(carbon)plan

MAR 13, 2026

Mr. Brian Stone
National Science Foundation
401 Dulany Street
Alexandria, VA 22314

RE: Dear Colleague Letter: "NSF Intent to Restructure Critical Weather Infrastructure"

Dear Acting Director Stone,

Thank you for the opportunity to provide comments on the Dear Colleague Letter: NSF Intent to Restructure Critical Weather Infrastructure.[1]

For context, CarbonPlan is a nonprofit research organization dedicated to the integrity and transparency of climate solutions. We rely on the high-quality tools, research infrastructure, networks, and scientific training that the National Center for Atmospheric Research (NCAR) supports.

We are concerned that the National Science Foundation (NSF) intends to restructure NCAR, potentially dismantling its research facilities, narrowing its focus, or disaggregating its functions across other agencies or private contractors. Such plans are especially concerning because NCAR's existing structure already ensures the type of "efficient and cost-effective operations" the Dear Colleague Letter cites as the rationale for considering NCAR's reorganization.[2]

In 1956, the National Academy of Sciences formed a committee to assess the state of atmospheric research in the United States. They found that individual universities were not able to take on complex, large-scale scientific problems in atmospheric sciences.[3] Absent a central coordinating body, universities, government agencies, and the private sector were unable to assemble the human and physical infrastructure necessary to sustain the types of long-term, global-scale research efforts required to advance the field.[4] In 1960, NCAR was founded to fill that gap. In the six decades since its founding, NCAR has grown into a globally recognized leader in weather and climate science, providing critical research, workforce development, open science tools and data, and scientific coordination that enhances disaster preparedness and natural resource management, while supporting national security for the American public.[5]

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1 National Science Foundation, Intent to restructure critical weather infrastructure, NSF 26-203 (Jan. 23, 2026).

2 *Id*.

3 NCAR, *History* (last visited Mar. 11, 2026).

4 NAS, *Proceedings of the scientific information meeting on atmospheric sciences* (Nov. 24, 1958) (published 1959).

5 Carlos Martinez, "What Americans lose if their national center for atmospheric research is dismantled," *Eos* (Jan. 2026).

As we will demonstrate in our responses to the Dear Colleague Letter's questions, it is precisely NCAR's unique mandate and centralized structure that provides value to the U.S. weather and climate research community. Centralization unlocks efficiencies of scale, cross-pollination of ideas, and partnerships — including shared computing infrastructure, joint modeling projects, and the kind of spontaneous cross-disciplinary collaboration that cannot be replicated when functions are distributed across institutions. For these reasons, we strongly encourage NSF to reconsider its intention to restructure NCAR. At the very least, NSF must offer a precise explanation of why it believes that a restructuring will improve NCAR's capacity to carry out its mission. To the best of our knowledge, NSF has failed to provide any such explanation.

Below, we respond to questions 1, 3, and 4, emphasizing the ways in which NCAR's current structure is fundamental to its success in achieving its mission.[6]

Question 1. Are there any areas in which NCAR activities or capabilities duplicate those of other government agencies, universities, or the private sector?

No, there is no other government agency, university, or company explicitly tasked with supporting open scientific infrastructure in service of the national weather and climate research community. NCAR's mandate calls on it to serve as both a coordinator and a platform for advancing the research of other organizations. This is an entirely unique role that no other entity fills. Below, we highlight three examples of how NCAR's mandate allows it to make novel contributions in support of our national weather and climate research agenda:

- **Long-term stewardship of open source Earth system modeling tools and data:** NCAR's orientation toward serving the broader research community has made it into a one-of-a-kind provider of public goods for the atmospheric sciences. Rather than approaching problems in a one-off manner, NCAR has a proven track record of identifying computational challenges and data needs shared across the field — things like atmospheric transport modeling or archiving data from hundreds of field campaigns — and then building open, general-purpose tools and datasets that address those needs. NCAR's success in deploying this model speaks for itself. Since its founding, NCAR has developed and continues to maintain some of the most ubiquitous tools in the field of weather and climate research, including the Community Earth System Model (CESM), the Weather Research and Forecasting (WRF) model, and the Model for Prediction Across Scales (MPAS). Each of these resources is purpose-built to serve the needs of the weather and climate science community and is fully open for anyone to use. Furthermore, NCAR ensures that these resources are truly community models by training potential users, supporting community contributions to models, and providing technical support to users.[7]

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[6] NCAR, *Who we are* (last visited Mar. 11, 2026).

