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Implementation of Federal Guidelines and Best Practices for Highly Influential Scientific Assessments in the Fifth National Climate Assessment

Overview

The Office of Management and Budget (OMB) defines a scientific assessment as "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."[1] To be considered "highly influential," an assessment

- could have a potential impact of more than $500 million in any year, or
- is novel, controversial, or precedent-setting or has significant interagency interest.

A highly influential scientific assessment (abbreviated HISA) is required by law to meet stringent peer review and information quality standards set by the Federal Government. OMB provides the following examples of assessments that may qualify as HISAs: 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.

Background on the Fifth National Climate Assessment

Established by the Global Change Research Act of 1990 (GCRA),[2] the Fifth National Climate Assessment (NCA5)[3] is the latest in a series of congressionally mandated scientific assessments. Each assessment "integrates, evaluates, and interprets the findings of the [U.S. Global Change Research] Program] and discusses the scientific uncertainties associated with such findings; analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and analyzes current trends in global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years."

NCAs are designated as HISAs and must comply with federal HISA requirements, as well as the GCRA and other applicable laws and policies. This memo outlines the organizational roles and responsibilities in NCA5, federal HISA requirements, and how these requirements and other best practices were implemented throughout the report's development.

Recommended Citation

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Organizational Roles in NCA5

Fourteen Federal Steering Committee (FSC) members, approximately 500 authors, 260 technical contributors, 41 review editors, 13 chapter coordinators, 18 peer reviewers, and more than 40 staff members contributed to NCA5, which was published on November 14, 2023. An overview of organizational roles relevant to this document is provided below. For information on other participant roles, see Appendix 1.[4]

National Oceanic and Atmospheric Administration (NOAA)

NOAA served as the lead administrative agency for NCA5 and was responsible for establishing procedures for the report, releasing Federal Register Notices, and ensuring compliance with federal HISA requirements.

U.S. Global Change Research Program (USGCRP)

USGCRP is charged with developing and producing the NCA. USGCRP is directed by the Subcommittee on Global Change Research (SGCR) of the National Science and Technology Council's Committee on Environment, which is overseen by the White House Office of Science and Technology Policy (OSTP). USGCRP staff also served as chapter points of contact (POCs), providing administrative support, chapter coordination, and guidance throughout report development.

Subcommittee on Global Change Research (SGCR)

The SGCR is composed of representatives from USGCRP's 15 federal member agencies.

The SGCR oversees USGCRP's activities and coordinates interagency activities through the USGCRP National Coordination Office and informal interagency working groups.

Federal Steering Committee (FSC)

The FSC for NCA5 consisted of one representative from each USGCRP member agency. In consultation with the SGCR, the FSC was responsible for selecting coordinating lead authors (CLAs), chapter leads (CLs), and review editors (REs); determining scope and content; and overseeing development and production of NCA5, including ensuring that the process adhered to principles of engagement and transparency.

NOAA Technical Support Unit (TSU)

The TSU is staffed primarily by the North Carolina Institute for Climate Studies (NCICS) through its NOAA Cooperative Institute (CISESS). The TSU is led by a NOAA federal employee and draws on support from other federal employees and contractors at NOAA's National Centers for Environmental Information. The TSU was established in 2010 to support the third NCA and the sustained assessment process. Since then, the TSU has supported the development of three NCAs, including their adherence to HISA requirements, as well as the development of other highly influential reports.[5] Working alongside USGCRP staff, the TSU provides support in six primary areas: editorial, graphics and design, science, information quality, web products and support, and project management. The TSU also developed and maintained the Assessment Collaboration Environment (ACE) website, which supported multiple aspects of report development. ACE is used to onboard authors, including recording their agreement to adhere to relevant legal requirements. The site is also used to access guidance documents and other resources, develop figures, share chapter drafts, and record figure metadata.

National Academies of Sciences, Engineering, and Medicine (NASEM)

The NASEM peer review committee (NASEM Committee) was charged with assessing the NCA5 Third Order Draft for consistency with the legislative NCA mandate and with current scientific understanding of climate change and related impacts in the United States. To support use and accessibility of the final NCA5, the committee reviewed the clarity and transparency of the writing and graphics and the effectiveness of communication of science and impacts.

