

May 16, 2025

**VIA EMAIL AND FEDEX**

The Honorable Howard Lutnick  
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U.S. Department of Commerce  
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Laura Grimm  
Acting Under Secretary of Commerce for  
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Administration  
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Re: *UK's ARIA Climate Engineering Program*

Dear Secretary Lutnick and Under Secretary Grimm:

We write on behalf of our client, Informed Consent Action Network (“**ICAN**”), regarding a controversial climate engineering program the United Kingdom (“**UK**”) is funding through its Advanced Research and Invention Agency (“**ARIA**”).<sup>1</sup> ICAN is a not-for-profit organization with a mission of combatting man-made disease and a proven record of raising public awareness about medical products and their effects on health. ICAN also actively investigates and reports on environmental pollutants/toxins and governmental activities and acts as America’s watchdog to hold government actors accountable to the people so that every person is provided true informed consent.

ICAN is concerned by ARIA’s “Exploring Climate Cooling” program<sup>2</sup> (“the **Program**”) which is poised to begin controversial outdoor geoengineering experiments<sup>3</sup> to test and develop technology to block sunlight by intentionally manipulating the earth’s temperature through solar radiation modification (“**SRM**”).<sup>4</sup> The rationale for this risky Program, meant to “tackle climate change,” is “to actively cool the Earth in order to ‘buy time’ to decarbonise [sic].”<sup>5</sup> After setting unachievable goals, and despite impetuous attempts to cut emissions, some climate scientists now believe that while “SRM ... is not ethically and politically desirable [it] may become a necessity ‘to slow climate warming and reduce climate impacts,’ [because] [t]he 1.5° Celsius and even the

<sup>1</sup> <https://www.aria.org.uk/> (<https://perma.cc/6CKN-V67N>).

<sup>2</sup> <https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling> (<https://perma.cc/SG3C-SE7H>).

<sup>3</sup> <https://www.aria.org.uk/media/wotbzgsm/aria-actively-cooling-the-earth-programme.pdf> (<https://perma.cc/MRX6-EBLH>). See also, <https://www.bbc.com/weather/articles/c5ygydeqq08o> (<https://perma.cc/2A8H-Q6XT>).

<sup>4</sup> <https://www.climate.gov/news-features/understanding-climate/solar-radiation-modification-noaa-state-science-sheet> (<https://perma.cc/3W55-GAQN>).

<sup>5</sup> <https://www.aria.org.uk/media/wotbzgsm/aria-actively-cooling-the-earth-programme.pdf> (<https://perma.cc/S8U2-AV5H>).

2° Celsius climate targets set by the Paris Climate Agreement are likely unattainable, given that the dramatic cuts advocated by the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) are not materializing.”<sup>6</sup>

Alarming, if deployed, SRM technology could adversely, and potentially irreversibly, affect Americans’ health, security, and the environment. The impacts of SRM, a technology which includes injecting chemicals into the stratosphere upwards of 40,000 feet above the earth, among other proposals, will be felt globally. According to the United Nations Environment Programme (“UNEP”), “SRM deployment in one country could have impacts regionally and globally, and those impacts are unclear at this point. As illustrated in the title of [UNEP’s] report [on the topic]: we have ‘one atmosphere.’ Everyone is a stakeholder.”<sup>7</sup> Thus, as detailed below, the Program poses serious risks to the American public. ICAN asks the National Oceanic and Atmospheric Administration (“NOAA”) to intercede on behalf of the American people to ensure the UK government does not engage in geoengineering experiments unless it obtains meaningful informed consent of the people.

## **I. NOAA SHOULD DISCOURAGE GEOENGINEERING GIVEN THE DIRE RISKS TO THE HEALTH OF THE AMERICAN PEOPLE AND OUR ENVIRONMENTAL WELL-BEING**

ICAN vehemently opposes any research or deployment of SRM absent transparency and meaningful informed consent. Informed consent requires full disclosure of the risks and benefits of SRM before the technology is tested or deployed in a manner that impacts the American people. Given the nascent state of SRM technology and general lack of understanding by even its greatest proponents of the potential risks of SRM, it is impracticable to fully apprise the public of the risks that ARIA’s SRM experiments pose to humanity.