[7] James Hurrell et al., "The community earth system model: a framework for collaborative research," *Bulletin of the American Meteorological Society* (Sep. 2013) (highlighting that "A hallmark of the CESM project continues to be that there is community governance of all its activities. Accordingly, development and production objectives and priorities emanate directly from the community of scientists who participate in the management of the CESM project."); This community science orientation is exemplified by how the codebase for the land component of CESM has over 60 contributors, and the CESM discussion forum has over 44,285 messages as of March 6, 2026.

As a consequence, NCAR's tools are used by tens of thousands of researchers to address pressing scientific problems that concern the American public. WRF, for example, is the core of the National Water Model, which forecasts streamflow across the continental United States and provides critical information for dam and reservoir operation and flood risk management.[8] Just as importantly, the fact that NCAR creates and freely distributes these tools ends up saving universities, government agencies, and even the private sector the trouble of having to carry out this work themselves.

- **Coordinating ambitious programs across the multi-sector Earth system science enterprise:** NCAR has unique human and physical infrastructure, including over 800 staff with specialized knowledge accumulated over decades, supercomputing resources dedicated specifically to NSF-funded weather and climate research, and state-of-the-art instruments and facilities for Earth system observation. These resources go beyond what any individual university or company could support in isolation. Together, these resources allow NCAR to integrate capabilities that tend to exist in isolation elsewhere — connecting observational, computational, and human expertise in service of the broader research community. This integration not only allows NCAR to facilitate large-scale research efforts, it also allows NCAR to provide shared resources, like models, datasets, and computing capacity that make smaller-scale research projects at other institutions more efficient. This shared foundation enables researchers to focus their efforts on advancing science rather than duplicating efforts.
- **Training a specialized scientific workforce:** In the same way that NCAR supports digital and physical scientific infrastructure, its extensive training programs help develop the human infrastructure needed to advance weather and climate research. NCAR plays an especially critical role in providing early-career researchers with resources that other sectors cannot match, including workshops on how to use specific tools,[9] supercomputing resources,[10] and one-on-one technical support.[11] NCAR also has several dedicated programs that support early-career researchers so they can bring unique problems to NCAR to collaborate with NCAR staff.[12] Researchers from practically any discipline within the Earth sciences can come to Boulder for a short time, take advantage of NCAR's specialized facilities and staff, and make rapid progress before returning to their home institution.

  Sustained support for training, technical support, and NCAR's exchange-based approach to collaboration have, over the decades, created a nationwide professional network of scientists that cuts across disciplines and institutions. A significant fraction of early-career weather and climate scientists naturally converge at NCAR at some point in their training. And because everyone ends up spending time in the same place, atmospheric chemists get to know forest ecologists who get to know scientific

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[8] NOAA, *The national water model* (last visited Mar. 11, 2026).

[9] *See, e.g.,* NCAR, *CESM tutorial 2026* (last visited Mar. 11, 2026).

[10] *See, e.g.,* NCAR's exploratory and classroom allocations.

[11] *See, e.g.,* NCAR's WRF support page (last visited Mar. 12, 2026).

[12] *See, e.g.,* NCAR's Graduate Visitor Program, which offers travel and housing support for 3 month visits for graduate student researchers. NCAR also encourages collaboration with student researchers beyond the formal Graduate Visitor Program.