Federal Guidelines and Implementation in NCA5

Peer and Public Review

The OMB Information Quality Bulletin for Peer Review (OMB Peer Review Bulletin),[1] issued under the Information Quality Act (IQA),[6] outlines numerous guidelines for the peer review of highly influential scientific information. Additional guidance, released in 2019 (OMB-19-15),[7] builds upon the OMB Peer Review Bulletin. For NCA5 (and previous NCAs), detailed mechanisms were defined and published in advance for interagency, peer, and public review of the report. This process was carefully designed to meet IQA requirements for HISAs.

Requirements and Best Practices	**Implementation in NCA5**
Develop a peer review plan and agenda.	USGCRP and the FSC developed a peer review plan and agenda. This was approved by the FSC and the SGCR. Notification of the peer review was submitted to NOAA's public announcement and archive of peer review plans. Contact information was included in the public announcement. No public comments on the peer review plan were received.
Choose a peer review mechanism that is adequate, giving due consideration to the novelty and complexity of the science to be reviewed, the relevance of the information to decision-making, the extent of prior peer reviews, and the expected benefits and costs of additional review. Ensure that when influential information that has been peer reviewed changes significantly (e.g., as a result of peer reviewer comments, additional analysis, or further consideration), a second peer review is conducted (OMB-19-15, Implementation Update 1.4).	NCA5 underwent an extensive, multiphase process of internal and external review from federal agency experts and the general public, as well as external peer review by a panel of experts established by NASEM. This included: ● Interagency reviews of the Zero Order (draft outline), Second Order, and Fourth Order Drafts, followed by a final clearance review of the Fifth Order Draft. These reviews were coordinated through the FSC and clearance was coordinated through the SGCR. ● Solicitation of public comments on the proposed framework (85 FR 41567), Zero Order Draft (87 FR 940), and Third Order Draft (87 FR 67873). ● Peer review by a panel of NASEM reviewers of the Third Order Draft. The peer review began on 11/7/2022. The NASEM peer review report,[8] which was itself peer reviewed by a second independent panel, was released publicly on 03/20/2023. ● A call for review editors (87 FR 33131) to ensure that review comments were appropriately addressed and documented by NCA5 authors. (See following section on process integrity.)
Strive to ensure that peer review practices are characterized by both scientific integrity and process integrity.	The NASEM Committee that reviewed NCA5 was tasked with providing a comprehensive, independent review of the draft NCA5 report in order to "determine whether it meets the requirements of the federal mandate; provides accurate information grounded in the scientific literature; and effectively communicates climate science, impacts, and responses for general audiences including the public, decision makers, and other stakeholders."

	Review editors, selected by the FSC after a public call for nominations, provided independent oversight of each chapter's responses to the Third Order Draft public comment and peer review. Each review editor attested that they had no conflict of interest prior to appointment to their chapter. Upon completion, review editors signed a document certifying that the author team considered all review comments and provided adequate written responses and that the submitted Fourth Order Draft reflected all documented edits.
Ensure that the peer review process is transparent by making available to the public the written charge to the peer reviewers, the peer reviewers' names, the peer reviewers' report(s), and the administrative agency's response to the peer reviewers' report(s).	USGCRP took the following steps to ensure that the NCA5 peer review and public comment process was transparent: ● Created review charges for public comment, peer review, and interagency review, along with instructions to review editors. Peer review and public comment charges were made public. ● Held a public kickoff meeting with NASEM peer reviewers, which was open to the public, to provide background information to the peer reviewers. ● Made public authors' responses to comments as downloadable PDFs on the NCA5 website. The names of the NASEM Committee were made public on the NASEM website. The names of the NCA5 peer reviewers and the names of the independent reviewers of the NASEM peer review report can be found in the final NASEM peer review report.[8] The peer review report was made public by NASEM and is also posted in a downloadable PDF on the NCA5 website.
Perform the following duties when selecting peer reviewers: ● consider expertise and balance; ● consider barring participation by scientists with a conflict of interest; ● ensure that reviewers are independent of the	USGCRP submitted a list of all NCA5 authors, contributors, and review editors to NASEM to ensure that no NCA5 contributors were considered for the peer review panels. On 11/30/2022, the NASEM Committee selected to review NCA5 held a closed discussion regarding potential conflicts of interest or biases among committee members. The NASEM process for selecting peer reviewers and conducting the review can be found in the Introduction section titled "The Committee's Approach to This Report" of the final