Indeed, the risks appear insurmountable. Proponents of geoengineering research admit in the 2021 National Academies of Sciences, Engineering, and Medicine (“NAS”) report, “Reflecting Sunlight: Recommendations for Solar Geoengineering Research and Research Governance” (collectively, “NAS Report”) that if SRM is deployed, it could have potentially catastrophic effects on weather, agriculture, natural ecosystems, and human health.<sup>8</sup> Specifically, proponents of SRM acknowledge that deployment could lead to stratospheric ozone depletion,<sup>9</sup> effects on global food production and biodiversity,<sup>10</sup> increases in air pollution and UV exposure-related

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<sup>6</sup> <https://www.cambridge.org/core/journals/ethics-and-international-affairs/article/producing-the-inevitability-of-solar-radiation-modification-in-climate-politics/402F719990D3BE9A4FEC1A68FF85F04B> (<https://perma.cc/DU4Z-9LC7>).

<sup>7</sup> <https://www.unep.org/news-and-stories/story/new-report-explores-issues-around-solar-radiation-modification> (<https://perma.cc/Y7QF-3XFP>).

<sup>8</sup> <https://nap.nationalacademies.org/read/25762/chapter/4#90> (<https://perma.cc/8AZK-M3U3>).

<sup>9</sup> <https://nap.nationalacademies.org/read/25762/chapter/4#43> (<https://perma.cc/AA5B-MNFK>).

<sup>10</sup> <https://phys.org/news/2024-09-climate-crisis-scientists.html> (<https://perma.cc/R526-5X87>).

premature mortality,<sup>11</sup> disruption of local and regional weather patterns leading to intensified droughts or flooding,<sup>12</sup> disruption of monsoon cycles that provide critical rain to agriculture,<sup>13</sup> ocean acidification,<sup>14</sup> increased acid deposition resulting in air pollution and acid rain,<sup>15</sup> diminution of solar power systems,<sup>16</sup> geopolitical conflict over who controls the global thermostat with SRM, and retaliation by countries suffering the effects thereof,<sup>17</sup> and unintended warming or excessive cooling due to uncertainty in estimates of the amount of SRM needed. There are additional unknown health risks as the chemicals being discussed for SRM, namely sulfur dioxide, sulfate aerosols, aluminum oxide, calcium carbonate, titanium dioxide and diamond dust, have not been sufficiently studied to ensure safety. SRM proponents acknowledge these risks while simultaneously acknowledging that the effects of SRM, good or bad, will be incredibly complex and cannot be fully known without deploying SRM and experimenting on our planet.<sup>18</sup>

Furthermore, researchers project that once SRM starts, it must continue in perpetuity, binding successive generations to use of the technology without their consent.<sup>19</sup> If the current UK government begins deploying SRM and a future UK regime decides to cease SRM operations, the result very well might be termination shock or a rapid onset of extreme temperatures possibly four times greater than temperatures scientists believe would be caused by climate change in the first place.<sup>20</sup> Such a result would devastate our planetary systems. Thus, researchers concerned about global warming, but skeptical of SRM, fear that the so-called “cure” of SRM could be worse than the “disease” of climate change due to such novel risks posed by SRM which are not predicted for climate change.<sup>21</sup>

Finally, as troubling as these risks are, what is worse is that predictions of possible SRM efficacy are based solely on models – models which SRM proponents acknowledge are inherently limited in their ability to accurately estimate the potential risks and benefits of SRM.<sup>22</sup> Generally, scientists use the same models for SRM research that they have been using to justify their rash predictions for climate change. These models, by their own admission, are riddled with

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<sup>11</sup> <https://online.ucpress.edu/elementa/article/10/1/00047/195026/Stratospheric-aerosol-injection-may-impact-global> (<https://perma.cc/J43T-45RC>).

<sup>12</sup> <https://www.nature.com/articles/s41598-024-73149-6> (<https://perma.cc/FJ99-A2YC>).

