s the mosquitoes were present above 3,000m and Nairobi is at only 1,600m! 17. A similar claim was made that the dengue vector, Stegomyia aegypti was once limited to 1,000m in Colombia but had 'recently been reported above 2,200m' One of the authors (the activist with the 32 different specialities) had recently published a claim (in The Lancet) that dengue had reached 2,200m 'in the past 15 years'. I had pointed out (again in *The Lancet*) that the publication he was quoting had categorically stated that dengue was not found above 1,750m. Moreover, although the maximum altitude of 2,200 m for the mosquito had been established (by two colleagues of mine) in 1979, this was the first ever investigation of the issue, so there was no evidence of an increase in altitude! Since that time, he has abandoned the claim that dengue has moved to higher altitudes, but still claims (e.g. in January 2005 at a UNESCO conference in Paris) that the mosquito has leapt from 1,000 to 2,200m in a matter of 15 years. 18. In summary, the treatment of this issue by the IPCC was ill-informed, biased, and scientifically unacceptable. The final 'Summary for Policymakers stated: *'Climate change is likely to have wide-ranging and mostly adverse impacts on human health, with significant loss of life*...Indirect effects of climate change include increases in the potential transmission of vector-borne infectious diseases (eg malaria, dengue, yellow fever, and some viral encephalitis) resulting from extensions of the geographical range and season for vector organisms. Projections by models…indicate that the geographical zone of potential malaria transmission in response to world temperature increases at the upper part of the IPCC-projected range (3-5ºC by 2100) would increase from approximately 45 per cent of the world population to approximately 60% by the latter half of the next century. This could lead to potential increases in malaria incidence (on the order of 50-80 million additional annual cases, relative to an assumed global background total of 500 million cases), primarily in tropical, subtropical, and less well-protected temperate-zone populations'. 19. These confident pronouncements, untrammelled by details of the complexity of the subject and the limitations of these models, were widely quoted as 'the consensus of 1,500 of the world's top scientists' (occasionally the number quoted was 2,500). This clearly did not apply to the chapter on human health, yet at the time, eight out of nine major web sites that I checked placed these diseases at the top of the list of adverse impacts of climate change, quoting the IPCC. 20. The issue of consensus is key to understanding the limitations of IPCC pronouncements. Consensus is the stuff of politics, not of science. Science proceeds by observation, hypothesis and experiment. Professional scientists rarely draw firm conclusions from a single article, but consider its contribution in the context of other publications and their own experience, knowledge, and speculations. The complexity of this process, and the uncertainties involved, are a major obstacle to meaningful understanding of scientific issues by non-scientists. 21. In the age of information, popular knowledge of scientific issues—particularly issues of health and the environment—is awash in a tide of misinformation, much of it presented in the 'big talk' of professional scientists. Alarmist activists operating in well-funded advocacy groups have a lead role in creating this misinformation. In many cases, they manipulate public perceptions with emotive and fiercely judgmental 'scientific' pronouncements, adding a tone of danger and urgency to attract media coverage. Their skill in promoting notions of scientific 'fact' sidesteps the complexities of the issues involved, and is a potent influence in education, public opinion and the political process. These notions are often re-enforced by attention to peer-reviewed scientific articles that appear to support their pronouncements, regardless of whether these articles are widely endorsed by the relevant scientific community. Scientists who challenge these alarmists are rarely given priority by the media, and are often presented as 'skeptics'.") *Id*.

[110] Hans von Storch is a professor at the Meteorological Institute of the University of Hamburg, and Director of the Institute of Coastal Research, GKSS, Germany. He also "served as a Lead Author for Working Group I of IPCC [AR3 and] acted as a Lead Author of Chapter 2 'Foundations of Decision Making' of Working Group II of IPCC AR5 until April 2014." See Dr. Hans von Storch, available at: http://www.hvonstorch.de/klima/. Dr. Storch prepared a powerpoint presentation highlighting scientific errors and exaggerations in the IPCC-AR4-WGI and WGII reports, recommending revisions in IPCC procedures, and identifying how climate science is in a postnormal state. *See* Hans von Storch, *InterAcademy Council Review of the IPCC* (2011), available at: http://reviewipcc.interacademycouncil.net/storch.IAC.1006.ppt ("*Climate science is in a postnormal state* - Postnormal science: Jerry

Ravetz, Silvio Funtovicz, 1986 and earlier. When *facts are uncertain, values in dispute, stakes high and decisions urgent*, **science is not done for reasons for curiosity but is asked for as support for preconceived value-based agendas**. Climate science is in a postnormal state") (emphasis in original). *Id*., at p. 9. ("Postnormality requires Analysis of two bodies of knowledge claims, namely (dominantly) scientifically constructed knowledge, and (dominantly) culturally constructed knowledge. Analytical support by cultural sciences needed. Discrimination between scientifically solid core of knowledge vs. added politically convenient (contested) knowledge claims" (blue emphasis in original). *Id*., at p. 11. *See also* Dennis Bray and Hans von Storch, *Climate Science: An Empirical Example of Postnormal Science*, Bulletin of the American Meteorological Society, Vol. 80, No.3 (March 1999), available at: http://journals.ametsoc.org/doi/pdf/10.1175/1520-0477%281999%29080%3C0439%3ACSAEEO%3E2.0.CO%3B2. ("This paper addresses the views regarding the certainty and uncertainty of climate science knowledge held by contemporary climate scientists. More precisely, it addresses the extension of this knowledge into the social and political realms as per the definition of postnormal science.") *Id.*, at Abstract. *See also* Hans von Storch, *Climate Science, IPCC, Postnormality and the Crisis of Trust*, Institute of Coastal Research and University of Hamburg (2011), available at: http://www.hvonstorch.de/klima/pdf/kap9-Storch.pdf; Olaf Stampf and Gerald Traufetter, *Climate Expert von Storch: Why Is Global Warming Stagnating?*, Der Spiegel (June 20, 2013), available at: http://www.spiegel.de/international/world/interview-hans-von-storch-on-problems-with-climate-change-models-a-906721.html.

[111] *See* "Appendix 1A: NOAA-Developed USGCRP/CCSP Assessments Supporting EPA GHG Endangerment Findings," *infra*.

[112] "This Product begins with a discussion of a number of formulations of uncertainty and the various ways in which uncertainty can arise. It introduces several alternative perspectives on uncertainty including both the classical or frequentist view of probability, which defines probability as the property of a large number of repeated trials of some process such as the toss of a coin, *and the subjectivist view, in which probability is an indication of degree of belief informed by all available evidence* […] Part 2 argues that it is insufficient to describe uncertainty in terms of qualitative language, using words such as 'likely' or 'unlikely'. Empirical evidence is presented that demonstrates that such words can mean very different things to different people, or indeed, different things to the same person in different contexts. Several simple strategies that have been employed to map words into probabilities in the climate literature are described. In order to make judgments about, and in the presence of uncertainty, the human mind subconsciously employs a variety of simplified strategies or 'cognitive heuristics'. In many circumstances, these serve well. However, in some settings, they can lead to significant biases in the judgments that people make. Part 3 summarizes key findings from the experimental literature in behavioral decision making, and discusses a number of the cognitive biases that can arise, including overconfidence, when reasoning and making decisions in the face of uncertainty […]Part 6 explores the issues of how best to propagate uncertainty through models or other decision-making aids, and, more generally, the issues of performing analysis of and with uncertainty [...]This Part closes with a discussion of deep uncertainty, surprise, and some additional issues related to the discussion of behavioral decision theory […]Part 8 addresses a number of issues that arise in communicating about uncertainty, again drawing on the empirical literature in psychology and decision science. Mental model methods for developing communications are outlined. One key finding is that empirical study is absolutely essential to the development of effective communication" (emphasis added). *See* SAP5.2/CCSP(2009), *infra* at Exec. Summ., pp. 7-8.

[113] "*The 'precautionary principle' is a decision strategy often proposed for use in the face of high uncertainty*. There are many different notions of what this approach does and does not entail. In some forms, it incorporates ideas of resilience or adaptation. *In some forms, it can also be shown to be entirely consistent with a decision analytic problem framing* […] *Precaution is often in the eye of the beholder*" (emphasis added). *Id.*, at pp. 16-17, 65-66.

[114] Indeed, this assessment makes reference to the communication challenges and public debates policymakers had faced as the result of the scientific uncertainties surrounding ozone-hole research findings. *See Id*., at pp. 24, 70.

[115]* Curiously, Susan Solomon co-authored a 2012 article recommending that the focus of climate science policy should shift away from CO2 concentrations toward CO2 emissions. The article uses terminology eerily reminiscent of the discursive approach EPA 'knowledge brokers' had used to shift the terms of debate surrounding the treatment of ozone-depleting chemicals from ozone depletion to chlorine concentration. *See* H. Damon Matthews, Susan Solomon and Raymond Pierrehumbert, *Cumulative Carbon as a Policy Framework for Achieving Climate Stabilization*, Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 370, no. 1974 (2012): 4365-4379, available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3405665/ ("The primary objective of the United Nations Framework Convention on Climate Change is to stabilize greenhouse gas concentrations at a level that will avoid dangerous climate impacts. However, *greenhouse gas concentration stabilization is an awkward framework within which to assess dangerous climate change on account of the significant lag between a given concentration level and the eventual equilibrium temperature change*. By contrast, recent research has shown that global temperature change can be well described by a given cumulative carbon emissions budget. *Here, we propose that cumulative carbon emissions represent an alternative framework that is applicable both as a tool for climate mitigation as well as for the assessment of potential climate impacts*") (emphasis added). *Id*., at Abstract. *See also Id*., at pp. 1-4. ("[A] considerable body of literature has evolved to attempt to first quantify what could be considered to be a 'dangerous' level of climate change, and second to determine what levels of greenhouse gas stabilization are consistent with avoiding said climate changes [fns]. There are several inherent difficulties with this approach, which have posed a considerable challenge to the progress of climate mitigation. Defining 'dangerous' levels of climate

change is clearly a subjective exercise, which is difficult to incorporate in a compelling manner into the process of policy decision making. *There has been a recent convergence in policy discussions towards a stated goal of limiting global warming to 2°C above pre-industrial temperatures [fn]; while there is evidence that 2°C of global warming would avoid a number of important and potentially dangerous climate impacts (see [fn] for a review of climate impacts associated with various levels of global temperature change), there is little by way of quantitative evidence that this represents a 'safe' policy target*, and some climate scientists argue that 2°C would result in unacceptably severe impacts [fns]. *Even given some chosen target for global temperature change, however, it is extremely difficult within the paradigm of greenhouse gas concentration stabilization to define an appropriate policy target for greenhouse gas emissions* […]Taken together, these difficulties present no clear way to estimate by how much emissions must be decreased to avoid a given level of global temperature change, which may or may not be sufficient to avoid dangerous anthropogenic interference in the climate system. […] However, the development of coupled climate–*carbon models over the past decade has allowed for the investigation of the climate response to emissions, rather than concentrations, of carbon dioxide […] The policy implication of this body of literature is that a given level of cumulative carbon emissions can be uniquely associated with a given global temperature change*. Consequently, the climate mitigation challenge can be simplified to the task of selecting an allowable cumulative emissions budget that is consistent with a given amount of global warming") (emphasis added). *Id*.

[116] *See, e.g., Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons, Summary for Policymakers and Technical Summary*, Intergovernmental Panel on Climate Change and United Nations Environment Program Technology and Economic Assessment Panel (Bert Metz, Lambert Kuijpers, **Susan Solomon**, Stephen O. Anderson, Ogunlade Davidson, Jose Pons, David de Jager, Tahl Kestin, Martin Manning and Leo Meyer, Eds.) (Cambridge Univ. Press, IPCC 2005), available at: https://www.ipcc.ch/pdf/special-reports/sroc/sroc_full.pdf; David de Jager, Martin Manning, Lambert Kuijpers, Stephen O. Andersen, Paul Ashford, Paul Atkins, Nick Campbell, Denis Clodic, Sukumar Devotta, Dave Godwin, Jochen Harnisch, Malcolm Ko, Suzanne Kocchi, Sasha Madronich, Bert Metz, Leo Meyer, José Roberto Moreira, John Owens, Roberto Peixoto, José Pon, John Pyle, Sally Rand, Rajendra Shende, Theodore Shepherd, Stephan Sicars, **Susan Solomon**, Guus Velders), Dan Verdonik, Robert Wickham, Ashley Woodcock, Paul Wright and Masaaki Yamabe, *Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons, Summary for Policymakers and Technical Summary*, Intergovernmental Panel on Climate Change and United Nations Environment Program Technology and Economic Assessment Panel (Ogunlade Davidson, Mack McFarland and Pauline Midgley, Eds.) (2005), available at: https://www.ipcc.ch/pdf/special-reports/sroc/sroc_spm.pdf . "This IPCC Special Report was developed in response to invitations by the United Nations Framework Convention on Climate Change (UNFCCC) [fn] and the Montreal Protocol on Substances that Deplete the Ozone Layer [fn] to prepare a balanced scientific, technical and policy relevant report regarding alternatives to ozone-depleting substances (ODSs) that affect the global climate system. It has been prepared by the IPCC and the Technology and Economic Assessment Panel (TEAP) of the Montreal Protocol. Because ODSs cause depletion of the stratospheric ozone layer [fn], their production and consumption are controlled under the Montreal Protocol and consequently are being phased out, with efforts made by both developed and developing country parties to the Montreal Protocol. ***Both the ODSs and a number of their substitutes are greenhouse gases (GHGs) which contribute to climate change*** (see Figure SPM-1). Some ODS substitutes, in particular hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), are covered under the UNFCCC and its Kyoto Protocol. Options chosen to protect the ozone layer could influence climate change. Climate change may also indirectly influence the ozone layer. This report considers ***the effects of total emissions of ODSs and their substitutes on the climate system and the ozone layer***. In particular, this provides a context for understanding how replacement options could affect global warming" (emphasis added). *Id*., at *Summary for Policymakers and Technical Summary*, pp. 3-4.

[117]* To repeat, this evidence has been provided to establish, for purposes of defining the scope of this FOIA request, that Professor Solomon and other DOC-NOAA officials *knew or had reason to know* EPA would use the DOC-NOAA-developed highly influential scientific assessments, in part, as primary support for its then forthcoming CAA Section 202(a)(1) GHG Endangerment Findings; it is not an effort by ITSSD to malign Dr. Solomon in any way.

[118] "a. The Administrator Properly Interpreted the Precautionary and Preventive Nature of the Statutory Language […] EPA rejects the argument that the endangerment test in CAA section 202(a) is not precautionary or preventive in nature. As discussed in more detail in the proposal, Congress relied heavily on the en banc decision in Ethyl when it revised section 202(a) and other CAA provisions to adopt the current language on endangerment and contribution. 74 FR 18886, 18891–2. The Ethyl court could not have been clearer on the precautionary nature of a criteria based on endangerment. The court rejected the argument that EPA had to find actual harm was occurring before it could make the required endangerment finding…" *See* United States Environmental Protection Agency, *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 FR 66496, 66506-66509 (Dec. 15, 2009), *supra*.

[119] *See* Carl F. Cranor, *Toward Understanding Aspects of the Precautionary Principle*, Journal of Medicine and Philosophy, Vol. 24, NO. 3 (2004), at pp. 259-279, available at: http://www.glerl.noaa.gov/seagrant/ClimateChangeWhiteboard/Resources/Uncertainty/climatech/crannor04PR.pdf; Stephen M. Gardiner, *A Core Precautionary Principle*, The Journal of Political Philosophy, Vol. 14, No. 1, (2006), at pp. 33–60, available at:

http://www.glerl.noaa.gov/seagrant/ClimateChangeWhiteboard/Resources/Uncertainty/Mac1/gardinert06PR.pdf; Nancy Myers, *The Rise of the Precautionary Principle: A Social Movement Gathers Strength*, Multinational Monitor (Sept. 2004), at pp. 9-15, available at: http://www.glerl.noaa.gov/seagrant/ClimateChangeWhiteboard/Resources/Uncertainty/climatech/meyers04PR.pdf (each posted on the website of the NOAA Great Lakes Environmental Research Laboratory).

[120] *See* Grant Thompson, *The Precautionary Principle in North Pacific Groundfish Management*, AFSC Quarterly Report (July-August-Sept. 1996), available at: http://www.afsc.noaa.gov/quarterly/Features/feature_jas96.pdf (posted on the website of the NOAA Alaska Fisheries Science Center).

[121] *See* National Oceanic and Atmospheric Administration National Marine Fisheries Service, *NOAA Technical Memorandum NMFS-F/SPO-40 - Providing Scientific Advice to Implement the Precautionary Approach Under the Magnuson-Stevens Fishery Conservation and Management Act* (June 1999), presented at the Proceedings of the Fifth National NMFS Stock Assessment Workshop, (Feb. 24-26, 1998), available at: http://www.st.nmfs.noaa.gov/StockAssessment/workshop_documents/nsaw5/nsaw5.html (posted on the website of NOAA's National Marine Fisheries Service website, setting forth web-accessible articles prepared by twenty-four authors which discuss how the precautionary principle can be employed in various capacities within NMFS regulations to implement said statute). *See also* V. R. Restrepo, G. G. Thompson, P. M. Mace, W. L. Gabriel, L. L. Low, A. D. MacCall, R. D. Methot, J. E. Powers, B. L. Taylor, P. R. Wade, and J. F. Witzig, *Technical Guidance On the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act*, NOAA Technical Memorandum NMFS-F/SPO-## (July 17, 1998), available at: http://www.nmfs.noaa.gov/sfa/NSGtkgd.pdf (posted on the website of NOAA's National Marine Fisheries Service).

[122] *See* National Oceanographic and Atmospheric Administration Office of General Counsel, *Climate Change Mitigation*, available at: http://www.gc.noaa.gov/gcil_climate.html (noting that, although "[t]he IOC [Intergovernmental Oceanographic Commission of the United Nations Education, Scientific and Cultural Organization (UNESCO)] has contributed to research on ocean fertilization by responding to requests for scientific and technical information[, t]he member states of the IOC however, have agreed that in regulating and researching ocean fertilization, *the precautionary principle should control*[,]" and posting to the NOAA OGC website under "General Climate Change Information" for public accessibility and viewing, *IOC Report, Sec. 4.3, Addressing the Impacts of Climate Change*.) As the IOC explicitly states, "The Member States noted the Report of the IOC ad hoc Consultative Group of Experts on Ocean Fertilization, and agreed that proposals to use ocean fertilization to sequester carbon in the ocean are cause for concern. They agreed that there is insufficient understanding of the potential impacts of such activities on the marine ecosystem, *and that a precautionary approach is appropriate until safeguards can be established*" (emphasis added). *See* United Nations Educational, Scientific and Cultural Organization, Intergovernmental Oceanographic Commission Report IOC/EC-XLI/3 (July 29, 2008), at Sec. 4.3.5, par. 265, p. 34, available at: http://www.gc.noaa.gov/documents/gcil_ec_xli_e.pdf. As the report reveals, not only had Assistant Secretary of Commerce and NOAA Administrator, Admiral Conrad Lautenbacher Jr, been invited by the IOC Chair to "address the Executive Council in his capacity as one of the Co-Chairpersons of GEO [Group on Earth Observations]", but the NOAA Administrator had been accompanied to this IOC meeting at which this report was issued by seven (7) other NOAA personnel: John Dunnigan, NOAA Assistant Administrator for Ocean Services and Coastal Zone Management; David McKinnie, NOAA Science Fellow, US Embassy, Jakarta, Indonesia; Stephen Piotrowicz, NOAA OCEAN US; Heather Allen, NOAA International Affairs Specialist; Ned Cyr NOAA Chief, Marine Ecosystems System, NOAA Fisheries; Terry Schaefer, Program Manager, International Activities Office, NOAA OAR; and Arthur Paterson, NOAA International Affairs Specialist. *See also* Group on Earth Observations, *About GEO*, available at: https://www.earthobservations.org/about_geo.shtml.

[123] Financial conflicts-of-interest may include those arising from: A) Significant investments, consulting arrangements, employer affiliations, grants/contracts, potential financial ties to regulated entities, other stakeholders, and regulatory agencies; B) Work as an expert witness; and/or C) Consulting arrangements, honoraria and sources of grants and contracts.

[124] *See* U.S. Global Change Research Program, Climate Literacy Framework, *A Guide for Individuals and Communities*, USGCRP website (last visited April 4, 2014), available at: http://www.globalchange.gov/resources/educators/climate-literacy.html; U.S. Global Change Research Program, *Climate Literacy: The Essential Principles of Climate Science*, (March 2009), available at: http://cpo.noaa.gov/sites/cpo/Documents/pdf/ClimateLiteracyPoster-8_5x11_Final4-11.pdf (Climate Literacy: The Essential Principles of Climate Science presents information that is deemed important for individuals and communities to know and understand about Earth's climate, impacts of climate change, and approaches to adaptation or mitigation.") *Id*., at inside cover.

[125] *See* "Appendix 1: EPA-TSD Table 1.1 "Core Reference Documents"".

[126] *See e.g.*, U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change* (SAP1.3/CCSP(2008g)), National Oceanic and Atmospheric Administration, National Climatic Data Center (Randall Dole, Martin Hoerling, and Siegfried Schubert (eds.)) (2008), at Sec. 2.5.2, p. 43, available at: http://library.globalchange.gov/sap-1-3-reanalysis-of-historical-climate-data-for-key-atmospheric-features-implications-for-attribution-of-causes-of-observed-change.

[127] *See, e.g.*, U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Trends in Emissions of Ozone-Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure* SAP 2.4/CCSP(2008h),

National Oceanic and Atmospheric Administration, National Climatic Data Center (Ravishankara, A.R., M.J. Kurylo, and C.A. Ennis (eds.)), at Sections 4.3 and 4.3.1, pp. 120, 121, available at: http://downloads.globalchange.gov/sap/sap2-4/sap2-4-final-all.pdf.

[128] *See, e.g.*, U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols* (SAP 3.2/CCSP(2008d)), National Oceanic and Atmospheric Administration, National Climatic Data Center (H. Levy II, D.T. Shindell, A. Gilliland, M.D. Schwarzkopf, L.W. Horowitz, (eds.)), at Sec. 2.1, p. 17, Sec. 2.2, p. 19, Sec. 2.3, p. 20, available at: http://downloads.globalchange.gov/sap/sap3-2/sap3-2-final-report-all.pdf.

[129] *See, e.g.*, U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* (SAP3.3/CCSP(2008i)), Department of Commerce, NOAA's National Climatic Data Center (Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)), at Sec. 3.2.4.3.1, pp. 95, 97, Sec. 3.3.9, p. 106, available at: http://downloads.globalchange.gov/sap/sap3-3/sap3-3-final-all.pdf

[130] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *State of the Climate in 2008*, Bulletin of the Meteorological Society Vol. 90, No. 8 (T.C. Peterson and M.O. Baringer, Eds. 2009), *supra* at Figure 2.33, p. S40, p. S47-S48, S52, S65, S67, S71, S104, S110-S111, S113.

[131] "Under the World Climate Research Programme (WCRP) the Working Group on Coupled Modelling (WGCM) established the Coupled Model Intercomparison Project (CMIP) as a standard experimental protocol for studying the output of coupled atmosphere-ocean general circulation models (AOGCMs). CMIP provides a community-based infrastructure in support of climate model diagnosis, validation, intercomparison, documentation and data access. This framework enables a diverse community of scientists to analyze GCMs in a systematic fashion, a process which serves to facilitate model improvement. Virtually the entire international climate modeling community has participated in this project since its inception in 1995…Coupled atmosphere-ocean general circulation models allow the simulated climate to adjust to changes in climate forcing, such as increasing atmospheric carbon dioxide…The Program for Climate Model Diagnosis and Intercomparison (PCMDI) archives much of the CMIP data and provides other support for CMIP. PCMDI's CMIP effort is funded by the Regional and Global Climate Modeling (RGCM) Program of the Climate and Environmental Sciences Division of the U.S. Department of Energy's Office of Science, Biological and Environmental Research (BER) program… Phase three of CMIP (CMIP3) included 'realistic' scenarios for both past and present climate forcing. The research based on this dataset provided much of the new material underlying the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4)." *See* World Climate Research Programme, CMIP Coupled Model Intercomparison Project, *CMIP - Coupled Model Intercomparison Project – Overview*, available at: http://cmip-pcmdi.llnl.gov/.

[132] Global climate simulations have been derived from the NASA Goddard Institute for Space Studies (GISS) version II' (two prime) model assuming the IPCC Special Report on Emission Scenarios (SRES) A1B 'business as usual' emission scenario." *See* E. Cooter, R.C. Gilliam, A. Gilliland, W.G. Benjey, J. Wall and C. Nolte, *Examining the Impact of Climate Change and Variability of Regional Air Quality Over the United States*, Presented at "Climate Science in Support of Decision-Making", Arlington, VA (Nov. 14-16, 2005), Environmental Protection Agency Exposure Research website, available at: http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=143744&fed_org_id=770&SIType=PR&TIMSType=&showCriteria=0&address=nerl/pubs.html&view=citation&personID=510&role=Author&sortBy=pubDateYear&count=100&dateBeginPublishedPresented=.

[133] "The most recent version of the GISS atmospheric GCM, Model E, resulted from a substantial reworking of the previous version, Model II′. Although model physics has become more complex, execution by the user is simplified as a result of modern software engineering and improved model documentation embedded within the code and accompanying web pages. The model, which can be downloaded from the GISS website by outside users, is designed to run on myriad platforms ranging from laptops to a variety of multiprocessor computers, partly because of NASA's rapidly shifting computing environment. The most recent (post-AR4) version can be run on an arbitrarily large number of processors." *See* SAP3.1/CCSP(2008c), *supra* at Sec. 2.5.3, p. 25.

[134] "The Modern Era-Retrospective Analysis for Research and Applications supports NASA's Earth science objectives, by applying the state-of-the-art GEOS-5 data assimilation system that includes many modern observing systems (such as EOS) in a climate framework. The MERRA project supports NASA's Earth science interests by: [1] utilizing the NASA global data assimilation system to produce a long-term (1979-present) synthesis that places the current suite of research satellite observations in a climate data context[; 2] providing the science and applications communities with state-of-the-art global analyses, with emphasis on improved estimates of the hydrological cycle on a broad range of weather and climate time scales. The MERRA time period covers the modern era of remotely sensed data, from 1979 through the present, and the special focus of the atmospheric assimilation is the hydrological cycle." *See* National Aeronautics and Space Administration, Goddard Flight Center Global Modeling and Assimilation Office, *MERRA: Modern Era-Retrospective Analysis for Research and Applications – Introduction to MERRA*, available at: http://gmao.gsfc.nasa.gov/research/merra/intro.php.

[135] "The new atmospheric models developed at GFDL for global warming studies are referred to as AM2.0 and AM2.1 (GFDL Atmospheric Model Development Team 2004). Key points of departure from previous GFDL models are the adoption of a new

numerical core for solving fluid dynamical equations for the atmosphere, the inclusion of liquid and ice concentrations as prognostic variables, and new parameterizations for moist convection and cloud formation." *See* SAP3.1/CCSP(2008c), *supra* at Sec. 2.5.1, pp. 22-23.

[136] "CCSM3 is a coupled climate model with components representing the atmosphere, ocean, sea ice, and land surface connected by a flux coupler. CCSM3 is designed to produce realistic simulations over a wide range of spatial resolutions, enabling inexpensive simulations lasting several millennia or detailed studies of continental-scale dynamics, variability and climate change…The new CCSM3 version incorporates several significant improvements in physical parameterizations. Enhancements in model physics are designed to reduce several systematic biases in mean climate produced by previous CCSM versions. These enhancements include new treatments of cloud processes, aerosol radiative-forcing, land-atmosphere fluxes, ocean mixed-layer processes, and sea-ice dynamics." *Id*., at Sec. 2.5.2, at pp. 24-25. "The Community Atmosphere Model (CAM) is the latest in a series of global atmosphere models developed at NCAR for the weather and climate research communities. CAM also serves as the atmospheric component of the Community Climate System Model (CCSM). *See* NCAR-UCAR Community Earth System Model, *CESM Models - CCSM3.0 Community Atmosphere Model (CAM)*, available at: http://www.cesm.ucar.edu/models/atm-cam/. "CESM is sponsored by the National Science Foundation (NSF) and the U.S. Department of Energy (DOE). Administration of the CESM is maintained by the Climate and Global Dynamics Division (CGD) at the National Center for Atmospheric Research (NCAR)." *See* NCAR-UCAR Community Earth System Model, *About CESM*, available at: https://www2.cesm.ucar.edu/about.

[137] "The PSU/NCAR mesoscale model (known as MM5) is a limited-area, nonhydrostatic, terrain-following sigma-coordinate model designed to simulate or predict mesoscale atmospheric circulation. The model is supported by several pre- and post-processing programs, which are referred to collectively as the MM5 modeling system. The MM5 modeling system software is mostly written in Fortran, and has been developed at Penn State and NCAR as a community mesoscale model with contributions from users worldwide. The MM5 modeling system software is freely provided and supported by the Mesoscale Prediction Group in the Mesoscale and Microscale Meteorology Division, NCAR." *See* Pennsylvania State University / National Center for Atmospheric Research, *MM5 Community Model*, available at: http://www.mmm.ucar.edu/mm5/mm5-home.html.

[138] "The Weather Research and Forecasting (WRF) Model is a next-generation mesoscale numerical weather prediction system designed to serve both atmospheric research and operational forecasting needs. It features two dynamical cores, a data assimilation system, and a software architecture allowing for parallel computation and system extensibility. The model serves a wide range of meteorological applications across scales ranging from meters to thousands of kilometers…WRF allows researchers the ability to produce simulations reflecting either real data (observations, analyses) or idealized atmospheric conditions. WRF provides operational forecasting a flexible and computationally efficient platform, while offering advances in physics, numerics, and data assimilation contributed by the many research community developers…There are two dynamical core versions of WRF, each with its own web page. The Advanced Research WRF (ARW) is supported to the community by the NCAR Mesoscale and Microscale Meteorology Division: http://www.mmm.ucar.edu/wrf/users. The WRF-NMM (NMM) is supported to the community by the Developmental Testbed Center (DTC): http://www.dtcenter.org/wrf-nmm/users." *See* The Weather Research and Forecasting Model (WRF), *Introduction*, available at: http://www.wrf-model.org/index.php. "The WRF system is in the public domain and is freely available for community use… The Mesoscale and Microscale Meteorology Division of NCAR is currently maintaining and supporting a subset of the overall WRF code (Version 3)." *See WRF Model Users Page*, available at: http://www2.mmm.ucar.edu/wrf/users/. "WRF-NMM was developed by the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Prediction (NCEP)…The NOAA/NCEP and the Developmental Testbed Center (DTC) are currently maintaining and supporting the WRF-NMM portion of the overall WRF code (Version 3)". *See* Development Testbed Center, *WRF-NMM Users Page*, available at: http://www.dtcenter.org/wrf-nmm/users/. "DTC is a distributed facility where the NWP community can test and evaluate new models and techniques for use in research and operations…[The f]undamental [pu]rpose of DTC [is t]o serve as a bridge between research and operations to facilitate the activities of both halves of the NWP [numerical weather prediction] Community." *See* Development Test Best Center, *About DTC*, available at: http://www.dtcenter.org/. "National Oceanic & Atmospheric Administration (NOAA)[,] Air Force Weather Agency (AFWA) [and] National Science Foundation (NSF)" serve as the DTC's sponsors. *Id*.

[139] CAMx is "[a]n open-source modeling system for multi-scale integrated assessment of gaseous and particulate air pollution." See CAMx Ozone, Particulates Toxics, *Home*, available at: http://www.camx.com/home.aspx. "CAMx is an Eulerian photochemical dispersion model that allows for integrated 'one-atmosphere' assessments of gaseous and particulate air pollution (ozone, particulate matter, air toxics) over spatial scales ranging from neighborhoods to continents. It is designed to unify all of the technical features required of 'state-of-the-science' air quality models into a single open-source system that is computationally efficient, flexible, and publicly available. CAMx can be supplied environmental input fields from many meteorological models (specifically WRF, MM5, and RAMS are supported) and emission inputs developed using many emissions processors (SMOKE, CONCEPT, EPS, EMS)." *See* CAMx, *CAMx Overview*, available at: http://www.camx.com/about/default.aspx.

[140] *See MAGICC – The Climate System in a Nutshell*, available at: http://www.magicc.org/. "MAGICC stands for 'Model for the Assessment of Greenhouse Gas Induced Climate Change'. It is a prime reduced-complexity model, often used by IPCC, for key scientific publications and by a number of Integrated Assessment Models." *Id*. "MAGICC was originally developed by Tom Wigley

(National Centre for Atmospheric Research, Boulder, US, and University of Adelaide, Australia) and Sarah Raper (Manchester Metropolitan University, UK) in the late 1980s and continuously developed since then. It has been one of the widely used climate models in various IPCC Assessment Reports. The latest version, MAGICC6, is co-developed by Malte Meinshausen (Potsdam Institute for Climate Impact Research, Germany, and the University of Melbourne, Australia)." *See* MAGICC Wiki, *Model Description*, available at: http://wiki.magicc.org/index.php?title=Model_Description.

[141] "The U.S. Energy Information Administration (EIA) is the statistical and analytical agency within the U.S. Department of Energy. EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment." *See* U.S. Energy Information Administration, *About EIA*, available at: http://www.eia.gov/about/mission_overview.cfm.

[142] "The National Energy Modeling System (NEMS) is a computer-based, energy-economy modeling system of U.S. through 2030. NEMS projects the production, imports, conversion, consumption, and prices of energy, subject to assumptions on macroeconomic and financial factors, world energy markets, resource availability and costs, behavioral and technological choice criteria, cost and performance characteristics of energy technologies, and demographics. NEMS was designed and implemented by the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE)…Energy resources and prices, the demand for specific energy services, and other characteristics of energy markets vary widely across the United States. To address these differences, NEMS is a regional model. The regional disaggregation for each module reflects the availability of data, the regional format typically used to analyze trends in the specific area, geology, and other factors, as well as the regions determined to be the most useful for policy analysis." *See* U.S. Energy Information Administration, *The National Energy Modeling System: An Overview*, available at: http://www.eia.gov/oiaf/aeo/overview/.

[143] "For more than a decade, the U.S. EPA's Community Multi-scale Air Quality (CMAQ) Model has been a powerful computational tool used by EPA and states for air quality management. The National Weather Service uses the model to produce daily U.S. forecasts for ozone air quality. CMAQ is also used by states to assess implementation actions needed to attain National Ambient Air Quality Standards…The CMAQ system includes emission, meteorology, and chemical modeling components…*In addition to air quality research and regulation, the CMAQ system is also being developed to address interactions between air pollutant concentrations and climate forcing* through 2-way coupling between CMAQ and the Weather Research and Forecast (WRF) model. Since its inception, CMAQ has been designed as a modular system able to incorporate data from related models that have alternate mathematical processes. This capability has allowed for inclusion of new science in the model to address increasingly complex air pollution issues. Thus, CMAQ has multi-pollutant capabilities to address diverse air quality issues such as photochemical ozone, airborne particulate matter, acid deposition, nutrient deposition and eutrophication, and air toxics." *See* United States Environmental Protection Agency, Atmospheric Modeling and Analysis Research, *Research In Action - Community Multi-scale Air Quality Model (CMAQ)*, available at: http://www.epa.gov/AMD/Research/RIA/cmaq.html.

[144] Within the EPA Global Change Research Program's "intramural effort, the National Exposure Research Laboratory (NERL) is the primary developer of the Community Multiscale Air Quality (CMAQ) model that predicts air quality pollutant transport and fate (Byun and Schere, 2006). CMAQ, which, as of December 2006, has undergone three external peer reviews, is being used by the Office of Air Quality Planning and Standards (OAQPS) within OAR for current rulemakings, as well as by the research community for a range of research applications including climate and air quality
interactions. Via a partnership between EPA and NOAA, a team at NERL is charged under this assessment with leading the development of a series of regional-scale air quality simulations using CMAQ under current and future climate scenarios. This effort, the Climate Impacts on Regional Air Quality (CIRAQ) project, was initiated in 2002…This team provides the air quality modeling expertise to develop these simulations, to interpret the sensitivity of air quality to the future climate changes simulated, and to consider regulatory implications of potential changes in air quality." *See* United States Environmental Protection Agency, Office of Research & Development Global Change Research Program and National Center for Environmental Assessment, *Assessment of the Impacts of Global Change on Regional U.S. Air Quality: A Synthesis of Climate Change Impacts on Ground-Level Ozone* (EPA/600/R-07/094F) (2009), *supra* at pp. 2-7- 2-8.

[145] "The assessment effort benefits substantially from a strong collaboration with the extramural research community. The EPA's National Center for Environmental Research (NCER), through its competitive Science To Achieve Results (STAR) grants program, funded a number of leading university research groups through the following Requests for Applications (RFAs): • 2000: *Assessing the Consequences of Interactions between Human Activities and a Changing Climate* • 2002: *Assessing the Consequences of Global Change for Air Quality: Sensitivity of U.S. air quality to climate change and future global impacts* • 2003: *Consequences of Global Change for Air Quality: Spatial Patterns in Air Pollution Emissions* • 2004: *Regional Development, Population Trend, and Technology Change Impacts on Future Air Pollution Emissions* • 2005: *Fire, Climate and Air Quality* • 2006: *Consequences of Global Change for Air Quality*. These RFAs… encompass roughly 25 projects, totaling over $20 million, covering topics including projection of population, development, and transportation trends; observations of biosphere-air quality interactions; coupled climate and air quality modeling; and human health effects" *See* United States Environmental Protection Agency, Office of Research & Development Global Change Research Program and National Center for Environmental Assessment, *Assessment of the Impacts of Global Change*

on Regional U.S. Air Quality: A Synthesis of Climate Change Impacts on Ground-Level Ozone (EPA/600/R-07/094F) (2009), *supra* at pp. 2-8-2-9.