agency sponsoring the review; ● avoid repeated use of the same reviewer in multiple assessments; ● provide reviewers with sufficient background information, including access to key studies, data, and models, to perform their role as peer reviewers; ● instruct reviewers to prepare a peer review report that describes the nature and scope of their review and their findings and conclusions; ● adopt or adapt the committee selection policies employed by the National Academy of Sciences (NAS)[6] when selecting peer reviewers who are not government employees; and ● ensure reviewers are asked to evaluate the objectivity of the underlying data and the sensitivity of the conclusions to analytic assumptions (OMB-19-15, Implementation Update 1.3).	NASEM peer review report. Additional information on NASEM review committee composition and balance, committee member conflicts of interest, and the independence of committee members from project sponsors can be found on the NASEM website. See the NASEM Peer Review Description for the review charge, the list of names of the NASEM peer review committee, and the timeline of meetings. A NASEM Peer Review Kickoff Meeting provided background and information to the reviewers. NASEM presented the findings of their peer review in a public sponsor meeting held on 03/16/2023. Members of the NASEM Committee, including the chair, also presented the findings of the peer review report to the authors during the closed all-authors meeting (April 2023).
Whenever feasible and appropriate, make the draft available to the public for comment at the same time it is submitted for peer review	The public comment period and the peer review period for the NCA5 Third Order Draft were made available at the same time (see peer review plan). The Notice of Planned Public Engagement Opportunities for

(or during the peer review process), noting that public comment is not a substitute for peer review.	NCA5 was published in 85 FR 65433 on 10/15/2020. The opportunity for public comment was made public via the Federal Register (87 FR 67873); USGCRP website, open notices, social media, and newsletters; and a White House press release.
Provide a vehicle for the public to provide written or oral comments.	Public and USGCRP agency comments on NCA5 drafts were collected via the internally built Review & Comment System to serve as "an interface for users to access USGCRP-related documents available for public review." In addition, USGCRP developed additional support tools to make the comment submission process as accessible as possible, including two recorded public webinars, step-by-step user guides in English and Spanish, and a short video tutorial to visually demonstrate the process for submitting a comment. During the Third Order Draft public comment period, USGCRP hosted 34 virtual public engagement workshops that were free and open to the public.
When employing a public comment process as part of the peer review, whenever practical, provide peer reviewers with access to public comments that address significant scientific issues with ample time to consider them in their review	Feedback from the public received prior to the Third Order Draft was provided to the NASEM Committee during the NASEM Peer Review Kickoff Meeting. The public comment period and the peer review period for the NCA5 Third Order Draft began at the same time (11/7/2022). The public comment process closed on 01/27/2023, while the peer review period closed on 03/20/2023. The peer review plan stated that public comments on the Third Order Draft would not be available to the NASEM Committee before its review.
Specify time limits for public participation throughout the peer review process.	Time limits for public participation were specified in the Federal Register Notices (85 FR 41567, 87 FR 940, 87 FR 67873). The overall timeline for the NCA5 development process was made public on the USGCRP website.
Response to Comments	Names and affiliations of people submitting public comments were not shared with authors during the review processes. Authors wrote responses to every public comment received on

