



PROTECT the PUBLIC'S TRUST

VIA ELECTRONIC MAIL

April 3, 2024

TO: Roderick Anderson
Acting Inspector General
U.S. Department of Commerce
1401 Constitution Avenue, N.W.
Washington, DC 20230

Dr. Cynthia J. Decker, Ph.D.
Science Integrity Officer
National Oceanic and Atmospheric Administration
Science Council
1315 East-West Highway
Silver Spring, MD 20910

**Re: Request for Investigation into Apparent Scientific Integrity Violations
Related to NOAA's "Billion Dollar Disaster" Project**

Dear Mr. Anderson and Dr. Decker,

The American people deserve a government that meets the highest standards of conduct and integrity, particularly when it comes to the government's handling of priority issues like climate change. That is why it is so concerning that the National Oceanic and Atmospheric Administration ("NOAA") appears to have run the Billion-Dollar Weather and Climate Disasters tracking project (the "Billions Project" or the "Project") in a manner that violates fundamental principles of scientific integrity.

Protect the Public's Trust (PPT) is a nonpartisan organization dedicated to promoting ethics in government and restoring the public's trust in government officials. Sensational climate claims made without proper scientific basis and spread by government officials threaten the public's trust in its scientific officials and undermines the government's mission of stewarding the environment. It also poses the danger of policymakers basing consequential government policy on unscientific claims unsupported by evidence. For this reason, PPT requests that you investigate the apparent scientific integrity violations of NOAA's Billions Project and its misleading and inaccurate claims about the Project's dataset.



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Background

The Billions Project is a tally of weather and climate disasters since 1980 that resulted in \$1 billion or more in losses.¹ The Project has had a big impact: it was highlighted by the U.S. government's U.S. Global Change Research Program as a "climate change indicator,"² and was cited as evidence that "extreme events are becoming more frequent and severe" in the Fifth U.S. National Climate Assessment.³ The dataset's influence and reach is vast. Per Google scholar, it has been cited in almost 1,000 articles.⁴

Though cited as evidence of climate change effects, the Billions Project does not utilize climate data. The Project's dataset only collects and reports economic data about disaster losses. Because of this, it cannot distinguish the effect of climate change as a factor on disaster losses from the effect of human factors like increases in the vulnerability and exposure of people and wealth to disaster damages due to population and economic growth.

The Project's statistical practices have raised criticism that they lead to inaccurate reporting on disaster events since the Project's beginning. For example, while the Project adjusted the dollar amount of damages for events in the database for inflation, it only included events that crossed the billion-dollar threshold in the year they occurred.^{5,6} This resulted in an apples-to-oranges comparison over time, as inflation effectively lowered the threshold for initial inclusion in the database over time. NOAA corrected this issue in 2012 and warned "[c]aution should be used in interpreting any trends based on this graphic for a variety of reasons."⁷

Since that time, the Project has continued to engage in statistical practices that appear to lead to inaccurate reporting on disaster events, such as using undisclosed calculation methodologies for determining losses from individual disaster events that

¹ See NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2024). <https://www.ncei.noaa.gov/access/billions/>.

² *Human Consequences of Climate Change*, USDA Forest Service Office of Sustainability and Climate and the Environmental Protection Agency (March 30, 2023), <https://storymaps.arcgis.com/collections/ad628a4d3e7e4460b089d9fe96b2475d?item=6>.

³ *Fifth National Climate Assessment: Climate Trends*, U.S. Global Change Research Program (November 2023), <https://nca2023.globalchange.gov/chapter/2/>.

⁴ https://scholar.google.com/scholar?hl=en&as_sdt=0%2C6&q=%22billion+dollar+disasters%22&btnG=.

⁵ Jason Samenow, *2011 billion dollar weather disaster record: legit or bad economics*, The Washington Post (Jan. 12, 2012), https://www.washingtonpost.com/blogs/capital-weather-gang/post/2011-billion-dollar-weather-disaster-record-legit-or-bad-economics/2012/01/12/gIQADocztP_blog.html.

⁶ Roger Pielke, Jr., *Everything You Hear About Billion-Dollar Disasters Is Wrong*, Forbes (Nov. 7, 2019), <https://www.forbes.com/sites/rogerpielke/2019/11/07/everything-you-hear-about-billion-dollar-disasters-is-wrong/?sh=5f74db052fea>.