[146] For example, twenty-eight (28) professors affiliated with eighteen (18) universities coauthored ten (10) studies for which $900,000 STAR grants had been awarded in-part, in connection with the 2006 *Consequences of Global Change for Air Quality* RFA. *See* United States Environmental Protection Agency Extramural Research, *Research Project Search- Consequences of Global Change For Air Quality*, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/recipients.display/rfa_id/434/records_per_page/ALL. See United States Environmental Protection Agency Extramural Research, *Study the Impact of Global Change on Air Quality Using the Global-Through-Urban Weather Research and Forecast Model with Chemistry - EPA Grant Number: R833376*, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8434/report/0 (Professor Zhang Yang of North Carolina State Univ., was one of three STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Effects of Global Change on the Atmospheric Mercury Burden and Mercury Sequestration Through Changes in Ecosystem Carbon Pools - EPA Grant Number: R833378*, at Abstract available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8435/report/0 (Professors Dale Johnson and Steve Lindberg of Univ. of Nevada and Yiai Luo of Univ. of Oklahoma were three of four STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Global Change and Air Pollution (GCAP) Phase 2: Implications for U.S. Air Quality and Mercury Deposition of Multiple Climate and Global Emission Scenarios for 2000-2050 - EPA Grant Number: R833370*, at Abstract, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8431/report/0 (Professors Daniel Jacob and Loretta Mickley of Harvard Univ., Daeowon Byun of Univ. of Houston, Joshua Fu of Univ. of Tennessee and John Seinfeld of Calif. Inst. of Technology were five of seven STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Impacts of Global Climate and Emissions Changes on U.S. Air Quality (Ozone, Particulate Matter, Mercury) and Projection Uncertainty - EPA Grant Number: R833373*, at Abstract, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8433/report/0 (Professors Zin-Zhong Liang, Hao He and Sue Senjian of Univ. of Maryland, and Michael Coughey, Kenneth Kunkel, Hang Lei, Allen Williams and Donal Weubbles of Univ. of Illinois Urbana-Champaign were the sole STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Impact of Global Change on Urban Air Quality via Changes in Mobile Source Emissions, Background Concentrations, and Regional Scale Meteorological Feedbacks - EPA Grant Number: R833372*, at Abstract, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8432/report/0 (Professors Michael Kleeman and Shu-Hwa Chen of Univ. of Calif., Davis and James Schauer of Univ. of Wisconsin were the sole STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Changes in Climate, Pollutant Emissions, and US Air Quality: An Integrating Modeling Study - EPA Grant Number: R833374*, at Abstract, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8436/report/0 (Professors Peter Adams and Spyros Pandis of Carnegie Mellon Univ. were the sole STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Sensitivity of Heterogeneous Atmospheric Mercury Processes to Climate Change - EPA Grant Number: R833375*, at Abstract, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8428/report/0 (Professors James Schauer, Tracey Holloway and Martin Shafer of Univ. of Wisconsin and Robert Griffin of Univ. of New Hampshire were the sole four STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Impact of Climate Change on Air Quality in the U.S.: Investigations With Linked Global- and Regional-Scale Models - EPA Grant Number: R833377*, at Abstract, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8355/report/0 (Professors Sanford Sillman, Gerald Keeler and Joyce Penner of Univ. of Michigan were the sole STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Effects of Future Emissions and a Changed Climate on Urban Air Quality - EPA Grant Number: R833371*, at Abstract, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8429/report/0 (Professor Mark Jacobson of Stanford Univ. was one of two STAR grant award recipients); United States Environmental Protection Agency Extramural Research, *Ensemble Analyses of the Impact and Uncertainties of Global Change on Regional Air Quality in the U.S. - EPA Grant Number: R833369*, at Abstract, available at: http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8437/report/0 (Professors Brian Lamb of Washington State Univ., Clifford Mass and Eric Salathe of Univ. of Washington and David Theobold of Colorado State Univ. were four of five of seven STAR grant award recipients).

[147] *See Memorandum of Understanding (MOU) Between the World Meteorological Organization (WMO) and the US Department of Commerce National Oceanic and Atmospheric Administration (NOAA)* (Jan. 18, 2008), available at: http://www.reginfo.gov/public/do/DownloadDocument?documentID=293181&version=1 ("WMO and NOAA "Agree to cooperate

and coordinate activities and programs in meteorology, hydrology and climate science. The broad objective of the cooperation is to allow the exchange of scientific resources, personnel and technical knowledge to support the improvement or development of meteorological or hydrological services for the benefit of the United States and other Members of the WMO…") *Id*., at p. 1.

[148] *See Memorandum of Understanding Between the United Nations Environment Programme and The Environmental Protection Agency of the United States of America* (Feb. 21, 2011), available at: http://www2.epa.gov/sites/production/files/2014-05/documents/epaunepmou.pdf ("1. Cooperative activities engaged in pursuant to this Memorandum may involve collaboration in the following areas, among others, as further elaborated by the Participants in accordance with this Memorandum: […] d. Responding to Global Challenges- Participants intend to build on existing cooperation to promote short- and long-term strategies to mitigate greenhouse-gas emissions; reduce climate forcers […] IV. Responding to Global Challenges - Participants intend to build on existing cooperation to promote short- and long-term strategies to mitigate green house gas emissions; reduce climate forcers […] Participants may explore opportunities for further cooperation in the following areas: […] (2) Climate adaptation technology (green infrastructure/green buildings) […] (8) support countries' move toward climate resilient and low carbon growth especially through clean technology (e.g. ozone and energy efficiency linkages; methane; appliance upgrades; biofuels; solar water heaters; and transport and fuel efficiency) [...] V. Providing Scientific Leadership – […] Climate science - black carbon") *Id*., at Sections I.d; IV.

[149] *See* United States Department of Commerce National Oceanic and Atmospheric Administration, Air Resources Laboratory News, *NOAA-EPA MOU on Air Quality Research* (April 10, 2003), *supra*.

[150] *See* United States Department of Commerce National Oceanic and Atmospheric Administration, Air Resources Laboratory News, *MOU Signed with EPA* (May 9, 2003), *supra*.

[151] *See Memorandum of Understanding between the U.S. Department of Energy and the National Oceanic and Atmospheric Administration for High Performance Computing* (Sept. 8, 2008), available at: http://science.energy.gov/~/media/_/pdf/news/in-focus/2008/Document.pdf.

[152] *See Memorandum of Understanding Between the U.S. Department of the Interior and the U.S. Department of Commerce to Coordinate and Cooperate in Climate-Related Activities Involving Science, Services, Mitigation, Adaptation, Educations and Communication* (July 30, 2010), available at: http://www.noaa.gov/climateresources/resources/doidocclimatemoufinal.pdf. "This Memorandum of Understanding (MOU) will enable the seamless coordination of: DOl's climate change impact science and resource-related land, water, wildlife, fish, marine, and tribal and cultural adaptive resource management expertise[;] DOC/NOAA's climate science, climate modeling at appropriate scales, and coastal, marine, and hydrologic expertise to support resource management and resource protection[;] and DOl and DOC's mutual data stewardship responsibilities, and monitoring, assessment, and communication expertise." *Id*., at p. 2.

[153] *See Memorandum of Agreement Between the U.S. Department of Commerce National Oceanic and Atmospheric Administration and the U.S. Environmental Protection Agency* (April 8, 2011), available at: http://water.epa.gov/type/oceb/nep/upload/2011epa_noaa_moa-signed.pdf ("I.B The purpose of this Agreement is to strengthen cooperation and communication and enhance our efforts and capabilities in a coordinated and focused manner, including the sharing of resources, tools and information, to assist regional government entities, States, Tribes, territories, and local governments in becoming sustainable and resilient coastal and waterfront communities, protecting healthy coastal ecosystems, restoring degraded coastal ecosystems *and adapting to climate change*" (emphasis added). *Id*., at Section I.B.

[154] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences* (SAP1.1/CCSP(2006), National Oceanic and Atmospheric Administration, National Climatic Data Center (Thomas R. Karl, Susan J. Hassol, Christopher D. Miller, and William L. Murray, editors, 2006), *supra* at pp. ii, Appendix A, p. 53.

[155] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change* (SAP1.3/CCSP(2008g)), National Oceanic and Atmospheric Administration, National Climatic Data Center (Randall Dole, Martin Hoerling, and Siegfried Schubert (eds.)) (2008), *supra* at p. ii. *See also* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols* (SAP 3.2/CCSP(2008d)), Department of Commerce, NOAA's National Climatic Data Center (H. Levy II, D.T. Shindell, A. Gilliland, M.D. Schwarzkopf, L.W. Horowitz, (eds.)), *supra* at p. ii; U.S. Department of Commerce National Oceanographic Administration, *Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking*, (SAP5.2/CCSP(2009)) (M. Granger Morgan (Lead Author), Hadi Dowlatabadi, Max Henrion, David Keith, Robert Lempert, Sandra McBride, Mitchell Small, and Thomas Wilbanks (Contributing Authors)), *supra* at p. ii.

[156] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Trends in Emissions of Ozone-Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure* SAP 2.4/CCSP(2008h), National Oceanic and Atmospheric Administration, National Climatic Data Center (Ravishankara, A.R., M.J. Kurylo, and C.A. Ennis (eds.)), *supra* at p. ii.

[157] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* (SAP3.3/CCSP(2008i)), Department of Commerce, NOAA's National Climatic Data Center (Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)), *supra* at p. ii.

[158] *See* U.S. Department of Commerce National Oceanographic Administration, *Decision Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data: A Focus on Water Resources*, (SAP5.3/CCSP(2008)) (Nancy Beller-Simms, Helen Ingram, David Feldman, Nathan Mantua, Katharine L. Jacobs, and Anne M. Waple (eds.)), *supra* at p. ii.

[159] *See* National Research Council, *Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties* (National Academies Press, Wash., DC 2005), at p. ii, available at: http://www.nap.edu/catalog.php?record_id=11175.

[160] *See* National Research Council, *Mitigating Shore Erosion along Sheltered Coasts* (National Academies Press, Wash., DC 2007), at p. ii, available at: file:///C:/Users/L%20Kogan/Downloads/11764%20(1).pdf.

[161] The Economy Act (31 U.S.C. §1535), which established "the first government-wide statutory authorization for federal agencies to provide work, services, or materials to other federal agencies on a [contractual and] reimbursable basis", generally presumes interagency redelegations are invalid. Act of June 30, 1932, ch. 314, 47 Stat. 382; 31 U.S.C. §1535(d). Although the Economy Act is silent on the issue of redelegation, it "does not give a performing agency any authority which it would not otherwise have". GAO OGC Fed'l Appropriations Law, 3rd Ed., Vol. III, p. 12-28, citing Comp. Gen. 262, 266 (1938). The Comptroller General has permitted interagency redelegations, provided "the ordering agency retains control over the redelegated tasks which must not involve significant decision-making authority or an agency's primary administrative functions". *See* Jason Marisam, *The Interagency Marketplace*, 96 Minn. Law Review 886, 901, 908 (2012), available at: http://www.minnesotalawreview.org/wp-content/uploads/2012/05/Marisam_MLR.pdf (citing B-163758, 1971 WL 7556 (Comp. Gen. May 6, 1971)). *See also* U.S. Department of Commerce, *Economy Act Agreements for Purchasing Goods or Services – Model Economy Act Agreement*, available at: http://www.gc.noaa.gov/documents/mou-economyact.pdf.

[162] *See* U.S. Department of Commerce Office of General Counsel, *Model Agreements*, available at: http://www.commerce.gov/os/ogc/model-agreements; U.S. Department of Commerce, *Department of Commerce Supplemental Information and Instructions for the Government-Wide Standard Interagency Agreement Form* (Jan. 2011), available at: http://www.nws.noaa.gov/cfo/budget_execution_accountability/reimbursable/docs/DOC%20Standard%20IAA%20Supplemental%20Instructions%202011%2001%2019.pdf; U.S. Department of Commerce Agreements Handbook (Nov. 2011) at pp. 10-15, available at: http://www.nist.gov/director/raco/upload/Final-DOC-Agreements-Handbook-Nov-2011.pdf.

[163] *See* Treasury and General Government Appropriations Act for Fiscal Year 2001, Pub. L. No. 106-554, 114 Stat. 2763, 2763A-153-154 (2000), §515, codified at 44 U.S.C. § 3516 note, *supra*.

[164] *Id.*, at Sec. 515(a). "The Director of the Office of Management and Budget *shall*, by not later than September 30, 2001, and with public and Federal agency involvement, issue guidelines under sections 3504(d)(1) and 3516 of title 44, United States Code, that provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies in fulfillment of the purposes and provisions of chapter 35 of title 44, United States Code [44 USCS § § 3501 et seq.], commonly referred to as the Paperwork Reduction Act" (emphasis added). *Id*.

[165] *Id*., at Sec. 515(b)(1).

[166] *Id*., at Sec. 515(b)(2)(A).

[167] *See* Office of Management and Budget, Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies ("OMB IQA Guidelines") 67 FR 8452 (Feb. 22, 2002), *supra*. *See also* Office of Management and Budget, *Final Information Quality Bulletin for Peer Review* ("OMB-PRB") (Dec. 16, 2004), available at: http://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2005/m05-03.pdf.

[168] "[T]he term 'scientific assessment' means an evaluation of a body of scientific or technical knowledge, which typically synthesizes multiple factual inputs, data, models, assumptions, and/or applies best professional judgment to bridge uncertainties in the available information. These assessments include, but are not limited to, state-of-science reports; technology assessments; weight-of-evidence analyses; meta-analyses; health, safety, or ecological risk assessments; toxicological characterizations of substances; integrated assessment models; hazard determinations; or exposure assessments." OMB-PRB, *supra*, at Sec. 1.7, pp. 36-37.

[169] *See* Office of Management and Budget, *Final Information Quality Bulletin for Peer Review* ("OMB-PRB") (Dec. 16, 2004) *supra*.

[170] *See* Office of Management and Budget, *Proposed Bulletin on Peer Review and Information Quality - Notice and request for comments*, 68 FR 54023 (Sept. 15, 2003), available at: http://www.gpo.gov/fdsys/pkg/FR-2003-09-15/pdf/03-23367.pdf ("OMB requests comments on a proposed bulletin under Executive Order No. 12866 and supplemental information quality guidelines. As part of an ongoing effort to improve the quality, objectivity, utility, and integrity of information disseminated by the Federal Government to the public, the Office of Management and Budget (OMB), in coordination with the Office of Science and Technology Policy (OSTP), proposes to issue *new guidance to realize the benefits of meaningful peer review of the most important science disseminated by the Federal Government regarding regulatory topics. The proposed bulletin would be issued under the authority of Section 515* of

the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658); 44 U.S.C. 3504(d)(1), 3506(a)(1)(B); Executive Order No. 12866, as amended" (emphasis added). Id., at 54023-54024.

[171] OMB had, once, again, complied with Congress' intent, as expressed in IQA Section 515(a), that it develop guidelines "with *public* and Federal agency involvement" (emphasis added) by seeking public comments on proposed guidelines that were subsequently incorporated into the final IQA guidelines.

[172] *Id.*, at Sec. I.5.

[173] *Id*., at Preamble, Sections I, p. 11, II, p. 12; Sec. I.6, p. 36. *See also* OMB IQA Guidelines at Sec. V.9, 67 FR 8452, 8460.

[174] *Id*., at Preamble, pp. 2, 11.

[175] *Id*., at Preamble, p. 11; Sec. I.7, pp. 36-37.

[176] *See* OMB-PRB, *supra* at §III.1.

[177] *See* Office of Management and Budget, *Final Information Quality Bulletin for Peer Review* ("OMB-PRB") (Dec. 16, 2004), *supra* at Preamble, Sec. III, p. 23, Sec. III.1, p. 39.

[178] "To the extent permitted by law, each agency *shall* conduct peer reviews on all information subject to this Section. The peer reviews shall satisfy the requirements of Section II of this Bulletin, *as well as the additional requirements found in this Section*" (emphasis added). *Id.*, at Sec. III.2, p. 39. (particularly, Preamble, pp. 23-26; Sections I-VII). "Section III requires a more rigorous form of peer review for highly influential scientific assessments…If information is covered by Section III, an agency is required to adhere to the peer review procedures specified in Section III" (emphasis added). *Id*., at Preamble, Sec. III, p. 23.

[179] *See* Office of Management and Budget, *Proposed Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies – [Notice and Request for Comment]*, 66 FR 34489 (June 28, 2001), available at: http://www.gpo.gov/fdsys/pkg/FR-2001-06-28/pdf/01-16227.pdf ("This notice requests comment on proposed guidelines for implementing Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554). Section 515 directs the Office of Management and Budget (OMB) to issue government-wide guidelines that 'provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies.'"). *Id*.

[180] "Influential scientific information (ISI) means scientific information the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or private sector decisions." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Information Officer & High Performance Computing and Communications, *National Oceanic and Atmospheric Administration Information Quality Guidelines* ("NOAA IQA Guidelines"), *supra* at "Part I – Background, NOAA Information, Definitions and Scope - Definitions." "A clear and substantial impact is one that has a high probability of occurring. If it is merely arguable or a judgment call, then it would probably not be clear and substantial. The impact must be on a policy or decision that is in fact expected to occur, and there must be a link between the information and the impact that is expected to occur." *Id*., at "Part II – Information Quality Standards and Pre-Dissemination Review – Objectivity." "The three key phrases, which managers must weigh in on, are whether or not there is a '**clear and substantial impact**,' and this impact has a '**high probability of occurring**', on '**important public policies or private sector decision making**.' It should also be kept in mind that these evaluated impacts may be regionally dependent in nature. If "yes" can be answered for each phrase, then it is ISI. *An informal addition by the NOAA Information Quality Contacts Group to "public policies or private sector decision-making" is 'strategic management processes'*". *Id*., at "Appendix: Additional ISI Guidance and Examples - Additional guidance for determining whether NOAA data meet the criteria for ISI". "The term highly influential scientific assessment (HISA) means influential scientific information that the agency or the Administrator of the Office of Information and Regulatory Affairs in the Office of Management and Budget determines to be a scientific assessment that: (i) could have a potential impact of more than $500 million in any year, or (ii) is novel, controversial, or precedent‐setting or has significant interagency interest." *Id*., at "Part I – Background, NOAA Information, Definitions and Scope - Definitions."

[181] *See* Office of Management and Budget, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies* ("OMB IQA Guidelines") 67 FR 8452 (Feb. 22, 2002), *supra* at Sec. III.2, p. 8459.

[182] *Id*., at Sec. V.3.b.

[183] *Id*., at Sec. V.3.b.i.

[184] *Id*., at Sec. V.3.b.ii, p. 8460.

[185] *Id*., at Sec. V.3.b.ii.A.

[186] *Id*., at Sec. V.3.b.ii.B.

[187] *Id*., at Sec. V.3.b.ii.B.i.

[188] *Id.*, at Sec. V.3.b.ii.B.ii.

[189] *See* Office of Management and Budget, *Final Information Quality Bulletin for Peer Review* ("OMB-PRB") (Dec. 16, 2004), *supra* at Preamble, p. 3.

[190] *Id*., at pp. 3-4.

[191] *See* OMB-PRB, *supra* at Sec. II.5.

[192] *Id*., at Sec. III.4.
[193] *Id*., at Sec. III.5.
[194] *Id*., at Sec. III.6.
[195] *Id*., at Sec. III.3.a.
[196] *Id.*, at Preamble describing Section III.3b, p. 24.
[197] *Id*., at Sec. III.3.b.
[198] *Id*.
[199] *Id*., at Preamble describing Section III.3.c, p. 24. "Special Government Employees", however, such as academics appointed to an advisory committee, may serve as peer reviewers. *Id.* The apparent reasoning behind this exception is as follows: "A special Government employee (SGE) is a Government employee. More specifically, an SGE is an officer or employee who is retained, designated, appointed, or employed to perform temporary duties, with or without compensation, for not more than 130 days during any period of 365 days. *Individuals who serve on advisory committees as SGEs are appointed to a committee to exercise their own individual best judgment on behalf of the Government. It is expected that SGEs will discuss and deliberate in a manner that is free from conflicts of interest*" (emphasis added). *See* United States Office of Government Ethics, *Advisory Committee Members*, available at: http://www.oge.gov/Topics/Selected-Employee-Categories/Advisory-Committee-Members/.
[200] *Id*.
[201] *Id*.
[202] *Id*.
[203]*See* OMB-PRB, at Section III.3c.
[204] *Id*., at p. 25. "We also considered whether a reviewer can be independent of the agency if that reviewer receives a substantial amount of research funding from the agency sponsoring the review. Research grants that were awarded to the scientist based on investigator-initiated, competitive, peer-reviewed proposals do not generally raise issues of independence. However, significant consulting and contractual relationships with the agency may raise issues of independence or conflict, depending upon the situation." *Id*.
[205] *See* National Institutes of Health, *Grants and Funding - Glossary & Acronym List*, available at: http://grants.nih.gov/grants/glossary.htm.
[206] *See* Section V.2 discussion, *infra*.
[207] *Id*., at Sec. III.2 ("The peer reviews shall satisfy the requirements of Section II of this Bulletin, as well as the additional requirements found in this Section.").
[208] *Id*., at Sec. II.3.c.
[209] *Id*., at Sec. III.3.d.
[210] *Id*., at Sec. III.3.c. ("In addition to the requirements of Section II (3)(c), which shall apply to all reviews conducted under Section III…") *Id*.
[211] "*The only exception to this bar* would be the rare case where the agency determines, using the criteria developed by NAS for evaluating use of 'employees of sponsors,' that a premier government scientist is (a) not in a position of management or policy responsibility and (b) possesses essential expertise that cannot be obtained elsewhere. Furthermore, to be eligible for this exception, the scientist must be employed by a different agency of the Cabinet-level department than the agency that is disseminating the scientific information. The agency's determination shall be documented in writing and approved, on a non-delegable basis, by the Secretary or Deputy Secretary of the department prior to the scientist's appointment" (emphasis added). *Id.*
[212] *See* OMB-PRB, at Preamble, p. 31, Section VII, p. 43.
[213] *See* Office of Management and Budget, *Final Information Quality Bulletin for Peer Review* ("OMB Peer Review Bulletin" or OMB-PRB") (Dec. 16, 2004) *supra* at Preamble, p. 9.
[214] "[T]he Bulletin does not directly cover information supplied to the government by third parties (e.g., studies by private consultants, companies and private, non-profit organizations, or research institutions such as universities). However, if an agency plans to disseminate information supplied by a third party (e.g., using this information as the basis for an agency's factual determination that a particular behavior causes a disease), the requirements of the Bulletin apply, if the dissemination is 'influential'". *Id*.
[215] *See* OMB-PRB, *supra* at Preamble (discussing Sec. IV – "Alternative Procedures"), at p. 28.
[216] *See* Public Law 106-554, §515(b)(2)(B), codified in 44U.S.C. §3516, note, *supra*; OMB IQA Guidelines, *supra* at Sec. III.3; OMB-PRB, *supra* at Sec. V.3.
[217] *See* Office of Management and Budget, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies* ("OMB IQA Guidelines") 67 FR 8452, 8459 (Feb. 22, 2002), *supra*.
[218] "Agencies *shall specify* appropriate time periods for agency decisions on whether and how to correct the information, and agencies *shall notify* the affected persons of the corrections made" (emphasis added). *Id.*, at Sec. III.3.i.
[219] "If the person who requested the correction does not agree with the agency's decision (including the corrective action, if any), the person may file for reconsideration within the agency. The agency *shall establish* an administrative appeal process to review the

agency's initial decision, *and specify* appropriate time limits in which to resolve such requests for reconsideration" (emphasis added). *Id*., at Sec. III.3.ii.

[220] In the interest of maintaining uniformity of federal agency IQA-related administrative practices, OMB subsequently determined that agencies should generally respond to IQA complaints *and* appeals *within sixty (60) calendar days*. "As OMB in its Guidelines did not establish any particular timetable, but left that to the agencies to determine, the agencies in their draft guidelines have included a variety of time periods. However, having reviewed the agencies' draft guidelines, OMB now believes that a *uniform response* period is preferable if practical. Unless there are important reasons for a different time period, agency procedures should provide for *a written response by the agency to complaints and appeals within 60 calendar days*. If the complaint or appeal requires more time to resolve, the agency should so notify the complainant within that period that more time is required, the reasons for delay, and an estimated decision date" (emphasis added). *See* Office of Management and Budget, Administrator, Office of Information and Regulatory Affairs ("OIRA"), *Memorandum, Information Quality Guidelines – Principles and Model Language* (Sept. 5, 2002), at Preamble, pp. 1-2, available at: http://www.whitehouse.gov/sites/default/files/omb/assets/omb/inforeg/pmcmemo.pdf.

[221] *Id.*, at Sec. V.8.

[222] *See* discussion, *infra*.

[223] "As a matter of good and effective agency information resources management, *agencies shall develop a process for reviewing the quality* (including the objectivity, utility, and integrity) of information *before it is disseminated*. Agencies shall treat information quality as integral to every step of an agency's development of information, including creation, collection, maintenance, and dissemination. This process shall enable the agency to substantiate the quality of the information it has disseminated through documentation or other means appropriate to the information" (emphasis added). *Id*., at Sec. III.2.

[224] "The term 'dissemination' also excludes information distributed for peer review in compliance with this Bulletin, provided that the distributing agency includes a clear disclaimer on the information as follows: 'THIS INFORMATION IS DISTRIBUTED SOLELY FOR THE PURPOSE OF PRE-DISSEMINATION PEER REVIEW UNDER APPLICABLE INFORMATION QUALITY GUIDELINES. IT HAS NOT BEEN FORMALLY DISSEMINATED BY [THE AGENCY]. IT DOES NOT REPRESENT AND SHOULD NOT BE CONSTRUED TO REPRESENT ANY AGENCY DETERMINATION OR POLICY'." *See* Office of Management and Budget, *Final Information Quality Bulletin for Peer Review* ("OMB-PRB") (Dec. 16, 2004), at Sec. I.3, pp. 35-36.

[225] "Accordingly, under this Bulletin, 'dissemination' also excludes information distributed for peer review in compliance with this Bulletin or shared confidentially with scientific colleagues, provided that the distributing agency includes an appropriate and clear disclaimer on the information, as explained more fully below…In cases where a draft report or other information is released by an agency *solely for purposes of peer review*, a question may arise as to whether the draft report constitutes an official 'dissemination' under information-quality guidelines. Section I instructs agencies to make this clear by presenting the following disclaimer in the report: 'THIS INFORMATION IS DISTRIBUTED SOLELY FOR THE PURPOSE OF PRE-DISSEMINATION PEER REVIEW UNDER APPLICABLE INFORMATION QUALITY GUIDELINES. IT HAS NOT BEEN FORMALLY DISSEMINATED BY [THE AGENCY]. IT DOES NOT REPRESENT AND SHOULD NOT BE CONSTRUED TO REPRESENT ANY AGENCY DETERMINATION OR POLICY.'" *Id*., at Preamble, pp. 8-9.

[226] The record appears to reflect that authors of each of these HISAs subsequently considered and incorporated the public comments received into the final HISA versions the agencies ultimately disseminated to the public. However, this is not clear in the case of the peer review of NCA2-2009 and SOC-2008.

[227] *See* United States Environmental Protection Agency, *Technical Support Document for Endangerment Analysis for Greenhouse Gas Emissions under the Clean Air Act; Sixth Order Draft June 21, 2008) - EPA-HQ-OAR-2008-0318-0082* (July 14, 2008), at Table 1.1, p. 4, available at: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2008-0318-0082.

[228] *See* United States Environmental Protection Agency, *Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act – Proposed rule*, 74 FR 18886 (April 24, 2009), available at: http://www.epa.gov/climatechange/Downloads/endangerment/EPA-HQ-OAR-2009-0171-0001.pdf.

[229] *See* Office of Management and Budget, Administrator, Office of Information and Regulatory Affairs ("OIRA"), *Memorandum, Information Quality Guidelines – Principles and Model Language* (Sept. 5, 2002), at p. 2, available at: http://www.whitehouse.gov/sites/default/files/omb/assets/omb/inforeg/pmcmemo.pdf.

[230] *Id*.

[231] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Information Officer & High Performance Computing and Communications, *National Oceanic and Atmospheric Administration Information Quality Guidelines* ("NOAA IQA Guidelines"), *supra*.

[232] *Id*., at *Part I: Background, NOAA Information, Definitions, and Scope - Information Disseminated by NOAA and Covered by these Guidelines*: Clarification.

[233] *Id*., at *Part II: Information Quality Standards and Pre-Dissemination Review - Peer Review of Influential Scientific Information*.

[234] *Id*., at *Part I: Background, NOAA Information, Definitions, and Scope – Definitions – Dissemination.*

[235] *Id*., at *Part I: Background, NOAA Information, Definitions, and Scope – Definitions - Agency Initiated Distribution of Information to the Public.*
[236] *Id*.
[237] *Id*., at *Part I: Background, NOAA Information, Definitions, and Scope – Definitions - Information Disseminated by NOAA and Covered by these Guidelines.*
[238] *Id*.
[239] *Id*., at *Part II: Information Quality Standards and Pre-Dissemination Review – Third Party Information.*
[240] *Id*., at *Part II: Information Quality Standards and Pre-Dissemination Review – Objectivity Standards for Specific Information Categories – B. Synthesized Products.*
[241] *Id*. To this end, the use of "data of known quality or from sources acceptable to the relevant scientific and technical communities" is recommended, as is the use of "methods that are either published in standard methods manuals, documented in accessible formats […] or generally accepted by the relevant scientific and technical communities." *Id*. While unique or irregularly produced synthesized products must, themselves, be internally or externally reviewed, the processes for developing regularly produced synthesized products must be subject to internal or external peer review. *Id*.
[242] *Id*., at *Part II: Information Quality Standards and Pre-Dissemination Review – Objectivity Standards for Specific Information Categories – C. Interpreted Products.*
[243] *Id*. To this end, the use of "methods that are documented in accessible formats by the disseminating office or generally accepted by the relevant scientific and technical communities" is recommended, as is [a]dditional information that demonstrates the quality and limitations of the interpreted products." *Id*.
[244] *Id*.
[245] *Id*., at *Part II: Information Quality Standards and Pre-Dissemination Review – Objectivity – Peer Review of Influential Scientific Information.*
[246] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Information Officer & High Performance Computing and Communications, *National Oceanic and Atmospheric Administration Policy on Conflicts of Interest For Peer Review Subject to OMB's Peer Review Bulletin* ("NOAA PRB-COI"), *supra*. "The individual, the other peer reviewers, and NOAA should not be placed in a situation where the findings and conclusions of a review could be reasonably questioned, and perhaps discounted or dismissed, simply because of the existence of conflicting interests." *Id*., at *General Principles*.
[247] *Id*., at *Conflict of Interest Policy*.
[248] *Id*.
[249] *Id*.
[250] *Id*.
[251] *Id*.
[252] *Id*.
[253] *Id*.
[254] *Id*., at *Implementation of this Conflict of Interest Policy*.
[255] *Id*.
[256] *Id*.
[257] *Id*.
[258] *Id*.
[259] *Id*.
[260] *Id*.
[261] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Information Officer & High Performance Computing and Communications, *National Oceanic and Atmospheric Administration Information Quality Guidelines* ("NOAA IQA Guidelines"), *supra* at Part III, Sec. A.1.
[262] *Id*., at Part III, Sec. A.4.
[263] *Id*., at Part III, Sec. B.1-2.
[264] *Id*., at Part III, Sec. B.3-4.
[265] *Id*., at Part III, Sec. B.6.
[266] *See* Appendix 2B: "U.S. Government-Employed Scientists Author-Contributors/Reviewers IPCC-AR3-WGI/WGII," *infra*.
[267] *See* Appendix 2A: "U.S. Government-Employed Scientists Author-Contributors/Reviewers IPCC-AR4-WGI/WGII," *infra*.
[268] *See* Appendix 14: "IPCC Assessments Referenced in NOAA Assessments," *infra*.
[269] *See* InterAcademy Council, *Climate Change Assessments Review of the Processes and Procedures of the IPCC* ("IAC-2010 Report") (10/1/10), available at: http://www.interacademycouncil.net/24026/26050.aspx.

[270] *See*, IAC-2010 Report, *supra* at iii, 59-65. The report found that, although "the IPCC has heightened public awareness of climate change, raised the level of scientific debate, and influenced the science agendas of many nations…*some fundamental changes to the process and the management structure are essentia*l" (emphasis added). *Id*., at 59.
[271] *See* IAC-2010 Report, *supra* at xiii-xiv, 16-17, Box 2.1, 22.
[272] IAC-2010 Report at 16, citing the findings of Bjurström, A., and M. Polk, *Physical and Economic Bias in Climate Change Research: A Scientometric Study of IPCC Third Assessment Report*, Climatic Change (2010), §3.2, available at: http://gaia.jhuapl.edu/sites/default/files/Bjurstrom_IPCC_bias.pdf. These authors estimate that AR4 reflects roughly similar rates of reliance upon non-peer-reviewed "gray" literature. *See* Roger Pielke Jr., Blog, *Gray Literature in the IPCC TAR, A Guest Post by Andreas Bjurström* (3/5/10) available at: http://rogerpielkejr.blogspot.com/2010/03/gray-literature-in-ipcc-tar-guest-post.html.
[273] *See* IPCC (2001), *Climate Change 2001: Mitigation, A Report of Working Group III of the Intergovernmental Panel on Climate Change* ("IPCC AR3 WG-III Report"), at §10.4.2.2, available at: http://www.ipcc.ch/ipccreports/tar/wg3/index.php?idp=437; IPCC (2007) *Climate Change 2007 - Mitigation of Climate Change, Contribution of Working Group III to the Fourth Assessment Report of the IPCC*, B. Metz, eds., Cambridge University Press ("IPCC AR4 WG-III Report"), available at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4_wg3_full_report.pdf.
[274] *See* United States Environmental Protection Agency, Office of Atmospheric Programs, Climate Change Division, *EPA's Response to the Petitions to Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act* (July 29, 2010), at Comments/Responses 2-17, 2-19 ("EPA-RTPs, Vol.2"), available at: http://digital.library.unt.edu/ark:/67531/metadc29357/; http://www.epa.gov/climatechange/endangerment/petitions/volume2.html.
[275] *See* IAC-2010 Report, *supra* at 44. Indeed, the WMO Secretary-General and UNEP Executive Director signed the Forewords to the AR3 and AR4 assessments. *See* IPCC (2001), *Climate Change 2001: The Scientific Basis, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, Foreword, M. Noguer, et al., (Cambridge University Press), available at: http://www.grida.no/climate/ipcc_tar/wg1/pdf/WG1_TAR-FRONT.pdf; IPCC (2007), *Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, at Foreword (Solomon, S., et al., eds.), Cambridge University Press, available at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-frontmatter.pdf.
[276] *See* IAC-2010 Report, *supra* at 52-53.
[277] *Id*., p. 52.
[278] *Id*.
[279] *Id*.
[280] *Id*., at p. 53.
[281] *See* EPA-RTPs Vol. 2, *supra* at Comments/Responses 2-25, 2-30.
[282] *See* IAC-2010 Report, *supra* at 14-15.
[283] *Id*., at pp. 54-55.
[284] *See* EPA-RTPs Vol. 2, *supra* at Comments/Responses 2-17, 2-18, 2-25.
[285] *See* United States Environmental Protection Agency, *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act: EPA's Response to Public Comments, Volume 1: General Approach to the Science and Other Technical Issues* ("EPA-RTCs Vol. 1") (April 17, 2009), *supra* at Responses 1-14-to-1-15, 1-20.
[286] "[T]he United Nations Secretary-General and the Chair of the Intergovernmental Panel on Climate Change (IPCC) [had asked]…the IAC…to establish an ad hoc review committee of experts from relevant fields to conduct the review and to present recommendations on possible revisions of IPCC processes and procedures for strengthening the capacity of IPCC to respond to future challenges and ensuring the ongoing quality of its reports." *Id*., at Foreword, p.3. *See also Id*., at "Committee to Review the Intergovernmental Panel on Climate Change", p. vi; "Appendix E - Committee biographies", at pp. 99-102.
[287] *See* IAC Report, *supra* at Executive Summary at pp. xii, 59.
[288] For example, Princeton Univ. participates in two of NOAA's Cooperative Institutes Programs ((CICS-M) and (CICS-P)), NOAA's NIDIS Program, and NOAA's NJ Sea Grant Program. The Univ. of Maryland participates in two of NOAA's Cooperative Institutes Programs ((CICS-M) and (CINAR)), NOAA's COCA Program, NOAA's Sea Grant Program, and Howard Univ.'s (NCAS) Program with NOAA. UC Irvine participates in one of NOAA's Cooperative Institutes Programs ((CICS-M)), while Scripps Institution of Oceanography participates in one of NOAA's Cooperative Institutes Programs ((CIMEC)) and in one of NOAA's RISA Programs ((CNAP)).
[289] *See, e.g.*, National Oceanic and Atmospheric Administration National Weather Service, *Aviation Quality Management System - Quality Management System: 1, 2, 3* (March 2012), available at: http://www.nws.noaa.gov/om/aviation/qms/12mar-qms.pdf (referring to the ISO 90012:2008—Quality Management System, and referring to various records requirements, *inter alia* "[d]esign and [d]evelopment [v]erification," "[d]esign and [d]evelopment [v]alidation," and "[v]alidation of processes for [p]roduction and [s]ervice [p]rovision." *Id*., at pp. 1-2).

[290] "A review by the Science Advisory Board (SAB) thirty years ago recognized the importance of sound modeling to EPA. In 1989, the SAB recommended a central body examine best modeling practices. This led to the formation of the Agency Task Force on Environmental Regulatory Modeling in 1992, which produced guidance on model peer review and quality, and proposed a charter for the formation of CREM. The CREM was established in 2000 by the EPA Administrator, after some additional guidance from the SAB received in 1999. The CREM has gone through several organizational changes with the support and urging of several EPA Administrators and the Office of the Science Advisor (OSA). The most recent charter was approved by the Science and Technology Policy Council (STPC) in 2012…" *See* United States Environmental Protection Agency Council for Regulatory Environmental Modeling, *History*, available at: http://www.epa.gov/crem/history.html; United States Environmental Protection Agency Council for Regulatory Environmental Modeling, *Information about the Council for Regulatory Environmental Modeling for the Science Advisory Board*, available at: http://www.epa.gov/crem/crem_sab.html.

[291] *See* United States Environmental Protection Agency, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by the Environmental Protection Agency*, EPA/260R-02-008 ("EPA IQA Guidelines") (Oct. 2002), *supra* at Sec. 6.5, *citing EPA Quality Manual for Environmental Programs* 5360 A1. May 2000, Section 1.3.1, available at: http://www.epa.gov/quality/qs-docs/5360.pdf.

[292] *See* United States Environmental Protection Agency Office of Information, *Final Guidance for Quality Assurance Project Plans - EPA QA/G-5*, EPA/240/R-02/009 (Dec. 2002), available at: http://www.epa.gov/QUALITY/qs-docs/g5-final.pdf.

[293] *See* Institute for Trade, Standards and Sustainable Development, *Freedom of Information Act Request No. EPA-HQ-2014-008026* (filed June 30, 2014 and recorded July 1, 2014), at pp. 42-48, available at: http://nebula.wsimg.com/594e44f03b7dec5c9b31ccc1f864ffa7?AccessKeyId=39A2DC689E4CA87C906D&disposition=0&alloworigin=1; https://foiaonline.regulations.gov/foia/action/public/view/request?objectId=090004d2802cce59.

[294] "Probably the most misunderstood concept in the design requirements of ISO9001 [which sets out the requirements of a quality management system], if not the entire standard, is *the difference between Design Verification and Design Validation*. *These two steps are distinctly different*, and important in a good design process. *One step is used to make sure that the design has addressed every requirement, while the other is used to prove that the design can meet the requirements set out for it…Verification is strictly a paper exercise*. It starts with taking all the design inputs: specifications, government and industry regulations, knowledge taken from previous designs, and any other information necessary for proper function. With these requirements in hand you compare to your design outputs: drawings, assembly instructions, test instructions, and electronic design files…*Validation is the step where you actually build a version of the product, and would be done against the requirements as modified after verification.* This does not necessarily mean the first production unit, but it can. It can also be an engineering model, which some companies use to prove the first run of a complicated new design, or it can be a portion of the design which is different from a previous model, when the design is a modification of an already-proven design. *Once you decide what representative product you will build to prove the design, you fully test it to make sure that the product, as designed, will meet all the necessary requirements defined in the Design Inputs*" (emphasis added). *See* Mark Hammar, *ISO9001 Design Verification vs Design Validation*, The ISO 9001 Blog, 9001 Academy (Nov. 12, 2013), available at: http://www.9001academy.com/blog/iso9001-design-verification-vs-design-validation/.