<sup>13</sup> *Id.*

<sup>14</sup> <https://www.tandfonline.com/doi/epdf/10.1080/00963402.2008.11461140?needAccess=true>.

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> <https://www.frontiersin.org/journals/climate/articles/10.3389/fclim.2021.720312/full> (<https://perma.cc/U29Q-6XMH>).

<sup>18</sup> <https://phys.org/news/2024-09-climate-crisis-scientists.html> (<https://perma.cc/R526-5X87>).

<sup>19</sup> [https://www.researchgate.net/publication/324163092\\_Towards\\_legitimacy\\_of\\_the\\_solar\\_geoengineering\\_research\\_enterprise](https://www.researchgate.net/publication/324163092_Towards_legitimacy_of_the_solar_geoengineering_research_enterprise).

<sup>20</sup> <https://doi.org/10.1038/s41467-017-01606-0> (<https://perma.cc/KV9R-DGEF>).

<sup>21</sup> <https://doi.org/10.1016/j.gloenvcha.2023.102674> (<https://perma.cc/QGL2-YJCW>).

<sup>22</sup> <https://nap.nationalacademies.org/read/25762/chapter/4#51> (<https://perma.cc/8ZEJ-RG39>).

uncertainties and inaccuracies.<sup>23</sup> According to Gavin Schmidt, the director of NASA’s Goddard Institute for Space Studies, “[f]rom the 1970s on, people have understood that all models are wrong ... [b]ut we’ve been working to make them more useful.”<sup>24</sup> Climate scientists further admit that “[s]ome models ‘run hot,’ suggesting more warming than what actually plays out.”<sup>25</sup> Moreover, the IPCC’s Sixth Assessment Report acknowledged that despite general improvements with climate models, uncertainties remain as to cloud feedbacks, aerosol effects, and regional projections, impacting confidence in the accuracy of specific climate outcomes.<sup>26</sup> Consequently, if actors engage in SRM based on these models, we would discover their inaccuracies only after experimenting on our own people and ecological systems.

In sum, given the uncertainty and dangers surrounding SRM, ICAN implores NOAA to dissuade scientists working for the UK government from engaging in research or experimenting on our people with SRM and exposing people to such devastating risks without first obtaining informed consent.

## **II. NOAA SHOULD DISCOURAGE SCIENTISTS WORKING FOR THE UK GOVERNMENT FROM SUPPORTING THE PROGRAM DUE TO ITS LACK OF OVERSIGHT AND LACK OF TRANSPARENCY**

### **A. There Is No Governance Framework in Place to Regulate Geoengineering Experiments**

SRM is a highly controversial and radical climate technofix with poorly understood and potentially devastating side effects. At present, all geoengineering, including SRM, is unregulated. Given SRM’s novelty, no federal nor international governance scheme exists for its research, experimentation, nor deployment. More than five hundred international scholars from sixty-one countries advocate for an international non-use agreement on solar geoengineering which demands effective political control and restriction of the development of SRM technologies.<sup>27</sup> In a recent report, UNEP warns SRM research and experimentation “might facilitate or exacerbate tensions and security risks.”<sup>28</sup> The UNEP is currently conducting a global review of SRM and preparing an assessment framework to provide safeguards and oversight of local, national, and international

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<sup>23</sup> <https://www.hoover.org/research/flawed-climate-models> (<https://perma.cc/3TMX-XFQE>).

<sup>24</sup> [https://www.theatlantic.com/science/archive/2025/01/climate-models-earth/681207/?hsenc=p2ANqtz-8ncg0HQsfZcwI1pjiiD94PfA2LSW4LI4bg4yWSRHRub6BU4AtGKP2VHYN06zvZQ7bljcDMl0xx7BPtpLBIWj3kBN0i0AIQ\\_FIdY-OENNsAuswv88&\\_hsmi=253870156](https://www.theatlantic.com/science/archive/2025/01/climate-models-earth/681207/?hsenc=p2ANqtz-8ncg0HQsfZcwI1pjiiD94PfA2LSW4LI4bg4yWSRHRub6BU4AtGKP2VHYN06zvZQ7bljcDMl0xx7BPtpLBIWj3kBN0i0AIQ_FIdY-OENNsAuswv88&_hsmi=253870156) (<https://perma.cc/EX4Z-NLL4>).