[Not required but in line with transparency of peer review process, USGCRP policies, and agency best practices for responding to public comments]	the Zero Order Draft and Third Order Draft. Authors provided a narrative response to the peer review comments as well as responses to every line-by-line comment received. Comments and responses to comments are publicly available on the downloads page of the NCA5 website: • Public Comments and Author Responses for the Zero Order Draft • Public Comments and Author Responses for the Third Order Draft • Review by National Academies of Sciences, Engineering, and Medicine • Narrative Response to the Academies Review • Author Responses to National Academies of Sciences, Engineering, and Medicine

Information Quality

HISAs are required to adhere to strict information quality guidelines, including compliance with the OMB Peer Review Bulletin,[1] the Information Quality Act (IQA),[4] and the Foundations for Evidence-Based Policymaking Act (Evidence Act).[9] These guidelines serve to ensure that assessment findings are open and of a sufficient quality by meeting standards of quality, utility, objectivity, integrity, reproducibility, and transparency.

Requirements and Best Practices	**Implementation in NCA5**
Assessing Information Quality Agencies are directed to develop information resources management procedures for reviewing and substantiating (by documentation or other means selected by the agency) the quality (including the objectivity, utility, and integrity) of information before it is disseminated.	The NCA5 Information Quality Officer was appointed from the NCA5 Administrative Agency (NOAA) to verify and report on IQA compliance. Appendix 2[10] of the final NCA5 report outlines the process for information quality. The IQA certification was made public upon publication of the final NCA5 report (11/14/2023).

Information Quality OMB Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies (67 FR 5365 Section 515)[11] denotes four substantive terms regarding information disseminated by Federal agencies: **quality, utility, objectivity,** and **integrity**. OMB M-19-15 Section 3 and the NOAA Scientific Integrity Guidelines[12] also include requirements for reproducibility. **Reproducibility** and **transparency** are considered in NOAA Information Quality Guidelines[13] as elements of utility.	USGCRP and TSU advised authors to evaluate the **quality** of information sources based on **applicability and utility, transparency and traceability, objectivity, integrity and security, and reproducibility** and provided information quality decision pathways as part of the NCA Information Quality Guidance to aid in source evaluation. To respect intellectual property rights, all NCA5 participants were required to disclaim their contribution scenario and intellectual property (including original text, figures, data, and software/computer code) during the onboarding process. This step ensured that the report content could be released under the Creative Commons 1.0 Universal Public Domain Dedication (CC0 1.0) license. A downloadable PDF of the NCA Information Quality Guidance was provided to authors on the Assessment Collaboration Environment (ACE) website. This guidance was made public upon publication of the final NCA5 report (11/14/2023).
Request for Input [Not required for HISA but in line with USGCRP policies and priorities for public engagement, as outlined in the USGCRP 2022–2031 Strategic Plan[16]]	USGCRP published a Federal Register Notice (85 FR 65433) calling for public submissions of "relevant scientific and/or technical research studies—including observed, modeled, and/or projected global change and climate science information, as well as societal drivers, vulnerability, impacts, and responses." This call was open from 10/15/2020 through 01/27/2023. USGCRP published a public call for visual art for the NCA5 Art x Climate project on 10/11/2022, which was also made public on challenge.gov. The call closed on 01/27/2023.
Compliance with the Evidence Act[9] and FAIRER data principles (Findable, Accessible, Interoperable,	The TSU built a comprehensive survey to facilitate the collection and review of metadata for all report figures and applicable tables. The survey was designed with input from NOAA Information Quality Guidelines[13] and included all fields