[295] *See* Scott Hausman, *NOAA Data Stewardship*, prepared for National Research Council Board on Research Data and Information, Third Meeting, (June 3, 2010), at p. 7, available at: http://sites.nationalacademies.org/PGA/cs/groups/pgasite/documents/webpage/pga_057292.ppt. The Committee "[c]oordinates the development of NOAA's environmental data management strategy, and policy, and provides guidance to ensure consistent implementation across NOAA, on behalf of the NOSC and CIO Council." *Id*. This presentation had been prepared by the Acting Director, NOAA National Climatic Data Center (NCDC).

[296] *Id*., at p. 8.

[297] *See* Diedre Jones, *NOAA Challenges in Environmental Data and Information Management*, prepared for National Research Council Board on Research Data and Information (Nov. 30, 2010), available at: http://sites.nationalacademies.org/PGA/cs/groups/pgasite/documents/webpage/pga_059739.ppt ("Revision of NOAA-wide Policy (NAO) 212-15 - Environmental data will be visible, accessible and independently understandable to users, except where limited by law, regulation, policy or by security requirements. […] Prepared by Environmental Data Management Committee for BRDI. […] FY 2011 EDMC Operating Plan Activities - Improve Data Documentation - The primary focus in FY 2011 will be to establish a metadata standard for NOAA and to provide detailed implementation guidance. NOAA will be encouraging the use and convergence on International Standard Organization (ISO) Metadata Standard. Detailed guidance to be built on NMFS Data Documentation Procedural Directive which is nearing completion.") *Id*., at pp. 8-9. This presentation had been prepared by the Director of the Operations Division of NOAA's National Weather Service and Deputy Chair of NOAA's Environmental Data Management Committee.

[298] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *NOAA Administrative Order 212-15 - "Management of Environmental Data and Information"* (2010), available at: http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_212/212-15.pdf.

[299] *Id.*, at Sections 1-2, 9.
[300] *Id*., at Sec. 6.01.
[301] *Id*., at Sec. 6.03.
[302] "The Office of the Chief Information Office (OCIO) will maintain a list of applicable authorities and references and will provide access to their electronic editions. The following items are some of the primary reference materials related to this Order. .01 "Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies" - OMB issuance that implements Section 515 of Public Law 106-554; […] .02 NOAA Information Quality Guidelines - NOAA's policy and procedures document implementing Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554)." *Id*., at Section 7.01-7.02.
[303] *See* National Oceanic and Atmospheric Administration, Office of the Chief Administration Officer, *NAO 212-15: Management of Environmental Data and Information*, available at: at: http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_212/212-15.html.
[304] "NOAA Chief Information Officer (CIO) shall be responsible for managing this Order in consultation with the CIO Council, the NOAA Observing Systems Council (NOSC) and the Environmental Data Management Committee (EDMC)." *Id*., at Sec. 5.01.
[305] *See* National Oceanic and Atmospheric Administration, Data Access and Archiving Requirements Working Group (DAARWG) of the NOAA Science Advisory Board, *Assessing the Use of Data From Non-NOAA Sources* (Nov. 9, 2011), available at: http://www.sab.noaa.gov/Meetings/2011/november/Assessing-Use-of-Data-from-non-NOAA-Sources%20_DAARWG-11_11-11.pdf.
[306] *Id*., at Sec. 1, p. 1.
[307] "A policy based on these guidelines should be used by NOAA projects or programs that wish to obtain environmental data from non-NOAA sources, especially if such data would be used NOAA-wide or in contexts that may affect life, property, *or highly influential scientific assessments [HISAs]*." *Id*., at Sec. 3, p. 3.
[308] *Id*.
[309] "NOAA should ensure that data come from a certified and reliable source. A procedure for certifying data sources should be established. Any uncertainty with regard to the data or their source should be documented." *Id*., at Sec. 4.5, p. 6.
[310] *See* National Oceanic and Atmospheric Administration, NOAA Environmental Data Management Committee, *NOAA Recommended Practice for the Use of External Data* (Version 1.0, March 27, 2013), at Sec. 2, p. 3, available at: https://www.nosc.noaa.gov/EDMC/documents/NOAA_RP_for_the_Use_of_External_Data_v1.0.pdf.
[311] *Id*.
[312] *Id*., at Sec. 3, p. 4.
[313] *Id*.
[314] *See* U.S. Global Change Research Program, *Synthesis & Assessment Products*, available at: http://www.globalchange.gov/engage/process-products/sap-summary. This website serves as a repository cataloguing many of the peer review files relating to USGCRP/CCSP assessments and reports developed by participating federal agencies, including NOAA, *except for* those relating to the Second National Climate Assessment – NCA2-2009.
[315] *See* Letter from William L. Kovacs to William J. Brennan, *Comments on USP Draft: Kovacs* (Aug. 1, 2008), at pp. 1, 2-3, available at: https://www.uschamber.com/sites/default/files/legacy/CO2/files/080108wkCOMMENTSCommentsonUSPFileKovacs.pdf.
[316] *Id*., at p. 3.
[317] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product 1.1 – Notice of Open Meeting*, 71 FR 3053 (Jan. 19, 2006), at: http://www.gpo.gov/fdsys/pkg/FR-2006-01-19/pdf/E6-513.pdf.
[318] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 1.3: ''Re-analyses of Historical Climate Data for Key Atmospheric Features. Implications for Attribution of Causes of Observed Change'' - Notice of Availability and Request for Public Comments*, 73 FR 20034 (April 14, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-04-14/pdf/E8-7896.pdf.
[319] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 2.2: Notice of Availability and Request for Public Comments* (Sept. 19, 2006), available at: http://www.gpo.gov/fdsys/pkg/FR-2006-09-19/pdf/E6-15542.pdf.
[320] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 2.4 ''Trends in Emissions of Ozone Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure.'': Notice of availability and request for public comments*, 73 FR 14457 (March 18, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-03-18/pdf/E8-5423.pdf.
[321] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 3.2 "Climate projections for research and assessment based on emissions scenarios developed through the CCTP" - Notice of availability and request for public comments*, 72 FR 68571 (Dec. 5, 2007), available at: http://www.gpo.gov/fdsys/pkg/FR-2007-12-05/pdf/E7-23595.pdf.

[322] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 3.3: "Weather and Climate Extremes in a Changing Climate, Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands" - notice of availability and request for public comments*, 72 FR 46611 (Aug. 21, 2007), available at: http://www.gpo.gov/fdsys/pkg/FR-2007-08-21/pdf/E7-16369.pdf.

[323] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 5.2 "Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking – notice of availability and request for public comments"*, 73 FR 21912 (April 23, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-04-23/pdf/E8-8829.pdf.

[324] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 5.3 "Decision Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data" - Notice of Availability and Request for Public Comments*, 73 FR 14457 (March 18, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-03-18/pdf/E8-5423.pdf.

[325] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Draft Unified Synthesis Product Report: Global Climate Change in the United States - Notice of Availability and Request for Public Comments*, 73 FR 41042 (July 17, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-07-17/pdf/E8-16386.pdf; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Draft Unified Synthesis Product Report: Global Climate Change in the United States - Notice of revision of the production schedule*, 73 FR 75678 (Dec. 12, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-12-12/pdf/E8-29495.pdf; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Draft Unified Synthesis Product Report: Global Climate Change in the United States - Notice of availability and request for public comments*, 74 FR 1666 (Jan. 13, 2009), available at: http://www.gpo.gov/fdsys/pkg/FR-2009-01-13/pdf/E9-371.pdf.

[326] *See* U.S. Global Change Research Program, *Synthesis & Assessment Products*, *supra*.

[327] NCA2-2009 constituted a highly influential scientific assessment ("HISA") because the twenty-one (21) highly influential scientific assessments ("HISAs") it summarized and synthesized "(i) could have a potential impact of more than $500 million in any year and (ii) [are] novel, controversial, or precedent-setting or has significant interagency interest", within the meaning of Section III.1 of the OMB Peer Review Bulletin. NOAA synthesized the summarized information and conclusions from those individual assessments it and other federal agencies had developed into a cohesive document. NOAA's summary and synthesis of these HISAs, however, had not been identical, word for word, to any one or more of the HISAs individually. The NCA2-2009 which was novel, controversial and precedent-setting, had been used as technical support for a major EPA action/ruling (i.e., the EPA Administrator's Clean Air Act GHG Endangerment Findings). These Findings had been anticipated to and had actually triggered EPA's enactment of mobile and stationary source GHG emissions control regulations bearing a potential economic impact of over USD $1 billion dollars. *See* Margo Thorning, *Impact of CAA GHG Regulations on U.S. Investment and Job Growth*, Testimony Before the Subcommittee on Energy and Power, Committee on Energy and Commerce, U.S. House of Representatives (2/9/11), available at: http://democrats.energycommerce.house.gov/sites/default/files/image_uploads/Thorning_Testimony.pdf. NCA2-2009 also has served, in part, as the scientific foundation for EPA's recently issued proposed GHG emissions new performance standards (regulations) for energy-generation facilities and for EPA's new proposed existing power plant regulations.

[328] NOAA's collective acts of summarizing and synthesizing the twenty-eight "core reference documents" (each of which had been characterized as HISAs) into a cohesive single NCA2-2009 that was not identical to any one or more such assessments effectively transformed the NCA2-2009 into a highly influential scientific assessment (HISA), within the meaning of the IQA. As a result, the IQA required NOAA to ensure both that the draft and final versions of the NCA2-2009 summary and synthesis had been substantively peer reviewed for scientific accuracy and that the peer review process so employed had satisfied the highest and most rigorous level IQA conflict-of-interest, independence/bias and transparency standards applicable to HISAs. See also Institute for Trade, Standards and Sustainable Development, EPA FOIA Request No. EPA-HQ-2014-008026 (filed June 30, 2014; recorded July 1, 2014), *supra* at pp. 27-28 (discussing how the EPA-TSD's syntheses of the summaries of at least twenty-eight (28) USGCRP/CCSP SAPs, which was novel, controversial and precedent-setting and was anticipated to trigger EPA's enactment of regulations bearing a potential economic impact of over USD $1 billion dollars, had transformed the EPA-TSD from ISI into a HISA).

[329] *See* Letter from William L. Kovacs to William J. Brennan, *Comments on USP Draft: Kovacs* (Aug. 1, 2008), *supra* at p. 4.

[330] For example, only twelve sets of public comments had been submitted in response to a draft version of SAP1.1. These were prepared by: 1) William Chameides, James Wang, and Lisa Moore, Environmental Defense; 2) David Douglass, Univ. of Rochester; 3) Haroon Kheshgi, Exxon-Mobil Research & Engineering Company; 4) Michael MacCracken, Climate Institute; 5) Alastair B. McDonald, The Open Univ.; 6) Jim Meyer; 7) Roger Pielke, Sr., Colorado State Univ.; 8) Alan Robock, Rutgers Univ.; 9) S. Fred Singer, Univ. of Virginia/SEPP; 10) R. E. Swanson; 11) Kevin E. Trenberth, NCAR-NSF; and 12) Derek Winstanley, Illinois Dep't. of Natural Resources. *See Compilation of Comments on the Public Review Draft of CCSP Synthesis and Assessment Product 1.1: 'Temperature trends in the lower atmosphere – steps for understanding and reconciling differences' and Author Responses*, available at: http://www.globalchange.gov/sites/globalchange/files/sap1-1prd-comments.pdf. It should be noted that Mr. MacCracken had

served on the NOAA or USGCRP-established Peer Review Panel established to review the Second National Climate Assessment – NCA2-2009. *See* "Appendix: 5B - USGCRP Ad Hoc Peer Review Panel USCRP/CCSP Global Climate Change Impacts 2009 (NCA2-2009)", *infra*).

[331] For example, *only one set of public comments* had been submitted in response to a draft version of SAP1.3. These were prepared by the NOAA Research Council. *See "SAP 1.3 'Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change' – Public Review Comments and Response to Public Review Comments* (Aug. 3, 2008), available at: http://www.globalchange.gov/sites/globalchange/files/sap1-3-publc-comments-responses.pdf.

[332] For example, only one set of public comments out of *five in total* had been submitted by other than the US government in response to a draft version of SAP2.4 These were prepared by S. Fred Singer, Univ. of Virginia/SEPP. The US government comments had been prepared by: 1) Samuel Williamson, NOAA/OFCM; 2) the NOAA Research Council; 3) Robert Portmann, NOAA ESRL CSD and 4) Susan Solomon, NOAA/ESRL/CSD. *See SAP 2.4 'Trends in Emissions of Ozone-depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure' – Public Review Comments and Response to Public Review Comments* (July 29, 2008) available at: http://www.globalchange.gov/sites/globalchange/files/sap2-4-Collated-Public-Comments-Response.pdf.

[333] For example, *only one set of public comments* had been submitted in response to a draft version of SAP3.2. These were prepared by Haroon Kheshgi, ExxonMobil Research & Engineering Company. *See SAP 3.2 'Climate Projections Based on Emissions Scenarios for Long-lived Radiatively Active Trace Gases and Future Climate Impacts of Short-lived Radiatively Active Gases and Aerosols' – Public Review Comments and Response to Public Review Comments* (2008), available at: http://www.globalchange.gov/sites/globalchange/files/sap3-2-response-public-comments.pdf.

[334] For example, four out of a total of seven sets of public comments had been submitted by other than US government agency employees in response to a draft version of SAP3.3. These were prepared by: 1) Jim Elsner, Florida State Univ.; 2) Max Mayfield, WPLG-TV; 3) Dave Panzer; and 4) Guoyu Ren. The remaining three sets of comments had been submitted by the following US government agency personnel: 1) Thomas L. Delworth, Isaac Held, and Gabriel A. Vecchi, NOAA; 2) Chris Landsea, NOAA; and 3) Indur Goklany, DOI. *See Compilation of Public Comments on CCSP Synthesis and Assessment Product 3.3 – 'Weather and Climate Extremes in a Changing Climate: Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands'* (Dec. 20, 2007), available at: http://www.globalchange.gov/sites/globalchange/files/sap3-3-public-comments-responses.pdf.

[335] For example, three out of a total of nine sets of public comments had been submitted by other than US government agency employees in response to a draft version of SAP5.2. These were prepared by: 1) Steven Sherwood, Yale Univ.; 2) Peter Guttorp, Univ. of Washington; and 3) Marilyn Averill, Univ. of Colorado. The remaining six sets of comments had been submitted by the following US government personnel: 1) Derek Park, NOAA Research Council; 2) Cecil DeWayne, NASA; 3) John Senn, EPA-OAR; 4) Sam Williamson, NOAA/OFCM; 5) Susan Solomon, NOAA/ESRL; and 6) Kathie Olsen and Marta Cehelsky, NSF. *See Collated Public Comments, SAP 5.2 'Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decision Making'* (2008), available at: http://www.globalchange.gov/sites/globalchange/files/sap5-2-response-public-comments.pdf.

[336] For example, only one out of a total of three sets of public comments had been submitted by other than US government agency employees in response to a draft version of SAP5.3. These were prepared by John Weiner, Univ. of Colorado. The remaining two sets of comments were submitted by the following US government personnel: 1) Jerry Elwood, DOE; and 2) Samuel Williamson, NOAA/OFCM. *See SAP 5.3 'Decision Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data' - Response to Public Comments* (2008), available at: http://www.globalchange.gov/sites/globalchange/files/sap5-3-Responses-PublicComment.pdf.

[337] For example, the name "Sakai" appeared beside public comments addressing the report's Executive Summary. *See Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Executive Summary* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_ExecSummary.pdf.

[338] However, all other public commenters were identified only by ID#s. *See Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – General Comments* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_General.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Preface* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Preface.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Executive Summary* (Sept. 2006), *supra*; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 1* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter01.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 2* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter02.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 3* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter03.pdf; *Comments and Responses on*

Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 4 (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter04.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 5* (Sept. 2006) available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter05.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Part II Overview* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_PtIIOverview.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 6* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter06.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 7* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter07.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 8* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter08.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Part III Overview* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_PtIIIOverview.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 10* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter10.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 11* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter11.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 13* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter13.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 14* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter14.pdf; *Comments and Responses on Public Review Draft of SOCCR/SAP 2.2, Comments from Public Reviewers – Chapter 15* (Sept. 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-Comment_Responses_Chapter15.pdf; *Comments on 'The First State of the Carbon Cycle Report' SOCCR/SAP 2.2, Comments from the Economics and Statistics Administration* (Jan. 2007), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-ESA_Comment-Responses.pdf; *Disposition of the NOAA Research Council's Comments on SAP 2.2* (Jan. 2007), available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2-NOAA_Comment-Responses.pdf.

[339] *See* U.S. Global Change Research Program, Organization & Leadership, *supra*. *See also* Climate Change Science Program, *Guidelines for Producing CCSP Synthesis and Assessment Products*, *supra* at p. 2 ("Membership on the CCSP Interagency Committee *is joint with* the Subcommittee on Global Change Research (SGCR) of the Committee on Environment and Natural Resources (CENR) of the President's National Science and Technology Council (NSTC). The CCSP Interagency Committee has overall responsibility for direction of the program, including compliance with the requirements of the Global Change Research Act of 1990" (emphasis added)); U.S. Climate Change Science Program, *Overview of the U.S. Climate Change Science Program* (Jan. 2006), available at: http://downloads.globalchange.gov/ccsp/infosheets/ccsp-program-overview.pdf ("The CCSP interagency governing body, the CCSP Interagency Committee, provides overall management direction and is responsible for ensuring the development and implementation of an integrated interagency program. It oversees and directs all aspects of the program, including setting top-level goals for the program and determining what products will be developed and produced to meet those goals. Through this structure, the CCSP also coordinates with the Climate Change Technology Program (CCTP) to address issues at the intersection of science and technology.").

[340] *See* U.S. Climate Change Science Program, *SAP-1.1 Prospectus for Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences* (Jan. 28, 2005), at inside cover, available at: http://www.globalchange.gov/sites/globalchange/files/sap1-1prospectus-final.pdf; U.S. Climate Change Science Program, *SAP-1.3 Prospectus for Re-Analysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change* (Oct. 30, 2006), at inside cover, available at: http://www.globalchange.gov/sites/globalchange/files/sap1-3prospectus-final.pdf; U.S. Climate Change Science Program, *SAP-2.2 Prospectus for North American Carbon Budget and Implications for the Global Carbon Cycle* (Feb. 14, 2006), at inside cover, available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2prospectus-final.pdf; U.S. Climate Change Science Program, *SAP-2.4 Prospectus for Trends in Emissions of Ozone-Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure* (Jan. 22, 2007), at inside cover, available at: http://www.globalchange.gov/sites/globalchange/files/sap2-4prospectus-final.pdf; U.S. Climate Change Science Program, *SAP-3.2 Prospectus for Climate Projections Based on Emissions Scenarios for Long-Lived Radiatively Active Trace Gases and Future Climate Impacts of Short-Lived Radiatively Active Gases and Aerosols* (Oct. 30, 2006), available at: http://www.globalchange.gov/sites/globalchange/files/sap3-2prospectus-final.pdf; U.S. Climate Change Science Program, *SAP-3.3 Prospectus for Weather and Climate Extremes in a Changing Climate Regions of Focus: North*

America, Hawaii, Caribbean, and U.S. Pacific Islands (July 20, 2006), at inside cover, available at: http://www.globalchange.gov/sites/globalchange/files/sap3-3prospectus-final.pdf; U.S. Climate Change Science Program, *SAP-5.2 Prospectus for Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Climate Decisionmaking* (Oct. 30, 2006), at inside cover, available at: http://www.globalchange.gov/sites/globalchange/files/sap5-2prospectus-final.pdf; U.S. Climate Change Science Program, *SAP-5.3 Prospectus for Decision-Support Experiments and Evaluations using Seasonal to Interannual Forecasts and Observational Data* (April 17, 2006), at inside cover, available at: http://www.globalchange.gov/sites/globalchange/files/sap5-3prospectus-final.pdf.

[341] NOAA federal register notices issued during January and September 2006 with respect to SAPs 1.1 and 2.2, however, did not contain such a statement. *See, e.g.*, United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product 1.1 – Notice of Open Meeting*, 71 FR 3053 (Jan. 19, 2006), *supra*; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 2.2: Notice of Availability and Request for Public Comments* (Sept. 19, 2006), *supra*.

[342] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 1.3: ''Re-analyses of Historical Climate Data for Key Atmospheric Features, Implications for Attribution of Causes of Observed Change'' - Notice of Availability and Request for Public Comments*, 73 FR 20034 (April 14, 2008), *supra*; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 2.4 ''Trends in Emissions of Ozone Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure'': Notice of availability and request for public comments*, 73 FR 14457 (March 18, 2008), *supra*; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 3.2 "Climate projections for research and assessment based on emissions scenarios developed through the CCTP" - Notice of availability and request for public comments*, 72 FR 68571 (Dec. 5, 2007), *supra*; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 3.3: "Weather and Climate Extremes in a Changing Climate, Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands" - Notice of Availability and Request for Public Comments*, 72 FR 46611 (Aug. 21, 2007), *supra*; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 5.2 "Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking – Notice of Availability and Request for Public Comments"*, 73 FR 21912 (April 23, 2008), *supra*; and United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 5.3,"Decision Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data" - Notice of Availability and Request for Public Comments*, 73 FR 14457 (March 18, 2008), *supra*.

[343] *Id., at* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Draft Unified Synthesis Product Report: Global Climate Change in the United States - Notice of Availability and Request for Public Comments*, 73 FR 41042 (July 17, 2008), *supra*; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Draft Unified Synthesis Product Report: Global Climate Change in the United States - Notice of revision of the production schedule*, 73 FR 75678 (Dec. 12, 2008), *supra*; United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Draft Unified Synthesis Product Report: Global Climate Change in the United States - Notice of Availability and Request for Public Comments*, 74 FR 1666 (Jan. 13, 2009), *supra*.

[344] *See* Climate Change Science Program, *Guidelines for Producing CCSP Synthesis and Assessment Products*, *supra* at Step 11, p. 5 ("11. The lead agency(ies) post the second draft of the product for public comment for not less than 45 days. Any stakeholders (plus experts who participated in the expert peer review process) may participate in the public comment period for the second draft.
This includes governmental and non-governmental entities. The prospectus will include the expected dates of the public comment period. Notice of the public comment period will be disseminated on the CCSP web site, in the Federal Register, and through other publications, web sites, and means as appropriate to the product, to encourage wide public participation in the review. All comments will be publicly available.") *Id.*

[345] *Id*.

[346] *See* United States Environmental Protection Agency, *Technical Support Document for Endangerment Analysis for Greenhouse Gas Emissions under the Clean Air Act; Sixth Order Draft June 21, 2008) - EPA-HQ-OAR-2008-0318-0082* (July 14, 2008), at Table 1.1, p. 4, available at: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2008-0318-0082;

[347] *See* United States Environmental Protection Agency, *Technical Support Document for the Advanced Notice of Proposed Rulemaking for Greenhouse Gases; Stationary Sources, Section VII - EPA-HQ-OAR-2008-0318-0081* (June 5, 2008, Final Draft), available at: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2008-0318-0081; United States Environmental

Protection Agency, *Technical Support Document – Section 202 Greenhouse Gas Emissions - Roadmap to Annex -EPA-HQ-OAR-2008-0318-0083* (July 14, 2008), available at: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2008-0318-0083.

[348] *See* United States Environmental Protection Agency, *Regulating Greenhouse Gas Emissions Under the Clean Air Act – Advanced Notice of Proposed Rulemaking*, 73 FR 44354, 44421 (July 30, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-07-30/pdf/E8-16432.pdf; United States Environmental Protection Agency, *Vehicle Technical Support Document: Evaluating Potential GHG Reduction Programs for Light Vehicles (Draft LD TSD 6/16/08) - EPA-HQ-OAR-2008-0318-0084* (July 14, 2008), available at: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2008-0318-0084.

[349] *See* United States Environmental Protection Agency, Technical Support Document for *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* (April 17, 2009, available at: http://www.epa.gov/climatechange/Downloads/endangerment/TSD_Endangerment.pdf.

[350] *See* United States Environmental Protection Agency, *Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Proposed Rule*, 74 FR 18886, 18888, 18903 (April 24, 2009), available at: http://www.gpo.gov/fdsys/pkg/FR-2009-04-24/pdf/E9-9339.pdf.

[351] "As of January 16, 2009, the CCSP had completed 21 synthesis and assessment products (SAPs) that address the highest priorities for U.S. climate change research, observation, and decision support needs." *See* EPA-TSD, *supra* at Box 1.1, p. 4. It had been previously reported, as of January 10, 2009, that 5 remaining SAPs had not been released. They included: "*Past Climate Variability and Change in the Arctic and at High Latitudes*, U.S. Climate Change Science Program Synthesis and Assessment Product (SAP) 1.2, Lead Agency: U.S. Geological Survey[;]…*Thresholds of Change in Ecosystems*, U.S. Climate Change Science Program Synthesis and Assessment Product (SAP) 4.2, Lead agency: U.S. Geological Survey[;]…SAP 4.1, *Coastal Sensitivity to Sea-Level Rise: A Focus on the Mid-Atlantic Region* [Lead agency: EPA;]…SAP 5.2, *Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking* [Lead agency: DOC-NOAA;]…SAP 2.3, *Aerosol Properties and their Impacts on Climate*, [Lead agency: NASA]." *See* Rick Piltz, *White House Science Office Finally Clears Two Delayed Climate Science Reports for Release*, Climate Science Watch (Jan. 10, 2009), available at: http://www.climatesciencewatch.org/2009/01/10/white-house-science-office-finally-clears-two-delayed-climate-science-reports-for-release/.

[352] *See* "Appendix 1: EPA-TSD Table 1.1 "Core Reference Documents"".

[353] "One point is clear: the potential regulation of greenhouse gases under any portion of the Clean Air Act could result in an unprecedented expansion of EPA authority that would have a profound effect on virtually every sector of the economy and touch every household in the land."
See United States Environmental Protection Agency, *Regulating Greenhouse Gas Emissions Under the Clean Air Act – Advanced Notice of Proposed Rulemaking*, 73 FR 44354, 44355 (July 30, 2008), *supra*. *See also* Rona Bierbaum, *Endangerment and Benefits In the ANPR*, EPA Office of Air and Radiation, Mobile Sources Technical Review Subcommittee - Clean Air Act Advisory Committee (Sept. 17, 2008), available at: http://www.epa.gov/oar/caaac/mstrs/sep2008/RBirnbaum.pdf ("With the ANPR, EPA did not make an endangerment finding, but rather seeks comments on implications of making an endangerment finding.") *Id*., at p. 2.

[354] *See* United States Environmental Protection Agency, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by the Environmental Protection Agency*, EPA/260R-02-008 (Oct. 2002), at Sec. 8.5, p. 32, available at: http://www.epa.gov/quality/informationguidelines/documents/EPA_InfoQualityGuidelines.pdf. *Id*.

[355] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Office of the Chief Information Officer & High Performance Computing and Communications, *National Oceanic and Atmospheric Administration Information Quality Guidelines*, at Part III – Administrative Correction Mechanism, Sec. C.1-2, *supra* ("1. Upon receipt of a proper request, the head of the responsible office will make a preliminary determination whether the request states a claim. A request for correction states a claim *if it reasonably demonstrates, on the strength of the assertions made in the request alone*, and assuming they are true and correct, that the information disseminated was based on a misapplication or non-application of NOAA's applicable published information quality standards. In other words, to state a claim, a request for correction must actually allege that NOAA disseminated information that does not comply with applicable guidelines […] 2. If a proper request is preliminarily determined to state a claim, the head of the responsible office *will objectively investigate and analyze relevant material, in a manner consistent with established internal procedures*, to determine whether the disseminated information complies with NOAA's information quality standards." (emphasis added).

[356] *See* Climate Change Science Program, *Guidelines for Producing CCSP Synthesis and Assessment Products*, *supra* at p. 2; *See* U.S. Climate Change Science Program, *Memorandum from William Brennan, Acting Director, U.S. Climate Change Science Program to CENR and CCSP Principals Re: Clarification of review and clearance process for CCSP Synthesis and Assessment Products* (Aug. 2007), *supra* at p.2.

[357] *See* National Oceanic Atmospheric Administration, *Cooperative Institute Program Office Fact Sheet*, NOAA website, available at: ftp://ftp.oar.noaa.gov/lci/1pgFactSheets/CIFAS.pdf. "Cooperative Institutes are non-federal organizations supported by the National Oceanic and Atmospheric Administration (NOAA). Cooperative Institutes have outstanding research programs in one or more areas relevant to the NOAA mission. NOAA's Cooperative Institutes collaborate in a large portion of NOAA's research and play a vital role

in increasing NOAA's research capacity and expertise." *Id.* As of 2012, there appears to have been eighteen (18) Cooperative Institutes managed by three NOAA lines offices: National Environmental Satellite, Data and Information Service (NESDIS), National Marine Fisheries Services (NMFS), and Oceanic and Atmospheric Research (OAR). *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *NOAA COOPERATIVE INSTITUTE PROFILES 6/6/2012*, NOAA website, available at: ftp://ftp.oar.noaa.gov/lci/Documents/ci-profiles.pdf. As of 2012, there had been three DOC-NOAA-NESDIS-managed Cooperative Institutes with the following host and participating universities: (1)(a) Name – Cooperative Institute for Climate and Satellites **(CICS-M)**; (b) Host – Univ. of Maryland College Park; (b) Participants - North Carolina State Univ., Univ. of California-Irvine, Colorado State Univ., Howard Univ., Univ. of Miami, Duke Univ., Univ. of North Carolina-Chapel Hill, Princeton Univ., City Univ. of New York, Columbia Univ., Oregon State Univ. and Remote Sensing Systems; (2)(a) Name – Cooperative Institute for Meteorological Satellite Studies **(CIMSS)**; (2)(b) Host – Univ. of Wisconsin-Madison; (2)(c) Participants – none; (3)(a) Name - Cooperative Institute for Oceanographic Satellite Studies **(CIOSS)**; (3)(b) Host - Oregon State Univ.; (3)(c) Participants – none. *Id.* As of 2012, there appears to have been one DOC-NOAA-NMFS-managed Cooperative Institute. (1)(a) Name - Cooperative Institute for the Pacifica Island Region **(CIPIR)**; (1)(b) Host – Univ. of Hawaii; (1)(c) – Participants – none. *Id.* As of 2012, there appears to have been fifteen (15) DOC-NOAA-OAR-managed Cooperative Institutes: (1)(a) Name - Cooperative Institute for Climate Applications Research **(CICAR)**; (1)(b) Host - Columbia Univ.; (1)(c) Participants – none; (2)(a) Name - Cooperative Institute for Climate Science **(CICS-P)**; (2)(b) Host - Princeton Univ.; (2)(c) Participants – none; (3)(a) Name - Cooperative Institute for Alaska Research **(CIFAR)**; (3)(b) Host – Univ. of Alaska - Fairbanks; (3)(c) Participants – none; (4)(a) Cooperative Institute for Limnology and Ecosystem Research **(CILER)**; (4)(b) Host – Univ. of Michigan; (4)(c) Participants - Grand Valley State Univ., Michigan State Univ. Ohio State Univ., Penn State Univ., Stony Brook Univ., Univ. of Illinois at Urbana-Champaign, Univ. of Minnesota, Univ. of Toledo, and Univ. of Wisconsin; (5)(a) Name - Cooperative Institute for Marine and Atmospheric Studies **(CIMAS)**; (5)(b) Host – Univ. of Miami; (5)(c) Participants - Florida Atlantic Univ., Florida Int'l Univ., Florida State Univ., NOVA Southeastern Univ., Univ. of Puerto Rico, Univ. of Florida, Univ. of South Florida, and Univ. of the Virgin Islands; (6)(a) Name - Cooperative Institute for Marine Ecosystems and Climate **(CIMEC)**; (6)(b) Host – Univ. of Calif. San Diego; (6)(c) Participants - Scripps Institution of Oceanography, Calif. State Univ., Los Angeles, Humboldt State, Univ. of Calif., Davis, Univ. of Calif., Los Angeles, Univ. of Calif., Santa Barbara, and Univ. of Calif., Santa Cruz; (7)(a) Name – Cooperative Institute for Mesoscale Meteorological Studies **(CIMMS)**; (7)(b) Host – Univ. of Oklahoma; (7)(c) Participants – none; (8)(a) Name - Cooperative Institute for Marine Resources Studies **(CIMRS)**; (8)(b) Host – Oregon State Univ.; (8)(c) Participants – none; (9)(a) Name - Cooperative Institute for the North Atlantic Region **(CINAR)**; (9)(b) Host - Woods Hole Oceanographic Institution; (9)(c) – Participants – Rutgers Univ., Univ. of Maryland-Center for Environmental Science, Univ. of Maine, and Gulf of Maine Research Institute; (10(a) Name – Cooperative Institute for Ocean Exploration, Research and Technology **(CIOERT)**; (10)(b) Host – Florida Atlantic Univ.; (10)(c) – Participants – Univ. of North Carolina-Wilmington; (11)(a) Name - Cooperative Institute for Research in the Atmosphere **(CIRA)**; (11)(b) Host – Colorado State Univ.; (11)(c) Participants – none; (12)(a) Name - Cooperative Institute for Research in Environmental Sciences **(CIRES)**; (12)(b) Host – Univ. of Colorado; (12)(c) Participants – none; (13)(a) Name - Joint Institute for Marine and Atmospheric Research **(JIMAR)**; (13)(b) Host – Univ. of Hawaii; (13)(c) Participants – none; (14)(a) Name – Joint Institute for the Study of the Atmosphere and Ocean **(JISAO)**; (14)(b) Host – Univ. of Washington; (14)(c) Participants – none; (15)(a) Name -Northern Gulf Institute **(NGI)**; (15)(b) Mississippi State Univ.; (15)(c) Participants – Univ. of Southern Mississippi, Louisiana State Univ., Florida State Univ., and Dauphin Island Sea Lab.

[358] As of 2014, there are sixteen (16) Cooperative Institutes, indicating that a consolidation of the DOC-NOAA Cooperative Institutes Program had taken place: CICS-M; CIMSS; CICS-P; CIPIR-JIMAR; CIFAR; CILER; CIMAS; CIMEC; CIMMS; CIMRS; CINAR; CIOERT; CIRA; CIRES; JISAO; and NGI. *See* United States Department of Commerce National Oceanic and Atmospheric Administration, *National Oceanic and Atmospheric Administration Cooperative Institutes*, NOAA website, available at: http://ci.noaa.gov/Locations.aspx.

[359] "The Modeling, Analysis, Predictions, and Projections (MAPP) Program's mission is to enhance the Nation's capability to understand and predict natural variability and changes in Earth's climate system. The MAPP Program supports development of advanced climate modeling technologies to improve simulation of climate variability, prediction of future climate variations from weeks to decades, and projection of long-term future climate conditions. To achieve its mission, the MAPP Program supports research focused on the coupling, integration, and application of Earth system models and analyses across NOAA, among partner agencies, and with the external research community." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Modeling, Analysis, Predictions, and Projections (MAPP)*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ModelingAnalysisPredictionsandProjections.aspx. "Researchers funded by MAPP refine models' computerized representations of Earth's processes and evaluate their performance… MAPP supports reanalysis projects that are critical to improving model simulations and projections. Reanalysis combines models with historical observations to create a complete and consistent historical record." *See* United States Department of Commerce, National Oceanic and Atmospheric

Administration Office of Oceanic and Atmospheric Research, *Climate Program Office Modeling, Analysis, Predictions, and Projections Brochure* (Oct. 2012), available at: http://cpo.noaa.gov/sites/cpo/Briefing%20sheets/MAPP_Oct24v2(2).pdf.

[360] "The Earth System Science (ESS) division supports research to provide a process-level understanding of the climate system through observation, modeling, analysis, and field studies." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *Climate Program Office – Earth Systems Science*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/EarthSystemScience.aspx. The website reveals at least one ESS-funded project that involved scientists from the following universities: Princeton Univ.; Harvard Univ.; Univ. of Calif.-Berkeley; Calif. Inst. Of Technology; Univ. of Leicester, Leicester, UK. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, Climate Program Office – Earth Systems Science – ESS Archive, *AC4 funds research that proposes revised mechanism for isoprene chemistry*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/EarthSystemScience/ESSArchive/TabId/541/ArtMID/1399/ArticleID/210/AC4-funds-research-that-proposes-revised-mechanism-for-isoprene-chemistry.aspx. *See also* Jingqiu Mao, Fabien Paulot, Daniel J. Jacob, Ronald C. Cohen, John D. Crounse, Paul O. Wennberg, Christoph A. Keller, Rynda C. Hudman, Michael P. Barkley and Larry W. Horowitz, Ozone and Organic Nitrates Over the Eastern United States: Sensitivity to Isoprene Chemistry, Journal of Geophysical Research: Atmospheres Volume 118, Issue 1(American Geophysical Union 2013), Wiley Online Library, available at: http://onlinelibrary.wiley.com/doi/10.1002/jgrd.50817/abstract.

[361] "The Coastal and Ocean Climate Applications (COCA) program addresses the needs of specific decision makers grappling with pressing climate-related issues in coastal and marine environments. This program strengthens initiatives — initially developed under the Sectoral Applications Research Program — *to support interdisciplinary applications research* aimed at addressing climate-related challenges in coastal communities as well as coastal and marine ecosystems." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions - Coastal and Ocean Climate Applications (COCA) [Program]*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/COCAProgram.aspx.

[362] For example, the following public and private universities had received DOC-NOAA research and other funding during 2008-2009: 1) Ohio State Univ. (2008); 2) Oregon State Univ. (2008); Virginia Inst. Of Marine Science (2008); Univ. Mass. Boston , Tufts Univ. and Univ. of Maryland (2008); Univ. of Wisconsin (2009); Clemson Univ., Coastal Carolina Univ. and Univ. of South Carolina (2009); Dillard Univ. and Tulane Univ. (2009); Oregon State Univ. (2009).

[363] "NOAA's Regional Integrated Sciences & Assessments (RISA) program supports research teams that help expand and build the nation's capacity to prepare for and adapt to climate variability and change." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram.aspx.