> programmers. These serendipitous relationships can last for decades and result in the cross-pollination of ideas that ultimately fuels the advancement of science. In this way, NCAR has come to serve as the hub of weather and climate research in the United States. Notably, cultivating this scientific network cannot be replicated by scattering training across institutions.
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> Our organization, CarbonPlan, represents a small part of that network. Practically every member of our scientific and technical staff has directly worked with or received training from NCAR and much of our work relies on the open software and scientific advances enabled by NCAR. Our work illustrates how NCAR's dedication to training helps build a technical workforce that both industry and civil society depend on.[13]

NCAR's ability to coordinate a global-scale science agenda and provide the infrastructure needed to execute that research depends on three things: durable funding, a mandate to coordinate a diffuse research community, and a commitment to providing public and fully open scientific infrastructure. Universities, for example, rely on funds tied to short grant cycles that support mostly non-permanent researchers (e.g., graduate students) who push work forward. This model promotes the rapid development of new ideas, but has a poor track record when it comes to maintaining scientific tools and long-term infrastructure. It also provides little in the way of coordination. In fact, university researchers working on related problems often end up competing for scarce resources, which all but inevitably leads to duplicate work and a focus on short-term results. The private sector has no issue developing and maintaining scientific tools. But almost all that work is proprietary. Proprietary data and tools, by definition, cannot serve as shared infrastructure for the broader scientific community. Government agencies come closest to being able to match some of NCAR's capabilities. However, other agencies do not have an explicit mandate to support or coordinate external research. While some agency work can be useful to researchers, the primary focus of government agencies is rightfully oriented toward fulfilling each agency's specific operational mission.

Without NCAR, the need for coordination and shared scientific infrastructure would not disappear. In its absence, *ad hoc* efforts would likely emerge in an attempt to fill these gaps, but the result would be a fragmented landscape of duplicated effort. Contrary to the premise of the question, NCAR's existing structure and its capacity to coordinate actively *reduces* duplicated efforts across other government agencies, universities, and the private sector.

Question 3. Are there other concepts for management and operations of NCAR activities that differ from the current model that NSF should consider?

No. It is inappropriate for NSF to consider other concepts for management and operations without first identifying a clear and evidence-based reason for doing so. NSF has not identified any such reason. NCAR already successfully executes its mandate, and

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[13] *See, e.g.,* AMS Headlines, *Responding to threats against NCAR* (Mar. 2, 2026) (last visited Mar. 13, 2026) (quoting Charles Nutter, the retired president of the Reinsurance Association of America: "The value of stand-alone research is multiplied by the interaction via NCAR among scientists in the broader weather community. NCAR has served as the threshold for the professional development of today's and tomorrow's scientists serving in both the public and private sectors").

effectively and efficiently provides value to the American public.

For any restructuring plan to be credible, it must demonstrate how that plan would preserve NCAR's mandate to "support, enhance, and extend the capabilities of the university community and the broader scientific community" — a mandate NCAR already successfully fulfills.[14] As explained in our response to Question 1, there is strong reason to doubt that any privatized or decentralized alternative could satisfy NCAR's existing mission.

Question 4. What should the performance objectives and metrics be for a restructured atmospheric research center?

A national atmospheric research center should have the following characteristics, all of which the current NCAR structure achieves:

- **Commitment to open science.** All datasets and modeling tools are publicly accessible and supported by community engagement.
- **Investment in basic weather and climate research.** Weather and climate are expressions of the same underlying physical processes operating across different timescales, and it is essential to invest in Earth system observation and prediction across the full weather-climate continuum in a single institution.
- **Translational capacity.** In addition to supporting basic research, NCAR translates this research into real-world applications by supporting practitioners in agriculture, forestry, water management, emergency preparedness and response, and other fields that depend on Earth system observation and prediction.
- **Support for education and workforce development.** Training the next generation of Earth system scientists is a critical role of NCAR, and this training benefits industry, government agencies, and academia.
- **Centralization in a single location.** Sharing physical infrastructure and concentrating expertise in a single location facilitates collaboration and enables NCAR to be more than the sum of its parts.
- **Continuity of institutional knowledge.** NCAR's accumulated institutional knowledge represents a critical national resource, and maintaining this institutional knowledge requires preserving NCAR's existing workforce and external partnerships.
- **Mission to serve the public interest.** It is essential that NCAR is a public research institution that is supported by federal funding. Privatization of any of NCAR's functions would compromise the integrity, accessibility, and public interest orientation of the center's work.

NCAR already successfully satisfies these criteria, calling into question the rationale for restructuring NCAR in the first place. If anything, NSF should be considering how to better support NCAR to unlock future advancements in weather and climate research, hazard preparedness, and natural resource management.

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[14] NCAR, *supra* at n. 6.

Sincerely,

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