Reusable, Equitable, and Responsible),[16, 17] including data inventory and access Evidence Act § 3511. Include metadata in the comprehensive data inventory on each data asset, including, to the maximum extent practicable: ● A description of the data asset, including variable names and definitions ● The name or title of the data asset ● Data asset accessibility and licensing, including to the extent practicable, any restriction on the use of the data asset ● A description of the method by which the public may access or request access to the data ● The date on which the data asset was most recently updated ● The owner and location of the data asset ● Any other metadata necessary to make the comprehensive data inventory useful to the agency and the public	required by the Evidence Act. The survey structure follows NOAA's implementation of the ISO-19115 documentation standards. To aid authors with metadata documentation, the TSU created a manual with step-by-step instructions on the type and extent of information required, underlying legal origins, and survey structure and functionality. This document was provided to authors on ACE. The TSU provided on-demand support to authors throughout the documentation process. Figure and tables were reviewed multiple times before release to identify and address any gaps in documentation. Metadata for any underlying datasets were added by the TSU upon the integration of the datasets into the dataset library. Before release, the NCA5 Information Quality Officer verified compliance with legal requirements and FAIRER data principles. Final figure and table metadata are viewable on the NCA5 report website and indicated by an eyeball icon at the top right of each figure and relevant table. Metadata are also archived on the Global Change Information System (GCIS), an open-source, web-based catalog of all materials and data used for USGCRP products and climate assessments. GCIS acts as an advanced, multifaceted bibliography, maintaining traceable provenance records of scientific information and providing access to the original data and research.
Indigenous Knowledge (IK) as it relates to information quality The OSTP/CEQ Guidance on Indigenous Knowledge[14]	● Guidance on writing related to Indigenous Peoples, including a glossary of terms, was developed by NCA4 authors; NCA5 authors were provided an opportunity to review and update as needed. Guidance was made available to all NCA5 participants on ACE.

(11/30/2022) promotes a Federal Government–wide effort to improve the recognition and inclusion of IK and outlines guidance to consider, include, and apply IK in federal research, policies, and decision-making. The Guidance on Indigenous Knowledge memorandum also notes that consultation and collaboration with Tribal Nations and Indigenous Peoples is critical to ensuring that IK is considered and applied in a manner that respects Tribal sovereignty and achieves mutually beneficial outcomes for Tribal and Indigenous communities.	• All NCA5 authors were provided with training on Indigenous Knowledge (IK) during orientation (first all-author meeting). • USGCRP and TSU, with legal counsel from NOAA and OSTP, updated the NCA Information Quality Guidance used by authors in previous Assessments. Finalized in April 2023, this updated guidance was reviewed by authors of the NCA5 Tribes and Indigenous Peoples chapter (Chapter 16) and was approved by the FSC, the USGCRP Executive Director, and the NCA5 Information Quality Officer. • Recognizing the challenges and burdens associated with numerous requests for Tribal Consultations, NCA5 worked together with OSTP/CEQ (Council on Environmental Quality) during the process of updating NCA5 IQA guidance and development of the OSTP/CEQ Guidance on Indigenous Knowledge to include NCA5-related questions during three planned Tribal Consultations. • The NCA5 Director worked with the OSTP/CEQ team to include examples from NCA4 on the use of IK in the OSTP/CEQ guidance. The updated IQA guidance for NCA5 was also included in Appendix C of the OSTP/CEQ guidance document, as an example of a successful approach to using IK as source materials in HISAs under the IQA • Authors from NCA5 Chapter 20 (Social Systems and Justice) engaged with the Quinault Indian Nation (QIN) early in the development process and established respectful practices. The NCA5 Director and chapter authors met twice with the Quinault Business Council to discuss and gain consent on including a text box titled Quinault Indian Nation Relocation and Sovereignty. The text box includes a quote from a Quinault Tribal member and an image contributed by the QIN.
Other considerations and best practices when writing about Indigenous Peoples The OSTP/CEQ Guidance on Indigenous Knowledge	In addition to the actions taken on the use of IK above: • NCA5 chapters recognize past injustices to Indigenous Peoples, including genocide, land dispossession, forced migration, colonialism, racism, systemic inequality, and inequitable access to resources. Historical narratives,