[364] "There are currently 11 active RISA projects across the country." *Id*. The Western Water Assessment ("WWA") Project is 'housed' in the University of Colorado which is an "affiliated institution". ." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams - Western Water Assessment*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/WWA.aspx. The WWA program appears to have commenced in 2009. The Southeast Climate Consortium ("SECC") began in 1998, and its "affiliated institutions" include: Auburn Univ.; Clemson Univ.; Florida State Univ.; North Carolina State Univ.; Univ. of Alabama-Huntsville; Univ. of Florida; Univ. of Georgia and Univ. of Miami. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams - Southeastern Climate Consortium*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/SECC.aspx. The Southern Climate Impacts Planning Program ("SCIPP")'s "affiliated institutions" include the Univ. of Oklahoma and Louisiana State Univ. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams - Southern Climate Impacts Planning Program*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/SCIPP.aspx. The "Pacific RISA" is 'housed' in the East-West Center of the Univ. of Hawaii, which is designated as an "affiliated institution". *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams – Pacific RISA*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/PacificRISA.aspx. The Great Lakes Integrated Sciences and Assessments Center ("GLISA"), which appears to have commenced in 2010, has the following "affiliated institutions": Univ. of Michigan, Ohio State Univ., and Michigan State Univ. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams – Great Lakes Integrated Sciences and Assessments Center*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/GLISA.aspx. The California

Nevada Applications Program ("CNAP"), which appears to have commenced during 2009 (judging from its 2010 Annual Report), is comprised of the following "affiliated institutions": Univ. of Calif., San Diego; San Diego State Univ.; Univ. of Washington; Univ. of Calif., Merced; Scripps Institution of Oceanography; and Desert Research Institute. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams – California Nevada Applications Program*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/CNAP.aspx. The Climate Assessment for the Southwest ("CLIMAS"), which has been in operation since 1998, is comprised of the following "affiliated institutions": Univ. of Arizona; and New Mexico State Univ. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams – Climate Assessment for the Southwest*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/CLIMAS.aspx. Carolinas Integrated Sciences and Assessments ("CISA"), which appears to have been in operation since 2003, is comprised of the following "affiliated institutions": East Carolina Univ.; North Carolina State Univ.; Univ. of North Carolina; Univ. of South Carolina. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams – Carolinas Integrated Sciences and Assessments*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/CISA.aspx. The Climate Impacts Research Consortium ("CIRC") appears to have commenced in 2010 and its 'Principal Investigator, Philip Mote, had served as a contributor to and reviewer of the Working Group I portion of the IPCC AR4. The CIRC is comprised of the following "affiliated institutions": Oregon State Univ.; Univ. of Oregon; Univ. of Wash.; and Univ. of Idaho. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams – Climate Impacts Research Consortium*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/CIRC.aspx. (CIRC is a member of The PNW Climate Impacts Research Consortium which includes the Oregon Climate Change Research Institute, and the Oregon Climate Service with which the following institutions are affiliated: Oregon State Univ.; Portland State Univ.; and Southern Oregon Univ. *See* "The PNW Climate Impacts Research Consortium", available at: http://pnwclimate.org/; "Oregon Climate Change Research Institute", available at: http://occri.net/; "Oregon Climate Service", available at: http://www.ocs.orst.edu/.) The Consortium on Climate Risk in the Urban Northeast ("CCRUN"), which appears to have commenced in 2011, is comprised of the following "affiliated institutions": Columbia Univ.; Univ. Mass. Amherst; City College of New York; Rutgers Univ.; Stevens Institute of Technology; Drexel Univ. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams – Consortium on Climate Risk in the Urban Northeast*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/CCRUN.aspx. The Alaska Center for Climate Assessment and Policy ("ACCAP"), which appears to have commenced during 2011, is 'housed' in the Univ. of Alaska-Fairbanks, a designated "affiliated institution". *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – RISA Program – RISA Teams – Alaska Center for Climate Assessment and Policy*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/RISAProgram/RISATeams/ACCAP.aspx.

[365] "The International Research and Applications Project (IRAP) is intended to support activities that link climate research and assessments to practical risk management, development and adaptation challenges in key regions throughout the world." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – International Research and Applications Project (IRAP), About About International Research and Applications Project (IRAP)*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/IRAPProgram/AboutIRAP.aspx. Apparently, DOC-NOAA had made a "long-term institutional investment in the International Research Institute for Climate and Society (IRI)" of Columbia University. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – International Research and Applications Project (IRAP)*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/IRAPProgram/MeetingsandEvents.aspx. The IRI website confirms that, "The IRI was established as a cooperative agreement between NOAA's Climate Program Office and Columbia University. It is part of The Earth Institute, Columbia University, and is located at the Lamont Campus." *See* "International Research Institute for Climate and Society (IRI) - Columbia University", available at: http://iri.columbia.edu/portal/server.pt.

[366] "The Sectoral Applications Research Program (SARP) supports interdisciplinary research to advance understanding of how climate variability and change affect key socio-economic sectors, and promotes the application of this new knowledge in climate-related decisions." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – Sectoral Applications Research Program - About the Sectoral Applications Research Program*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/SARPProgram/AboutSARP.aspx.

This program appears to have commenced during 2011. Based on the annual 2011 report submitted by NOAA grant recipients, NOAA appears to have funded the following universities: Univ. of North Carolina-Chapel Hill; Penn State Univ.; Texas A&M Univ. *See* "Annual Report to the National Oceanic and Atmospheric Administration's Climate Program Office, Sectoral Applications Research Program (SARP), Portfolio-based Approaches to Managing Climate Uncertainty in Urban Water Planning (Award No. NA11OAR4310144)", NOAA website, available at: http://cpo.noaa.gov/sites/cpo/Projects/SARP/CharacklisAnnualRpt.pdf.

[367] "The National Integrated Drought Information System (NIDIS) provides dynamic and easily accessible drought information for the Nation…NIDIS integrates basic and applied research performed by NOAA and other agencies into an adaptive decision-support environment for resource managers, farmers, and other water users." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Climate Program Office, *Climate and Societal Interactions – National Integrated Drought Information System (NIDIS), About the National Integrated Drought Information System (NIDIS)*, NOAA website, available at: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/NIDISProgram.aspx. The NIDIS program appears to have commenced in 2006. *See* United States Department of Commerce, National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research, *Climate Program Office National Integrated Drought Information System Brochure* (Oct. 2012), available at: http://cpo.noaa.gov/sites/cpo/Briefing%20sheets/NIDIS_Oct24v2.pdf. It appears that, during 2010, NOAA had funded a NIDIS research project that involved the following universities: Mississippi State Univ.; Princeton Univ.; and Univ. of Washington. *See* Lifeng Luo, *Research project funded by NOAA Climate Program Office*, Hydroclimatology Research Group at MSU (May 21, 2010), available at: http://drought.geo.msu.edu/news/2010520/.

[368] *See* NOAA CWISE, available at: http://cwise.ncsu.edu/ ("The NOAA Cooperative Program for Climate & Weather Impacts on Society and the Environment (CWISE) is a collaboration between NOAA's National Climatic Data Center, NOAA's Coastal Services Center, and NC State University and its partners. CWISE brings together research, education and information services relating to the Earth's climate and weather systems and their impacts. The scientific acticities within CWISE are organized under broad thematic areas. The topical areas and scientific objectives are guided by the NOAA Strategic Plan and its related goals in the context of the research, education, outreach activities and expertise resident at NCDC, CSC, NCSU and participating universities and federal and state agencies.") *Id*.

[369] "NOAA's National Sea Grant College Program is a network of *33 Sea Grant programs located in every coastal and Great Lakes state, Puerto Rico, Lake Champlain and Guam*. These programs serve as the core of a dynamic, *national university-based network of over 300 institutions involving more than 3,000 scientists, engineers, educators, students and outreach experts*. The network engages the power of academia and a wide variety of partners to address issues such as coastal hazards, sustainable coastal development and seafood safety" (emphasis added). *See* United States Department of Commerce National Oceanographic and Atmospheric Administration, *Sea Grants Program – National Network of State Programs*, NOAA website, available at: http://seagrant.noaa.gov/WhereWeWork/SeaGrantPrograms.aspx. *See also* Mississippi-Alabama Sea Grant Consortium, *About MASGC*, available at: http://masgc.org/about; NJ Sea Grant Consortium, *About Us-Member Institutions*, available at: http://njseagrant.org/about-us/member-institutions/; South Carolina Sea Grant Consortium, *The Changing Face of Coastal South Carolina: Enhancing Understanding – Informing Decision-making, Strategic Plan 2014-2017* (Oct. 29, 2012), at p. 47, available at: http://www.scseagrant.org/pdf_files/SCSGC-Strat-Plan-2014-2017.pdf.; Illinois-Indiana Sea Grant, *About Us*, available at: http://www.iisgcp.org/aboutus.html.

[370] These 33 programs are found at and involve the following universities: 1) Guam Sea Grant Program - Univ. of Guam; 2) Hawaii Sea Grant Program - Univ. of Hawaii; 3) Alaska Sea Grant Program - Univ. of Alaska-Fairbanks; 4) Puerto Rico Sea Grant Program - Univ. of Puerto Rico; 5) Washington Sea Grant Program - Univ. of Washington; 6) Oregon Sea Grant Program - Oregon State Univ.; 7) University of Southern California Sea Grant Program - Univ. of Southern California; 8) California Sea Grant Program - UC-San Diego, UC-Davis, US-Santa Barbara, UC-Santa Cruz, UC Los Angeles, Stanford Univ; 9) Louisiana Sea Grant Program - Louisiana State Univ.; 10) Mississippi-Alabama Sea Grant Consortium - (Auburn Univ., Dauphin Island Sea Lab, Jackson State Univ., Miss. State Univ., Univ. of Alabama, Univ. of Miss., Univ. of So. Miss., Univ. of So. Alabama); 11) Florida Sea Grant Program - Univ. of Florida; 12) National Sea Grant Law Center - Univ. of Mississippi; 13) Georgia Sea Grant Program - Univ. of Georgia; 14) South Carolina Sea Grant Consortium **(**Clemson Univ., College of Charleston, Coastal Carolina Univ., Medical Univ. of South Carolina, South Carolina State Univ., The Citadel, Univ. of South Carolina, SC Dep't of Natural Resources**)**; 15) North Carolina Sea Grant Program - North Carolina State Univ.; 16) Virginia Sea Grant Program - Virginia Institute of Marine Science; 17) Maryland Sea Grant Program - Univ. of Maryland; 18) Delaware Sea Grant Program - Univ. of Delaware; 19) New Jersey Sea Grant Consortium - **(**including Rutgers Univ., Princeton Univ., and twenty other universities**)**, 20) New York Sea Grant Program - State Univ. of New York Stonybrook; 21) Connecticut Sea Grant Program - Univ. of Connecticut; 22) Rhode Island Sea Grant Program - Univ. of Rhode Island; 23) WHOI Sea Grant Program - Woods Hole Oceanographic; 24) MIT Sea Grant Program - Massachusetts Institute of Technology; 25) New Hampshire Sea Grant Program - Univ. of New Hampshire; 26) Maine Sea Grant Program - Univ. of Maine; 27) Lake Champlain Sea Grant Program - Univ. of Vermont; 28) Pennsylvania Sea Grant Program - Penn State Univ.; 29) Ohio Sea Grant Program - Ohio State Univ.; 30) Michigan Sea Grant Program - Univ. of Michigan; 31) Illinois-Indiana Sea Grant Program - **(**Univ. of Illinois-Urbana, Purdue Univ.**)**; 32) Wisconsin Sea Grant Program - Univ. of Wisconsin; and 33) Minnesota Sea Grant Program -

Univ. of Minnesota. *See, e.g.*, California Sea Grant College Program, *Program Directory – 2005-2006*, at p. 5, available at: http://www-csgc.ucsd.edu/BOOKSTORE/Resources/PD_2005.pdf. *Cf.* California Sea Grant College Program, *Program Directory – 2006-2007*, at pp. 10-11; California Sea Grant College Program, *Program Directory – 2009*, at pp. 7-8, available at: http://www-csgc.ucsd.edu/BOOKSTORE/Resources/PD.2009.pdf.

[371] *See* NOAA Center for Atmospheric Sciences (NCAS), *About Us*, available at: http://ncas.howard.edu/about-ncas/ ("In September 2001, the National Oceanic and Atmospheric Administration (NOAA) Center for Atmospheric Sciences (NCAS) was awarded a cooperative agreement with the Department of Commerce NOAA Educational Partnership Program. NCAS is a cooperative partnership between four (4) minority-serving institutions (MSI): Howard University (HU) — the lead institution, Jackson State University (JSU), the University of Puerto Rico at Mayagüez (UPRM), and the University of Texas at El Paso (UTEP); and two (2) majority universities: *University of Maryland College Park (UMCP), and the State University of New York at Albany (SUNYA)*" (emphasis added). *Id*.

[372] *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, *NOAA Coral Reef Conservation Program – Climate Change*, available at: http://coralreef.noaa.gov/threats/climate/ ("Climate change impacts have been identified as one of the greatest global threats to coral reef ecosystems. As temperature rise, mass bleaching, and infectious disease outbreaks are likely to become more frequent. Additionally, carbon dioxide (CO2) absorbed into the ocean from the atmosphere has already begun to reduce calcification rates in reef-building and reef-associated organisms by altering sea water chemistry through decreases in pH (ocean acidification). In the long term, failure to address carbon emissions and the resultant impacts of rising temperatures and ocean acidification could make many other coral ecosystem management efforts futile. Climate change and ocean acidification have been identified by many groups as the most important threat to coral reefs on a global basis. In 2007, *the Intergovernmental Panel on Climate Change (IPCC) noted that the evidence is now 'unequivocal' that the earth's atmosphere and oceans are warming. They concluded that these changes are primarily due to anthropogenic greenhouse gases* (i.e.those derived from human activities), especially the accelerating increase in emissions of CO2") (emphasis added). *Id.*; U.S. Department of Commerce National Oceanic and Atmospheric Administration, *NOAA Coral Reef Conservation Program - Fiscal Year 2006 Accomplishments*, available at: http://coralreef.noaa.gov/aboutcrcp/howwework/accomplishments/archive/resources/fy06_crcp_accomps.pdf. *See also* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *NOAA Coral Reef Conservation Program Funding Opportunities*, available at: http://coralreef.noaa.gov/aboutcrcp/workwithus/funding/.

[373] *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, *National Coral Reef Preservation Program - Coral Reef Research Institutes and Programs*, available at: http://www.coris.noaa.gov/activities/cr_rip.html; National Oceanic and Atmospheric Administration, *Center for Sponsored Coastal Ocean Research - Coral Reef Institutes*, available at: http://www.cop.noaa.gov/ecosystems/coralreefs/current/institutes.aspx; Hawaii Coral Reef Initiative Research Program, *Governance*, available at: http://www.hcri.ssri.hawaii.edu/about/governance.html (housed at the **Univ. of Hawaii**); Nova Southeastern University, *National Coral Reef Institute (NCRI)*, available at: http://www.nova.edu/ocean/ncri/index.html; Caribbean Coral Reef Institute (CCRI), *Welcome to the Caribbean Coral Reef Institute*, available at: http://ccri.uprm.edu/ (housed at the **Univ. of Puerto Rico**); Western Pacific Coral Reef Institute (housed at the **Univ. of Guam**). *See also* Coastal States.org, *Coral Reef Conservation - FY2015*, available at: http://www.coastalstates.org/wp-content/uploads/2014/02/CSO_CRCP_FY15_Appropriations_FS.pdf ("As a result of E.O. 13089, Congress also appropriated funds to support state and region-based coral reef research initiatives, which resulted in the creation of four U.S. Coral Reef Institutes: National Coral Reef Institute, Hawaii Coral Reef Initiative, Caribbean Coral Reef Institute, and Western Pacific Coral Reef Institute. […] **Historical funding for the Institutes is approximately $3 million**. […] [T]he Coral Reef Institutes have yet to be recognized through a cooperative institute agreement with NOAA […]") (emphasis added). *Id.*, at pp. 1-2. For FY2009 this program issued grant awards to the following universities and nonprofit institutes: **Univ. of Hawaii** ($163,806); **UC San Diego** ($56,385); **Univ. of North Carolina** ($169,150); **Georgia Institute of Technology** ($112, 066); **The Nature Conservancy** ($648,000); **SUNY** ($39,249). *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, *NOAA Coral Reef Conservation Program Grant Awards in Fiscal Year 2009*, available at: http://coralreef.noaa.gov/aboutcrcp/workwithus/funding/grants/resources/fy09_grant_awards.pdf. For FY 2010, this program issued grant awards to the following universities and nonprofit institutes: **The Nature Conservancy** ($1,138,232); **Univ. of California Regents** ($43,387); **Univ. of Hawaii** ($88,590). In addition, for FY2010, the Coral Reef Institutes also had been funded as follows: **Hawaii Coral Reef Institute** (**Univ. of Hawaii**) ($150,000); **National Coral Reef Institute (Nova Southeastern Univ.)** ($1,045,000); **Caribbean Coral Reef Institute (Univ. of Puerto Rico)** ($878,000); **Western Pacific Coral Reef Institute (Univ. of Guam)** ($200,000). *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, *NOAA Coral Reef Conservation Program, Financial Assistance Awards for Fiscal Year 2010*, available at: http://coralreef.noaa.gov/aboutcrcp/workwithus/funding/grants/resources/fy10_grant_awards.pdf.

[374] *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, *Regional Ocean Partnerships*, available at: http://www.csc.noaa.gov/oceangovernance/ ("The U.S. Commission on Ocean Policy and the Interagency Ocean Policy Task Force recommended the development of regional ocean councils to help state and federal agencies jointly address ocean and coastal challenges. Regional staff members from the NOAA Coastal Services Center support regional ocean partnership efforts at all levels.

Regional ocean partnerships include the following: Caribbean Regional Ocean Partnership[;] Council of Great Lakes Governors[;] Governors' South Atlantic Alliance[;] Gulf of Mexico Alliance[;] Hawaii Ocean Resources Management Plan[;] Mid-Atlantic Regional Council on the Ocean[;] Northeast Regional Ocean Council[;] Pacific Regional Ocean Partnership[;] West Coast Governors Alliance on Ocean Health[.]") *Id*. "This grant program was developed to advance effective coastal and ocean management through regional ocean governance, including the goals for national ocean policy and comprehensive ocean planning set out in the president's *Final Recommendations of the Interagency Ocean Policy Task Force*, July 19, 2010. The ROPFP program supported two categories of activities: 1) implementation of a spectrum of regional ocean partnership priorities, with a focus on ocean planning activities, and 2) support for development and operations for regional ocean partnerships" (emphasis in original). *See* NOAA Coastal Services Center Office of Ocean and Coastal Resource Management, *Grant Awards - NOAA Regional Ocean Partnership Funding Program* (Jan. 2012), at p. 1, available at: http://www.csc.noaa.gov/funding/_pdf/RegionalOceanPartnershipFundingProgramGrantAwardsAnnouncement.pdf (awarding *inter alia* "a total of $1,062,431 [to t]he **South Carolina Sea Grant Consortium** […] to support the South Atlantic Alliance's initiative to provide a multi-state and regional framework for ocean planning in the Southeast U.S., as well as to continue the development and organization of the alliance for the Southeast region" and awarding $249,000 to the **Univ. of Hawaii** "representing the Pacific Islands region […] to support the development of the Pacific Regional Ocean Partnership (PROP)"). *Id*., at p. 2; NOAA Coastal Services Center Office of Ocean and Coastal Resource Management, *Grant Awards - NOAA Regional Ocean Partnership Funding Program* (Sept. 2012), at p. 1, available at: http://www.csc.noaa.gov/funding/_pdf/RegionalOceanPartnershipGrantAnnouncementSEPT2012.pdf (awarding *inter alia* $225,000 to the **Univ. of Hawaii** "to continue support for the establishment of the Pacific Regional Ocean Partnership (PROP) as a governance structure to implement priorities of the Pacific region, as well as the National Ocean Policy, by enhancing the regional capacity for ocean planning.") *Id*., at p. 2; NOAA Coastal Services Center Office of Ocean and Coastal Resource Management, *Grant Awards - NOAA Regional Ocean Partnership Funding Program* (Aug. 2013), at p. 1, available at: http://www.csc.noaa.gov/funding/_pdf/RegionalOceanPartnershipFundingProgramGrantAnnouncementAUG2013.pdf (allocating part of an award of $665,602 received by the Mid-Atlantic Regional Council on the Ocean (MARCO) to **Rutgers Univ**. "to advance regionally focused climate adaptation policies consistent with the goals of the National Ocean Policy," and an award of $166,250 to the **Univ. of Hawaii** "to build regional capacity to support implementation of the Pacific Regional Ocean Partnership (PROP) agreement and the PROP Action Plan, including priority activities enhancing climate and disaster resilience and addressing regional needs through coastal and marine spatial planning among the states of American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and Hawaii.") *Id*., at pp. 1-2.

[375] *See* NOAA Coastal Services Center, *Previous Announcements - Table 2.0: Archive of Selected NOAA Competitive Federal Funding Opportunities (FFOs)*, available at: http://www.csc.noaa.gov/funding/archive.html.

[376] *See* Executive Summary and/or Section I.C of the broad agency announcements of federal funding opportunity discussed herein.

[377] For example, Funding Opportunity Number: NFA-NFA-2007-2000946 (2007) had identified thirty-nine of the "most prevalent" Catalogue of Federal Domestic Assistance (CFDA) numbers (CFDA 11.400-11.481) describing subject matter relating to the statutory support for that BAA. As of 2012, at least seven of these CFDA numbers had been archived (11.443-11.445, 1.449-11.450, 11.455 and 11.477). See e.g., U.S. General Services Administration, *Catalogue of Federal Domestic Assistance (CFDA)* (2012), at pp. AIS-3, AIP-7, A-1, available at: https://www.cfda.gov/downloads/CFDA_2012.pdf.

[378] *See* United States Code, Title 15 – Commerce and Trade, Chapter 40 – Department of Commerce, 15 USC §1540, available at: http://www.gpo.gov/fdsys/granule/USCODE-2011-title15/USCODE-2011-title15-chap40-sec1540.

[379] *See* United States Code, Title 15 – Commerce and Trade, Chapter 56 – National Climate Program, 15 USC §2901, available at: http://www.gpo.gov/fdsys/granule/USCODE-2010-title15/USCODE-2010-title15-chap56-sec2901.

[380] *See* Public Law 98-210 (Dec. 6, 1983) 97 STAT 1409, available at: http://www.gpo.gov/fdsys/pkg/STATUTE-97/pdf/STATUTE-97-Pg1409.pdf.

[381] *See* United States Code, Title 16 - Conservation, Chapter 33 - Coastal Zone Management, 16 USC §1456, available at: http://www.gpo.gov/fdsys/granule/USCODE-2011-title16/USCODE-2011-title16-chap33-sec1456c.

[382] *See* United States Code, Title 33 – Navigation and Navigable Waters, Chapter 17 – National Oceanic and Atmospheric Administration, Subchapter II - Surveys, 33 USC §883a-d, available at: http://www.gpo.gov/fdsys/granule/USCODE-2011-title33/USCODE-2011-title33-chap17-subchapII-sec883d.

[383] *See* United States Code, Title 33 – Navigation and Navigable Waters, Chapter 17 – National Oceanic and Atmospheric Administration, Subchapter V – Research, Development, Education and Innovation, 33 USC 893a, available at: http://www.gpo.gov/fdsys/granule/USCODE-2010-title33/USCODE-2010-title33-chap17-subchapV-sec893.

[384] *See* United States Code, Title 33 – Navigation and Navigable Waters, Chapter 27 – Ocean Dumping, Subchapter II – Research, 33 USC §1442, available at: http://www.gpo.gov/fdsys/granule/USCODE-2011-title33/USCODE-2011-title33-chap27-subchapII-sec1442.

[385] *See* United States Code, Title 49 – Transportation, Chapter 447 – Safety Regulation, 42 USC §44720, available at: http://www.gpo.gov/fdsys/pkg/USCODE-2011-title49/html/USCODE-2011-title49.htm.

[386] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Omnibus Notice Announcing the Availability of Grant Funds for Fiscal Year 2006*, 70 FR 37766, 37769 (June 30, 2005), available at: http://www.gpo.gov/fdsys/pkg/FR-2005-06-30/pdf/05-12927.pdf.

[387] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Office of Finance, Announcement of Federal Funding Opportunity, *NOAA's Broad Area Announcement (BAA) - Funding Opportunity Number: NFA-NFA-2007-2000946*, available at: http://www.csc.noaa.gov/funding/_pdf/archive/2007/NOAA_BAA_2007.pdf.

[388] *See* U.S. Department of Commerce, National Oceanic And Atmospheric Administration Office of Finance and Administration (NFA), Announcement of Federal Funding Opportunity, *FY 2008 Broad Agency Announcement Funding - Opportunity Number: NFA-NFAPO-2008-2001388*, at pp. 1-2, available at: http://www.csc.noaa.gov/funding/_pdf/archive/2010/NOAA_BAA_2008_closing_9-30-2009.pdf. NOAA's solicitation for FY2008 adds the following statements: "It is not a mechanism for awarding Congressionally directed funds. Funding for potential projects in this notice is contingent upon the availability of Fiscal Year 2008 and Fiscal Year 2009 appropriations." *Id*., at p. 1.

[389] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Announcement of Federal Funding Opportunity, NOAA's Broad Area Announcement (BAA) - Funding Opportunity Number: NFA-NFA-2007-2000946*, *supra* at pp. 3-4; U.S. Department of Commerce, National Oceanic And Atmospheric Administration Office of Finance and Administration (NFA), *Announcement of Federal Funding Opportunity, FY 2008 Broad Agency Announcement Funding - Opportunity Number: NFA-NFAPO-2008-2001388*, *supra* at pp. 2-3.

[390] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) Office of Finance and Administration (NFA), *Announcement of Federal Funding Opportunity, FY 2010-FY2011 Broad Agency Announcement - Funding Opportunity Number: NOAA-NFA-NFAPO-2010-2002272*, at pp. 1-3, available at: http://www.csc.noaa.gov/funding/_pdf/archive/2010/baa_ffo_2010-2011.pdf.

[391] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), *FY 2012 - 2013 Broad Agency Announcement (BAA) - Funding Opportunity Number: NOAA-NFA-NFAPO-2012-2003133*, available at: http://www.csc.noaa.gov/funding/_pdf/archive/2012/baa_ffo_2012-2013.pdf ("B. Program **Priorities…1. Long-term mission goal: Climate Adaptation and Mitigation and responding to climate and its impacts**. Projected future climate-related changes include increased global temperatures, melting sea ice and glaciers, rising sea levels, increased frequency of extreme precipitation events, acidification of the oceans, modifications of growing seasons, changes in storm frequency and intensity, air quality, alterations in species' ranges and migration patterns, earlier snowmelt, increased drought, and altered river flow volumes. Impacts from these changes are regionally diverse, and affect numerous sectors related to water, energy, transportation, forestry, tourism, fisheries, agriculture, and human health.") (emphasis added). *Id*., at pp. 2-3.

[392] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) Office of Finance and Administration (NFA), *Announcement of Federal Funding, FY 2014 - 2015 Broad Agency Announcement (BAA) - Funding Opportunity Number: NOAA-NFA-NFAPO-2014-2003949*, available at: http://www.csc.noaa.gov/funding/_pdf/NOAA_BAA_FFO_2014-2015_posted_12.09.2013_closing_9.30.2015.pdf ("B. Program **Priorities...1. Long-term mission goal: Climate Adaptation and Mitigation**…Projected future climate-related changes include increased global temperatures, melting sea ice and glaciers, rising sea levels, increased frequency of extreme precipitation events, acidification of the oceans, modifications of growing seasons, changes in storm frequency and intensity, air quality, alterations in species' ranges and migration patterns, earlier snowmelt, increased drought, and altered river flow volumes.") (emphasis added). *Id*., at pp. 2-3.

[393] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Notice of Availability of Grant Funds for Fiscal Year 2009*, 73 FR 40052-40053, 40075, 40078, 40080 (July 11, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-07-11/pdf/E8-15720.pdf.

[394] *See* National Oceanic and Atmospheric Administration, Department of Commerce, Notice of Federal Funding Opportunity, *NOAA's Broad Area Announcement (BAA) - Funding Opportunity Number: NFA-NFA-2007-2000946*, supra.

[395] *See* Federal Acquisition Regulation 35.016(a), 48 CFR 35.016(a), *Broad Agency Announcement*, available at: http://www.gpo.gov/fdsys/pkg/CFR-2002-title48-vol1/pdf/CFR-2002-title48-vol1-sec35-016.pdf; http://www.acquisition.gov/far/html/Subpart%2035_0.html. "(b) The BAA, together with any supporting documents, shall— (1) *Describe the agency's research interest, either for an individual program requirement or for broadly defined areas of interest covering the full range of the agency's requirements*; (2) Describe the criteria for selecting the proposals, their relative importance, and the method of evaluation; (3) Specify the period of time during which proposals submitted in response to the BAA will be accepted; and (4) Contain instructions for the preparation and submission of proposals" (emphasis added). *Id*., at 48 CFR 35.016(b).

[396] *Id*., at 48 CFR 35.016(c)-(e).

[397] *See* FAR 6.102(d), available at: http://www.acquisition.gov/far/html/Subpart%206_1.html#wp1087654; 48 CFR Sec. 6.102(d), available at: http://www.law.cornell.edu/cfr/text/48/6.102; U.S. Army, *Broad Agency Announcements*, available at: http://www.arl.army.mil/www/default.cfm?page=8.
[398] *See* Public Law 98-369 (98 stat 1175 et seq.) authorizing use of 'general solicitations' or Broad Agency Announcements (BAA's).
[399] *See* United States Code, Title 15 – Commerce and Trade, Chapter 9 – National Weather Service, available at: http://www.gpo.gov/fdsys/granule/USCODE-2010-title15/USCODE-2010-title15-chap9-sec313.
[400] *See* United States Code, Title 15 – Commerce and Trade, Chapter 56 – National Climate Program, available at: http://www.gpo.gov/fdsys/granule/USCODE-2011-title15/USCODE-2011-title15-chap56-sec2904.
[401] *See* United States Code, Title 15 – Commerce and Trade, Chapter 56A – Global Change Research, Subchapter 1 - United States Global Change Research Program, available at: http://0-www.gpo.gov.librus.hccs.edu/fdsys/search/pagedetails.action?collectionCode=USCODE&searchPath=Title+15%2FChapter+56a%2FSUBCHAPTER+I&granuleId=USCODE-1995-title15-chap40-sec1540&packageId=USCODE-1995-title15&oldPath=Title+15%2FCHAPTER+56A&fromPageDetails=true&collapse=true&ycord=2931.
[402] *See* United States Code, Title 16 – Conservation, Chapter 9 – Fish and Wildlife Service, available at: http://www.gpo.gov/fdsys/granule/USCODE-2011-title16/USCODE-2011-title16-chap9-sec753a.
[403] *See* United States Code, Title 16 – Conservation, Chapter 38 – Fishery Conservation and Management, Subchapter – Fishery Monitoring and Research, available at: http://www.gpo.gov/fdsys/granule/USCODE-2011-title16/USCODE-2011-title16-chap38-subchapV-sec1884/content-detail.html.
[404] *See* United States Code, Title 16 – Conservation, Chapter 83 – Coral Reef Conservation, available at: http://www.gpo.gov/fdsys/search/pagedetails.action?collectionCode=USCODE&searchPath=Title+16%2FCHAPTER+83&granuleId=USCODE-2011-title16-chap38-subchapV-sec1884&packageId=USCODE-2011-title16&oldPath=Title+16%2FChapter+38%2FSubchapter+V%2FSec.+1884&fromPageDetails=true&collapse=true&ycord=5000.
[405] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research Climate Program Office, *Announcement of Federal Funding Opportunity: NOAA Climate Program Office (CPO) for Fiscal Year (FY) 2007 - Funding Opportunity Number: OAR-CPO-2007-2000636*, available at: http://www1.ncdc.noaa.gov/pub/data/sds/cdr/ffo/sds-fy07-ffo.pdf.
[406] *Id*., at pp. 2-9.
[407] *Id*., at pp. 10-11.
[408] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research, *New NOAA Cooperative Institutes (CIs): (1) Alaska and Related Arctic Regions Environmental Research and (2) Earth System Modeling for Climate Applications – Notice of Availability of Funds*, 72 FR 60317 (Oct. 24, 2007), available at: http://www.gpo.gov/fdsys/pkg/FR-2007-10-24/pdf/E7-20973.pdf.
[409] *Id*., at 60319.
[410] *See* National Climatic Data Center, Coastal Services Center, and Climate Program Office, National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, *Notice of Funding Availability - FY 2007 Climate and Weather Impacts on Society and the Environment*, available at: http://www.csc.noaa.gov/funding/_pdf/archive/2007/FFO_CWISE.pdf.
[411] *Id*., at p. 3.
[412] *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, National Oceans Service and National Oceanic And Atmospheric Administration, *Announcement of Federal Funding Opportunity – Funding Opportunity Number: NOS-NCCOS-2007-2000701* (June 2006), at p. 3, available at: http://coastalscience.noaa.gov/funding/docs/2007%20CRES%20FFO%20Report.pdf.
[413] *Id*., at p. 5.
[414] *Id*., at p. 10.
[415] *See* Oceanic and Atmospheric Research (OAR), National Oceanic And Atmospheric Administration, Department of Commerce, *Climate Program Office for FY 2009 - Funding Opportunity Number: OAR-CPO-2009-2001430*, available at: http://apply07.grants.gov/apply/opportunities/instructions/oppOAR-CPO-2009-2001430-cfda11.431-cid2117994-instructions.pdf ("In FY 2009, NOAA will accept individual applications in all the Competitions below […] 1. Arctic Research Program (ARP): The goal of the Arctic Research Program (ARP) is to: provide climate-relevant observations and analysis of the broader Arctic region, with an emphasis on the Pacific sector of the Arctic […] In FY2009, the ARP is soliciting proposals for post-IPY synthesis and analysis activities […] 2. Atmospheric Composition and Climate (ACC): The Atmospheric Composition and Climate (ACC) Program pursues two overall research objectives: (i) to improve the predictive understanding of the radiative forcing of the climate system by aerosols and by chemically active greenhouse gases, including the role of water vapor in the upper troposphere in altering the radiative forcing directly and via its influence on aerosols and other chemically active greenhouse gases, and (ii) to better characterize the recovery of the stratospheric ozone layer and its role in climate change […] Primary emphasis is on utilizing process research to contribute to the improvement of climate modeling ability for decision support […] 3. Climate Change Data and Detection (CCDD): The goal of the

Climate Change Data and Detection (CCDD) Program is to provide data and information management support to assure the availability of critical data sets for a variety of programs and assessments, both national and international e.g., the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP), the International Geosphere-Biosphere Programme (IGBP), the Intergovernmental Panel on Climate Change (IPCC), and the U.S. Climate Change Science Program (CCSP). The data and resulting products extend the existing long-term climate record and serve as essential input to predictive models […]4. Climate Dynamics and Experimental Prediction (CDEP): Climate Test Bed (CTB) Research Program The National Centers for Environmental Prediction (NCEP) and the Climate Program Office are jointly sponsoring the Climate Test Bed (CTB) Research Program. The objective of the NCEP's CTB is to improve operational methodologies and techniques leading to improved quality and applicability of NOAA operational climate forecasts, products, and applications. The goal of the CTB Research Program is to support research that forms a foundation for potential transition of research advancements into the CTB […]5. Climate Prediction Program for the Americas (CPPA): The Climate Prediction Program for the Americas (CPPA) is a competitive research program with a goal to improve operational intraseasonal to interannual climate and hydrologic predictions for the Americas with quantified uncertainties sufficient for making informed decisions […] 6. Climate Variability and Predictability (CVP): In support of NOAA?s prediction mission, the Climate Variability and Predictability (CVP) Program seeks to understand the role and inherent predictability of coupled ocean-atmosphere interactions in the global climate system over sub-decadal and longer timescales with an emphasis on climatic impacts over North America. In FY 2009, the CVP Program is soliciting proposals that aim to advance our ability to make decadal climate predictions, with a particular focus on coupled ocean-atmosphere interactions in the Atlantic and Pacific sectors that influence North American climate [...] 7. Global carbon Cycle (GCC): The goal of the Global Carbon Cycle (GCC) Program is to improve our ability to predict the fate of anthropogenic carbon dioxide and future atmospheric carbon dioxide concentrations using a combination of atmospheric and oceanic global observations, process-oriented field studies and modeling […] 8. Regional Integrated Sciences and Assessments (RISA): […]The Regional Integrated Sciences and Assessments (RISA) Program supports integrated, place-based research across a range of social, natural, and physical science disciplines to expand decision-makers' options in the face of climate change and variability at the regional level. It does this in a manner that is cognizant of and analyzes the context decision-makers function within and the constraints they face in managing their climate sensitive resources. The RISA Program seeks to: (1) foster interdisciplinary research and assessment synthesis; (2) improve our understanding of and bridging the gap among climatic, environmental and societal interactions on different temporal and spatial scales; and (3) contribute to regional decision support and climate information service […] In FY 2009, the RISA Program is soliciting proposals for one distinct region: the Pacific Islands […] 9. Sector Applications and Research Program (SARP): The Sectoral Applications Research Program (SARP) is designed to catalyze and support interdisciplinary applied research, outreach and education activities that enhance the capacity of key socio-economic sectors and systems to respond to and plan for climate variability and change through the use of climate information and related decision support resources. This goal is pursued through research projects and partnership efforts that: a) involve stakeholders in the design and assessment of the 8 research activities; and b) develop innovative and transferable methods for understanding and adapting to changes in climate.") *Id*., at pp. 2-8.

[416] *See* Oceanic and Atmospheric Research (OAR), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, Announcement of Federal Funding Opportunity, *A Cooperative Agreement for Climate Adaptation and Mitigation - Funding Opportunity Number: NOAA-OAR-CPO-2011-2002920*, available at: http://apply07.grants.gov/apply/opportunities/instructions/oppNOAA-OAR-CPO-2011-2002920-cfda11.431-cid2224598-instructions.pdf ("Funding Opportunity Description: […]The collaborator will focus on the themes of 1) Climate Adaptation and Mitigation: The impacts of a changing climate on the Nation's ocean and coastal ecosystems, which include living marine resources, salt and freshwater resources, as well as coastal communities; 2) Improved Scientific Understanding of the Changing Climate system and its Impacts: The need to advance understanding of the climate system and climate impacts, improve climate predictions and projections, and better inform adaptation and mitigation strategies; 3) Assessments of Current and Future States of the Climate System: Stakeholders and the general public need a clear understanding of the best available science that describes the state of the climate and the likely impacts of climate change […] B. Program Priorities The Climate Program Office expects the recipient to address the following four priority areas: 1. Improved scientific understanding of the changing climate system and its impacts […] 2. Assessments of current and future states of the climate system that identify potential impacts and inform science, service, and stewardship decisions […] 3. Mitigation and adaptation efforts supported by sustained, reliable, and timely climate assessments […] 4. A climate-literate public that understands its vulnerabilities to a changing climate and makes informed decisions.") *Id*., at pp. 1-4.