<sup>25</sup> *Id.* See also, <https://www.science.org/content/article/use-too-hot-climate-models-exaggerates-impacts-global-warming>; <https://www.usgs.gov/programs/climate-adaptation-science-centers/news/addressing-hot-model-problem-approaches-using#:~:text=Some%20climate%20models%20fall%20victim,of%20evidence%20suggest%20will%20occur> (<https://perma.cc/9GQ7-9YF2>).

<sup>26</sup> [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_TS.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_TS.pdf) (<https://perma.cc/R4ZG-MWLG>).

<sup>27</sup> <https://www.solargeoeng.org/non-use-agreement/> (<https://perma.cc/GXD3-LHCB>); <https://www.solargeoeng.org/non-use-agreement/open-letter/> (<https://perma.cc/K64W-3W4A>).

<sup>28</sup> *Id.*

SRM research.<sup>29</sup> In the U.S., even researchers in favor of geoengineering called for a governance plan for research of SRM and **no deployment** of SRM in the NAS report.<sup>30</sup> In the last two years in the U.S., more than thirty states have introduced bills to ban geoengineering and/or weather modification reflecting the will of many Americans to ban the kind of SRM experiments the UK government intends to deploy. Certainly, given the overall lack of governance and oversight, ARIA's actions defy the recommendations of many of the greatest supporters of SRM research in academia and the will of the American people who will undoubtedly be impacted. Thus, NOAA should discourage the Program's unregulated SRM experiments.

Moreover, SRM experimentation is likely to instigate international and domestic political conflict. The international community is deeply divided on SRM deployment, including under what circumstances deployment would be necessary, what governance model would be appropriate, and whether any deployment or governance model could be broadly acceptable to all countries. For example, in early 2024, Switzerland proposed an SRM resolution at the United Nations Environment Assembly (UNEA-6), but the resolution failed after numerous African countries and others from the Global South opposed it.<sup>31</sup> The opposition expressed concerns with the promotion of SRM technologies and called for a global governance mechanism for non-use of SRM.<sup>32</sup> Their concerns include whether SRM deployment could disrupt local and regional patterns, negatively impact water availability and food production, threaten biodiversity, and increase pollution levels in an already over polluted world. Further, we know countries like Russia<sup>33</sup> and China are researching SRM deployment, with China considering geoengineering as a potential warfare strategy.<sup>34</sup>

Because it would be impossible to precisely define and limit the target impact area of SRM to a particular nation, SRM conducted in one state may adversely affect neighboring states and countries and cause international conflicts. For these reasons, NOAA should oppose SRM research, experimentation, and deployment to prevent international and domestic geopolitical conflicts, and encourage scientists working for the UK government to do the same.

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<sup>29</sup> *Id.*

<sup>30</sup> <https://www.nationalacademies.org/news/2021/03/new-report-says-u-s-should-cautiously-pursue-solar-geoengineering-research-to-better-understand-options-for-responding-to-climate-change-risks> (<https://perma.cc/J3JH-K8KF>).

<sup>31</sup> <https://nation.africa/kenya/news/solar-radiation-modification-why-this-science-fiction-climate-hack-was-rejected-at-unea-6-4547200>.

<sup>32</sup> <https://wedocs.unep.org/bitstream/handle/20.500.11822/43789/K2316003E-AMCEN-19-6-ADVANCE-REPORT.pdf?sequence=3> at 32 (<https://perma.cc/KM6W-845P>).

<sup>33</sup> <https://thedi diplomat.com/2023/01/how-china-uses-geoengineering-to-pursue-a-hybrid-warfare-strategy/> (<https://perma.cc/YBB3-MSTF>).

<sup>34</sup> <https://thedi diplomat.com/2023/01/how-china-uses-geoengineering-to-pursue-a-hybrid-warfare-strategy/> (<https://perma.cc/YBB3-MSTF>).



