

Committee to Advise the U.S. Global Change Research Program Fall 2024 Meeting Briefing / Reference materials

Topic: Use of Artificial Intelligence in the development of USGCRP highly influential scientific assessments (HISAs)

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Core Meeting Resources

The following resources are recommended for all meeting participants in advance of the Fall meeting.

[1] **Article:** [The role of artificial intelligence tools in climate change scientific assessments](#)¹ [Note: to access this paper on SSRN, you can create a login, or choose the [Download without registration](#) option.]

The USGCRP Advisory Committee's Fall meeting discussions focus on the intersection of 1) the USGCRP scientific assessment process, 2) core principles to ensure that those assessments are authoritative, accurate, and useful, and 3) available artificial intelligence approaches and tools.

- **[2] Artificial Intelligence:** [GAO Science & Tech Spotlight: Generative AI](#)
- **[3] USGCRP Assessment Process:** [NCA5 Appendix 1](#) (additional details in [NCA4 Appendix 1](#))
- **[4] NCA Information Quality standards / principles:** [NCA5 Appendix 2](#) (Information quality)

¹ Al Khourdajie, Alaa, *The role of artificial intelligence tools in climate change scientific assessments* (March 4, 2024). *Abstract:* Scientific assessments, such as the IPCC reports, are vital tools for evidence-based decision-making. However, the exponential growth of scientific literature and the length of these reports can hinder the efficiency of the assessment processes, and the accessibility of their findings. This perspective article explores how existing and emerging artificial intelligence (AI) tools could offer solutions to these challenges. The article discusses the use of advanced information retrieval, text mining, and machine learning tools to navigate the increasingly vast climate change literature and support consensus-building. It argues that expert judgment remains crucial for assessing compiled literature. The article also looks at the potential of Large Language Models (LLMs) to communicate the complex findings of IPCC reports, emphasising the need to preserve scientific nuance, complexity and uncertainty. The article concludes with proposed hybrid ways forward for combining AI solutions with expert judgment could significantly improve the effectiveness of future IPCC assessments.

Definitions

- **Scientific assessment:** '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.' [[OMB Memorandum M-05-03](#)]
- **HISA:** 'A scientific assessment is considered "highly influential" if the agency or the OIRA Administrator determines that the dissemination could have a potential impact of more than \$500 million in any one year on either the public or private sector or that the dissemination is novel, controversial, or precedent-setting, or has significant interagency interest.' [[OMB M-05-03](#)]
- **Artificial Intelligence:** [[John S. McCain National Defense Authorization Act for FY 2019](#), Section 238] (g) ARTIFICIAL INTELLIGENCE DEFINED.—In this section, the term “artificial intelligence” includes the following:
 - (1) Any artificial system that performs tasks under varying and unpredictable circumstances without significant human oversight, or that can learn from experience and improve performance when exposed to data sets.
 - (2) An artificial system developed in computer software, physical hardware, or other context that solves tasks requiring human-like perception, cognition, planning, learning, communication, or physical action.
 - (3) An artificial system designed to think or act like a human, including cognitive architectures and neural networks.
 - (4) A set of techniques, including machine learning, that is designed to approximate a cognitive task.
 - (5) An artificial system designed to act rationally, including an intelligent software agent or embodied robot that achieves goals using perception, planning, reasoning, learning, communicating, decision making, and acting