[417] *See* Oceanic and Atmospheric Research (OAR), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, Announcement of Federal Funding Opportunity, *Research Partnerships in Support of Regional Climate Adaptation - Funding Opportunity Number: NOAA-OAR-CPO-2012-2003304*, at p. 10, available at: http://apply07.grants.gov/apply/opportunities/instructions/oppNOAA-OAR-CPO-2012-2003304-cfda11.431-cid2268558-instructions.pdf ("[T]he President's Interagency Climate Change Adaptation Task Force (ICCATF) recommends that regional climate science and service efforts of the Federal government should be better coordinated to most effectively support regional-to-local decision makers facing the impacts of climate change. This announcement is designed to stimulate partnerships by bringing people

together around specific projects related to regionally relevant issues addressing climate adaptation […] The NOAA Climate Program Office's (CPO) Regionally Integrated Science and Assessments (RISA) program supports research teams that conduct innovative, interdisciplinary, user-inspired, and regionally relevant research that informs resource management and public policy. CPO funds eleven different RISA teams across the United States and Pacific Islands, many of which are a model for interdisciplinary science and assessment. RISAs have been nationally and internationally recognized for their innovations in providing support to decision makers on the ground who are managing risks associated with climate variability and change. NOAA's RISA program is a part of CPO's Climate and Societal Interactions (CSI) division and an active partner in the National Climate Data Center's (NCDC) efforts to build an integrated regional climate services partnership. CSI provides leadership and support for decision support research, assessments and climate services development activities in support of adaptation. In addition to RISA, CSI's programs include the International Research and Applications Project (IRAP), the Sectoral Applications Research Program (SARP), the National Integrated Drought Information System (NIDIS), and the Coastal and Ocean Climate Applications (COCA) […] RISA teams interact with a diversity of decision makers, scientists, and practitioners, including federal representatives, at local, state and federal scales. The aim of this announcement is to build on these partnerships through research projects. NOAA CPO intends to invite participation from several federal partners to evaluate program relevance and to seek leveraging opportunities to support the proposed projects […] We aim to encourage expansion of regional capacity for climate knowledge to action by enhancing or initiating partnerships for research. Proposals for this competition should have at least one lead investigator be a RISA scientist […] Applicants must show how the proposed project will influence broad regional networks and/or multiple user groups across a RISA region or across multiple RISA regions. i. Develop regional capacity for coastal and marine climate adaptation […] ii. Develop regional or cross-regional capacity for water resource management and planning […] iii. Develop regional capacity for land managers to adapt to climate.") *Id*., at pp. 1-2, 4, 7-9.

[418] *See* Oceanic and Atmospheric Research (OAR), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, Announcement of Funding Opportunity, *Climate Program Office for FY 2013 - Funding Opportunity Number: NOAA-OAR-CPO-2013-2003445*, at p. 3, available at: http://research.aces.illinois.edu/sites/research.aces.illinois.edu/files/Climate%20Program%20Office%20for%20FY%202013.pdf ("B. Program Priorities CPO supports competitive research through four major Programs: Climate Observations and Monitoring (COM); Earth System Science (ESS); Modeling, Analysis, Predictions, and Projections (MAPP); and Climate and Societal Interactions (CSI). Through this Announcement, CPO's Programs are seeking applications for seven individual competitions in FY 2013 […] The *seven competitions* covered by this Announcement are as follows: ESS - Understanding and Improving Prediction of Tropical Convection using Results from the DYNAMO (Dynamics of the Madden-Julian Oscillation) Field Campaign ESS - Atlantic Meridional Overturning Circulation (AMOC) Mechanisms and Decadal Predictability ESS - Atmospheric Chemistry, Carbon Cycle, and Climate MAPP - Research to Advance Climate Reanalysis MAPP - Research to Advance Climate and Earth System Models CSI-Sectoral Applications Research Program (SARP) CSI-Coastal and Ocean Climate Applications (COCA) […] In FY 2013, the ESS Program solicits proposals for research in the following three areas: 1. Understanding and Improving Prediction of Tropical Convection using Results from the DYNAMO (Dynamics of the Madden-Julian Oscillation) Field Campaign […] 2. Atlantic Meridional Overturning Circulation (AMOC) Mechanisms and Decadal Predictability […] 3. Atmospheric Chemistry, Carbon Cycle, and Climate […] In FY 2013, the MAPP Program is soliciting research proposals for the following two competitions: 1. Research to Advance Climate Reanalysis […] 2. Research to Advance Climate and Earth System Models […] In FY 2013, the following CSI competitions will be held: 1. SARP is soliciting proposals for two focus areas: 1) climate extreme event preparedness, planning, and adaptation; and 2) projects supporting the Coping with Drought Initiative in support of the National Integrated Drought Information System (NIDIS). 2. COCA is soliciting proposals focused on advancing the knowledge and capacity of decision makers at federal, state, and local levels to assess the risks of, prepare for, and respond to the impacts of climate variability and change on coastal communities and coastal and marine ecosystems" (emphasis added)). *Id*., at pp. 5-9.

[419] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) Oceanic and Atmospheric Research, *Announcement of Federal Funding Opportunity, NOAA Sea Grant Community Climate Adaptation Initiative 2011 - Funding Opportunity Number: NOAA-OAR-SG-2011-2002930*, available at: http://apply07.grants.gov/apply/opportunities/instructions/oppNOAA-OAR-SG-2011-2002930-cfda11.417-cid2225928-instructions.pdf.

[420] "The NOAA National Sea Grant College Program was established by Congress to promote responsible use and conservation of the Nation's ocean, coastal, and Great Lakes resources. Sea Grant carries out NOAA's mission of stewardship of our country's oceans and atmospheres through a broadly based network of universities." *Id*., at p. 1. *See also* National Sea Grant College Program Act, Public Law 89–688 (Oct. 15, 1966), 80 Stat. 998, 33 USC 1101 et seq., amended through Public Law 110–394, (Oct. 13, 2008), available at: http://www.gpo.gov/fdsys/pkg/USCODE-2011-title33/pdf/USCODE-2011-title33-chap22.pdf; http://legcounsel.house.gov/Comps/National%20Sea%20Grant%20College%20Program%20Act.pdf.

[421] *Id*., at p. 3.

[422] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research, *Northern Gulf of Mexico Cooperative Institute – Notice of Availability of Funds*, 71 FR 18082 (April 10, 2006), available at: http://www.gpo.gov/fdsys/pkg/FR-2006-04-10/pdf/E6-5184.pdf ("the NGOM CI would also contribute to the [Gulf of Mexico Coastal Ocean Observing System] GCOOS vision to 'establish a sustained observing system for the Gulf of Mexico to provide observations and products needed by users in this region'' to enable: Detecting and predicting climate variability and consequences…") *Id*., at 18083.

[423] *Id*., at 18083.

[424] *See* Northern Gulf Institute (NGI), *Project Progress Report Reporting Period: 10/01/06 – 06/30/07 - Supported by NA06OAR4320264*, available at: http://www.northerngulfinstitute.org/about/documents/progressReport2007.pdf ("The Northern Gulf Institute (NGI) is a NOAA Cooperative Institute, a partnership of five complementary academic institutions and NOAA. The collaboration is led by Mississippi State University (MSU), partnering with the University of Southern Mississippi (USM), Louisiana State University (LSU), Florida State University (FSU) and the Dauphin Island Sea Lab (DISL). […] The initial funding for the NGI was received on October 1, 2007. […]NGI conducts high-impact research and education programs in the Northern Gulf of Mexico region focused on integration - integration of the land-coast- ocean-atmosphere continuum; integration of research to operations; and integration of individual organizational strengths into a holistic program. […] The NGI implementation builds upon the proposal submitted by the NGI consortium to NOAA on May 23, 2006, a number of interactions with NOAA and resulting clarifications after selection, the NOAA October 1, 2006 award, the preparation and review of a Memorandum of Agreement between MSU and NOAA, and reference to NOAA's Cooperative Institute Interim Handbook."). *Id*., at pp. 1, 4-5.

[425] *See* National Oceanic and Atmospheric Administration, *Announcement of Federal Funding Opportunity - Funding Opportunity Number: NESDIS-NESDISPO-2009-2001411*, at p. 1, available at: http://www1.ncdc.noaa.gov/pub/data/sds/cooperative.revised.pdf "At least one research institution should be in Maryland, Washington D.C. or the adjacent states (Delaware, Pennsylvania, West Virginia and Virginia).") *Id*. *See also* National Environmental Satellite Data and Information Service Program Office (NESDISPO), National Environmental Satellite Data and Information Service (NESDIS), National Oceanic and Atmospheric Administration (NOAA), Commerce, *Notice of Funding Availability*, 73 FR 58560 (Oct. 7, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-10-07/pdf/E8-23826.pdf; National Environmental Satellite Data and Information Service Program Office (NESDISPO), National Environmental Satellite Data and Information Service (NESDIS), National Oceanic and Atmospheric Administration (NOAA), Commerce, *Notice of Rescission and of Revised Funding Availability*, 73 FR 79448 (Dec. 29, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-12-29/pdf/E8-30770.pdf.

[426] *Id*., at p. 3.

[427] "The CIs primary sponsor will be NESDIS/Center for Satellite Applications and Research (STAR, formerly known as Office of Research and Applications, ORA) and NESDIS/National Climatic Data Center. Research and development entities that the proposed CI may work with include NOAA programs, laboratories, science centers, other CI and NOAA-owned facilities; Sea Grant Colleges; other extramural NOAA partners; other Federal agencies; academia; and the private sector." *Id*., at p. 5.

[428] *Id*., at p. 11.

[429] *See* Cooperative Institute for Climate and Satellites, *Scientific Report For the Period: July 1, 2009 – March 31, 2010 - NOAA Grant NA09NES0006* (2010), available at: http://www.cicsnc.org/assets/pdfs/cics_annual_2010.pdf ("The Cooperative Institute for Climate and Satellites (CICS) was formed through a national consortium of academic, non-profit and community organizations with leadership from the University of Maryland, College Park (UMCP) and the University of North Carolina (UNC) System through North Carolina State University (NCSU). This partnership includes Minority Serving Institutions as well as others with strong faculties who will enhance CICS' capability to contribute to NOAA's mission and goals. CICS consists of two principal locations, one on the M-Square Research Park campus of UMCP adjacent to the NOAA Center for Weather and Climate Prediction, and the other within the National Climatic Data Center. The two locations are referred to as CICS-MD, located in College Park MD, and CICS-NC located located in Asheville NC.") *Id*., at p. 4. *See also* Cooperative Institute for Climate and Satellites, *About CICS NC*, available at: http://www.cicsnc.org/about/ ("In 2009, The Cooperative Institute for Climate and Satellites (CICS) was formed through a national consortium of academic, non-profit and community organizations, with leadership from the University of Maryland College Park (UMCP) and North Carolina State University with principal locations in College Park, Maryland and Asheville, North Carolina.") *Id*.

[430] *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, OAR Cooperative Institutes Program Office (CIPO), Oceanic and Atmospheric Research (OAR), *Notice of Funding Availability - A North Atlantic Regional Cooperative Institute [Federal Funding Opportunity (FFO): OAR-CIPO-2008-2001597]*, 73 FR 58569 (Oct. 7, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-10-07/pdf/E8-23654.pdf.

[431] "More specifically, the new CI will perform the following types of research activities: Research on the linkages among productivity, fish and fisheries, pollution, climate change, and ecosystem health; […] Research to distinguish marine resource changes due to human impacts from those resulting from natural forcing, including climate variability and change; […] [and] Examination of

the expected increases in socioeconomic benefits accrued from a better understanding of the effects of climate change, food webs, physical-chemical coupling, and ecosystem production dynamics." 73 FR 58569-58570.

[432] *Id*., at 73 FR 58570.

[433] See U.S. Department of Commerce National Oceanic and Atmospheric Administration, *NOAA Selects New Cooperative Institute to Study Climate and North Atlantic Ecosystems* (June 18, 2009), available at: http://www.noaanews.noaa.gov/stories2009/20090618_atlanticcoop.html ("NOAA's Oceanic and Atmospheric Research and National Marine Fisheries Service, have selected a consortium of five universities for the new Cooperative Institute for North Atlantic Region (CINAR). *The institutions will join NOAA to conduct ocean and climate research to better understand the correlation between climate change and variability*, fishing practices and fish populations, and to develop an integrated capability to research emerging issues from an ecosystem perspective.") (emphasis added). *Id*.

[434] *See Memorandum of Agreement Between the National Oceanic and Atmospheric Administration and the Woods Hole Oceanographic Institution Establishing the Cooperative Institute for the North Atlantic Region ("CINAR")* (Dec. 11, 2011), available at: http://www.cinar.org/fileserver.do?id=125784&pt=2&p=79251. Although the MOA was legally effective as of the signing date of December 11, 2011, a five-year NOAA Science Advisory Board review refers to a five-year agreement. If there was an earlier MOA executed between NOAA and Woods Hole Institution NOAA should disclose such document. *See External Review of the Cooperative Institute for the North Atlantic Region Woods Hole Oceanographic Institution (lead), University of Maryland Center for Environmental Science, Rutgers University, University of Maine, Gulf of Maine Research Institute, Submitted to the National Oceanic and Atmospheric Administration Science Advisory Board* (Oct. 1, 2012), available at: http://www.sab.noaa.gov/Meetings/2012/november/CINAR_Review_FINAL.pdf ("CINAR was established in July of 2009 and this review is its first 5-year review. […] Having just completed its third year of a 5-year agreement, CINAR continues to build on strong pre-existing partnerships between NOAA and partner institutions and develop new collaborations.") *Id*., at pp. 2-3.

[435] *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA), *Cooperative Institute: Eastern U.S. Continental Shelf Frontier Exploration, Research, and Technology Development – Notice of Funding Availability*, 73 FR 38397 (July 7, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-07-07/pdf/E8-15313.pdf.

[436] *See* Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT), *Annual Progress Report: 01 July 2009 to 31 March 2010* (2010), at pp. 13, 21, 30, 31, 33, 49, 53, available at: http://cioert.org/_resources/CIOERT_Y1_Annual_Report_July_2009.pdf ("The Cooperative Institute for Ocean Exploration, Research, and Technology (CIOERT) is led by the Harbor Branch Oceanographic Institute at Florida Atlantic University in Fort Pierce, Florida. The University of North Carolina Wilmington is the co-managing partner, and limited partners are SRI International in St. Petersburg, FL, and the University of Miami, Miami, FL. The CIOERT is aligned with the NOAA/OAR Office of Ocean Exploration and Research (OER).") *Id*., at p. 2.

[437] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Announcement of Federal Funding Opportunity: A Cooperative Institute to Improve Mesoscale and Stormscale High Impact Weather Forecasts, Watches, And Warnings Through The Use Of, And Enhancement Of, Weather Radar - Funding Opportunity Number: NOAA-OAR-CIPO-2011-2002772*, available at: http://apply07.grants.gov/apply/opportunities/instructions/oppNOAA-OAR-CIPO-2011-2002772-cfda11.432-cid2213326-instructions.pdf.

[438] *Id*., at p. 14. *See also* 75 FR 69917-69918 (Nov. 16, 2010), available at; http://www.gpo.gov/fdsys/pkg/FR-2010-11-16/pdf/2010-28592.pdf.

[439] *Id*., at p. 1.

[440] *See* Cooperative Institute for Mesoscale Meteorological Studies, *Annual Report - NA11OAR4320072 Fiscal Year – 2012* (2012), available at: http://www.cimms.ou.edu/reports/cimmsfy12.pdf ("CIMMS, under the new cooperative agreement, concentrates its research and outreach efforts and resources on the following principal themes: […] (4) impacts of climate change related to extreme weather events […] This report describes NOAA-funded research and outreach progress made by CIMMS scientists at OU and those assigned to our collaborating NOAA units under new cooperative agreement NA11OAR4320072 during 1 October 2011 through 30 June 2012 […] CIMMS was competed in 2010-11 and OU was awarded a new cooperative agreement beginning in October 2011, retaining the name CIMMS. A new Memorandum of Understanding is pending.") *Id*., at p. 5.

[441] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research, *Notice of Funding Availability - NOAA Cooperative Institutes (CIs): (1) A CI To Support NOAA Research Facilities in the Pacific Northwest, (2) A CI for Southwestern U.S. Marine Ecosystems, Climate and Ocean Studies, and (3) A Southeastern Regional CI for Atmospheric and Marine Studies*, 74 FR 58603-58607 (Nov. 13, 2009), available at: http://www.gpo.gov/fdsys/pkg/FR-2009-11-13/pdf/E9-27332.pdf; 75 FR 5566 (Feb. 3, 2010), available at: http://www.gpo.gov/fdsys/pkg/FR-2010-02-03/pdf/2010-2202.pdf.

[442] *Id.*, at 74 FR 58604-58605.

[443] *See* Joint Institute for the Study of the Atmosphere and Ocean (JISAO), *Annual Report July 1, 2010 – March 31, 2011* (2011), available at: http://www.jisao.washington.edu/sites/default/files/2010-11AnnualReport.pdf ("Through a NOAA competitive grant process, the Joint Institute for the Study of the Atmosphere and Ocean (JISAO) at the University of Washington (UW) was

successfully reestablished in 2010. […] The JISAO/NOAA Cooperative Agreement funding for the nine months ending on March 31, 2011, totals **$16,573,653** ($13,873,385 new award plus previous award amendment # 185, $2,700,268 received for Steve Riser in July 2010).) *Id.*, at pp. 1, 11. *See* Joint Institute for the Study of the Atmosphere and Ocean (JISAO), *Annual Report April 1, 2011 – March 31, 2012* (2011), available at: http://jisao.washington.edu/sites/default/files/PDFs/2012_AnnualReport.pdf ("The JISAO/NOAA Cooperative Agreement funding for the period ending on March 31, 2012 totals **$14,137,403**.") (emphasis added). *Id.*, at p. 12.

[444] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research, *Notice of Funding Availability - NOAA Cooperative Institutes (CIs): (1) A CI To Support NOAA Research Facilities in the Pacific Northwest, (2) A CI for Southwestern U.S. Marine Ecosystems, Climate and Ocean Studies, and (3) A Southeastern Regional CI for Atmospheric and Marine Studies*, 74 FR 58603-58607 (Nov. 13, 2009), *supra*; 75 FR 5566 (Feb. 3, 2010), *supra*; U.S. Department of Commerce, National Oceanic and Atmospheric Administration Office of Oceanic and Atmospheric Research (OAR) Cooperative Institutes Program Office and National Marine Fisheries Service (NMFS), *Announcement of Federal Funding Opportunity, A Cooperative Institute for Southwestern U.S. Marine Ecosystems, Climate, and Ocean Studies – Funding Opportunity Number: NOAA-OAR-CIPO-2010-2002117*, available at: http://www.federalgrants.com/A-Cooperative-Institute-for-Southwestern-US-Marine-Ecosystems-Climate-and-Ocean-Studies-20933.html.

[445] *Id*.

[446] *See Memorandum of Agreement Between The United States Department of Commerce National Oceanic and Atmospheric Administration AND The Regents of the University of California Concerning the Cooperative Institute for Marine Ecosystems and Climate Commonly known as CIMEC* (April 2011), available at: http://cimec.ucsd.edu/images/CIMEC_MOA.pdf ("This is a MOA between SIO/UCSD and NOAA for the administration of CIMEC. SIO/UCSD enters into this MOA as the administrative lead member representing the team of seven academic members that are committed to the CI in the proposal submitted in response to NOAA's Announcement of Federal Funding Opportunity (NOAA-OAR-CIPO-2010-2002117) on February 10, 2010.") *Id.*, at p. 2.

[447] *See* Cooperative Institute for Marine Ecosystems and Climate (CIMEC), *Progress Report 2010-2011 - NA10OAR4320156* (2011), available at: http://cimec.ucsd.edu/pdfs/CIMEC_ANNUAL_FY11.pdf ("CIMEC began on July 1, 2010. The collective expertise of the seven CIMEC academic member institutions has much to offer NOAA to meet its goals. The subsequent nine months have been a period of growth. CIMEC follows and builds on the highly successful JIMO with an increased emphasis on marine ecosystems and climate, consistent with NOAA's mission. […] CIMEC will build upon SIO's experience from nearly twenty years of management of the Joint Institute for Marine Observations, and work closely with NOAA line offices, goal teams and laboratories to assist in transitioning research and development into NOAA data products and services") *Id.*, at p. 6.

[448] *See* U.S. Department of Commerce, National Marine Fisheries Service (NMFS) and Oceanic and Atmospheric Research (OAR), *Announcement of Federal Funding Opportunity: A Cooperative Institute for the Pacific Islands Region - Funding Opportunity Number: NOAA-NMFS-PIFSC-2011-2002847* (2011), available at: http://apply07.grants.gov/apply/opportunities/instructions/oppNOAA-NMFS-PIFSC-2011-2002847-cfda11.432-cid2218248-instructions.pdf.

[449] *Id.*, at p. 2. "The CI will conduct research under research themes which support NOAA in all four of its mission goals: (1) Protect, restore and manage the use of coastal and ocean resources through ecosystems-based management; (2) *Understand climate variability and change to enhance society's ability to plan and respond*; (3) Serve society's needs for weather and water information; and (4) Support the Nation's commerce with information for safe, efficient and environmentally sound transportation. These long-term goals are similar to the four goals listed in NOAA's Next Generation Strategic Plan as well: (1) Healthy Oceans; (2) *Climate Adaptation and Mitigation*; (3) Weather-Ready Nation; and (4) Resilient Coastal Communities and Economies" (emphasis added). *Id.*, at p. 4. *See also, Id.*, at pp. 9-11, 16-17.

[450] *Id.*, at p. 18.

[451] *See* Joint Institute for Marine and Atmospheric Research, *Annual Report for Fiscal Year 2011 - For Cooperative Agreements NA17RJ1230, NA09OAR4320075, and NA08OAR4320910* (2011), available at: http://www.soest.hawaii.edu/jimar/jimar.rpt2011.final.pdf ("FY 2011 has been a special year. NOAA issued an RFP for a Pacific Islands Cooperative Institute as part of the re-competition of all cooperative institutes. The University of Hawaii submitted a proposal to manage the new institute under the name of JIMAR. The UH proposal was successful and a new JIMAR will be established on October 1, 2011.") *Id.*, at p. v.

[452] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Announcement of Federal Funding Opportunity, NOAA Cooperative Institute to expand Understanding of the Earth as it Relates to Atmospheric Processes and Trends, Climate Variability and Change, Stratospheric Ozone, Weather Prediction, Air Quality, Geodynamics, Space Weather and the Water Cycle - Funding Opportunity Number: NOAA-OAR-CIPO-2012-2003286*, available at: http://apply07.grants.gov/apply/opportunities/instructions/oppNOAA-OAR-CIPO-2012-2003286-cfda11.432-cid2267159-instructions.pdf .

[453] *Id.*, at p. 1.

[454] *Id.*, at p. 2.

[455] *Id*., at p. 10.
[456] *See* Cooperative Institute for Research in Environmental Sciences (CIRES), 2012 Annual Report - Agreement No. NA10OAR4320142 (2012), at p. 2, available at: http://cires.colorado.edu/pubs/admin/annual/CIRES_Annual_Report_FY12.pdf.
[457] *See* U.S. Department of Commerce, National Ocean Service (NOS), National Oceanic and Atmospheric Administration, *Announcement of Federal Funding Opportunity, NOAA Regional Ocean Partnership Funding Program - FY2012 Funding Competition - Funding Opportunity Number: NOAA-NOS-CSC-2012-2003280*, available at: http://southatlanticalliance.org/wp-content/uploads/2013/12/NOAA-Phase-2-FFO.pdf
[458] *Id*., at pp. 1, 4.
[459] "This funding opportunity supports the Department of Commerce's objectives to 'Support coastal communities that are environmentally and economically sustainable,' and 'Support climate adaptation and mitigation.' It also directly contributes to the NOAA strategic goal for Resilient Coasts and Economies, and the objectives therein, including 'Comprehensive Ocean and Coastal Planning and Management' and 'Resilient Coastal Communities That Can Adapt to Impacts of Hazards and Climate Change.'" *Id*., at p. 4.
[460] *Id*., at p. 7.
[461] *See e.g.*, CICAR Annual Report 2008-2009, wherein NOAA assigned "program managers" to oversee CICAR projects.
[462] *See, e.g.*, CINAR Annual Report 2011-2012, wherein NOAA scientists were assigned as "program managers" beside CINAR scientists serving as principal investigators on projects.
[463] *See, e.g.*, CICS-M Annual Report 2006-2007, wherein NOAA assigned persons as project "collaborators" to oversee CICS-M projects.
[464] *See, e.g.*, CIMSS Annual Report 2007, wherein NOAA scientists assigned to a project were designated as "collaborators" and as "technical points of contact."
[465] *See, e.g.*, CICS-P Annual Report 2007-2008, wherein NOAA Geophysical Fluid Dynamics Laboratory (GFDL) scientists were included in CICS-P projects as "other participating researchers".
[466] *See, e.g.*, JISAO Annual Report 2006-2007, wherein NOAA scientists were assigned as "other personnel" beside JISAO scientists serving as principal investigators on projects.
[467] *See, e.g.*, JIMO Annual Report 2005-2006 and CIOSS Annual Report 2008, wherein NOAA scientists retained oversight of CI projects in the capacity of "technical contacts."
[468] *See, e.g.*, CIMRS Annual Report 2007-2008, wherein NOAA scientists participated in CI projects designated as "collaborating NOAA investigators."
[469] *See, e.g.*, CILER Annual Report 2009-2010, wherein NOAA Great Lakes Environmental Research Laboratory (GLERL) scientists were designated as lone or co-principal investigators on CILER projects. A review of other CI program annual reports will reveal similar placements of NOAA office line personnel.
[470] *See, e.g.*, NGI Annual Report 2008-2009, wherein NOAA scientists were designated as lone or co-principal investigators on ten (10) NOAA-led projects at NGI facilities.
[471] *See, e.g.*, CIMMS Annual Report 2005-2006, wherein scientists from NOAA's National Severe Storms Laboratory (NSSL) were assigned as principal investigators leading their own projects at CIMMS facilities.
[472] *See* Appendix 3E – "Approximate Reported Funding NOAA Cooperative Institute Programs FYs 2004-2010", *infra*. It sets forth sixteen (16) Cooperative Institute Programs by host university or nonprofit institute. These include the: 1) Cooperative Institute for Climate Science at Princeton University (CICS-P); 2) Cooperative Institute for Climate and Studies (CICS-M) superseded by Cooperative Institute for Climate and Satellite Studies (CICS-M) at the University of Maryland; 3) Cooperative Institute for Research in the Atmosphere (CIRA) at Colorado State Univ.; 4) Cooperative Institute for Meteorological Satellite Studies (CIMSS) at Univ. of Wisconsin-Madison; 5) Cooperative Institute for Arctic Research (CIFAR), University of Alaska Fairbanks superseded by Cooperative Institute for Alaska Research University of Alaska Fairbanks (CIFAR-II); 6) Cooperative Institute for Climate Applications and Research (CICAR) at Earth Institute Columbia University; 7) Cooperative Institute for Limnology and Ecosystems Research (CILER) at Univ. of Michigan; 8) Cooperative Institute of Marine and Atmospheric Studies (CIMAS) at Univ. of Miami; 9) Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) at Univ. of Oklahoma; 10) Cooperative Institute for Oceanographic Satellite Studies (CIOSS) at Oregon State Univ.; 11) Cooperative Institute for Marine Resources Studies (CIMRS) at Oregon State Univ.; 12) Cooperative Institute for Research in Environmental Sciences (CIRES) at Univ. of Colorado; 13) Joint Institute for Marine and Atmospheric Research (JIMAR) at Univ. of Hawaii expanded to include Joint Institute for Marine and Atmospheric Research (JIMAR-CIPIR); 14) Joint Institute for the Study of the Atmosphere & Ocean (JISAO) at Univ. of Washington; 15) Joint Institute for Marine Observations (JIMO) at Scripps Institution for Oceanography at UC San Diego (now expired); 16) Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT) at Florida Atlantic Univ.; and 17) Cooperative Institute for the North Atlantic Region (CINAR) at Woods Hole Oceanographic Institution.
[473] "Extension institutional awards […] were created when the NOAA Research Council recommended that CI awards established before January 1, 2006 be extended to allow NOAA additional time to complete competitions under NOAA's new CI policy (NAO

216-107)." *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, Office of Oceanic and Atmospheric Research, *MEMORANDUM From Cherri Helms, OAR Cooperative Institutes Program Office for NOAA Office of Oceanic and Atmospheric Research Cooperative Institute Awardees - Subject: Performance Reporting* (Jan. 3, 2012), at p. 1, available at: ftp://ftp.oar.noaa.gov/LCI/Documents/PPRGuidance_FY12.pdf. *See also* U.S. Department of Commerce National Oceanic and Atmospheric Administration, Office of Oceanic and Atmospheric Research, *MEMORANDUM From Philip Hoffman, Director of Cooperative Institute Program for NOAA Office of Oceanic and Atmospheric Research Cooperative Institute Awardees – Subject: Performance Reporting* (Jan. 20, 2013), available at: ftp://ftp.oar.noaa.gov/lci/Documents/PPRGuidance_FY13.pdf.

[474] "Shadow awards were created to allow CI projects selected competitively through a NOAA program to be funded for the entire period of the project, even if it extends beyond the end of the main institutional award." *Id*., at p.2. *See also* U.S. Department of Commerce National Oceanic and Atmospheric Administration, Office of Oceanic and Atmospheric Research, *MEMORANDUM From Philip Hoffman, Director of Cooperative Institute Program for NOAA Office of Oceanic and Atmospheric Research Cooperative Institute Awardees – Subject: Performance Reporting* (Jan. 20, 2013), supra at p. 1 ("Shadow Awards - Shadow awards expire June 30, 2013.") *Id.*

[475] *See* Appendix 3E – "Approximate Reported Funding NOAA Cooperative Institute Programs FYs 2004-2010", *infra*.

[476] *See* Appendix 3E: "Approximate Reported Funding NOAA Cooperative Institute Programs FYs 2004-2010," *infra*.

[477] "The issues addressed by BASC are at the forefront of contemporary concerns. Climate change and impacts, global climate models and the implications of their results, air pollution, and severe weather are topics discussed not just by scientists, but in Congress and in headlines every day. Our understanding of these issues directly affects the nation's environmental policies, energy choices, manufacturing decisions, construction codes, and agricultural methods." *See* National Academy of Sciences, *Board on Atmospheric Sciences and Climate - About BASC*, available at: http://dels.nas.edu/global/basc/About-Us.

[478] "BECS advises the nation about the causes and consequences of environmental change and informs environmental decisions. In this context, the role of BECS will encompass strategic planning, program development, and oversight of NRC studies and other activities initiated under the auspices of the board […]BECS is responsible for NRC programs that[: 1) Build understanding of human interactions with the biophysical environment; [2)] Contribute to the development of a coherent field of scientific endeavor in this area; [3)] Integrate social and behavioral science research into environmental science and policy; [and 4] Advance the behavioral, social, and decision sciences…" *See* National Academy of Sciences, *Board on Environmental Change and Society - Statement of Task*, available at: http://sites.nationalacademies.org/DBASSE/BECS/DBASSE_068033.

[479] *See* OMB-PRB, *supra* at Sec. IV, p. 27.

[480] *Id*.

[481] *See* Ian Fein, *Reassessing the Role of the National Research Council: Peer Review, Political Tool, or Science Court?*, 99 Calif. Law Rev. 465 (2011), available at: http://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=1045&context=californialawreview (discussing how politicians and federal agencies have increasingly turned to the NRC to defuse political controversies, particularly in the natural resources arena. The author discusses three such cases).

[482] *See* Edward J. Calabrese, *The Genetics Panel of the NAS BEAR I Committee (1956): epistolary evidence suggests self‐interest may have prompted an exaggeration of radiation risks that led to the adoption of the LNT cancer risk assessment model*, Archives of Toxicology (July 4, 2014), at p. 1, Abstract available at: http://www.ncbi.nlm.nih.gov/pubmed/24993953.

[483] *Id*.

[484] *See* United States Environmental Protection Agency, *Administrator Gina McCarthy, Remarks at the National Academy of Sciences, As Prepared*, EPA Newsroom Speeches (4/28/14), available at: http://yosemite.epa.gov/opa/admpress.nsf/8d49f7ad4bbcf4ef852573590040b7f6/2c0a15a30105f16185257cc8004be075!OpenDocument ("When it comes to quality *science that has **supported** the work of EPA and other federal agencies, the National Academy has been the gold standard*. Has it always been easy for us to hear what you've told us? No. But even when you've challenged us, your tough love has made us stronger. And EPA counts on your science to guide our actions and gauge our progress […]When we follow the science -- we all win. This country and the world move forward. And today: the need to follow the science -- and the risks of ignoring it -- are crystal clear. *Just look at the threat of climate change*. From more frequent and intense heat waves, droughts, floods, and storms -- to more smog and asthma -- climate change has put our health and economic risks on steroids. Using the best science we have to offer -- *our next U.S. National Climate Assessment is about to be finalized*. From coastal cities to the Great Plains, we have to use that science to prepare and to plan. Just like we use the science on mercury, acid rain, ozone pollution, particulate matter and more. To reduce the risks that threaten our health and safety, we need to listen to climate science. We cannot let those same critics of science continue to manufacture uncertainties that stop us from taking urgently needed climate action. If 97 out of 100 doctors said you were really sick -- I'd say it's pretty risky to go with the 3 that didn't. Climate evidence is clear: arctic sea ice is receding to new lows. Seas are rising to new highs. And the cost of inaction is escalating: 2012 was a historically expensive year for disasters -- with a price tag of $110 billion dollars. Climate extremes impact insurance premiums, property taxes, food prices, medical bills, and more. *The Academy was right to point out that collective climate risk amounts to an overdose of across-the-board risk -- to our health, our*

economy, our environment, and our security. This is what the science tells us -- climate change is not the product of conspiracies or political agendas. And if there's one thing we know with 100 percent certainty -- it's that denial and inaction are the biggest dangers of all. That's why the president's Climate Action Plan to cut carbon pollution -- and prepare for climate impacts is so critical. And EPA will deliver our pieces of that plan -- without fail" (emphasis added). *Id*.

[485] *See* Holly Doremus, *Scientific and Political Integrity in Environmental Policy*, 86 Texas L. Rev. 1601, 1652 (2008), available at: http://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=3001&context=facpubs.

[486] "Debate over regulatory peer review remains highly polarized: some consider it a panacea while others suggest that it poses a serious problem.[fn] Supporters assert that if peer review works for science, it should work for agency decisions that rely on science as well; [fn] critics stress the difference between research and regulation, and argue that peer review is inherently incapable of generating the same benefits for regulation that it produces within the scientific field." *See* Ian Fein, *Reassessing the Role of the National Research Council: Peer Review, Political Tool, or Science Court?*, 99 Calif. Law Rev. 465 (2011), *supra* at pp. 474-475, *citing* J.B. Ruhl and James Salzman, *In Defense of Regulatory Peer Review*, 84 Wash. Univ. L. Rev. 1 (2006), available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1016057&download=yes; Holly Doremus, *Scientific and Political Integrity in Environmental Policy*, 86 Texas L. Rev. 1601 (2008), *supra*.

[487] *See* Holly Doremus, *Scientific and Political Integrity in Environmental Policy*, 86 Texas L. Rev. 1601 (2008), *supra* at 1651-1652. "No peer reviewer can know how hard the scientists under review actually worked to practice objectivity and skepticism. The best reviewers can do is to evaluate whether the judgments made fall within the broad range of professionally acceptable ideas." *Id*., at 1652.

[488] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *NOAA Research Council Scientific Integrity Commons – The Policy*, available at: http://nrc.noaa.gov/ScientificIntegrityCommons.aspx; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of the Chief Administrative Officer, *NOAA Administrative Order NAO 202-735D: Scientific Integrity* (Dec. 7, 2011), available at: http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_202/202-735-D.html and http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_202/202-735-D.pdf; National Oceanic and Atmospheric Administration, *Procedural Handbook for NOAA Administrative Order (NAO) 202-735D: Scientific Integrity* (Dec. 7, 2011), available at: http://nrc.noaa.gov/sites/nrc/Documents/Procedural_Handbook_NAO_202-735D_31Jan_2012.pdf.

[489] *See* Presidential Memorandum for the Heads of Executive Departments and Agencies, *Scientific Integrity*, The White House (March 9, 2009), available at: http://www.whitehouse.gov/the-press-office/memorandum-heads-executive-departments-and-agencies-3-9-09 ("Science and the scientific process must inform and guide decisions of my Administration on a wide range of issues, including improvement of public health, protection of the environment, increased efficiency in the use of energy and other resources, mitigation of the threat of climate change, and protection of national security…Specifically, I direct the following: 1… (c) When scientific or technological information is considered in policy decisions, the information should be subject to well-established scientific processes, including peer review where appropriate, and each agency should appropriately and accurately reflect that information in complying with and applying relevant statutory standards…"). *Id*.

[490] The 2010 White House Office of Science and Technology Policy Director's guidelines implementing the principles set forth in the President's memorandum specifically referred to "peer review" as a scientific process that is indispensable to ensuring the scientific integrity of scientific or technological information that agencies such as EPA consider in policy decisions. "Scientific and technological information is often a significant contributor to the development of sound policies. Thus, it is important that policymakers involve science and technology experts and that the scientific and technological information and processes relied upon in policymaking be of the highest integrity. ***Successful application of science in public policy depends on the integrity of the scientific process*** both to ensure the validity of the information itself and to engender public *trust in Government*. For this reason, agencies should develop policies that: […] 2. Strengthen the actual and perceived credibility of Government research. Of particular importance are: a) ensuring that selection of candidates for scientific positions in the executive branch is based primarily on their scientific and technological knowledge, credentials, experience, and integrity, b) ***ensuring that data and research used to support policy decisions undergo independent peer review by qualified experts, where feasible and appropriate, and consistent with law***, c) **setting clear standards governing *conflicts of interest***, and, d) adopting appropriate whistleblower protection" (emphasis added). *See* Memorandum to the Heads of Executive Departments and Agencies, *Scientific Integrity*, Director of the Office of Science and Technology Policy (Dec. 17, 2010), at pp. 1-2, available at: http://www.whitehouse.gov/sites/default/files/microsites/ostp/scientific-integrity-memo-12172010.pdf.

[491] *See* Holly Doremus, *Scientific and Political Integrity in Environmental Policy*, 86 Texas L. Rev. 1601 (2008), *supra* at 1652 ("The best reviewers can do is to evaluate whether the judgments made fall within the broad range of professionally acceptable ideas. That can reveal extreme departures from acceptable norms, with sufficient devotion of time and effort, [fn] and only if the reviewers themselves both have the

requisite expertise and actively practice the virtues of objectivity and skepticism. [fn] […] [E]ffective peer review requires the devotion of extraordinary amounts of time by experts who face many competing demands on their time,[fn] and brings little in the

way of professional rewards. It must therefore be reserved for those situations in which it is most likely to provide concrete improvements, and in which the reviewers are most likely to emerge from the experience confident that their time was well spent.") *Id*.

[492] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration National Climatic Data Center, *Global Warming – Introduction*, NOAA website, available at: https://www.ncdc.noaa.gov/monitoring-references/faq/global-warming.php ("One of the most vigorously debated topics on Earth is the issue of climate change, and the National Environmental Satellite, Data, and Information Service (NESDIS) data centers are central to answering some of the most pressing global change questions that remain unresolved.") *Id*.

[493] *See, e.g.*, John Droz, Jr, *Top Professor Fired for Exposing Huge Wind Energy Scam*, Climate Change Dispatch (Aug. 5, 2014), available at: http://www.climatechangedispatch.com/top-professor-fired-for-exposing-huge-wind-energy-scam.html; David Rose, *The fatcat ecocrats exposed: Web of 'green' politicians, tycoons and power brokers who help each other benefit from billions raised on your bills*, MailOnline (Dec. 14, 2013), available at: http://www.dailymail.co.uk/news/article-2523726/Web-green-politicians-tycoons-power-brokers-help-benefit-billions-raised-bills.html#ixzz2nV84KSiQ; *Al Gore could become world's first carbon billionaire*, The Telegraph (Nov. 3, 2009), available at: http://www.telegraph.co.uk/earth/energy/6491195/Al-Gore-could-become-worlds-first-carbon-billionaire.html.