## B. The Program Lacks Promised Transparency

ARIA claims that it will conduct small-scale experiments that are rigorously assessed and will not involve toxic materials.<sup>35</sup> ARIA claims, “[a]s a publicly funded, non-profit agency, our research efforts are grounded in transparency, responsible stewardship, and a commitment to broad public benefit.”<sup>36</sup> Yet, to date, ARIA has provided only minimal and high-level details regarding its proposed experiments. Shockingly, the public has no means of requesting this information from ARIA because, “ARIA is not subject to the Freedom of Information Act 2000.”<sup>37</sup>

Thus far, ARIA has disclosed that it will fund twenty-one projects involving: 1) stratospheric aerosol injection, 2) marine cloud brightening, and 3) thickening Arctic sea ice to make it more reflective, which will include outdoor experiments.<sup>38</sup> Even if these experiments do not involve injecting metals or “toxic materials” into the atmosphere, there are no studies to support the safety of injecting *anything* into the atmosphere. ARIA cannot demonstrate that whatever it does choose to inject will not harm or alter our health, ecosystems, or environment.

Equally concerning is that ARIA still has not disclosed detailed information, such as the names of individual researchers, who will receive the allocated £56.8 million in funding to conduct this research and the experiments. This is troubling given the interest of certain billionaires in SRM and their affiliation with some prominent SRM researchers. And, while SRM research has received some government funding, prior to ARIA’s Program, major funding for SRM research derived from wealthy technocrats and philanthropists and their charitable organizations concerned with climate change.<sup>39</sup> As reported by Time Magazine:

[George Soros is] not the only billionaire who’s recently become interested in bouncing the sun’s rays back into space. Among the world’s ultra-rich, plans to swat back the sun’s rays like they’re capital gains taxes (to, as it were, apply a [generous helping of sunblock](#) to the earth’s atmosphere) have seemingly been all the rage.

Bill Gates, for instance, [backed](#) a project by Harvard University scientists to test an idea to spray calcium carbonate into the atmosphere in the skies over northern Scandinavia in 2021 (the project was ultimately canned after outcry from local Indigenous groups and environmentalists). Jeff Bezos put Amazon’s

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<sup>35</sup> <https://www.bbc.com/weather/articles/c5ygydeqq08o> (<https://perma.cc/DKQ3-FT7P>).

<sup>36</sup> <https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling/>. (<https://perma.cc/BS48-Q624>).

<sup>37</sup> <https://www.aria.org.uk/contact> (<https://perma.cc/4FWL-5SYR>).

<sup>38</sup> <https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling#fundedprojects><https://www.aria.org.uk/opportunity-spaces/future-proofing-our-climate-and-weather/exploring-climate-cooling#fundedprojects> (<https://perma.cc/C6S6-L42D>).

<sup>39</sup> [https://www.solargeoeng.org/wp-content/uploads/2023/02/SGNUA\\_1\\_Briefing\\_note.pdf](https://www.solargeoeng.org/wp-content/uploads/2023/02/SGNUA_1_Briefing_note.pdf) (<https://perma.cc/9KT3-P34X>).

supercomputer capabilities [to work](#) modeling the effects of plans to inject huge amounts of sulfur dioxide (SO<sub>2</sub>) into the atmosphere later that year. Earlier this month, Dustin Moskovitz, a billionaire Facebook cofounder, plowed \$900,000 into funding for scientists in Mali, Brazil, Thailand, and other countries to study the potential effects of solar geoengineering. Even the smaller fry are getting in on the action, with venture capitalists giving a combined \$750,000 to a company pledging to implement a planetary solar geoengineering project using SO<sub>2</sub>. That company, Make Sunsets, conducted its [first U.S.-based tests last week](#), launching balloons containing SO<sub>2</sub> in Nevada.<sup>40</sup>

Disturbingly, ARIA recently disclosed that Harvard University will participate in the project involving outdoor experiments in the stratosphere. No further details are provided about Harvard's involvement. This is concerning given that Bill Gates previously funded Harvard's controversial SCOPEX program which was cancelled due to public outcry from indigenous groups and environmentalists.<sup>41</sup>