includes the following principles and practices: ● Acknowledge historical context and past injustice ● Practice early and sustained engagement ● Earn and maintain trust ● Respect different processes and world views ● Recognize challenges ● Consider co-management and co-stewardship structures ● Pursue co-production of knowledge	including deep-time Indigenous traditions, are described in the NCA5 text. ● While most authors were asked to provide only one affiliation for chapter credits, authors affiliated with a Tribe were allowed to report both their institution and Tribal affiliation (e.g., "Kyle Whyte, Citizen Potawatomi Nation and University of Michigan"). ● The authors of Chapter 15 (Human Health) developed a series of videos with interviews of Tribal leaders from Louisiana sharing their local knowledge, wisdom, and experiences of the health impacts and resilience-building following Hurricane Ida. The full videos are publicly available on the US Climate Resilience Toolkit website. ● Other chapters (e.g., Alaska [Chapter 29] and Hawai'i and US-Affiliated Pacific Islands [Chapter 30]) include quotes from elders (with consent) and terminology in native languages. ● To recognize representation and different worldviews in design choice, the Tribes and Indigenous Peoples chapter uses a figure directly from the 2021 Status of Tribes and Climate Change Report,[15] as it had already gone through extensive iteration and reflects Indigenous values and design aesthetic. ● To foster continued trust and sustained engagement, "Dear Tribal Leader," "Dear Native Hawaiian Organizations," and "Dear Pacific Islands Community Member or Representative" letters were sent after the release of NCA5 to describe how input from Indigenous Peoples had been incorporated into NCA5 and to share resources. Note that this appears to be a new process across the Federal Government, as previous "Dear Tribal Leader" letters had been sent only when the government was *asking* for something from Tribal leaders.
Copyright [Not required by OMB but in line with NOAA's legal interpretation of US copyright law]	The TSU contacted authors, publishers, organizations, and other individuals as needed to obtain the necessary copyright permissions to use and prepare derivative works, in perpetuity, of all copyright-protected graphics and photos selected for use in NCA5. When necessary, NOAA legal representatives were consulted to determine whether a graphic or image could be included in NCA5.

	Credit to the original creator and a link to the copyright license, if applicable, were provided in the caption for all adapted or directly cited figures and tables. Terms of reuse were also specified on the NCA5 report website as part of the metadata documentation. The NCA5 website notes that the Art x Climate artworks and associated artists' statements are not official Assessment products and do not necessarily represent the views of the authors or USGCRP. Each artwork depicted in the Art x Climate gallery is the property of the artist and protected by copyright law. USGCRP obtained permission to use the artwork in conjunction with NCA5.
Personal Privacy [Not required by OMB but in line with NOAA's legal interpretation of the Privacy Act of 1974, as amended, 5 U.S.C. § 552a]	Likeness and Profile Release forms were required for all uses of a person's name, image, likeness, portrait, or voice in any media or activities related to the National Climate Assessment or sustained assessment process. Signatories of the Likeness and Profile Release forms affirmed that they held copyright ownership of any written copy, photograph, video, film footage, and/or any information provided or that they had obtained permission from the copyright owner(s) upon release to the US Government for use.

Digital Accessibility

According to OMB, "digital accessibility refers to those practices related to the development, procurement, maintenance, and use of information and communication technology that ensure functionality is accessible to and usable by individuals with disabilities as provided by law, either directly or by supporting the use of a person's assistive technology."[18] HISAs are required to ensure digital accessibility per Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794d)[19] and in accordance with OMB's guidelines for strengthening digital accessibility (M-24-08).[18]

Requirements and Best Practices	**Implementation in NCA5**
Ensuring Digital Accessibility	All tools (e.g., ACE, Contribute, Review and Comment) and final NCA5 products (e.g., report website, downloadable PDFs) were designed to be usable, accessible, and fully compliant with Section 508 and other legal requirements. Of note, the TSU:

	• Provided authors with guidance on how to design accessible figures and tables (e.g., color combinations to avoid, alternatives to complex or nested tables). This guidance was provided to authors on ACE. • Ensured graphics were readable for users with color-perception challenges by using appropriate color schemes and visual presentations. • Designed the NCA5 website to adhere to the core requirements of the U.S. Web Design System (USWDS)[20] under the 21st Century Integrated Digital Experience Act of 2018[21] and to meet Level AA Web Content Accessibility Guidelines (WCAG) at a minimum and Level AAA standards where possible. • Developed and implemented alternative text for all figures, icons, and other images to support the use of screen readers.