[494] Climate change has long been one of the most controversial and divisive political issues the world, including Washington, has ever addressed. *See* Nick Cohen, The Climate Change Deniers Have Won, The Guardian (March 22, 2014), available at: http://www.theguardian.com/commentisfree/2014/mar/22/climate-change-deniers-have-won-global-warming; Andrew J. Hoffman, *How To Fix The Broken Debate On Climate Change*, Footnote (May 1, 2013), available at: http://footnote1.com/how-to-fix-the-broken-debate-on-climate-change/; Joel Achenbach and Juliet Eilperin, *Climate-change Science Makes for Hot Politics*, The Washington Post (Aug. 19, 2011), available at: http://www.washingtonpost.com/national/health-science/climate-change-science-makes-for-hot-politics/2011/08/18/gIQA1eZJQJ_story.html?hpid=z1

[495] *See* National Academy of Science, *Organization*, available at: http://www.nasonline.org/about-nas/organization/ ("The National Academy of Sciences was established in 1863 to address the government's urgent need for an independent advisor on scientific matters. As science began to play an ever-increasing role in national priorities and public life, the National Academy of Sciences expanded to include the National Research Council in 1916, the National Academy of Engineering in 1964, and the Institute of Medicine in 1970. The National Academy of Sciences (NAS), National Academy of Engineering (NAE), and Institute of Medicine (IOM) are private, nonprofit membership organizations that elect the nation's leading scientists, engineers, and medical professionals and engage in a wide variety of activities to advance research and knowledge in science, engineering, and medicine. Most policy studies done at the request of the government are conducted by the National Research Council (NRC), operated jointly by the NAS and the NAE. The IOM also conducts studies following the procedures established for the NRC.") *Id*.

[496] *See*, The National Academy of Science, *Climate Change at the National Academies – NRC Reports*, available at: http://nas-sites.org/americasclimatechoices/.

[497] *See* National Research Council, *Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties* (National Academies Press, Wash., DC 2005), *supra* at p. ii.

[498] *See* National Research Council, *Abrupt Climate Change: Inevitable Surprises*, (National Academies Press, Wash., DC 2002), at p. ii, available at: http://www.nap.edu/openbook.php?isbn=0309074347 ("This study was supported by Contract/Grant 50-DKNA-7-90052 between the National Academy of Sciences, NOAA's United States Global Change Research Program, and the National Aeronautics and Space Administration.") *Id*.

[499] *See* National Research Council, *Mitigating Shore Erosion along Sheltered Coasts* (National Academies Press, Wash., DC 2007), *supra* at p. ii.

[500] *See* National Research Council, Board on Atmospheric Sciences and Climate, *Advancing the Science of Climate Change*, National Academies Press (Wash., DC 2010), available at: http://nap.edu/catalog.php?record_id=12782 ("*This study was supported by the National Oceanic and Atmospheric Administration under contract number* ***DG133R08CQ0062***") (emphasis added). *Id*., at p. i; National Research Council, Board on Atmospheric Sciences and Climate, *Limiting the Magnitude of Future Climate Change*, National Academies Press, (Wash., DC 2010), available at: http://www.nap.edu/catalog.php?record_id=12785 ("*This study was supported by the National Oceanic and Atmospheric Administration under contract number* ***DG133R08CQ0062****, TO# 4*) (emphasis added). *Id*., at p. i; National Research Council, Board on Atmospheric Sciences and Climate, *Adapting to the Impacts of Climate Change*, National Academies Press (Wash., DC 2010), available at: http://www.nap.edu/catalog.php?record_id=12783 ("*This study was supported by the National Oceanic and Atmospheric Administration under contract number* ***DG133R08CQ0062***") (emphasis added). *Id*., at p. i; National Research Council, Board on Atmospheric Sciences and Climate, *Informing an Effective Response to Climate Change*, National Academies Press (Wash., DC 2010), available at: http://www.nap.edu/catalog.php?record_id=12784 ("*This study was supported by the National Oceanic and Atmospheric Administration under contract number* ***DG133R08CQ0062***") (emphasis added). *Id*., at p. i; National Research Council, Ocean Studies Board, *Ocean Acidification: A National Strategy to Meet the Challenges of a Changing Ocean*, National Academies Press (Wash., DC 2010), available at: http://www.nap.edu/catalog.php?record_id=12904 ("*This*

study was supported by ***Contract/Grant No. DG133R-08-CQ-0062,*** *OCE 0946330, NNX09AU42G, and G09AP00160 between the National Academy of Sciences and the* ***National Oceanic and Atmospheric Administration****, National Science Foundation, National Aeronautics and Space Administration, and U.S. Geological Survey*") (emphasis added). *Id*., at p. i; National Research Council, Board on Atmospheric Sciences and Climate, *Assessment of Intraseasonal to Interannual Climate Prediction and Predictability*, National Academies Press (Wash., DC 2010), available at: http://www.nap.edu/catalog.php?record_id=12878 ("*This study was supported by the National Oceanic and Atmospheric Administration under contract number* ***DG133R-08-CQ-0062****, TO# 2*") (emphasis added. *Id*., at p. i; National Research Council, Board on Atmospheric Sciences and Climate, *America's Climate Choices*, National Academies Press (Wash., DC 2011), available at: http://www.nap.edu/catalog.php?record_id=12781 ("*This study was supported by the National Oceanic and Atmospheric Administration under contract number* ***DG133R08CQ0062****, Task Order # 4*) (emphasis added). *Id*., at p. i; National Research Council, Water Science and Technology Board, *Global Change and Extreme Hydrology: Testing Conventional Wisdom*, National Academies Press (Wash., DC 2011), available at: http://www.nap.edu/catalog.php?record_id=13211 ("*Support for this project was provided by the U.S. Nuclear Regulatory Commission Grant No. NRC-04-09-153,* ***National Oceanic and Atmospheric Administration Grant No. RA133R-09-SE-4232****, and National Aeronautics and Space Administration Grant No. NNX10AK53G*") (emphasis added). *Id*., at p. i; National Research Council, Board on Atmospheric Sciences and Climate and Board on Environmental Change and Society, *A Review of the U.S. Global Change Research Program's Strategic Plan*, National Academies Press (Wash., DC 2011), available at: http://www.nap.edu/catalog.php?record_id=13330 ("*This study was supported by the National Oceanic and Atmospheric Administration under contract number* ***DG133R08CQ0062****, Task Order #8*") (emphasis added), Id., at p. i; National Research Council, Board on Atmospheric Studies and Climate, *A National Strategy for Advancing Climate Modeling*, National Academies Press (Wash., DC 2012), available at: http://www.nap.edu/catalog.php?record_id=13430 ("*This study was supported by the* ***National Oceanic and Atmospheric Administration under contract DG133R-08-CO-0062 Task Order #12****, the National Aeronautics and Space Administration under contract NNX08AB07G, the National Science Foundation under Grant No. ATM-0809051, the Department of Energy under contract DE-SC0005113, and the U.S. intelligence community*") (emphasis added). *Id*., at p. i; National Research Council, Board on Earth Sciences and Resources and Ocean Studies Board, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*, National Academies Press (Wash., DC 2012) available at: http://www.nap.edu/catalog.php?record_id=13389. ("*This study was supported by the California Department of Water Resources, Contract No. 4600008602;* ***the National Oceanic and Atmospheric Administration, Contract No. DG133R08CQ0062****; the U.S. Army Corps of Engineers, Contract No. W912HQ-09-P-0155; and the United States Geological Survey, Grant/Cooperative Agreement No. G09AP00152*") (emphasis added). *Id*., at p. i; National Research Council, Board on Atmospheric Sciences and Climate, *Abrupt Impacts of Climate Change: Anticipating Surprises*, National Academies Press (Wash., DC 2013), available at: http://www.nap.edu/catalog.php?record_id=18373 ("*This study was supported by* ***the National Oceanic and Atmospheric Administration under contract number WC133R-11-CQ-0048, TO#3****, the National Science Foundation under grant number EAR-1305802, the United States intelligence community, and the National Academies*" (emphasis added). *Id*., at p. i; National Research Council, Polar Research Board, *The Arctic in the Anthropocene: Emerging Research Questions*, National Academies Press (Wash., DC 2014), available at: http://www.nap.edu/catalog.php?record_id=18726 ("*This study was supported by the U.S. Arctic Research Commission, the Department of Energy under award number DE-SC0008724; the National Aeronautics and Space Administration under award number NNX13A014G;* ***the National Oceanic and Atmospheric Administration under award number WC133R-11-CQ-0048****, TO#4; the National Science Foundation under award number ARC-1243485; and the Smithsonian Institution under award number 12-PO-590-0000254005*" (emphasis added). *Id*., at p. i.

[501] *See* National Research Council, *A Review of the Draft 2013 National Climate Assessment* (National Academies Press. Wash., DC 2013), at p. iii, available at: http://www.nap.edu/catalog.php?record_id=18322 and http://nas-sites.org/americasclimatechoices/other-reports-on-climate-change/2013-2/895-2/ ("This study was supported by the National Aeronautics and Space Administration under contract #NNH07CC79B, TO #5.") *Id*

[502] *See* National Academy of Sciences, National Academy of Engineering , Institute of Medicine and National Research Council, *POLICY ON COMMITTEE COMPOSITION AND BALANCE AND CONFLICTS OF INTEREST FOR COMMITTEES USED IN THE DEVELOPMENT OF REPORTSCOMMITTEES USED IN THE DEVELOPMENT OF REPORTS* (May 12, 2003), at "APPENDIX A - Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports", National Academies website, at pp. 9-10, available at: http://www.nationalacademies.org/coi/bi-coi_form-0.pdf.

[503] *Id*., at p. 10.

[504] *Id*.

[505] *Id*.

[506] For example, "The Intergovernmental Personnel Act Mobility Program provides for the temporary assignment of personnel between the Federal Government and state and local governments, colleges and universities, Indian tribal governments, *federally funded research and development centers*, and other eligible organizations" (emphasis added). *See* United States Office of Personnel Management, *Hiring Authorities - INTERGOVERNMENT PERSONNEL ACT - Overview*, available at: http://www.opm.gov/policy-data-oversight/hiring-authorities/intergovernment-personnel-act/. "Assignments to or from state and local governments, institutions of

higher education, Indian tribal governments and other eligible organizations are intended to facilitate cooperation between the Federal Government and the non-Federal entity through the temporary assignment of skilled personnel. These assignments allow civilian employees of Federal agencies to serve with eligible non-Federal organizations for a limited period without loss of employee rights and benefits. […]The legal authority for assignments under the Intergovernmental Personnel Act is 5 USC [S]ections 3371 through 3375. The regulations can be found in Code of Federal Regulations (CFR), part 5, chapter 334." *See* United States Office of Personnel Management, *Hiring Authorities - INTERGOVERNMENT PERSONNEL ACT – Provisions*, available at: http://www.opm.gov/policy-data-oversight/hiring-authorities/intergovernment-personnel-act/#url=Provisions. *See also* 5 CFR PART 334 – *Temporary Assignments Under the Intergovernmental Personnel Act (IPA)*, available at: http://www.law.cornell.edu/cfr/text/5/part-334.

[507] "Non-Federal employees on detail to Federal agencies remain employees of their permanent organizations for most purposes. […]If the assignee is detailed to a set of unclassified duties, the assignee continues to be paid directly by the non-Federal organization at a rate of pay based on the assignee's non-Federal job. The Federal agency may agree to reimburse the non-Federal organization for all, some, or none of the costs of the assignment. […] By statute, a non-Federal employee may be given an excepted appointment for two years without regard to the provisions governing appointment in the competitive service. This appointment may be extended for not more than an additional two years." *See* United States Office of Personnel Management, *Hiring Authorities - INTERGOVERNMENT PERSONNEL ACT – Assignment*, available at: http://www.opm.gov/policy-data-oversight/hiring-authorities/intergovernment-personnel-act/#url=Assignment.

[508] *See, e.g.*, Lawrence Livermore National Security, LLC, *Organizational Conflicts of Interest Disclosure* (July 2007), available at: http://www.ucop.edu/raohome/cgmemos/07-07S1a.pdf.

[509] *See* University of Alabama, *Faculty Handbook, Appendix E – On Preventing Conflicts of Interest in Government-Sponsored Research at Universities: A Joint Statement of The Council of the American Association of University Professors and The American Council on Education* (December, 1964), available at: http://teaching.ua.edu/policies/handbook/appendixpdfs/e.pdf.

[510] *See* American Association of University Professors, *On Preventing Conflicts of Interest in Government-Sponsored Research at Universities*, available at: http://www.aaup.org/report/preventing-conflicts-interest-government-sponsored-research-universities; and http://www.aaup.org/file/government-sponsored-research.pdf.

[511] *See* National Science Foundation, *Grant Policy Manual*, at Chap. V, Sec. "510 – Conflicts of Interest (July 2005)," p. v-2, available at: http://www.nsf.gov/pubs/manuals/gpm05_131/gpm05_131.pdf.

[512] *See* Daniel R. Levinson, *Institutional Conflicts of Interest at NIH Grantees* (OEI-03-09-00480), Department of Health and Human Services Office of Inspector General (Jan. 2011), Executive Summary at p. i, available at: http://oig.hhs.gov/oei/reports/oei-03-09-00480.pdf. Aside from "conflicting financial interest of a researcher[, c]onflicts can also exist for the institutions themselves. An institution's financial interests (e.g., royalties, equity, stockholdings, and gifts) or those of its senior officials can become institutional conflicts when the financial interests pose a risk of undue influence on decisions involving the institution's research." *Id*., at p. 1 (citing Institute of Medicine of the National Academies, *Conflict of Interest in Medical Research, Education, and Practice*, ch. 8 (April 21, 2009)).

[513] *Id*., at p. ii. For example, Duke University's Institutional Conflict of Interest in Research Policy has described an institutional conflict of interest as involving "a situation in which the financial interests of an institution or an institutional official, acting within his or her authority on behalf of the institution, may affect or appear to affect the research, education, clinical care, business transactions, or other activities of the institution." Such policy indicates that an institutional conflict of interest in research "may occur whenever the financial interests of the institution, or of an institutional official who has authority to act on behalf of the institution, might affect-or reasonably appear to affect-institutional processes for the design, conduct, reporting, review, or oversight of research." *See* Duke University Ethics and Compliance Office, *Institutional Conflict of Interest Policy*, available at: http://duke.edu/services/ethicscompliance/coi/icoi_policy.php. On the other hand, Columbia University's conflict of interest policy does not seem to cover more than individual researcher conflicts of interest. *See* Columbia University Office of Compliance Research and Training, *Conflict of Interest and Research*, available at: http://www.columbia.edu/cu/compliance/docs/conflict_interest/; Columbia University *Policy on Financial Conflicts of Interest and Research* (July 1, 2009, effective Aug. 24, 2012), available at: http://evpr.columbia.edu/files/evpr/imce_shared/FCOI_Research_Policy.pdf.

[514] *See* Daniel R. Levinson, *Institutional Conflicts of Interest at NIH Grantees* (OEI-03-09-00480), Department of Health and Human Services Office of Inspector General (Jan. 2011), *supra* at Executive Summary, pp. ii-iii.

[515] "It is important that NIH know of the existence of institutional conflicts so it can ensure that the related research is free from any intended or unintended bias." *Id*., at p. iii.

[516] *Id*., at p. 18.

[517] *Id*.

[518] *Id*.

[519] *See* Northwestern University, *Institutional Conflict of Interest in Research* (Jan. 13, 2014), at p. 2, available at: http://www.northwestern.edu/coi/policy/institutional_policy.pdf.

[520] *Id*.

[521] *See* Hank Campbell, *The Corruption of Peer Review Is Harming Scientific Credibility*, The Wall Street Journal (July 13, 2014) (and accompanying comments), available at: http://online.wsj.com/articles/hank-campbell-the-corruption-of-peer-review-is-harming-scientific-credibility-1405290747.

[522] *Id*.

[523] "Absent rigorous peer review, we get the paper published in June in the *Proceedings of the National Academy of Sciences*. Titled 'Female hurricanes are deadlier than male hurricanes,' it concluded that hurricanes with female names cause more deaths than male-named hurricanes—ostensibly because implicit sexism makes people take the storms with a woman's name less seriously. The work was debunked once its methods were examined, but not before it got attention nationwide. Such a dubious paper made its way into national media outlets because of the imprimatur of the *prestigious National Academy of Sciences*. Yet a look at the organization's own submission guidelines makes clear that if you are a *National Academy* member today, you can edit a research paper that you wrote yourself and only have to answer a few questions before an editorial board; you can even arrange to be the official reviewer for people you know. The result of such laxity isn't just the publication of a dubious finding like the hurricane gender-bias claim. Some errors can have serious consequences if bad science leads to bad policy. In 2002 and 2010, papers published in the *Proceedings of the National Academy of Sciences* claimed that a pesticide called atrazine was causing sex changes in frogs. As a result the Environmental Protection Agency set up special panels to re-examine the product's safety. Both papers had the same editor, David Wake of the University of California, Berkeley, who is a colleague of the papers' lead author, Tyrone Hayes, also of Berkeley. In keeping with *National Academy of Sciences policy*, Prof. Hayes preselected Prof. Wake as his editor. Both studies were published without a review of the data used to reach the finding. No one has been able to reproduce the results of either paper, including the EPA, which did expensive, time-consuming reviews of the pesticide brought about by the published claims. As the agency investigated, it couldn't even use those papers about atrazine's alleged effects because the research they were based on didn't meet the criteria for legitimate scientific work. The authors refused to hand over data that led them to their claimed results—which meant no one could run the same computer program and match their results" (emphasis added). *Id*.

[524] *See* Appendix 3A: "Scientists Affiliated With NOAA Grant-Funded Entities Author Contributors/Reviewers IPCC-AR4-WGI," *infra*; Appendix 3B: "Scientists Affiliated With NOAA Grant-Funded Entities Author Contributors/Reviewers IPCC-AR4-WGII," *infra*.

[525] *See* Appendix 3C: "Scientists Affiliated With NOAA Grant-Funded Entities Author Contributors/Reviewers IPCC-AR3-WGI/WGII," *infra*.

[526] *See* Appendix 3D: "Scientists Affiliated With Entities Participating in NOAA Grant-Funded Climate Science-Research-Related Programs - Contributors to NOAA-Developed USGCRP/CCSP SAPs, NCA2-2009, SOC-2008," *infra*.

[527] * Appendices 3A-3C also collectively reveal that seven (7) individuals from these six (6) universities had both contributed to the NOAA-developed SAPs and assessments/reports noted above and had contributed to and/or reviewed IPCC-AR4-WGI and/or WGII. This overlap reduces the aggregate number of contributors/reviewers from 287 gross persons to 280 net persons, and increases these six universities' aggregate share of all contributors to NOAA-developed assessments/reports and contributors/reviewers to/of IPCC-AR4-WGI and/or WGII from approximately 37% to approximately 38%.

[528] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences* (SAP1.1/CCSP(2006), National Oceanic and Atmospheric Administration, National Climatic Data Center (Thomas R. Karl, Susan J. Hassol, Christopher D. Miller, and William L. Murray, editors, 2006), *supra* at pp. ii, Appendix A, p. 53; U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change* (SAP1.3/CCSP(2008g)), National Oceanic and Atmospheric Administration, National Climatic Data Center (Randall Dole, Martin Hoerling, and Siegfried Schubert (eds.)) (2008), *supra* at p. ii; U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Trends in Emissions of Ozone-Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure* SAP 2.4/CCSP(2008h), National Oceanic and Atmospheric Administration, National Climatic Data Center (Ravishankara, A.R., M.J. Kurylo, and C.A. Ennis (eds.)), *supra* at p. ii; U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols* (SAP 3.2/CCSP(2008d)), Department of Commerce, NOAA's National Climatic Data Center (H. Levy II, D.T. Shindell, A. Gilliland, M.D. Schwarzkopf, L.W. Horowitz, (eds.)), *supra* at p. ii; U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* (SAP3.3/CCSP(2008i)), Department of Commerce, NOAA's National Climatic Data Center (Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)), *supra* at p. ii; U.S. Department of Commerce National Oceanographic Administration, *Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking*, (SAP5.2/CCSP(2009)) (M. Granger Morgan (Lead Author), Hadi Dowlatabadi, Max Henrion, David Keith, Robert Lempert, Sandra McBride, Mitchell Small, and Thomas Wilbanks (Contributing Authors)), *supra* at p. ii; U.S. Department of Commerce National Oceanographic Administration, *Decision Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data: A*

Focus on Water Resources, (SAP5.3/CCSP(2008)) (Nancy Beller-Simms, Helen Ingram, David Feldman, Nathan Mantua, Katharine L. Jacobs, and Anne M. Waple (eds.)), *supra* at p. ii.

[529] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences* (SAP1.1/CCSP(2006), National Oceanic and Atmospheric Administration, National Climatic Data Center (Thomas R. Karl, Susan J. Hassol, Christopher D. Miller, and William L. Murray, editors, 2006), *supra*.

[530] *See* United States Department of Commerce, National Oceanographic and Atmospheric Administration, *Notice; Establishment of Climate Change Science Program (CCSP) Product Development Committee (CPDC) for Synthesis and Assessment Product 1.1 (CPDC–S&A 1.1)*, 70 FR 53636 (Sept. 9, 2005), available at: http://www.gpo.gov/fdsys/pkg/FR-2005-09-09/pdf/05-17942.pdf.

[531] *See* Federal Advisory Committee Act, Pub.L. 92–463 §1, 86 Stat. 770 (Oct. 6, 1972), codified in 5 U.S.C. App, available at: http://www.gpo.gov/fdsys/pkg/USCODE-2010-title5/html/USCODE-2010-title5-app-federalad.htm; http://www.law.cornell.edu/uscode/html/uscode05a/usc_sup_05_5_10_sq1.html.

[532] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product 1.1, "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences"*, (Wash., DC), The National Academies Press (2005), at pp. ii, 53, available at: http://www.nap.edu/download.php?record_id=11285.

[533] *See* US General Services Administration, *Terminated Federal Advisory Committees – U.S. Department of Commerce*, available at: http://www.gsa.gov/portal/content/249033.

[534] *See* Appendix: 4A "Author-Contributors - USGCRP/CCSP SAP1.1", *infra*.

[535] "The Author Team Convening Lead Authors (CLAs), Lead Authors (LAs), and Chief Editor were constituted as a Federal Advisory Committee that was charged with advising the CCSP on the scientific and technical content of the Report. Contributing Authors (CAs) provided relevant input used in the development of the report, but CAs who were not also LAs or CLAs did not participate in the Federal Advisory Committee (FAC) committee deliberations upon which this Synthesis and Assessment Product was developed." *See* SAP 1.1, *supra* at p. ix.

[536] *See* Appendix: 4B "NRC *Ad Hoc* Peer Review Panel USCRP/CCSP SAP1.1", *infra*.

[537] *See* Appendix 4C: "NRC Report Review Committee - SAP1.1", *infra*.

[538] *See* The National Academy of Sciences Board of Atmospheric Science and Climate, *Climate Research Committee*, available at: http://dels.nas.edu/global/basc/Climate-Research-Committee ("The CRC was formed in 1981 to foster atmospheric, oceanic, and related research aimed at advancing knowledge and understanding of the physical climate system and forced climate change. Over time, the scope of the committee's work expanded […] When it was a standing committee (until December 2010), the CRC convened a number of forums focused on emerging issues of interest to the climate science and policy communities and was instrumental in developing several important NRC activities, including the *America's Climate Choices* suite of activities, the study on *Stabilization Targets for Greenhouse Gas Concentrations* […] In June 2011, the Climate Research Committee (CRC) was merged into BASC.") *Id*.

[539] "The issues addressed by BASC are at the forefront of contemporary concerns. Climate change and impacts, global climate models and the implications of their results, air pollution, and severe weather are topics discussed not just by scientists, but in Congress and in headlines every day. Our understanding of these issues directly affects the nation's environmental policies, energy choices, manufacturing decisions, construction codes, and agricultural methods." *See* National Academy of Sciences, *Board on Atmospheric Sciences and Climate - About BASC*, available at: http://dels.nas.edu/global/basc/About-Us.

[540] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product 1.1, "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences"*, (Wash., DC, the National Academies Press (2005)), *supra* at pp. ii, vi, vii.

[541] *See* Appendix 4D: "NRC Oversight Committee on Climate Change Research (Of Board on Atmospheric Sciences & Climate) During Work of *Ad Hoc* NRC Peer Review Panel - SAP1.1", *infra*.

[542] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change* (SAP1.3/CCSP(2008g)), National Oceanic and Atmospheric Administration, National Climatic Data Center (Randall Dole, Martin Hoerling, and Siegfried Schubert (eds.)) (2008), *supra*.

[543] *See* United States Department of Commerce, National Oceanographic and Atmospheric Administration, *Notice to Establish the National Oceanic and Atmospheric Administration (NOAA) Climate Change Science Program (CCSP) Product Development Committee (CPDC) for Synthesis and Assessment Product 1.3 (CPDC—S&A 1.3) Under the Provisions of the Federal Advisory Committee Act*, 71 FR 64511-64512 (Nov. 2, 2006), available at: http://www.gpo.gov/fdsys/pkg/FR-2006-11-02/pdf/E6-18491.pdf.

[544] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product 1.3: Reanalyses of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change*, Washington, DC, The National Academies Press (2008), at p. vi, available at: http://www.nap.edu/openbook.php?record_id=12135.

[545] *See* US General Services Administration, *Terminated Federal Advisory Committees – U.S. Department of Commerce*, *supra*.

[546] *See* Appendix 5A: "Author-Contributors - USGCRP/CCSP SAP1.3," *infra*.

[547] *See* Appendix 5B: "NRC *Ad Hoc* Peer Review Panel - SAP1.3," *infra*.
[548] *See* Appendix 5C: "NRC Report Review Committee - SAP1.3," *infra*.
[549] *See* Appendix 5D: "NRC Oversight Board on Atmospheric Sciences & Climate During Work of *Ad Hoc* NRC Peer Review Panel - SAP1.3," *infra*.
[550] *See* The White House Office of the Press Secretary, *President Obama Announces Members of Science and Technology Advisory Council* (April 27, 2009), available at: http://www.whitehouse.gov/the_press_office/President-Obama-Announces-Members-of-Science-and-Technology-Advisory-Council.
[551] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Trends in Emissions of Ozone-Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure* SAP 2.4/CCSP(2008h), National Oceanic and Atmospheric Administration, National Climatic Data Center (Ravishankara, A.R., M.J. Kurylo, and C.A. Ennis (eds.), *supra*.
[552] *See* Appendix 6A: "Author-Contributors - USGCRP/CCSP SAP2.4," *infra*.
[553] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Draft Synthesis and Assessment Product 2.4: Trends in Emissions of Ozone Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure*, (Wash., DC), The National Academies Press (2007), at p. vi, http://www.nap.edu/openbook.php?record_id=12076.
[554] *See* Appendix 6B: "NRC *Ad Hoc* Peer Review Panel - SAP2.4," *infra*.
[555] *See* Appendix 6C: "NRC Report Review Committee - SAP2.4," *infra*.
[556] *See* Appendix 6D: "NRC Oversight Board on Atmospheric Sciences & Climate During Work of *Ad Hoc* NRC Peer Review Panel - SAP2.4," *infra*.
[557] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols* (SAP 3.2/CCSP(2008d)), Department of Commerce, NOAA's National Climatic Data Center (H. Levy II, D.T. Shindell, A. Gilliland, M.D. Schwarzkopf, L.W. Horowitz, (eds.), *supr*a.
[558] *See* Appendix 7A: "Author-Contributors - USGCRP/CCSP SAP3.2," *infra*.
[559] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product 3.2, "Climate Projections Based on Emission Scenarios for Long-lived and Short-lived Radiatively Active Gases and Aerosols"*, (Wash., DC), The National Academies Press (2007), at p. vi, available at: http://www.nap.edu/openbook.php?record_id=12035.
[560] *See* Appendix 7B: "NRC *Ad Hoc* Peer Review Panel - SAP3.2," *infra*.
[561] *See* Appendix 7C: "NRC Report Review Committee - SAP3.2," *infra*.
[562] *See* Appendix 7D: "NRC Oversight Board on Atmospheric Sciences & Climate During Work of *Ad Hoc* NRC Peer Review Panel - SAP3.2," *infra*.
[563] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* (SAP3.3/CCSP(2008i)), Department of Commerce, NOAA's National Climatic Data Center (Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.), *supra*.
[564] *See* United States Department of Commerce, National Oceanographic and Atmospheric Administration, *Notice; Establishment of the Climate Change Science Program (CCSP) Product Development Committee (CPDC) for Synthesis and Assessment Product 3.3 (CPDC—S&A 3.3) Under Provisions of the Federal Advisory Committee Act and Announcement of the First Meeting of the Committee*, 71 FR 57472 (Sept. 29, 2006), available at: http://www.gpo.gov/fdsys/pkg/FR-2006-09-29/pdf/E6-16083.pdf.
[565] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* (SAP3.3/CCSP(2008i)), Department of Commerce, NOAA's National Climatic Data Center (Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)), *supra* at pp. iv-v.
[566] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product 3.3, "Weather and Climate Extremes in a Changing Climate"*, (Washington, DC) The National Academies Press (2007), at p. ii, available at: http://www.nap.edu/openbook.php?record_id=11973.
[567] *See* US General Services Administration, *Terminated Federal Advisory Committees – U.S. Department of Commerce*, *supra*.
[568] *See* Appendix 8A: "Author-Contributors - USGCRP/CCSP SAP3.3," *infra*.
[569] *See* Appendix 8B: "NRC Peer Review Panel - SAP3.3," *infra*.
[570] *See* Appendix 8C: "NRC Report Review Committee - SAP3.3," *infra*.
[571] *See* Appendix 8D – "NRC Oversight Board on Atmospheric Sciences & Climate During Work of *Ad Hoc* NRC Peer Review Panel - SAP3.3," *infra*.
[572] *See* U.S. Department of Commerce National Oceanographic Administration, *Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking*, (SAP5.2/CCSP(2009)) (M. Granger Morgan (Lead

Author), Hadi Dowlatabadi, Max Henrion, David Keith, Robert Lempert, Sandra McBride, Mitchell Small, and Thomas Wilbanks (Contributing Authors)), available at: http://downloads.globalchange.gov/sap/sap5-2/sap5-2-final-report-all.pdf

[573] *See* Appendix 9A: "Author-Contributors - USGCRP/CCSP SAP5.2," *infra*.

[574] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product 5.2, "Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Climate Decision Making"*, Wash., DC, The National Academies Press (2007), at p. ii, available at: http://www.nap.edu/openbook.php?record_id=11873.

[575] *See* Appendix 9B: "NRC Peer Review Panel - SAP5.2," *infra*.

[576] *See* Appendix 9C: "NRC Report Review Committee - SAP5.2," *infra*.

[577] *See* Appendix 9D: "NRC Oversight Board on Atmospheric Sciences & Climate During Work of *Ad Hoc* NRC Peer Review Panel SAP5.2," *infra*.

[578] *See* U.S. Department of Commerce National Oceanographic Administration, *Decision Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data: A Focus on Water Resources*, (SAP5.3/CCSP(2008)) (Nancy Beller-Simms, Helen Ingram, David Feldman, Nathan Mantua, Katharine L. Jacobs, and Anne M. Waple (eds.)), available at: http://downloads.globalchange.gov/sap/sap5-3/sap5-3-final-all.pdf.

[579] *See* United States Department of Commerce, National Oceanographic and Atmospheric Administration, *Notice to Establish the National Oceanic and Atmospheric Administration (NOAA) Climate Change Science Program (CCSP) Product Development Committee (CPDC) for Synthesis and Assessment Product 5.3 (CPDC-S&A 5.3) Under the Provisions of the Federal Advisory Committee Act*, 71 FR 54615-54616 (Sept. 18, 2006), available at: http://www.gpo.gov/fdsys/pkg/FR-2006-09-18/pdf/E6-15472.pdf.

[580] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Draft Synthesis and Assessment Product 5.3: Decision-Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data* (2008), at p. ii, available at: http://www.nap.edu/openbook.php?record_id=12087.

[581] *See* US General Services Administration, *Terminated Federal Advisory Committees – U.S. Department of Commerce*, *supra*.

[582] *See* Appendix 10A: "Author-Contributors - USGCRP/CCSP SAP5.3," *infra*.

[583] *See* Appendix 10B: "NRC Peer Review Panel - SAP5.3," *infra*.

[584] *See* Appendix 10C: "NRC Report Review Committee SAP5.3," *infra*.

[585] *See* National Research Council, *Review of CCSP Draft Synthesis and Assessment Product 5.3: Decision-Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data*, Wash., DC: The National Academies Press (2008), *supra* at pp. ii, vi. *See also* National Research Council Board on Environmental Change and Society, *Board on Environmental Change and Society Inaugurated* (May 10, 2012), available at: http://sites.nationalacademies.org/DBASSE/BECS/DBASSE_070355; National Research Council Board on Environmental Change and Society, *BECS in Brief*, available at: http://sites.nationalacademies.org/dbasse/becs/dbasse_071006 ("The Board on Environmental Change and Society (BECS) evolved from the Committee on Human Dimensions of Global Change (CHDGC), which has since 1989 helped to guide research on the interactions between human activities and the environment.") *Id*.

[586] *See* Appendix 10D: "NRC Oversight Committee on Human Dimensions of Global Change During Work of *Ad Hoc* NRC Peer Review Panel - SAP5.3," *infra*.

[587] *See* U.S. Department of Commerce National Oceanic and Atmospheric Administration, *The North American Carbon Budget and Implications for the Global Carbon Cycle*, SAP2.2/CCSP(2007), *supra* at Inside Cover ("For purposes of compliance with Section 515 [of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554) and the information quality act guidelines issued by the Department of Commerce], this CCSP Synthesis and Assessment Product is an "interpreted product" as that term is used in NOAA guidelines and *is classified as "highly influential.*") (emphasis added). *Id*.; U.S. Department of Commerce National Oceanic and Atmospheric Administration, *Peer Review Plans - United States Climate Change Science Program Unified Synthesis Product – ID 128*, available at: http://www.cio.noaa.gov/itmanagement/prplans/PRsummaries.html ("The CCSP Unified Synthesis Product will integrate and evaluate the information contained in the U.S. Climate Change Science Program Synthesis and Assessment Products in the context of other recent climate and global change scientific studies and formal assessments. ID: 128 *Info. Type: Highly Influential Scientific Assessment*") (emphasis added). *Id*.

[588] *See* U.S. Department of Commerce National Oceanographic Administration, *The North American Carbon Budget and Implications for the Global Carbon Cycle*, SAP2.2/CCSP(2007), *supra*.

[589] *Id.*, at "Acknowledgement", p. vi.

[590] "Production of this report was charged to scientists at the Oak Ridge National Laboratory (run by Battelle Memorial Institute). This team has coordinated all aspects of production of the report, following production of the Prospectus." *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *NOAA Peer Review Approach for the Expert Review of the Climate Change Science Program Synthesis and Assessment Product 2.2: North American carbon budget and implications for the global carbon cycle* (March 2007), at p. 1, available at: http://www.cio.noaa.gov/itmanagement/prplans/pdfs/CCSP_2_2_Peer_Review_Approach.pdf.

[591] *See* U.S. Climate Change Science Program, *CCSP Synthetic Assessment Product 2.2 - Prospectus for North American Carbon Budget and Implications for the Global Carbon Cycle* (Feb. 14, 2006), at p. 3, available at: http://www.globalchange.gov/sites/globalchange/files/sap2-2prospectus-final.pdf.
[592] *See* Appendix 11A: "Author-Contributors USGCRP/CCSP SAP2.2," *infra*.
[593] *See* Appendix 11B: "USGCRP Ad Hoc Peer Review Panel - SAP2.2," *infra*.
[594] *See* U.S. Global Change Research Program, *Second National Climate Assessment (2009)*, at Inside Cover, p. 7, available at: http://globalchange.gov/what-we-do/assessment/previous-assessments/global-climate-change-impacts-in-the-us-2009.
[595] *See* United States Department of Commerce, National Oceanographic and Atmospheric Administration, *Notice of Establishment of Climate Change Science Program (CCSP) Unified Synthesis Product Development Committee (USPDC) and Announcement of Public Meeting*, 73 FR 14442 (March 18, 2008), available at: http://www.gpo.gov/fdsys/pkg/FR-2008-03-18/pdf/E8-5440.pdf.
[596] Since 2010, the CENR has been revised and renamed the Committee on Environment, Natural Resources and Sustainability ("CENRS"). *See* The White House, *Charter of the Committee on Environment, Natural Resources and Sustainability*, National Science and Technology Council (10-5-10), available at: http://www.whitehouse.gov/sites/default/files/microsites/ostp/nstc-cenrs-charter.pdf.
[597] "This report was produced by an advisory committee chartered under the Federal Advisory Committee Act, for the Subcommittee on Global Change Research, and at the request of the U.S. Government." *Id*., at Inside Cover. "The USGCRP called for this report. An expert team of scientists operating under the authority of the Federal Advisory Committee Act, assisted by communication specialists, wrote the document." *Id*., at p. 7. *See also* United States Department of Commerce, National Oceanic and Atmospheric Administration, *U.S. Climate Change Science Program Draft Unified Synthesis Product Report: Global Climate Change Impacts in the United States – notice of availability and request for public comments*, 74 FR 1666 (Jan. 13, 2009), available at: http://www.gpo.gov/fdsys/pkg/FR-2009-01-13/pdf/E9-371.pdf. *See also* U.S. Global Change Research Program, *Second National Climate Assessment* (2009), *supra* at Inside Cover, p. 7.
[598] *Id*.
[599] *Id*.
[600] *See* US General Services Administration, *Terminated Federal Advisory Committees – U.S. Department of Commerce*, *supra*.
[601] *See* Appendix 12A: "Author-Contributors/Editors USGCRP/CCSP Global Climate Change Impacts 2009 (NCA2-2009)," *infra*.
[602] Id; United States Department of Commerce, National Oceanic and Atmospheric Administration, *Global Climate Change Impacts in the United States* (Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.), supra at p. 1 ("Federal Advisory Committee Authors, Co-Chairs and Editors-in-Chief […] Author Team.") *Id*.
[603] The third co-editor-in-chief had been Jerry Mellilo of the Marine Biological Laboratory, a nonprofit institute.
[604] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Peer Review Plans - United States Climate Change Science Program Unified Synthesis Product*, available at: http://www.cio.noaa.gov/itmanagement/prplans/PRsummaries.html.
[605] *See* Appendix 12B: "USGCRP Ad Hoc Peer Review Panel USCRP/CCSP Global Climate Change Impacts 2009 (NCA2-2009)," *infra*.
[606] *See* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Peer Review Plans - State of the Climate in 2008 – ID 129*, available at: http://www.cio.noaa.gov/itmanagement/prplans/PRsummaries.html (The State of the Climate Report is a 150+ page summary of weather and climate conditions of the past year. Working with contributing authors from more than 50 countries around the world, this report places today's climate in historical context and provides perspectives on the extent to which the climate system varies and changes as well as the effect that climate is having on societies and the environment. *ID: 129 Info. Type: Influential Scientific Information*") (emphasis added). *Id*.
[607] *See* Office of Management and Budget, *Final Information Quality Bulletin for Peer Review* ("OMB-PRB") (Dec. 16, 2004), *supra* at Preamble, p. 11, Section I.6.
[608] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *State of the Climate in 2008*, Bulletin of the Meteorological Society Vol. 90, No. 8 (T.C. Peterson and M.O. Baringer, Eds. 2009), *supra*.
[609] *See* United States Department of Commerce National Oceanic and Atmospheric Administration, *Peer Review Plans – State of the Climate 2008: – ID 129 – Charge Statement to Peer Reviewers*, available at: http://www.cio.noaa.gov/itmanagement/prplans/ID129_StatementToPeerReviewers_StateClimate_Nov08-1.doc.
[610] *See* Appendix 13: "Author-Contributors - State of the Climate 2008 (SOC-2008)," *infra*.
[611] *See* United States Department of Commerce National Oceanic and Atmospheric Administration, *Peer Review Plans – State of the Climate 2008: – ID 129 – Charge Statement to Peer Reviewers*, *supra*.
[612] *Id*.
[613] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *State of the Climate in 2008*, Bulletin of the Meteorological Society Vol. 90, No. 8 (T.C. Peterson and M.O. Baringer, Eds. 2009), *supra*, at p. S175.
[614] *See* OMB-PRB Section II.5.
[615] *Id*.