Moreover, these geoengineering researchers stand to profit from SRM research and experimentation on our people and our planet. For instance, top geoengineering researcher David Keith led the Gates funded SCOPEX project at Harvard. Mr. Keith has been an outspoken proponent of SRM research for decades. In 2023 he left Harvard and sold his company Carbon Engineering to Occidental Petroleum for \$1.1 billion.<sup>42</sup> Carbon Engineering is engaged in carbon dioxide removal, a different kind of geoengineering. Mr. Keith made \$72 million from the sale.<sup>43</sup>

Conversely, according to Raymond Pierrehumbert, an atmospheric physicist at the University of Oxford, "[SRM is] not only a bad idea in terms of something that would never be safe to deploy [. . .] [b]ut even doing research on it is not just a waste of money, but actively dangerous."<sup>44</sup> Indeed, researchers across the globe like Pierrehumbert who signed the international non-use agreement on solar geoengineering, demand that governments commit to halting funding for any development of SRM, including further research.<sup>45</sup> For all these reasons, NOAA should implore researchers at ARIA to halt the Program and encourage full transparency of any expenditures to date in furtherance of its aims.

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<sup>40</sup> <https://time.com/6258126/solar-geoengineering-billionaires-george-soros/> (emphasis in original) (<https://perma.cc/38V2-SJJN>).

<sup>41</sup> <https://www.scientificamerican.com/article/high-profile-geoengineering-experiment-shuts-down/> (<https://perma.cc/MPQ3-Q4BW>).

<sup>42</sup> <https://www.nytimes.com/2024/08/01/climate/david-keith-solar-geoengineering.html> (<https://perma.cc/P54U-A7BE> (paywall removed)).

<sup>43</sup> *Id.*

<sup>44</sup> <https://www.nytimes.com/2024/08/01/climate/david-keith-solar-geoengineering.html> (<https://perma.cc/P54U-A7BE>).

<sup>45</sup> <https://www.solargeoeng.org/why-the-new-letter-of-support-for-solar-geoengineering-research-is-misguided/> (<https://perma.cc/4CWD-FEFY>).

### III. ACTIONS REQUESTED

NOAA must intervene to fulfill its obligations to the American people and lead the international community. NOAA has a unique “mission to better understand our natural world and help protect its precious resources [which] extends beyond national borders to monitor global weather and climate, and work with partners around the world. [NOAA] holds key leadership roles in shaping international ocean, fisheries, climate, space and weather policies.”<sup>46</sup> Full transparency and public oversight are crucial to maintaining the public’s confidence in NOAA’s ability to protect our natural world from potentially harmful technologies and to lead the international community. ICAN implores NOAA to:

1. **Issue a guidance document, subject to Executive Order 13891, to discourage research, experimentation, and deployment of geoengineering activities, including SRM, to protect the American people and our environment from the potentially devastating consequences of SRM.**
2. **Discourage researchers and collaborators in all foreign nations, especially the UK government, from engaging in SRM research, outdoor experiments, and deployment because SRM poses unknown risks and long-term effects to human health and the environment and grave risks to U.S. national security.**
3. **Encourage scientists working for the UK government to halt the Program and all research and experimentation stemming therefrom so that no SRM activities that may affect the American people can be conducted without the informed consent of the American people.**
4. **Encourage researchers and collaborators working for the UK government to enhance transparency and disclose all details regarding any proposed SRM research or experimentation and disclose the amount, recipients, and purpose of all funding that has been or will be dispersed.**

The hubris of the scientists and researchers at ARIA leading them to believe that they have the right to block the sun could cost Americans greatly if their experiments proceed without constraint. ICAN implores NOAA to take the actions above and intercede on behalf of the American people and for our planet. We look forward to a prompt response explaining what actions NOAA will take.

Very truly yours,



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<sup>46</sup> <https://www.noaa.gov/about-our-agency> (<https://perma.cc/JRT6-5E2J>).



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