⁷ Pielke, *supra* note 7.



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result in drastically higher loss estimates than those reported by other institutions at NOAA.⁸

In addition, the Project's dataset itself is beset by numerous violations of the scientific integrity standards set by NOAA and the Biden Administration.

The Scientific Integrity Policies Regulating the Billions Project

NOAA's Scientific Integrity Policies

NOAA maintains strict and far-reaching scientific integrity policies to ensure it upholds the highest standards of quality in its scientific research and publications. The primary source of NOAA's scientific integrity policies is NOAA Administrative Order 202-735D.3 (the "SI Order"), which went into effect on March 1, 2024.⁹ NOAA's stated intent behind the SI Order is "to strengthen universal confidence—from scientists to decision-makers to the general public—in the quality, validity, and reliability of NOAA science."¹⁰

The SI Order applies broadly within NOAA. Section 2.01(a) of the SI Order applies its scientific integrity policies to "[a]ll NOAA employees, political and career . . . who engage in, supervise, or manage scientific activities, analyze and/or publicly communicate information resulting from scientific activities, or use scientific information or analyses in making bureau or office policy, management, or regulatory decisions, unless excepted under a collective bargaining agreement."¹¹ Under this far reaching definition, the NOAA staff that produce, maintain, and communicate with the public about the Billions Project are covered by the SI Order's policies.

The SI Order's definition of forbidden "Scientific and Research Misconduct" is sweeping and total:¹²

Scientific and Research Misconduct—Scientific misconduct is a significant departure from the Code of Scientific Conduct or the Code of Ethics for Supervisors and Managers and may be committed intentionally, knowingly or recklessly. This type of misconduct includes, but is not limited to, fabrication, falsification, plagiarism and interference. Research misconduct is fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. Research misconduct

⁸ See *infra* at 7 (comparison of the Billions Project's estimate of losses from Hurricane Idalia to the National Hurricane Center's estimate of losses).

⁹ NAO 202-735D-3: *Scientific Integrity*, NOAA (Mar. 1, 2024), <https://www.noaa.gov/organization/administration/nao-202-735d-2-scientific-integrity>.

¹⁰ SI Order at 2.

¹¹ *Id.*

¹² *Id.* at 7.



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does not include honest error or differences of opinion, and may be committed intentionally, knowingly or recklessly.

Similarly, the SI Order forbids the “Suppression of Science,” which it defines in relevant part as the “deliberate . . . [d]istorting or selective releasing of scientific analysis, assessment, research, product, or data for public communication.”¹³

The SI Order defines “Scientific Integrity” as adherence to a core set of professional values that insulate science from scientific misconduct.¹⁴

Scientific Integrity—Scientific integrity is the adherence to professional practices, ethical behavior, and the principles of honesty and objectivity when conducting, managing, using the results of, and communicating about science and scientific activities. Inclusivity, transparency, and protection from inappropriate influence are hallmarks of scientific integrity.

As used in these definitions, and throughout the SI Order, the terms “falsification” and “fabrication” have particular definitions:¹⁵

Falsification—Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

Fabrication—Making up data or scientific results and recording or reporting them.

In addition to these standards of honesty, the SI Order’s Principles of Scientific Integrity require adherence to standards for ensuring NOAA’s scientific and research products can be reviewed and their methodologies analyzed.¹⁶ These standards are “transparency” and “traceability.”¹⁷

Transparency— Transparency of scientific integrity should guide scientists to give visibility to their data and to describe their analyses, methods and how to interpret their results in ways that allow others to assess them.

Transparency ensures that all relevant data and information used to inform a decision made or action taken is visible, accessible, and consumable by affected or interested parties, to the extent allowable by law. This includes,

¹³ *Id.* at 8.

¹⁴ *Id.* at 7.

¹⁵ *Id.* at 4.

¹⁶ *Id.* at 9.

¹⁷ *Id.* at 8.



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to the extent possible, providing the information necessary to interpret artificial intelligence and machine learning methodologies when used.

Traceability—The ability to verify sources, data, information, methodology, results, and assessments, research, analysis, conclusions or other evidence to establish the integrity of findings.