[616] *Cf.* Wikipedia, *Military-Industrial Complex*, available at: ("The military–industrial complex, or military–industrial–congressional complex,[fn] comprises the policy and monetary relationships which exist between legislators, national armed forces, and the arms industry that supports them. These relationships include political contributions, political approval for military spending, lobbying to support bureaucracies, and oversight of the industry. It is a type of iron triangle. The term is most often used in reference to the system behind the military of the United States, where it gained popularity after its use in the farewell address of President Dwight D. Eisenhower on January 17, 1961,[fn] though the term is applicable to any country with a similarly developed infrastructure. [fns] *The term is sometimes used more broadly to include the entire network of contracts and flows of money and resources among individuals as well as corporations and institutions of the defense contractors, The Pentagon, the Congress and executive branch*.") (emphasis added). *Id*.

[617] *See* Institute for Trade, Standards and Sustainable Development, *EPA FOIA Request No. EPA-HQ-2014-008026* (filed June 30, 2014; recorded July 1, 2014), *supra*.

[618] *See* Institute for Trade, Standards and Sustainable Development, *Comments Submitted in Response to EPA Proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units - Docket ID No. EPA-HQ-OAR–2013-0602* (*filed* Aug. 15, 2014), available at: http://nebula.wsimg.com/9293ff84df35eecadd25e73a03499114?AccessKeyId=39A2DC689E4CA87C906D&disposition=0&alloworigin=1.

[619] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *State of the Climate in 2008*, Bulletin of the Meteorological Society Vol. 90, No. 8 (T.C. Peterson and M.O. Baringer, Eds. 2009), *supra*.

[620] *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *Global Climate Change Impacts in the United States* (Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009), *supra*.

[621] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences* (SAP1.1/CCSP(2006), National Oceanic and Atmospheric Administration, National Climatic Data Center (Thomas R. Karl, Susan J. Hassol, Christopher D. Miller, and William L. Murray, editors, 2006), *supra*.

[622] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change* (SAP1.3/CCSP(2008g)), National Oceanic and Atmospheric Administration, National Climatic Data Center (Randall Dole, Martin Hoerling, and Siegfried Schubert (eds.)) (2008), *supra*.

[623] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Trends in Emissions of Ozone-Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure* SAP 2.4/CCSP(2008h), National Oceanic and Atmospheric Administration, National Climatic Data Center (Ravishankara, A.R., M.J. Kurylo, and C.A. Ennis (eds.)), *supra*.

[624] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols* (SAP 3.2/CCSP(2008d)), Department of Commerce, NOAA's National Climatic Data Center (H. Levy II, D.T. Shindell, A. Gilliland, M.D. Schwarzkopf, L.W. Horowitz, (eds.)), *supra*.

[625] *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* (SAP3.3/CCSP(2008i)), Department of Commerce, NOAA's National Climatic Data Center (Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)), *supra*.

[626] *See* U.S. Department of Commerce National Oceanographic Administration, *The First State of the Carbon Cycle Report (SOCCR): The North American Carbon Budget and Implications for the Global Carbon Cycle*, (SAP2.2/CCSP(2007)), National Oceanic and Atmospheric Administration, National Climatic Data Center (King, A.W., L. Dilling, G.P. Zimmerman, D.M. Fairman, R.A. Houghton, G. Marland, A.Z. Rose, and T.J. Wilbanks (eds.)), *supra*.

[627] *See* U.S. Department of Commerce National Oceanographic Administration, *Best Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Decisionmaking*, (SAP5.2/CCSP(2009)) (M. Granger Morgan (Lead Author), Hadi Dowlatabadi, Max Henrion, David Keith, Robert Lempert, Sandra McBride, Mitchell Small, and Thomas Wilbanks (Contributing Authors)), *supra*.

[628] *See* U.S. Department of Commerce National Oceanographic Administration, *Decision Support Experiments and Evaluations Using Seasonal to Interannual Forecasts and Observational Data: A Focus on Water Resources*, (SAP5.3/CCSP(2008)) (Nancy Beller-Simms, Helen Ingram, David Feldman, Nathan Mantua, Katharine L. Jacobs, and Anne M. Waple (eds.)), *supra*.

[629] *See* National Research Council, *Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties* (National Academies Press, Wash., DC 2005), *supra*.

[630] *See* National Research Council, *Mitigating Shore Erosion along Sheltered Coasts* (National Academies Press, Wash., DC 2007), *supra*.

[631] *See* National Research Council, *Abrupt Climate Change: Inevitable Surprises*, (National Academies Press, Wash., DC 2002), *supra*.

[632] *See* U.S. Department of Commerce National Oceanic Atmospheric Administration, *Cooperative Institute Program Office Fact Sheet*, NOAA website, available at: ftp://ftp.oar.noaa.gov/lci/1pgFactSheets/CIFAS.pdf. "Cooperative Institutes are non-federal organizations supported by the National Oceanic and Atmospheric Administration (NOAA). Cooperative Institutes have outstanding research programs in one or more areas relevant to the NOAA mission. NOAA's Cooperative Institutes collaborate in a large portion of NOAA's research and play a vital role in increasing NOAA's research capacity and expertise." *Id.* As of 2012, there appears to have been **eighteen (18) Cooperative Institutes managed by three NOAA lines offices**: National Environmental Satellite, Data and Information Service (NESDIS), National Marine Fisheries Services (NMFS), and Oceanic and Atmospheric Research (OAR). *See* United States Department of Commerce, National Oceanic and Atmospheric Administration, *NOAA COOPERATIVE INSTITUTE PROFILES 6/6/2012*, NOAA website, available at: ftp://ftp.oar.noaa.gov/lci/Documents/ci-profiles.pdf. As of 2012, there had been three DOC-NOAA-NESDIS-managed Cooperative Institutes with the following host and participating universities: (1)(a) Name – Cooperative Institute for Climate and Satellites **(CICS-M)**; (b) Host – Univ. of Maryland College Park; (b) Participants - North Carolina State Univ., Univ. of California-Irvine, Colorado State Univ., Howard Univ., Univ. of Miami, Duke Univ., Univ. of North Carolina-Chapel Hill, Princeton Univ., City Univ. of New York, Columbia Univ., Oregon State Univ. and Remote Sensing Systems; (2)(a) Name – Cooperative Institute for Meteorological Satellite Studies **(CIMSS)**; (2)(b) Host – Univ. of Wisconsin-Madison; (2)(c) Participants – none; (3)(a) Name - Cooperative Institute for Oceanographic Satellite Studies **(CIOSS)**; (3)(b) Host - Oregon State Univ.; (3)(c) Participants – none. *Id.* As of 2012, there appears to have been one DOC-NOAA-NMFS-managed Cooperative Institute. (1)(a) Name - Cooperative Institute for the Pacifica Island Region **(CIPIR)**; (1)(b) Host – Univ. of Hawaii; (1)(c) – Participants – none. *Id.* As of 2012, there appears to have been fifteen (15) DOC-NOAA-OAR-managed Cooperative Institutes: (1)(a) Name - Cooperative Institute for Climate Applications Research **(CICAR)**; (1)(b) Host - Columbia Univ.; (1)(c) Participants – none; (2)(a) Name - Cooperative Institute for Climate Science **(CICS-P)**; (2)(b) Host - Princeton Univ.; (2)(c) Participants – none; (3)(a) Name - Cooperative Institute for Alaska Research **(CIFAR)**; (3)(b) Host – Univ. of Alaska - Fairbanks; (3)(c) Participants – none; (4)(a) Cooperative Institute for Limnology and Ecosystem Research **(CILER)**; (4)(b) Host – Univ. of Michigan; (4)(c) Participants - Grand Valley State Univ., Michigan State Univ. Ohio State Univ., Penn State Univ., Stony Brook Univ., Univ. of Illinois at Urbana-Champaign, Univ. of Minnesota, Univ. of Toledo, and Univ. of Wisconsin; (5)(a) Name - Cooperative Institute for Marine and Atmospheric Studies **(CIMAS)**; (5)(b) Host – Univ. of Miami; (5)(c) Participants - Florida Atlantic Univ., Florida Int'l Univ., Florida State Univ., NOVA Southeastern Univ., Univ. of Puerto Rico, Univ. of Florida, Univ. of South Florida, and Univ. of the Virgin Islands; (6)(a) Name - Cooperative Institute for Marine Ecosystems and Climate **(CIMEC)**; (6)(b) Host – Univ. of Calif. San Diego; (6)(c) Participants - Scripps Institution of Oceanography, Calif. State Univ., Los Angeles, Humboldt State, Univ. of Calif., Davis, Univ. of Calif., Los Angeles, Univ. of Calif., Santa Barbara, and Univ. of Calif., Santa Cruz; (7)(a) Name - Cooperative Institute for Mesoscale Meteorological Studies **(CIMMS)**; (7)(b) Host – Univ. of Oklahoma; (7)(c) Participants – none; (8)(a) Name - Cooperative Institute for Marine Resources Studies **(CIMRS)**; (8)(b) Host – Oregon State Univ.; (8)(c) Participants – none; (9)(a) Name - Cooperative Institute for the North Atlantic Region **(CINAR)**; (9)(b) Host - Woods Hole Oceanographic Institution; (9)(c) – Participants – Rutgers Univ., Univ. of Maryland-Center for Environmental Science, Univ. of Maine, and Gulf of Maine Research Institute; (10(a) Name - Cooperative Institute for Ocean Exploration, Research and Technology **(CIOERT)**; (10)(b) Host – Florida Atlantic Univ.; (10)(c) – Participants – Univ. of North Carolina-Wilmington; (11)(a) Name -Cooperative Institute for Research in the Atmosphere **(CIRA)**; (11)(b) Host – Colorado State Univ.; (11)(c) Participants – none; (12)(a) Name - Cooperative Institute for Research in Environmental Sciences **(CIRES)**; (12)(b) Host – Univ. of Colorado; (12)(c) Participants – none; (13)(a) Name - Joint Institute for Marine and Atmospheric Research **(JIMAR)**; (13)(b) Host – Univ. of Hawaii; (13)(c) Participants – none; (14)(a) Name – Joint Institute for the Study of the Atmosphere and Ocean **(JISAO)**; (14)(b) Host – Univ. of Washington; (14)(c) Participants – none; (15)(a) Name -Northern Gulf Institute **(NGI)**; (15)(b) Mississippi State Univ.; (15)(c) Participants – Univ. of Southern Mississippi, Louisiana State Univ., Florida State Univ., and Dauphin Island Sea Lab.

[633] As of 2014, there are sixteen (16) Cooperative Institutes, indicating that a consolidation of the DOC-NOAA Cooperative Institutes Program had taken place: CICS-M; CIMSS; CICS-P; CIPIR-JIMAR; CIFAR; CILER; CIMAS; CIMEC; CIMMS; CIMRS; CINAR; CIOERT; CIRA; CIRES; JISAO; and NGI. *See* United States Department of Commerce National Oceanic and Atmospheric Administration, *National Oceanic and Atmospheric Administration Cooperative Institutes*, NOAA website, available at: http://ci.noaa.gov/Locations.aspx

[634] *See Annual Progress Report July 1, 2003 – June 30, 2004 Cooperative Institute for Climate Science at Princeton University - NOAA Cooperative Agreement NA17RJ2612* (2004), at p. 164, available at: https://www.princeton.edu/cics/about-us/reviews-reports/ProgressReport_2003-2004.pdf. Investigator **Michael Oppenheimer** had made author-contributions to and had reviewed the

WGI version of IPCC-AR4, and had made author-contributions to the WGII portion of IPCC-AR4. Investigator **Colm Sweeney** had made author-contributions to the WGI portion of IPCC-AR4. **Investigators Stephen Pacala and Jorge Sarmiento had made author-contributions to NOAA-developed SAP2.2**.

[635] *See Annual Progress Report July 1, 2004 – June 30, 2005 Cooperative Institute for Climate Science at Princeton University - NOAA Cooperative Agreement NA17RJ2612* (2005), at p. 142, available at: https://www.princeton.edu/cics/about-us/reviews-reports/review-binder/2005_CICS_Annual_Report.pdf. Investigator **Michael Oppenheimer** had made author-contributions to and had reviewed the WGI version of IPCC-AR4, and had made author-contributions to the WGII portion of IPCC-AR4. Investigator **Colm Sweeney** had made author-contributions to the WGI portion of IPCC-AR4. **Investigators Stephen Pacala and Jorge Sarmiento had made author-contributions to NOAA-developed SAP2.2**.

[636] *See Annual Progress Report July 1, 2005 – June 30, 2006 Cooperative Institute for Climate Science at Princeton University - NOAA Cooperative Agreement NA17RJ2612* (2006), at p. 145, available at: https://www.princeton.edu/cics/about-us/reviews-reports/NA17RJ2612-2005-2006.pdf. Investigator **Michael Oppenheimer** had made author-contributions to and had reviewed the WGI version of IPCC-AR4, and had made author-contributions to the WGII portion of IPCC-AR4. **Investigators Stephen Pacala and Jorge Sarmiento had made author-contributions to NOAA-developed SAP2.2**.

[637] *See Annual Progress Report July 1, 2006 – June 30, 2007 Cooperative Institute for Climate Science at Princeton University - NOAA Cooperative Agreement NA17RJ2612* (2007), at p. 128, available at: https://www.princeton.edu/cics/about-us/reviews-reports/NA17RJ2612_2006-07.pdf. Investigator **Michael Oppenheimer** had made author-contributions to and had reviewed the WGI version of IPCC-AR4, and had made author-contributions to the WGII portion of IPCC-AR4. **Investigators Stephen Pacala and Jorge Sarmiento had made author-contributions to NOAA-developed SAP2.2**.

[638] *See Annual Progress Report July 1, 2007 – June 30, 2008, Cooperative Institute for Climate Science at Princeton University - NOAA Cooperative Agreement NA17RJ2612* (2008) at p. 106, available at: https://www.princeton.edu/cics/about-us/reviews-reports/NA17RJ2612_22007-2008.pdf. Investigator **Michael Oppenheimer** had made author-contributions to and had reviewed the WGI version of IPCC-AR4, and had made author-contributions to the WGII portion of IPCC-AR4. **Investigator Stephen Pacala had made author-contributions to NOAA-developed SAP2.2**.

[639] *See Annual Progress Report July 1, 2008 – March 31, 2009 Cooperative Institute for Climate Science at Princeton University NOAA Cooperative Agreement NA08OAR4320752 Shadow Award NA08OAR4320915* (2009) at p. 106, available at: https://www.princeton.edu/cics/about-us/reviews-reports/NA08OAR4320752_Year1.pdf.

[640] *See Annual Progress Report April 1, 2009 – March 31, 2010 Cooperative Institute for Climate Science at Princeton University NOAA Cooperative Agreement NA08OAR4320752* (2010), at p. , available at: https://www.princeton.edu/cics/about-us/reviews-reports/Final_PDF_VERSION_09-10_CICS_Annual_Progress_Report_JCver3-May-14th.pdf.

[641] *See Cooperative Institute for Climate Studies – Five Year Review* (2006), at pp. available at: https://essic.umd.edu/joom2/media/com_form2content/documents/c19/a425/f92/CICSS_Review-06.pdf?TB_iframe=1&width=75%&height=75%&modal=1. "The total CICS funding during the current award, which includes grant years one through four as well as the initial increment for year 5, is $9,832,583." *Id*., at pp. 84-85.

[642] *Id*.

[643] *See* Cooperative Institute for Climate and Studies (CICS), *Scientific Report For the period: September 1, 2005 – August 31, 2006 - NOAA Grant NA17EC1483* (2006), available at: http://essic.umd.edu/cics-md/downloads/sci-report_0905-0806.pdf. **Investigator Konstantin Vinnikov had made author-contributions to NOAA-developed SAP1.1,** had made author contributions or had reviewed the WGI portion of IPCC AR3, and had reviewed the WGI portion of IPCC-AR4. **Investigator Eugenia Kalnay had made author-contributions to NOAA-developed SAPs 1.1 and 1.3. Investigator Phil Arkin had made author-contributions to NOAA-developed SAP 1.3,** and also had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. **Investigator James Carton had made author-contributions to NOAA-developed SAP1.3. Investigator Antonio Busalaachi had served on the NRC Oversight Board on Atmospheric Sciences & Climate Change during the work of the ad hoc NRC Peer Review Panels on SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3.**

[644] *See* Cooperative Institute for Climate and Studies (CICS), *Scientific Report for the Period: September 1, 2006 – August 31, 2007* (2007), available at: http://essic.umd.edu/cics-md/downloads/CICS%20report%202007.pdf. **Investigator Konstantin Vinnikov had made author-contributions to NOAA-developed SAP1.1,** had made author contributions or had reviewed the WGI portion of IPCC AR3, and had reviewed the WGI portion of IPCC-AR4. **Investigator Eugenia Kalnay had made author-contributions to NOAA-developed SAPs 1.1 and 1.3. Investigator Phil Arkin had made author-contributions to NOAA-developed SAP 1.3,** and also had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. **Investigator James Carton had made author-contributions to NOAA-developed SAP1.3. Investigator Antonio Busalaachi had served on the NRC Oversight Board on Atmospheric Sciences & Climate Change during the work of the ad hoc NRC Peer Review Panels on SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3.**

[645] *See* Cooperative Institute for Climate and Studies (CICS), *Scientific Report For the period: September 7, 2007 – August 31, 2008 - NOAA Grant NA17EC1483* (2008), available at: http://essic.umd.edu/cics-md/downloads/CICS%20report%202008.pdf. **Investigator**

Konstantin Vinnikov had made author-contributions to NOAA-developed SAP1.1, had made author contributions or had reviewed the WGI portion of IPCC AR3, and had reviewed the WGI portion of IPCC-AR4. **Investigator Eugenia Kalnay had made author-contributions to NOAA-developed SAPs 1.1 and 1.3. Investigator Phil Arkin had made author-contributions to NOAA-developed SAP 1.3,** and also had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. **Investigator James Carton had made author-contributions to NOAA-developed SAP1.3. Investigator Antonio Busalaachi had served on the NRC Oversight Board on Atmospheric Sciences & Climate Change during the work of the ad hoc NRC Peer Review Panels on SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3.**

[646] *See* Cooperative Institute for Climate and Satellite Studies (CICS), *Scientific Report For the period: September 1, 2009 – Aug 31, 2010 - NOAA Grant NA17EC1483* (Sept. 1, 2010), at p. 13, available at: ftp://ftp.oar.noaa.gov/lci/annualreports/cicsm_fy10.pdf ("In May 2009 a nationwide consortium led by Maryland won a competition for a new NOAA-supported Cooperative Institute for Climate and Satellites (CICS).") *Id*., at p. 7. **Investigator Phil Arkin had made author-contributions to NOAA-developed SAP 1.3,** and also had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. **Investigator James Carton had made author-contributions to NOAA-developed SAP1.3. Investigator Antonio Busalaachi had served on the NRC Oversight Board on Atmospheric Sciences & Climate Change during the work of the ad hoc NRC Peer Review Panels on SAPs 1.1, 1.3, 2.4, 3.2, 3.3, 5.2 and 5.3.**

[647] *See* Cooperative Institute for Climate and Satellites, *Scientific Report For the Period: July 1, 2009 – March 31, 2010 - NOAA Grant NA09NES0006* (2010), at p. 12, available at: http://www.cicsnc.org/assets/pdfs/cics_annual_2010.pdf.

[648] *See* Cooperative Institute for Research in the Atmosphere, *CIRA Annual Report FY03/04* (2004), at p. 11, available at: http://www.cira.colostate.edu/sites/default/files/cira-reports/cira_annual_report_fy03-04.pdf.

[649] *See CIRA Annual Report FY 04/05 Cooperative Institute for Research in the Atmosphere* (2005), available at: http://www.cira.colostate.edu/sites/default/files/cira-reports/cira_annual_report_fy04-05.pdf.

[650] *See CIRA Annual Report FY 05/06 Cooperative Institute for Research in the Atmosphere* (2006), available at: http://www.cira.colostate.edu/sites/default/files/cira-reports/cira_annual_report_fy05-06.pdf. Investigator **David Randall** had made author-contributions to the WGI portion of IPCC-AR4.

[651] *See CIRA Annual Report FY 06/07 Cooperative Institute for Research in the Atmosphere* (2007) at p. 25, available at: http://www.cira.colostate.edu/sites/default/files/cira-reports/cira_annual_report_fy06-07.pdf. Investigator **David Randall** had made author-contributions to the WGI portion of IPCC-AR4.

[652] *See* Cooperative Institute for Research in the Atmosphere, *CIRA Annual Report FY07/08* (2008), at p. 38, available at: http://www.cira.colostate.edu/sites/default/files/cira-reports/cira_annual_report_fy07-08.pdf. **Investigator Thomas Vander Haar had served on the NRC Oversight Board on Atmospheric Sciences & Climate during the work of the ad hoc NRC Peer Review Panels on SAPs1.3, 2.4, 3.2, 3.3, 5.2 and 5.3.**

[653] *See* Cooperative Institute for Research in the Atmosphere (CIRA), *Annual Report FY 08/09* (2009), at p. 38, available at: http://www.cira.colostate.edu/sites/default/files/cira-reports/cira_annual_report_fy08-09.pdf. Investigator **A. Scott Denning** had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. **Investigator Sonia Kreidenweis had served as a reviewer of the NRC Peer Review Panel Report for SAP3.2**.

[654] *See CIRA Annual Report FY 2009/2010 Cooperative Institute for Research in the Atmosphere* (2010), available at: ftp://ftp.oar.noaa.gov/LCI/annualreports/CIRA_Combin_fy10.pdf.

[655] *See* University of Wisconsin-Madison Cooperative Institute for Meteorological Satellite Studies (CIMSS), *Cooperative Agreement Annual Report for the period 1 January 1, 2006 to December 31, 2006 Cooperative Agreement Number NA06NES4400002* (2006),

[656] *See* University of Wisconsin-Madison Cooperative Institute for Meteorological Satellite Studies (CIMSS), *Cooperative Agreement Annual Report for the period 1 January 2007 to 31 December 2007 Cooperative Agreement Number: NA06NES4400002* (2007), available at: https://cimss.ssec.wisc.edu/reports/CIMSS-CA-Report_2007_Final.pdf

[657] *See* University of Wisconsin-Madison Cooperative Institute for Meteorological Satellite Studies (CIMSS), *Cooperative Agreement Annual Report for the period 1 October 2007 to 30 September 2008 Cooperative Agreement Number NA06NES4400002* (2008), at p. 13, available at: http://cimss.ssec.wisc.edu/reports/CIMSS-CA-Report_2008_Final.pdf. **Investigator Steven Ackerman had made author-contributions to the NOAA-developed SOC-2008**, and had made author-contributions to or reviewed the WGI portion of IPCC-AR3. **Investigator Ralf Bennartz had made author-contributions to the NOAA-developed SOC-2008. Investigator James Kossin had made author-contributions to NOAA-developed SAP3.3.**

[658] *See* University of Wisconsin-Madison Cooperative Institute for Meteorological Satellite Studies (CIMSS), *Cooperative Agreement Annual Report for the period 1 October 2008 to 30 September 2009 Cooperative Agreement Number: NA06NES4400002* (2009), at p.13, available at: https://cimss.ssec.wisc.edu/reports/CIMSS-CA-Report_2009_Final.pdf. **Investigator Steven Ackerman had made author-contributions to the NOAA-developed SOC-2008**, and had made author-contributions to or reviewed the WGI portion of IPCC-AR3. **Investigator Ralf Bennartz had made author-contributions to the NOAA-developed SOC-2008. Investigator James Kossin had made author-contributions to NOAA-developed SAP3.3.**

[659] *See* University of Wisconsin-Madison Cooperative Institute for Meteorological Satellite Studies (CIMSS), *Cooperative Agreement Annual Report for the period 1 October 2009 to 30 September 2010 - Cooperative Agreement Number: NA06NES4400002* (2010), at p. 14, available at: ftp://ftp.oar.noaa.gov/lci/annualreports/cimss_fy10.pdf. **Investigator Steven Ackerman had made author-contributions to the NOAA-developed SOC-2008**, and had made author-contributions to or reviewed the WGI portion of IPCC-AR3. **Investigator Ralf Bennartz had made author-contributions to the NOAA-developed SOC-2008.**

[660] *See* Cooperative Institute for Arctic Research, University of Alaska Fairbanks, *Annual Report 1 July 2003–30 June 2004 - Year 3 of Cooperative Agreement NA17RJ1224* at p. ii, Appendix 1, available at: http://www.cifar.uaf.edu/research/annualreport3.pdf. **Investigator John Walsh had made author-contributions to the NOAA-developed NCA2-2009**, and also had made author-contributions to the WGI and WGII portions of IPCC-AR4.

[661] *See* Cooperative Institute for Arctic Research University of Alaska Fairbanks, *Annual Report 1 July 2004–30 June 2005 - Year 4 of Cooperative Agreement NA17RJ1224* (2005) at p. ii, Appendix 1, available at: http://www.cifar.uaf.edu/research/annualreport4.pdf. **Investigator John Walsh had made author-contributions to the NOAA-developed NCA2-2009**, and also had made author-contributions to the WGI and WGII portions of IPCC-AR4. **Investigator Thomas Weingartner had made author-contributions to the NOAA-developed SOC-2008**.

[662] *See* Cooperative Institute for Arctic Research University of Alaska Fairbanks, *Annual Report 1 July 2005–30 June 2006 - Year 5 of Cooperative Agreement NA17RJ1224* (2006), at p. ii, Appendix 1, available at: http://www.cifar.uaf.edu/research/annualreport5.pdf. **Investigator John Walsh had made author-contributions to the NOAA-developed NCA2-2009**, and also had made author-contributions to the WGI and WGII portions of IPCC-AR4. **Investigators Thomas Weingartner and Vladimir Romanovsky had made author-contributions to the NOAA-developed SOC-2008**. Investigator Vladimir Romanovsky also reviewed the WGII portion of IPCC-AR4.

[663] *See* Cooperative Institute for Arctic Research University of Alaska Fairbanks, *Annual Report 1 July 2006–30 June 2007 - Year 6 of Cooperative Agreement NA17RJ1224* (2007), at p. ii, Appendix 1, available at: http://www.cifar.uaf.edu/research/annualreport6.pdf. **Investigator John Walsh had made author-contributions to the NOAA-developed NCA2-2009**, and also had made author-contributions to the WGI and WGII portions of IPCC-AR4. **Investigator Thomas Weingartner had made author-contributions to the NOAA-developed SOC-2008**.

[664] *See* Cooperative Institute for Arctic Research University of Alaska Fairbanks, *Annual Report 1 July 2007–30 June 2008 - Year 7 of Cooperative Agreement NA17RJ1224* (2008), at p. ii, Appendix 1, available at: http://www.cifar.uaf.edu/research/annualreport7.pdf. **Investigator John Walsh had made author-contributions to the NOAA-developed NCA2-2009**, and also had made author-contributions to the WGI and WGII portions of IPCC-AR4. **Investigators Thomas Weingartner and Vladimir Romanovsky had made author-contributions to the NOAA-developed SOC-2008**. Investigator Vladimir Romanovsky also reviewed the WGII portion of IPCC-AR4.

[665] *See* Cooperative Institute for Arctic Research University of Alaska Fairbanks, *Annual Report 1 July 2008–30 June 2009 - Year 7 of Cooperative Agreement NA17RJ1224* (2009), available at: http://www.cifar.uaf.edu/research/annualreport8.pdf. **Investigator John Walsh had made author-contributions to the NOAA-developed NCA2-2009**, and also had made author-contributions to the WGI and WGII portions of IPCC-AR4. **Investigators Thomas Weingartner and Vladimir Romanovsky had made author-contributions to the NOAA-developed SOC-2008**. Investigator Vladimir Romanovsky also reviewed the WGII portion of IPCC-AR4.

[666] *See* Cooperative Institute for Arctic Research University of Alaska Fairbanks, Final Report from CIFAR to NOAA on Extension to Close-out of Cooperative Agreement No. NA17RJ1224 - 1 July 2009–30 November 2009 (Dec. 2009), available at: http://www.cifar.uaf.edu/research/Final%20Report%20from%20CIFAR%20to%20NOAA.pdf.

[667] *See* Cooperative Institute for Alaska Research University of Alaska Fairbanks ("CIFAR-II"), *First Progress Report on Cooperative Agreement NA08OAR4320751 1 July 2008 through 31 March 2009* (April 2009), at p. ii, Appendix 1, available at: http://www.cifar.uaf.edu/research/CIFAR_rpt_July08-March09.pdf. **Investigator John Walsh had made author-contributions to the NOAA-developed NCA2-2009**, and also had made author-contributions to the WGI and WGII portions of IPCC-AR4. **Investigators Thomas Weingartner, Vladimir Romanovsky and David Walker had made author-contributions to the NOAA-developed SOC-2008**. Investigator Vladimir Romanovsky also reviewed the WGII portion of IPCC-AR4.

[668] *See* Cooperative Institute for Alaska Research University of Alaska Fairbanks ("CIFAR-II"), *Second Progress Report on Cooperative Agreement NA08OAR4320751 1 April 1, 2009 through 31 March 2010*, at p. ii, Appendix 1, available at: http://www.cifar.uaf.edu/research/CIFAR_rpt_April09-March10.pdf. **Investigator John Walsh had made author-contributions to the NOAA-developed NCA2-2009**, and also had made author-contributions to the WGI and WGII portions of IPCC-AR4. **Investigators Thomas Weingartner and Vladimir Romanovsky had made author-contributions to the NOAA-developed SOC-2008**. Investigator Vladimir Romanovsky also reviewed the WGII portion of IPCC-AR4.

[669] *See* Cooperative Institute for Climate Applications and Research (CICAR), Earth Institute Columbia University, *Annual Performance Report from July 1, 2009 to June 30, 2010*, available at: ftp://ftp.oar.noaa.gov/LCI/annualreports/cicar_fy10.pdf.

[670] *See* Cooperative Institute for Climate Applications and Research (CICAR), Earth Institute Columbia University, *Annual Performance Report from July 1, 2010 to June 30, 2011*, at pp. 183-184, available at: ftp://ftp.oar.noaa.gov/lci/annualreports/cicar_fy11.pdf. This report lists the principal investigators for each of these CICAR NOAA grant contracts. *Several of the investigators to NOAA Grant No. NA08OAR4320754 had made contributions to IPCC-AR-3 and IPCC-AR-4, USGCRP/CCSP SAPs and also had served on NRC peer review panels reviewing them. For example, **investigator (beneficiary) Lisa Goddard had served on the NRC Peer Review Panel for USCRP/CCSP SAP5.3**. Investigator Ed Cook had made author-contributions or had reviewed to the WGI portion of IPCC-AR3, and had made author contributions to the WGI portion of IPCC-AR4. Investigator **Taro Takahashi had made author-contributions to NOAA-developed SOC-2008 and SAP2.2**.

[671] *See Id*. Several investigators for NOAA Grant No. NA08OAR4320912 served as author-contributors or had reviewed the WGI portions of IPCC-AR3 or IPCC-AR4, or to NOAA-developed assessments. **For example, investigator Suzanne Camargo had made author-contributions to NOAA-developed SOC-2008**. Mark Cane had made author contributions to or had reviewed the WGI portion of IPCC-AR3. Sidney Hemming had served as a reviewer of the WGI portion of IPCC-AR4.

[672] *See* Cooperative Institute for Climate Applications and Research (CICAR) at Columbia University, *Annual Performance Report - July 1, 2003 to June 30, 2004* (2004), available at: http://cicar.ei.columbia.edu/sitefiles/file/CICAR-Annual-Report-2004.pdf. Investigator **Mark Cane** had made author-contributions to or reviewed the WGI portion of IPCC-AR3.

[673] *See* Cooperative Institute for Climate Applications and Research (CICAR) at Columbia University, *Annual Performance Report - July 1, 2005 to June 30, 2006* (2006), available at: http://cicar.ei.columbia.edu/sitefiles/file/CICAR_Annual_Report_2006.pdf. Investigators **Mark Cane, Ed Cook** and **Martin Visbeck** had made author-contributions to or reviewed the WGI portion of IPCC-AR3, and **Ed Cook** also had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Sydney Hemming** had reviewed the WGI portion of IPCC-AR4. **Investigator Lisa Goddard had served on the ad hoc NRC Peer Review Panel for SAP5.3**. **Investigator Taro Takahashi had made author-contributions to the NOAA-developed SAP2.2 and SOC-2008**.

[674] *See* Cooperative Institute for Climate Applications and Research (CICAR) at Columbia University, *NOAA-Sponsored Project Summaries - July 1, 2006 – June 30, 2007* (2007), available at: http://cicar.ei.columbia.edu/sitefiles/file/CICAR_2007_Project_Summaries_Web2011.pdf. Investigators **Mark Cane and Ed Cook** had made author-contributions to or reviewed the WGI portion of IPCC-AR3, and **Ed Cook** also had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Sydney Hemming** had reviewed the WGI portion of IPCC-AR4. **Investigator Lisa Goddard had served on the ad hoc NRC Peer Review Panel for SAP5.3**. **Investigator Taro Takahashi had made author-contributions to the NOAA-developed SAP2.2 and SOC-2008**.

[675] *See* Cooperative Institute for Climate Applications and Research (CICAR) at Columbia University, *Annual Report to NOAA - July 1, 2007 to June 30, 2008* (2008), available at: http://cicar.ei.columbia.edu/sitefiles/file/CICAR_Annual_Report_2008.pdf. Investigators **Mark Cane and Ed Cook** had made author-contributions to or reviewed the WGI portion of IPCC-AR3, and **Ed Cook** also had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Sydney Hemming** had reviewed the WGI portion of IPCC-AR4. **Investigator Lisa Goddard had served on the ad hoc NRC Peer Review Panel for SAP5.3**. **Investigator Taro Takahashi had made author-contributions to the NOAA-developed SAP2.2 and SOC-2008**.

[676] *See* Cooperative Institute for Climate Applications and Research (CICAR) at Columbia University, *Annual Report to NOAA - July 1, 2008 to June 30, 2009* (2009), available at: http://cicar.ei.columbia.edu/sitefiles/file/CICAR_Annual_Report_2009_GOL.pdf ("**The majority of NOAA funding for CICAR has been directed to the Lamont-Doherty Earth Observatory (LDEO) – the University's primary Earth science research unit**" (emphasis added).) *Id*., Executive Summary at p. 1. Investigators **Mark Cane and Ed Cook** had made author-contributions to or reviewed the WGI portion of IPCC-AR3, and **Ed Cook** also had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Sydney Hemming** had reviewed the WGI portion of IPCC-AR4. **Investigator Lisa Goddard had served on the ad hoc NRC Peer Review Panel for SAP5.3**. **Investigator Taro Takahashi had made author-contributions to the NOAA-developed SAP2.2 and SOC-2008**. **Investigator Suzanne Camargo had made author-contributions to the NOAA-developed SOC-2008.**

[677] *See* Cooperative Institute for Climate Applications and Research (CICAR) at Columbia University, *Annual Performance Report to NOAA - July 1, 2009 to June 30, 2010* (2010), available at: ftp://ftp.oar.noaa.gov/LCI/annualreports/cicar_fy10.pdf. Investigators **Mark Cane and Ed Cook** had made author-contributions to or reviewed the WGI portion of IPCC-AR3, and **Ed Cook** also had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Sydney Hemming** had reviewed the WGI portion of IPCC-AR4. **Investigator Lisa Goddard had served on the ad hoc NRC Peer Review Panel for SAP5.3**. **Investigator Taro Takahashi had made author-contributions to the NOAA-developed SAP2.2 and SOC-2008**. **Investigator Suzanne Camargo had made author-contributions to the NOAA-developed SOC-2008.**

[678] "The current CILER Cooperative Agreement with NOAA was awarded in 2007 to the University of Michigan and nine consortium universities (Michigan State University, University of Toledo, Grand Valley State University, University of Minnesota-Duluth, University of Wisconsin, University of Illinois at Urbana-Champaign, Ohio State University, State University of New York at Stony Brook, and Pennsylvania State University)." *See* Cooperative Institute for Limnology and Ecosystems Research, *About the Cooperative Institute for Limnology and Ecosystems Research*, available at: http://ciler.snre.umich.edu/about-us. *See also* NOAA

News, *NOAA Expands Great Lakes Research – Ten Universities Named to Form Great Lakes Cooperative Institute*, NOAA Magazine (June 12, 2007), available at: http://www.noaanews.noaa.gov/stories2007/s2875.htm.

[679] *See* Cooperative Institute for Limnology and Ecosystems Research (CILER), *Annual Report for NA07OAR4320006 - Year Three: Through March 31, 2010* (2010), at pp. 4, 7, available at: http://ciler.snre.umich.edu/sites/ciler.snre.umich.edu/files/2009-2010%20CILER%20Annual%20Report_0.pdf. "The renewal of the CILER Cooperative Agreement went into effect in July of 2007 […] Since the renewal of this new agreement has been in effect, CILER supported over 70 project grants that total over $7.5 million in research funding. During the past year (i.e., current reporting period) CILER administered 15 additional CI project grants totaling $3.7 million. There were 12 non-CI grants administered totaling $2.6 million." *Id*., at p. 4. Funding through March 31, 2010 was $7,410,278. *Id*., at p. 7.

[680] *See* Cooperative Institute of Marine and Atmospheric Studies (CIMAS), *Third Annual Report – NOAA Cooperative Agreement NA17RJ1226 2003-2004* (2004), at p. 8, available at: http://cimas.rsmas.miami.edu/documents/2004-CIMAS_Annual.pdf.