Scientific Integrity

The White House Office of Science and Technology Policy (OSTP) Scientific Integrity Policy, developed in response to the National Science and Technology Council Framework on Federal Scientific Integrity Policy and Practice and adopted in May 2023, defines scientific integrity as the adherence to professional practices, ethical behavior, and the principles of honesty, objectivity, and transparency when conducting, managing, using the results of, and communicating about science and scientific activities. Inclusivity and protection from inappropriate influence are hallmarks of scientific integrity.

In addition to the measures of scientific integrity listed in the sections above, NCA5 met the OSTP Scientific Integrity Policy guidelines through the policies and practices listed below.

Requirements and Best Practices	**Implementation in NCA5**
Protecting scientific processes	• Only one person, the NCA5 Director, served as the liaison between the developers of the Assessment (USGCRP and all participants) and the Executive Office of the President (EOP). Upon clearance of the report by SGCR, the Director delivered it to OSTP, which then delivered the report to the President and the Congress, per the GCRA. • Because the Key Messages of NCA are developed by consensus by author teams, only one person per

	chapter—the Federal Coordinating Lead Author—delivered chapter drafts and the final chapter content to the NCA5 Director, who then delivered drafts and the final report to the FSC and SGCR for review and clearance, per the 1972 Federal Advisory Committee Act (FACA). ● Employees of the EOP and appointed officials of federal agencies were not permitted to participate in NCA5 as chapter authors, contributors, or review editors. Any author who was appointed to a position in the EOP or a federal agency during the development of NCA5 recused themselves from further participation in NCA5. ● Employees of the EOP and appointed officials of federal agencies were not permitted to participate in the NCA5 review and clearance process. SGCR held authority for NCA5 clearance. ● All participants (authors, contributors, review editors) were required to disclose conflicts of interest during the onboarding process before they were permitted to begin work on NCA5. Participants were required to notify USGCRP if any potential or actual conflict situations arose. ● During the onboarding process and before they were permitted to begin work on NCA5, all participants (authors, contributors, review editors) were required to agree to abide by the NOAA Scientific Integrity Guidelines[12] as "covered individuals," as well as any scientific integrity policy that applied to them by virtue of their affiliation with a university or other institution. ○ Note: the OSTP Scientific Integrity Policy was not yet published when participants were onboarded for NCA5. ● The NCA5 peer review process (see section above) provided independent peer review following the guidelines for a HISA. ● There were three rounds of interagency technical review, led by the FSC, and a clearance review, led by the SGCR. The review process allowed for iterative discussions between authors and agency scientists to ensure the accuracy of the scientific record and to correct identified inaccuracies. ● TSU maintains archives of all chapter drafts, at each stage

	of development, to protect and conserve federal research resources and records of data and results. ● TSU maintains archives of all metadata (see above IQA section for more information on GCIS).
Ensuring the free flow of scientific information	● NCA5 is freely available to the public in an online digital format. ● GCIS acts as an advanced, multifaceted bibliography, maintaining traceable provenance records of scientific information and providing access to the original data and research (see above IQA section on GCIS). ● NCA5 was released in a timely manner and in accordance with publicly available timelines posted on the USGCRP website. ● The NCA5 Director served as the single liaison to OSTP. EOP and appointed officials in agencies were not permitted to participate in the development or technical reviews of NCA5 to ensure that scientific findings and products were not suppressed, delayed, or altered for political purposes and were not subjected to inappropriate influence. ● The FSC and SGCR worked in a transparent and consensus-based fashion, where comments and responses were shared across agencies, to ensure that any one agency did not have inappropriate influence on NCA5 or on any one chapter or element of NCA5, and did not unduly delay publication. ○ While the number of all-federal author teams was reduced in NCA5 compared to NCA4, three chapters of NCA5 (Energy [Chapter 5], Forests [Chapter 7], and Agriculture [Chapter 11]) remained authored by federal employees only. ● Chapter lead authors were given autonomy to select author teams and determine the scope of their chapters without political interference or inappropriate influence while at the same time complying with policies and procedures for NCA development process and reviews. ● Authors are permitted and encouraged to communicate the findings of the Assessment in their personal capacities, and in accordance with their employers in their professional capacity. ● Authors were provided with media training and