USGCRP Scientific Assessment Process

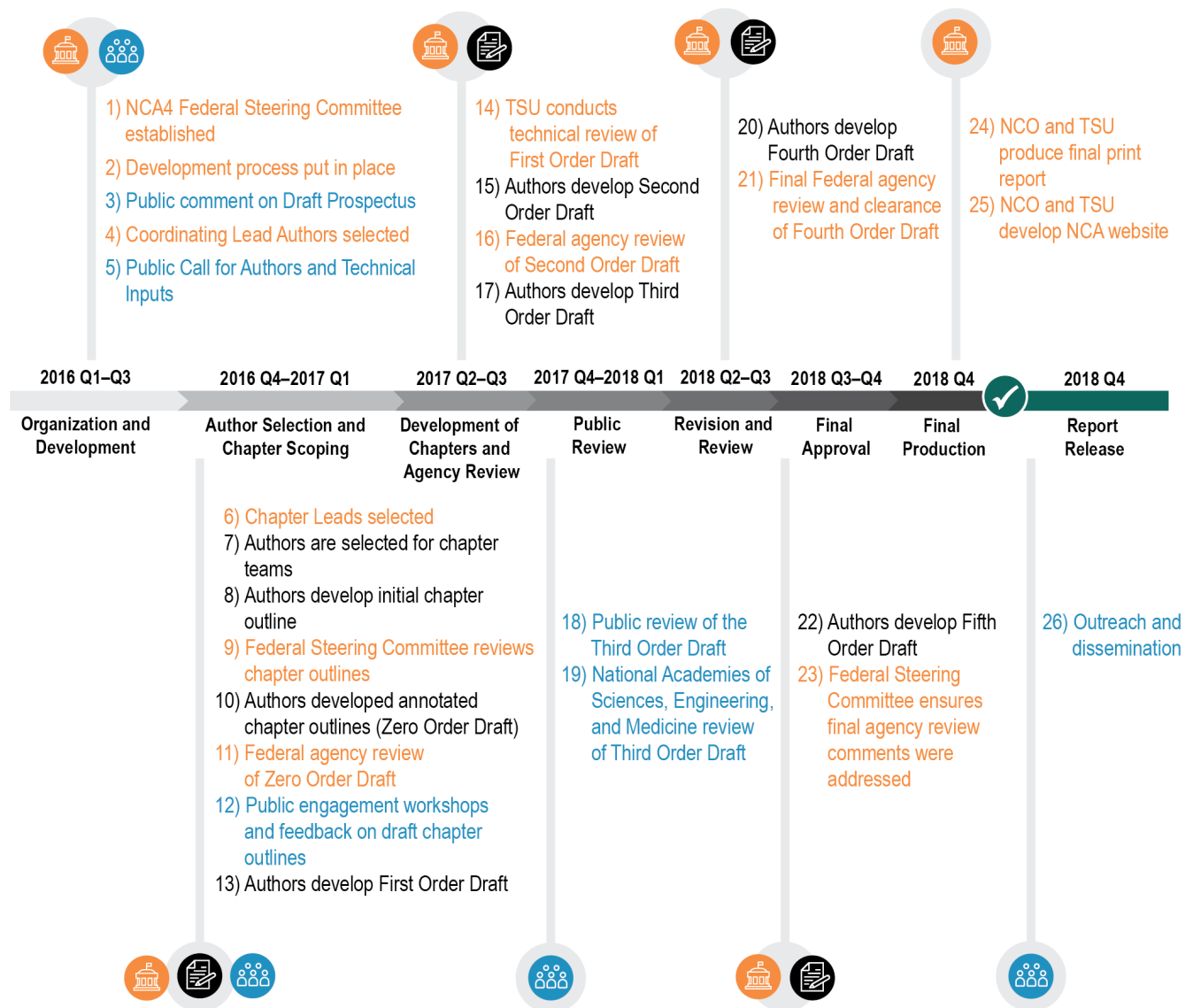


Figure A1.4: This is a graphic illustration of the NCA4 development process. Multiple points of federal review and decision (orange icons) were present throughout the process. In addition, public engagement (blue icons) was a cornerstone of the NCA development process. Authors used these feedback mechanisms to inform the development and execution of their chapters (black icons).

[Source: USGCRP, NCA 4, [Figure A1.4: Report Process](#)]

Additional resource options

Note: The following materials provide additional information to inform or support session-specific discussions. You are encouraged to use these for deeper exploration, according to your needs / interests.

Discussion Framing and Foundations: Artificial Intelligence

U.S. Federal guidance and resources

- [Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence](#) (White House, October 2023)
- OMB Memo M-24-10 [Advancing Governance, Innovation, and Risk Management for Agency Use of Artificial Intelligence](#) (March 2024)
- [NIST Artificial Intelligence](#) guidance and resources.
- Congressional Research Service: [Generative Artificial Intelligence and Copyright Law](#) (2023)

Speaker-related resources

- *Human-AI Teaming* [Heng]. NASEM Hauser Policy Impact Fund Webinar Series: Navigating the Era of Artificial Intelligence: Part 1: [Achieving human-AI harmony](#) (May 2024). Part 2: [The Role of Social Sciences](#) (July 2024)
- *Allen AI* [Weld]. [AI for Science](#) and [Semantic Scholar](#)

Principles / Requirements for Authoritative, Useful, Trusted Scientific Assessments

U.S. Federal guidance and resources

- NCA: [Information Quality Guidance for the National Climate Assessment](#) – including Information Quality Decision Pathways by source material type.
- OSTP/CEQ [Guidance for Federal Departments and Agencies on Indigenous Knowledge](#) (Nov 2022)
- NIST: [NIST AI Fact Sheet](#), NIST [Trustworthy & Responsible AI Resource Center](#) (AIRC)

Speaker-related resources

- [Shilton] [Institute for Trustworthy AI in Law and Society \(TRAILS\)](#) [NSF Award]
- [Xu] [EAAMO research initiative](#) (advances computational techniques to improve access to opportunity for historically marginalized communities); [SMART Partnership](#) (computational and research solutions for effective conservation management)

Principles: Insights from other Agencies and Organizations

AI Policies: Journals

- *Science* magazine [[blog on updated guidance](#)]
- *Nature* [[Artificial Intelligence policies](#)] [[Why Nature will not allow the use of generative AI in images and video](#)] (Jun 2023)]
- Elsevier [[AI policy](#)]