[681] *See* Cooperative Institute of Marine and Atmospheric Studies (CIMAS), *Fourth Annual Report – NOAA Cooperative Agreement NA17RJ1226 2004-2005* (2005), at p. 13, available at: http://cimas.rsmas.miami.edu/documents/2005_CIMAS_Annual.pdf. **Investigator Lisa Beal had made author-contributions to the NOAA-developed SOC-2008.** Investigator **Amy Clement** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Brian Soden** had made author-contributions and had reviewed the WGI portion of IPCC-AR4, and had made author-contributions or reviewed the WGI portion of IPCC-AR3. Investigator **J. Prospero** made author-contributions or reviewed the WGI portion of IPCC-AR3.

[682] *See* Cooperative Institute of Marine and Atmospheric Studies (CIMAS), *Fifth Annual Report – NOAA Cooperative Agreement NA17RJ1226 2005-2006* (2006), at p. 13, available at: http://cimas.rsmas.miami.edu/documents/2006_Annual_Report.pdf. **Investigator Lisa Beal had made author-contributions to the NOAA-developed SOC-2008.** Investigator **Brian Soden** had made author-contributions and had reviewed the WGI portion of IPCC-AR4, and had made author-contributions or reviewed the WGI portion of IPCC-AR3. Investigator **J. Prospero** made author-contributions or reviewed the WGI portion of IPCC-AR3.

[683] *See* Cooperative Institute of Marine and Atmospheric Studies (CIMAS), *Sixth Annual Report – NOAA Cooperative Agreement NA17RJ1226 2006-2007* (2007), at pp. 11-12, available at: http://cimas.rsmas.miami.edu/documents/2007_Annual_Report.pdf. Investigator **Brian Soden** had made author-contributions and had reviewed the WGI portion of IPCC-AR4, and had made author-contributions or reviewed the WGI portion of IPCC-AR3. Investigator **J. Prospero** made author-contributions or reviewed the WGI portion of IPCC-AR3.

[684] *See* Cooperative Institute of Marine and Atmospheric Studies (CIMAS), *Seventh Annual Report – NOAA Cooperative Agreement NA17RJ1226 2007-2008* (2008), at pp. 11-12, available at: http://cimas.rsmas.miami.edu/documents/2008_Annual_Report.pdf. **Investigator (Benjamin Kirtman) had served on the NRC Peer Review Panel for NOAA-developed SAP1.3**. Investigator **J. Prospero** made author-contributions or reviewed the WGI portion of IPCC-AR3. Investigator **Brian Soden** had made author-contributions to and had reviewed the WGI portion of IPCC-AR4. Investigator **Amy Clement** had made author-contributions to the WGI portion of IPCC-AR4.

[685] *See* Cooperative Institute of Marine and Atmospheric Studies (CIMAS), *Eight Annual Report – NOAA Cooperative Agreement NA17RJ1226, Continuation Award NA08OAR4320892 and Shadow Award NA08OAR4320889, 2008-2009* (2009), at p. 10, available at: http://cimas.rsmas.miami.edu/documents/2009_Annual_Report.pdf. **Investigator (Benjamin Kirtman) had served on the NRC Peer Review Panel for NOAA-developed SAP1.3**.

[686] *See* Cooperative Institute of Marine and Atmospheric Studies (CIMAS), *Ninth Annual Report – NOAA Cooperative Agreement NA17RJ1226, Continuation Award NA08OAR4320892 and Shadow Award NA08OAR4320889, 2009-2010* (2010), at p. , available at: http://cimas.rsmas.miami.edu/documents/2010%20Annual_Report.pdf. **Investigator (Benjamin Kirtman) had served on the NRC Peer Review Panel for NOAA-developed SAP1.3**.

[687] *See* Cooperative Institute for Mesoscale Meteorological Studies, *Annual Report, NOAA NA17RJ1227 Fiscal Year – 2004* (2004), at p. 11, available at: http://www.cimms.ou.edu/reports/CIMMSFY04.pdf. **Investigator David Karoly had served on the NRC Peer Review Panel for SAP3.3, had made author-contributions to SAP1.3, had served on NRC Oversight Committee on Climate Change Research of the Oversight Board on Atmospheric Sciences & Climate during the NRC's peer review of SAP1.1, and had reviewed the WGI portion of IPCCAR4.**

[688] *See* Cooperative Institute for Mesoscale Meteorological Studies, *Annual Report, NOAA NA17RJ1227 Fiscal Year – 2005* (2005), at pp. 10-11, available at: http://www.cimms.ou.edu/reports/cimms2005.pdf. **Investigator David Karoly had served on the NRC Peer Review Panel for SAP3.3, had made author-contributions to SAP1.3, had served on NRC Oversight Committee on Climate Change Research of the Oversight Board on Atmospheric Sciences & Climate during the NRC's peer review of SAP1.1, and had reviewed the WGI portion of IPCCAR4.**

[689] *See* Cooperative Institute for Mesoscale Meteorological Studies, *Annual Report, NOAA NA17RJ1227 Fiscal Year – 2006* (2006), at pp. 10-11, available at: http://www.cimms.ou.edu/reports/cimm0607.pdf. **Investigator David Karoly had served on the NRC Peer Review Panel for SAP3.3, had made author-contributions to SAP1.3, had served on NRC Oversight Committee on Climate**

Change Research of the Oversight Board on Atmospheric Sciences & Climate during the NRC's peer review of SAP1.1, and had reviewed the WGI portion of IPCCAR4.

[690] *See* Cooperative Institute for Mesoscale Meteorological Studies, *Annual Report, NOAA NA17RJ1227 Fiscal Year – 2007* (2007), at p. 10, available at: http://www.cimms.ou.edu/reports/cimm0708.pdf. **Investigator David Karoly had served on the NRC Peer Review Panel for SAP3.3, had made author-contributions to SAP1.3, had served on NRC Oversight Committee on Climate Change Research of the Oversight Board on Atmospheric Sciences & Climate during the NRC's peer review of SAP1.1, and had reviewed the WGI portion of IPCCAR4.**

[691] *See* Cooperative Institute for Mesoscale Meteorological Studies, *Annual Report, NOAA NA17RJ1227 Fiscal Year – 2008* (2008), at p. 11, available at: http://www.cimms.ou.edu/reports/cimms0809.pdf.

[692] *See* Cooperative Institute for Mesoscale Meteorological Studies, *Annual Report, NOAA NA17RJ1227 Fiscal Year – 2009* (2009), at p. 11, available at: http://www.cimms.ou.edu/reports/cimmfy09.pdf.

[693] *See* Cooperative Institute for Mesoscale Meteorological Studies, *Annual Report, NOAA NA17RJ1227, NA08OAR4320904 and NA08OAR4320886Fiscal Year – 2010* (2010), at p.12, available at: http://www.cimms.ou.edu/reports/cimmfy10a.pdf.

[694] *See* The Cooperative Institute for Oceanographic Satellite Studies (CIOSS), *Year 2 Annual Progress Report (April 1, 2004 - March 31, 2005)* (2005), at p. 48, available at: http://cioss.coas.oregonstate.edu/CIOSS/Documents/Published_Reports/Year%202%20Annual%20Progress%20Report.pdf.

[695] *Id*.

[696] *See* The Cooperative Institute for Oceanographic Satellite Studies (CIOSS), *Year 3 Annual Progress Report (April 1, 2005 - March 31, 2006)* (2006), at p. 17, available at: http://cioss.coas.oregonstate.edu/CIOSS/Documents/Published_Reports/CIOSS_Year_3_Progress_Report.pdf. Investigator **Mark Abbott** had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. **Investigator Robert Miller had served on the NRC Peer Review Panel for SAP 1.3**. **Investigator James Coakley had served on the NRC Oversight Committee on Climate Change Research of the NRC Oversight Board on Atmospheric Sciences & Climate during Work of the ad hoc NRC Peer Review Panel for NOAA-developed SAP1.1.**

[697] See The Cooperative Institute for Oceanographic Satellite Studies (CIOSS), *Year 4 Annual Progress Report (April 1, 2006 - March 31, 2007)* (2007) at p. 20, available at: http://cioss.coas.oregonstate.edu/CIOSS/Documents/Published_Reports/CIOSS_Year_4_Progress_Report.pdf. **Mark Abbott** had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. **Investigator Burke Hales had made author-contributions to NOAA-developed SAP2.2**. **Investigator Robert Miller had served on the NRC Peer Review Panel for SAP 1.3**.

[698] *See* The Cooperative Institute for Oceanographic Satellite Studies (CIOSS), *Year 5 Annual Progress Report (April 1, 2007 - March 31, 2008)* (2008) at p. 17, available at: http://cioss.coas.oregonstate.edu/CIOSS/Documents/Published_Reports/CIOSS_Year_5_Progress_Report.pdf. **Mark Abbott** had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. **Investigator Burke Hales had made author-contributions to NOAA-developed SAP2.2**. **Investigator Robert Miller had served on the NRC Peer Review Panel for SAP 1.3**.

[699] *See* The Cooperative Institute for Oceanographic Satellite Studies (CIOSS), *Year 6 Annual Progress Report (April 1, 2008 - December 31, 2008* (2008) at p. 16, available at: http://cioss.coas.oregonstate.edu/CIOSS/Documents/Published_Reports/CIOSS_Year_6_Progress_Report.pdf.

[700] *See* The Cooperative Institute for Oceanographic Satellite Studies (CIOSS), *Year 7 Annual Progress Report (January 1, 2009 - December 31, 2009)* (2009) at p. 19, available at: http://cioss.coas.oregonstate.edu/CIOSS/Documents/Published_Reports/CIOSS_Year_7_Progress_Report.pdf. **Investigator Robert Miller had served on the NRC Peer Review Panel for SAP 1.3**.

[701] *See* The Cooperative Institute for Oceanographic Satellite Studies (CIOSS), *Year 8 Annual Progress Report (January 1, 2010 - December 31, 2010)* (2010), at pp. 19, 24, available at: ftp://ftp.oar.noaa.gov/lci/annualreports/cioss_fy10.pdf. The report indicates that CIOSS had secured approximately $1 million funding in FY 2009. *Id*., at p. 24. "This Annual Report covers the calendar year of 2010. Since CIOSS' anniversary date is April 1, this report covers parts of CIOSS Year 7 (4/1/2009 - 3/31/2010) and Year 8 (4/1/10-3/31/11)." *Id*., at p. 2. **Investigator Robert Miller had served on the NRC Peer Review Panel for SAP 1.3**.

[702] *See Cooperative Institute for Marine Resources Studies (CIMRS) Annual Report FY 2004*, available at: http://oregonstate.edu/cimrs/sites/default/files/2004annualreport.pdf. **Investigator Robert O'Malley had made author-contributions to the NOAA-developed SOC-2008**.

[703] *See Cooperative Institute for Marine Resources Studies (CIMRS) Annual Report FY 2005*, available at: http://oregonstate.edu/cimrs/sites/default/files/2005annual.pdf.

[704] *See Cooperative Institute for Marine Resources Studies (CIMRS) Annual Report FY 2007*, available at: http://oregonstate.edu/cimrs/sites/default/files/2006_7annualrpt.pdf.

[705] *See Cooperative Institute for Marine Resources Studies (CIMRS) Annual Report FY 2008*, available at: http://oregonstate.edu/cimrs/sites/default/files/2007_8annualrpt.pdf.

[706] *See Cooperative Institute for Marine Resources Studies (CIMRS) Annual Report FY 2009*, available at: http://oregonstate.edu/cimrs/sites/default/files/2008_9annualrpt.pdf.
[707] *See Cooperative Institute for Marine Resources Studies (CIMRS) Annual Report FY 2010*, available at: http://oregonstate.edu/cimrs/sites/default/files/2009_10annualrept.pdf.
[708] *See* Cooperative Institute for Research in Environmental Sciences (CIRES), *FY 2004 Annual Report NOAA Cooperative Agreement NA17RJ1229* (Nov. 15, 2004), at p. 6, available at: http://cires.colorado.edu/pubs/admin/annual/CIRES_Annual_Report_FY04.pdf.
[709] *See* Cooperative Institute for Research in Environmental Sciences (CIRES), *FY 2005 Annual Report NOAA Cooperative Agreement NA17RJ1229* (Sept. 29, 2005), at p. 8, available at: http://cires.colorado.edu/pubs/admin/annual/CIRES_Annual_Report_FY05.pdf.
[710] *See* Cooperative Institute for Research in Environmental Sciences (CIRES), *FY 2006 Annual Report NOAA Cooperative Agreement NA17RJ1229* (Sept. 30, 2006), at p. 6, available at: http://cires.colorado.edu/pubs/admin/annual/CIRES_Annual_Report_FY06.pdf. **Investigator Ted Scambos had made author-contributions to the NOAA-developed SOC-2008**, had reviewed the WGII portion of IPCC-AR4, and had made author-contributions to or had reviewed the WGII portion of IPCC-AR3. **Investigator Margaret Tolbert had served on the NRC ad hoc Peer Review Panel for SAP2.4**.
[711] *See* Cooperative Institute for Research in Environmental Sciences (CIRES), *FY 2007 Annual Report NOAA Cooperative Agreement NA17RJ1229* (Sept. 27, 2007), at p. 8, available at: http://cires.colorado.edu/pubs/admin/annual/CIRES_Annual_Report_FY07.pdf. **Investigator Margaret Tolbert had served on the NRC ad hoc Peer Review Panel for SAP2.4**.
[712] *See* Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado at Boulder, *Annual Report 2008*, at p. 19, available at: http://cires.colorado.edu/pubs/admin/annual/CIRES_Annual_Report_FY08.pdf. **Investigator Margaret Tolbert had served on the NRC ad hoc Peer Review Panel for SAP2.4**. **Investigator Lisa Dilling had made author-contributions to NOAA-developed SAP2.2.**
[713] *See* Cooperative Institute for Research in Environmental Sciences, University of Colorado at Boulder, *2009 CIRES Annual Report*, at p. 19, available at: http://cires.colorado.edu/pubs/admin/annual/CIRES_Annual_Report_FY09.pdf. **Investigator Lisa Dilling had made author-contributions to NOAA-developed SAP2.2.**
[714] *See* Cooperative Institute for Research in Environmental Sciences, University of Colorado at Boulder, *CIRES Annual Report 2010*, at p. 17, available at: http://cires.colorado.edu/pubs/admin/annual/CIRES_Annual_Report_FY10.pdf.
[715] *See* Joint Institute for Marine and Atmospheric Research (JIMAR), *2004 Annual Report for Cooperative Agreement NA17RJ1230* (2004), at p. iv, available at: http://www.soest.hawaii.edu/jimar/2004JIMARAnnRep.pdf. This $ amount is the aggregate amount of funding received for FYs 2002-2003. Investigator **Bin Wang** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **S.P. Xie** had made author contributions to or had reviewed the WGI and WGII portions of IPCC-AR3. **Investigator Mark Merrifield had made author contributions to the NOAA-developed SOC-2008**.
[716] *See* Joint Institute for Marine and Atmospheric Research (JIMAR), *Annual Report for Fiscal Year 2005* (2005), at p. viii, available at: http://www.soest.hawaii.edu/jimar/jimar_rpt2005.rev.pdf. Investigator **Bin Wang** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **S.P. Xie** had made author contributions to or had reviewed the WGI and WGII portions of IPCC-AR3. **Investigator Mark Merrifield had made author contributions to the NOAA-developed SOC-2008**.
[717] *See* Joint Institute for Marine and Atmospheric Research (JIMAR), *Annual Report for Fiscal Year 2006* (2006), at p. vii, available at: http://www.soest.hawaii.edu/jimar/jimar2006_report_screen.pdf. Investigator **Bin Wang** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **S.P. Xie** had made author contributions to or had reviewed the WGI and WGII portions of IPCC-AR3. **Investigator Mark Merrifield had made author contributions to the NOAA-developed SOC-2008**.
[718] *See* Joint Institute for Marine and Atmospheric Research (JIMAR), *Annual Report for Cooperative Agreement NA17RJ1230* (2007), at p. vii, available at: http://www.soest.hawaii.edu/jimar/JIMAR_rpt07_final_all.pdf. For FY 2002-2007, JIMAR received aggregate funding in the amount of $68,297,970. *Id*. Investigator **S.P. Xie** had made author contributions to or had reviewed the WGI and WGII portions of IPCC-AR3. **Investigator Mark Merrifield had made author contributions to the NOAA-developed SOC-2008**.
[719] *See* Joint Institute for Marine and Atmospheric Research (JIMAR), *Annual Report for Fiscal Year 2008 for Cooperative Agreement NA17RJ1230* (2008), at p. vii, available at: http://www.soest.hawaii.edu/jimar/jimar_rpt08.final.lr.pdf. Investigator **Bin Wang** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **S.P. Xie** had made author contributions to or had reviewed the WGI and WGII portions of IPCC-AR3. **Investigator Mark Merrifield had made author contributions to the NOAA-developed SOC-2008**.
[720] *See* Joint Institute for Marine and Atmospheric Research (JIMAR), *Annual Report for Fiscal Year 2009 for Cooperative Agreements NA17RJ1230 and NA080AR4320910* (2009), at p. viii, available at: http://www.soest.hawaii.edu/jimar/JIMAR_09AnnualReport.pdf. Investigator **Bin Wang** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **S.P. Xie** had made author contributions to or had reviewed the WGI and WGII portions of IPCC-AR3. **Investigator Mark Merrifield had made author contributions to the NOAA-developed SOC-2008**.
[721] *See* Joint Institute for Marine and Atmospheric Research (JIMAR), *Annual Report for Fiscal Year 2010 for Cooperative Agreements NA17RJ1230, NA09OAR4320075, and NA08OAR4320910* (2010), at p. viii, available at:

http://www.soest.hawaii.edu/jimar/JIMAR_2010_annual_report.pdf. Investigator **Bin Wang** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **S.P. Xie** had made author contributions to or had reviewed the WGI and WGII portions of IPCC-AR3. **Investigator Mark Merrifield had made author contributions to the NOAA-developed SOC-2008**.

[722] *See* Joint Institute for Marine and Atmospheric Research (JIMAR-CIPIR), *2012 Annual Report for Cooperative Agreement NA11NMF4320128* (2012), available at: ftp://ftp.oar.noaa.gov/lci/annualreports/cipir_fy12.pdf ("We are currently in the process of assembling our new Memorandum of Agreement between the UHM and NOAA. Due to the timing of the establishment of this new institute and the close-out of our prior cooperative agreement NA17RJ1230/NA09OAR4320075, projects were funded under the sun-setting of NA09OAR4320075.") *Id*., at p. v.

[723] *See* Joint Institute for the Study of the Atmosphere & Ocean (JISAO), *2004 Annual Report - July 1, 2003 – June 30, 2004* (2004), at p. 5, available at: http://www.jisao.washington.edu/sites/default/files/PDFs/2004AnnualReport.pdf. Investigators **Christopher Bretherton** and **Ignatius Rigor** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Edward Miles had made author-contributions to the NOAA-developed NCA2-2009,** and had reviewed the WGII portions of IPCC-AR3 and IPCC-AR4. **Investigator John Wallace had served on the NRC Peer Review Panel for SAP 1.1**, and had made author-contributions to or reviewed the WGI portion of IPCC-AR3. Investigator **E.P. Salathe** had made author-contributions to or reviewed the WGI portion of IPCC-AR3. Investigator **Amy Snover** had made author-contributions or reviewed the WGII portion of IPCC-AR3. **Investigator Nathan Mantua had made author-contributions to the NOAA-developed SAP 5.3**. Investigator **Philip Mote** had made author-contributions and reviewed the WGI portion of IPCC-AR4, and had reviewed the WGII portion of IPCC-AR4. **Investigator Peter Rhines had served on the NRC Oversight Committee on Climate Change Research of the Oversight Board on Atmospheric Sciences & Climate during the work of the ad hoc NRC Peer Review Panel for SAP1.1**.

[724] *See* Joint Institute for the Study of the Atmosphere & Ocean (JISAO), *2004 Annual Report - July 1, 2004 – June 30, 2005* (2005), at p. 4, available at: http://www.jisao.washington.edu/sites/default/files/PDFs/2005annualReport.pdf ("The JISAO/NOAA Cooperative Agreement funding for the [three] years ending on June 30, 2005 totals $46,972,954.") *Id*. Investigators **Christopher Bretherton** and **Ignatius Rigor** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Edward Miles had made author-contributions to the NOAA-developed NCA2-2009,** and had reviewed the WGII portions of IPCC-AR3 and IPCC-AR4. **Investigator John Wallace had served on the NRC Peer Review Panel for SAP 1.1**, and had made author-contributions to or reviewed the WGI portion of IPCC-AR3. **Investigator Peter Rhines had served on the NRC Oversight Committee on Climate Change Research of the Oversight Board on Atmospheric Sciences & Climate during the work of the ad hoc NRC Peer Review Panel for SAP1.1**.

[725] *See* Joint Institute for the Study of the Atmosphere & Ocean (JISAO), *Annual Report – July 1, 2005 – June 30, 2006* (2006), available at: http://www.jisao.washington.edu/sites/default/files/PDFs/2006_AnnualReport.pdf ("The JISAO/NOAA Cooperative Agreement funding for the [four] years ending on June 30, 2006 totals $60,284,132.") *Id*., at p. 21. Investigators **Christopher Bretherton** and **Ignatius Rigor** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Edward Miles had made author-contributions to the NOAA-developed NCA2-2009,** and had reviewed the WGII portions of IPCC-AR3 and IPCC-AR4. **Investigator John Wallace had served on the NRC Peer Review Panel for SAP 1.1**, and had made author-contributions to or reviewed the WGI portion of IPCC-AR3. Investigator **Qiang Fu** had reviewed the WGI portion of IPCC-AR4. **Investigator Peter Rhines had served on the NRC Oversight Committee on Climate Change Research of the Oversight Board on Atmospheric Sciences & Climate during the work of the ad hoc NRC Peer Review Panel for SAP1.1**.

[726] *See* Joint Institute for the Study of the Atmosphere & Ocean (JISAO), *Annual Report – July 1, 2006 - June 30, 2007* (2007), available at: http://www.jisao.washington.edu/sites/default/files/PDFs/2007AnnualReport.pdf ("The JISAO/NOAA Cooperative Agreement funding for the five years ending on June 30, 2007, totals $75,982,042."). *Id*., at p. 10. Investigator **Edward Miles had made author-contributions to the NOAA-developed NCA2-2009,** and had reviewed the WGII portions of IPCC-AR3 and IPCC-AR4. Investigator **Qiang Fu** had reviewed the WGI portion of IPCC-AR4. Investigator **Ignatius Rigor** had made author-contributions to the WGI portion of IPCC-AR4.

[727] *See* Joint Institute for the Study of the Atmosphere & Ocean (JISAO), *Annual Report – July 1, 2007 - June 30, 2008* (2008), available at: http://www.jisao.washington.edu/sites/default/files/PDFs/2008AnnualReport.pdf ("The JISAO/NOAA Cooperative Agreement funding for the six years ending on June 30, 2008 totals $88,852,874.") *Id*., at p. 11. Investigator **Edward Miles had made author-contributions to the NOAA-developed NCA2-2009,** and had reviewed the WGII portions of IPCC-AR3 and IPCC-AR4. Investigator **Qiang Fu** had reviewed the WGI portion of IPCC-AR4. Investigator **Ignatius Rigor** had made author-contributions to the WGI portion of IPCC-AR4.

[728] *See* Joint Institute for the Study of the Atmosphere & Ocean (JISAO), *Annual Report – July 1, 2008 - June 30, 2009* (2009), available at: http://www.jisao.washington.edu/sites/default/files/2009AnnualReport.pdf ("The JISAO/NOAA Cooperative Agreement funding for the [seven] years ending on June 30, 2009 totals $102,889,049."). *Id*., at p. 14. Investigator **Ignatius Rigor** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Edward Miles had made author-contributions to the NOAA-developed NCA2-2009,** and had reviewed the WGII portions of IPCC-AR3 and IPCC-AR4. Investigator **Edward Miles had made**

author-contributions to the NOAA-developed NCA2-2009, and had reviewed the WGII portions of IPCC-AR3 and IPCC-AR4. **Investigator Nathan Mantua had made author-contributions to the NOAA-developed SAP 5.3**.

[729] *See* Joint Institute for the Study of the Atmosphere & Ocean (JISAO), *Annual Report – July 1, 2009 - June 30, 2010* (2010), available at: http://www.jisao.washington.edu/sites/default/files/2010AnnualReport.pdf ("The JISAO/NOAA Cooperative Agreement funding for the [eight] years ending on June 30, 2010, totals $117,506,671."). *Id*., at p. 13. Investigator **Ignatius Rigor** had made author-contributions to the WGI portion of IPCC-AR4. Investigator **Edward Miles had made author-contributions to the NOAA-developed NCA2-2009,** and had reviewed the WGII portions of IPCC-AR3 and IPCC-AR4. **Investigator Nathan Mantua had made author-contributions to the NOAA-developed SAP 5.3**.

[730] *See* Northern Gulf Institute (NGI), *Project Progress Report Reporting Period: 10/01/06 – 06/30/07 - Supported by NA06OAR4320264*, available at: http://www.northerngulfinstitute.org/about/documents/progressReport2007.pdf.

[731] *See* Northern Gulf Institute (NGI), *Cooperative Institute Project Progress Report Reporting Period: July 1, 2007 – June 30, 2008* (July 30, 2008), available at: http://www.northerngulfinstitute.org/about/documents/progressReport2008.pdf.

[732] *See* Northern Gulf Institute (NGI), *Cooperative Institute Progress Report Reporting Period: July 01, 2008 –June 30, 2009* (July 30, 2009), available at: http://www.northerngulfinstitute.org/about/documents/progressReport2009.pdf.

[733] *See* Northern Gulf Institute NGI), *Cooperative Institute Progress Report NOAA Award#: NA06OAR4320264 – Reporting Period July 1, 2009 through June 30, 2010* (2010), at p. 7, available at: http://www.northerngulfinstitute.org/about/documents/progressReport2010.pdf.

[734] *See* Joint Institute for Marine Observations (JIMO), *Annual Report - NOAA NA17RJ1231 – 2003-2004*, available at: http://jimo.ucsd.edu/communications/annual_report/annual_reports.html ("Established in 1991, JIMO is one of thirteen OAR Joint Institutes within NOAA and is located on the SIO [Scripps Institution of Oceanography] campus of the University of California at San Diego."). *Id*., at p. 1. Investigator **Charles Keeling** had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. Investigator **Dan Cayan** had made author contributions to the WGII portion of IPCC-AR4. Investigator **V. Ramanathan** had made author-contributions to and had reviewed the WGI portion of IPCC-AR4. **Investigator Peter Bromirski had made author-contributions to NOAA-developed SAP3.3**.

[735] *See* Joint Institute for Marine Observations (JIMO), *Annual Report 2004-2005* (2005), at p. 26, available at: http://jimo.ucsd.edu/communications/annual_report/JIMO.04_05.pdf. Investigator **Charles Keeling** had made author-contributions to or had reviewed the WGI portion of IPCC-AR3. Investigator **Dan Cayan** had made author contributions to the WGII portion of IPCC-AR4. Investigator **V. Ramanathan** had made author-contributions to and had reviewed the WGI portion of IPCC-AR4. **Investigator Peter Bromirski had made author-contributions to NOAA-developed SAP3.3**. **Investigator Andrew Dickson had made author-contributions to NOAA-developed SOC-2008.**

[736] *See* Joint Institute for Marine Observations (JIMO), *Annual Report 2005-2006* (2006), at p. 28, available at: http://jimo.ucsd.edu/communications/annual_report/JIMO.05-06.pdf. Investigator **Charles Keeling** had made author contributions to or had reviewed the WGI portion of IPCC-AR3. Investigator **Dan Cayan** had made author contributions to the WGII portion of IPCC-AR4. Investigator **V. Ramanathan** had made contributions to and had reviewed the WGI portion of IPCC-AR4. **Investigator Peter Bromirski had made author-contributions to NOAA-developed SAP3.3**. **Investigator Andrew Dickson had made author-contributions to NOAA-developed SOC-2008.**

[737] *See* Joint Institute for Marine Observations (JIMO), *Annual Report 2006-2007* (2007), at p. 17, available at: http://jimo.ucsd.edu/communications/annual_report/JIMO.06-07.pdf. Investigator **Dan Cayan** had made author contributions to the WGII portion of IPCC-AR4. Investigator **V. Ramanathan** had made author-contributions to and had reviewed the WGI portion of IPCC-AR4. Investigator **Ralph Keeling** had made author-contributions to the WGI portions of IPCC-AR3 and IPCC-AR4. **Investigator Andrew Dickson had made author-contributions to NOAA-developed SOC-2008.**

[738] *See* Joint Institute for Marine Observations (JIMO), *Annual Report 2007-2008* (2008), at p. 17, available at: http://jimo.ucsd.edu/communications/annual_report/JIMO.07-08.pdf. Investigator **Dan Cayan** had made author contributions to the WGII portion of IPCC-AR4. Investigator **V. Ramanathan** had made author-contributions to and had reviewed the WGI portion of IPCC-AR4. Investigator **Ralph Keeling** had made author-contributions to the WGI portions of IPCC-AR3 and IPCC-AR4. **Investigator Andrew Dickson had made author-contributions to NOAA-developed SOC-2008.**

[739] *See* Joint Institute for Marine Observations (JIMO), *Annual Report 2008-2009* (2009), at p. 17, available at: http://jimo.ucsd.edu/communications/annual_report/JIMO.08-09.pdf. Investigator **Dan Cayan** had made author contributions to the WGII portion of IPCC-AR4. Investigator **V. Ramanathan** had made author-contributions to and had reviewed the WGI portion of IPCC-AR4. Investigator **Ralph Keeling** had made author-contributions to the WGI portions of IPCC-AR3 and IPCC-AR4. **Investigator Andrew Dickson had made author-contributions to NOAA-developed SOC-2008.**

[740] *See* Joint Institute for Marine Observations (JIMO), *Annual Report 2009-2010* (2010), at p. 17, available at: http://jimo.ucsd.edu/communications/annual_report/JIMO.09-10.pdf. Investigator **Dan Cayan** had made author contributions to the WGII portion of IPCC-AR4. Investigator **V. Ramanathan** had made author-contributions to and had reviewed the WGI portion of

IPCC-AR4. Investigator **Ralph Keeling** had made author-contributions to the WGI portions of IPCC-AR3 and IPCC-AR4. **Investigator Andrew Dickson had made author-contributions to NOAA-developed SOC-2008.**

[741] *See* Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT), *Annual Progress Report: 01 July 2009 to 31 March 2010* (2010), at p.2, available at: http://cioert.org/_resources/CIOERT_Y1_Annual_Report_July_2009.pdf ("In July 2009, CIOERT received $150,000 (NOAA award # NA09OAR4320073) to support Task I Administration and Education/Outreach activities and submitted an annual Science Plan for Task II and III activities. FAU received the latter funding of $1.15M (Amendment 1 to NOAA Award # NA09OAR4320073) in October 2009."). *Id*.

[742] *Id*.

[743] *See* Cooperative Institute for Marine Ecosystems and Climate (CIMEC), *Progress Report 2010-2011 - NA10OAR4320156* (2011), available at: http://cimec.ucsd.edu/pdfs/CIMEC_ANNUAL_FY11.pdf ("CIMEC began on July 1, 2010.") *Id.*

[744] Total NOAA funding received for FYs 2010-2011 amounted to **$3,735, 427**. *Id*., at p. 12.

[745] *See* Cooperative Institute for the North Atlantic Region, *Annual Progress Report July 1, 2009 - March 31, 2010* (April 2010), available at: http://cinar.org/fileserver.do?id=62524&pt=10&p=42773 ("CINAR has been in existence since July 1, 2009, and during the past nine months we devoted considerable time to start-up issues as detailed below. Immediately upon establishment, we began processing proposals for projects that had been on hold in NOAA awaiting the establishment of this new CI. […] The Cooperative Institute for the North Atlantic Region (CINAR) is a regional CI that focuses on the U.S. northeast continental shelf (NES) large marine ecosystem (LME) that encompasses the shelf from Cape Hatteras to Nova Scotia - one of the world's most highly productive marine ecosystems. […] CINAR is a consortium of five partner institutions […] Partners include the University of Maryland Center for Environmental Science (UMCES), Rutgers University (RU), the Woods Hole Oceanographic Institution (WHOI), the University of Maine (UME), and the Gulf of Maine Research Institute (GMRI). The CINAR Program Office is located at WHOI.") *Id*., at pp. 4, 7.

[746] *Id*., at p. 12. *See also* Cooperative Institute for the North Atlantic Region, *Annual Progress Report April 1, 2011 to March 31, 2012* (April 2012), available at: http://cinar.org/fileserver.do?id=124804&pt=2&p=80986 ("**In its first year of operation, CINAR supported 11 projects for 9 investigators, totaling $3.6 million in funds**. **Year one funds were mainly through the NMFS line office ($3.5 million)**. In year two, funding increased significantly to a total of $11.4 million with $3.3 million from NMFS, $7.7 million from OAR, and $0.3 million from NOS. In year three, funding was nearly $10.4 million with $5.7 million from OAR, $3 million from NMFS, and $1.7 million from NOS.") *Id.*, at p. 7.

[747] *See* Grants Online, available at: https://grantsonline.rdc.noaa.gov/flows/publicSearch/showAwardDetails.do?awdNum=NA16GP2029.

[748] *See* Grants Online, available at: https://grantsonline.rdc.noaa.gov/flows/publicSearch/showAwardDetails.do?awdNum=NA16GP2990.

[749] *See* Grants Online, available at: https://grantsonline.rdc.noaa.gov/flows/publicSearch/showAwardDetails.do?awdNum=NA03**OAR**4310064 .

[750] *See* Grants Online, available at: https://grantsonline.rdc.noaa.gov/flows/publicSearch/showAwardDetails.do?awdNum=NA03**OAR**4310058.

[751] *See* Grants Online, available at: https://grantsonline.rdc.noaa.gov/flows/publicSearch/showAwardDetails.do?awdNum=NA04**OAR**4310122.

[752] *See* Grants Online, available at: https://grantsonline.rdc.noaa.gov/flows/publicSearch/showAwardDetails.do?awdNum=NA04OAR4310185.

[753] *See* Grants Online, available at: https://grantsonline.rdc.noaa.gov/flows/publicSearch/showAwardDetails.do?awdNum=NA05OAR4311004.

[754] "The Author Team Convening Lead Authors (CLAs), Lead Authors (LAs), and Chief Editor were constituted as a Federal Advisory Committee that was charged with advising the CCSP on the scientific and technical content of the Report. Contributing Authors (CAs) provided relevant input used in the development of the report, but CAs who were not also LAs or CLAs did not participate in the Federal Advisory Committee (FAC) committee deliberations upon which this Synthesis and Assessment Product was developed." *See* U.S. Climate Change Science Program and the Subcommittee on Global Change Research, *Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences* (SAP1.1/CCSP(2006), National Oceanic and Atmospheric Administration, National Climatic Data Center (Thomas R. Karl, Susan J. Hassol, Christopher D. Miller, and William L. Murray, editors, 2006), *supra* at p. ix.

[755] *See* National Research Council, *Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product 1.3: Reanalyses of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change*, Washington, DC, The National Academies Press (2008), *supra* at p. vi.

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[757] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 35-36.

[758] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at pp. 33, 35-36.

[759] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 113, 115. *Some such grants were awarded specifically to *this* SAP2.2 author-contributor.

[760] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at pp. 113, 115. *Some such grants were awarded specifically to *this* SAP2.2 author-contributor.

[761] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 141-142.

[762] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 142.

[763] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 141-142.

[764] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 142.

[765] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 141-142.

[766] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 142.

[767] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 141-142. *Some such grants were awarded specifically to *this* SAP2.2 author-contributor.

[768] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 142. * Some such grants were awarded specifically to *this* SAP2.2 author-contributor.

[769] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 33, 35.

[770] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at pp. 31-33.

[771] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 33, 35.

[772] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at pp. 31-33.

[773] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at pp. 33, 35.

[774] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at pp. 31-33.

[775] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: pp. 146-147. *Some such grants were awarded specifically to *this* SAP2.2 author-contributor.

[776] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at pp. 146, 149. *Some such grants were awarded specifically to *this* SAP2.2 author-contributor.

[777] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: pp. 146-147.

[778] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at pp. 146, 149.

[779] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: pp. 146-147.

[780] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at pp. 146, 149.
[781] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 110.
[782] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 112.
[783] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 110.
[784] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 112.
[785] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 89.
[786] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at: p. 87.
[787] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 50.
[788] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 50.
[789] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 13.
[790] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at: p. 12-13.
[791] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at: p. 17.
[792] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 123.
[793] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at: p. 125.
[794] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 51.
[795] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 52.
[796] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, at pp. 180-181, available at: http://science.energy.gov/~/media/_/pdf/universities/SC_StatebyState_awards_FY2006.pdf.
[797] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, at p. 182, available at: http://science.energy.gov/~/media/_/pdf/universities/SC_StatebyState_awards_FY2007.pdf.
[798] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 50.
[799] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 50.
[800] *See* The Nature Conservancy, *Restoration Works - Highlights from a Decade of Partnership between The Nature Conservancy and the National Oceanic and Atmospheric Administration's Restoration Center* (2012), available at: http://www.nature.org/ourinitiatives/habitats/oceanscoasts/restoration-works.pdf ("The Nature Conservancy (TNC) and the National Oceanic and Atmospheric Administration (NOAA) *have been working together since 2001* through a National Partnership to restore a diversity of habitats in our nation's coastal waters. In the past decade, some $8 million in federal funds have been matched by more than $10 million in additional state, local and private funds to implement innovative restoration projects yielding tangible results that improve the condition of coastal waterways around the United States") (emphasis added). *Id.*, at p. 8. *See also* U.S. Department of Commerce National Oceanic and Atmospheric Administration, *NOAA Coral Reef Conservation Program - Fiscal Year 2006 Accomplishments*, available at: http://coralreef.noaa.gov/aboutcrcp/howwework/accomplishments/archive/resources/fy06_crcp_accomps.pdf.
[801] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 69.

[802] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 70.
[803] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 51.
[804] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 52.
[805] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 119.
[806] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 121.
[807] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 143.
[808] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 177.
[809] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 181.
[810] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 90.
[811] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2007*, *supra* at p. 91.
[812] *See, e.g.*, U.S. Department of Energy Office of Science, Information Management for Office of Science (IMSC), *Listing of Awards for States – FY2006*, *supra* at: p. 26. *See also* University of California Santa Barbara, Marine Sciences Institute, *MSI 2007-2008 Annual Report - Awards Administered Research Summaries*, available at: http://graphics.msi.ucsb.edu/ann_reps/ANNREP08/resummaries_k.html ("James Kennett 10/1/2003-9/14/2007, $450,826, US Department of Energy, DE-FG02-03ER63696 - Effects of Oceanic Disposal of Carbon Dioxide on Benthic Microfauna: Foraminfera as Indicators of Dissolution and Ecosystem Health - Carbon dioxide (CO2) sequestration is currently being considered as a mechanism for reducing the release of carbon dioxide to the atmosphere. Because direct infection of CO2 at the seafloor provides certain advantages to other disposal venues, a crucial part of investigating oceanic CO2 sequestration is to determine the biological and geochemical effects on the benthic realm.") *Id.*