	communication toolkits and may seek further help from USGCRP staff. ● Biweekly meetings with federal agency communications staff were organized and conducted by USGCRP between August 2023 and January 2024 to ensure accurate and consistent representation of NCA5 findings. Agencies were provided with NCA5 communication toolkits, including social media toolkits.
Supporting decision-making processes	● The NCA5 peer and public review process (see section above) and interagency review process ensured the quality, accuracy, and transparency of scientific information in NCA5, which may be used to support policymaking and decision-making, including opportunities to express differing scientific opinions. ● NCA5 is policy relevant and policy neutral. It does not prescribe specific policy interventions, advocate for a particular policy or viewpoint, or include recommendations on policy. NCA5 authors assess a range of potential impacts to help decision-makers better identify risks that could be avoided or reduced to inform, not prescribe, policy.
Ensuring accountability	● The NCA5 website provides instructions on how to report suspected errata. TSU manages reports of errata and, with USGCRP, works with authors to determine whether there is a scientific inaccuracy in the report. Edits to NCA5 based on errata reports are documented in the errata PDF, which is regularly updated and publicly available on the NCA5 downloads page.
Protections	● All authors were required to have the scientific expertise needed to contribute meaningfully to the chapter. Additionally, chapter leads were required to build diverse teams by considering a range of disciplines (physical, social, and biological sciences; Indigenous Knowledge; science communication; etc.), a broad array of experience (practitioner, academic, etc.), and diverse lived experiences and perspectives, including geographic location, career stage, professional organization type, race, ethnicity, gender, and past assessment experience. ● For the first time, a code of conduct was instituted for all

	NCA participants to help ensure that all participants could engage in an inclusive, respectful, and safe environment.

Additional Diversity, Equity, Inclusion, Justice, and Accessibility Considerations

USGCRP's 2022–2031 Strategic Plan[16] emphasizes diversity, equity, inclusion, justice, and accessibility to help ensure that Americans benefit equitably from federal science investments, including exploring methods for communicating, engaging, and collaborating with communities and research users to understand how scientific information can be most effectively translated for use in decision-making.

In addition to the examples provided in the sections above, NCA5 took several steps to improve the inclusive nature of the NCA development process, advance the conversation around equity and justice, and enhance accessibility of NCA5 products.

- Guidance was provided to chapter leads on how to build diverse author teams. For the first time, a code of conduct was instituted for all NCA participants to help ensure that all participants could engage in an inclusive, respectful, and safe environment.
- Closed-captioned options were available for public engagement webinars.
- Spanish translation was provided during the US Caribbean (Chapter 23) public engagement workshop.
- The draft US Caribbean chapter released during the Third Order Draft public comment period was also available for review in Spanish. Public comments could be submitted in Spanish.
- For the first time, the entire Assessment will be translated into Spanish (expected late spring/early summer 2024).
- Throughout the report development process, USGCRP encouraged discussions around equity and justice topics. Authors were asked to consider the justice implications of climate change so as to make the report more broadly representative and inclusive of historically underrepresented communities.
- Authors were provided with guidance on writing about people or groups of people and equity/justice topics, including recommendations for terminology. The NCA5 glossary includes some of the first official Federal Government definitions for terms related to environmental justice and equity (e.g., "overburdened" and "underserved").
- USGCRP coordinated author-driven social science and Indigenous author cohorts for authors to discuss these topics and share information across chapters.
- New guidance was developed and provided to authors on how to better include climate risks, impacts, and responses in areas outside the contiguous United States, including Alaska, Hawai'i and US-Affiliated Pacific Islands, and the US Caribbean.[21]
- Because NCA5 represents the first time that a website serves as the official report of record, the report was developed and designed to be delivered as a digital product. The NCA5 website was optimized for use on tablets and phones and boasts an improved search function so that content is accessible to the widest possible audience.

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