The SI Order’s Principles of Scientific Integrity further promote scientific openness by encouraging all covered individuals who “engage in science and the development of scientific products . . . to publish data and findings in transparent ways that enhance NOAA’s reputation for reliable science,” including by “communicating what is known about the provenance, validity, and accuracy of all data as well as the process of creating the data.”¹⁸ The SI Order’s definition of “scientific products” is broad and encompasses communications about scientific research, like the Billions Project:¹⁹

Scientific Product—The results of scientific activities including the analysis, synthesis, compilation, or translation of scientific information and data into electronic and hardcopy formats for the use of NOAA, the Department of Commerce, or the Nation. These products include, but are not limited to, experimental and operational models, forecasts, graphics, and verbal and written communications of all kinds relating to scientific activities, including NOAA social media accounts.

Additionally, the SI Order’s Code of Scientific Conduct requires NOAA staff and partners to be “[a]ccountable in conducting research and interpretation of research results” by “[d]isclos[ing] all research methods used, available data, and final reports and publications consistent with applicable scientific standards, laws, and policy.”²⁰

NOAA’s commitment to these principles is demonstrated by how seriously it takes potential scientific integrity violations. The SI Order’s Policy on Scientific Integrity strictly prohibits them and requires thorough investigation when they have been alleged.²¹

It is NOAA policy that:

.01 Research and Scientific Misconduct by any covered individual are prohibited.

...

¹⁸ *Id.* at 10.

¹⁹ *Id.* at 8.

²⁰ *Id.* at 17.

²¹ *Id.* at 8-9.



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.02 All covered individuals comply with the requirements of, and adhere to, the principles of scientific integrity, integrity of science activities, Code of Scientific Conduct and Code of Ethics for Science Supervision and Management described in this NAO when performing their duties within and outside of NOAA.

...

.04 Under no circumstance may any covered individuals ask or direct Federal scientists or other NOAA employees to suppress or alter, or delay scientific data, findings, analysis, assessments, or research, including how they are used in communications of all kinds, both public and internal, and in congressional testimony.

.05 All allegations of scientific and research misconduct, and loss of scientific integrity brought against covered individuals will be thoroughly assessed to determine if they are credible.

.06 Credible allegations of fabrication, falsification, plagiarism, and interference with or undue influence on accurate public reporting of science will be examined using the process laid out in the Procedural Handbook to this NAO and may result in personnel actions, referral to the Inspector General's office, or NOAA's Acquisition and Grants Office.

The SI Order makes clear that NOAA considers all these policies necessary for its ability to fulfill its purpose: "Transparency, traceability, and integrity [including prohibitions against falsification and fabrication] at all levels are required for NOAA to achieve its strategic vision of 'healthy ecosystems, communities, and economies that are resilient in the face of change.'"²² "These are the "core values of [NOAA] and the reason for maintaining this Order."²³

The Biden Administration's Memorandum on Scientific Integrity

In addition to the NOAA's scientific integrity policy, President Biden's Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking prohibits the influence of politics on science and requires government agencies to use well-established scientific processes:²⁴

²² *Id.* at 7.

²³ *Id.*

²⁴ Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking, 86 Fed. Reg. 8845 (Jan. 27, 2021), <https://www.govinfo.gov/content/pkg/FR-2021-02-10/pdf/2021-02839.pdf>.



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It is the policy of my Administration to make evidence-based decisions guided by the best available science and data. Scientific and technological information, data, and evidence are central to the development and iterative improvement of sound policies, and to the delivery of equitable programs, across every area of government. Scientific findings should never be distorted or influenced by political considerations. When scientific or technological information is considered in policy decisions, it should be subjected to well-established scientific processes, including peer review where feasible and appropriate, with appropriate protections for privacy.

Analysis

The Billions Project appears to violate basic scientific integrity standards.

Several potential violations have been identified and thoroughly analyzed by Professor Roger Pielke, Jr. in his forthcoming paper *Scientific Integrity and U.S. "Billion Dollar Disasters"* (the "Pielke Paper").²⁵ Professor Pielke identifies at least seven violations of scientific integrity within the Billions Project related to transparency and traceability. These errors also present concerns about falsification and fabrication because the discrepancies within the Project's dataset and its extreme departures from disaster loss estimates by other institutions are incapable of outside review and evaluation due to the opacity of the Project's baseline data and calculation methods. These errors are described below.

1. The Billions Project does not identify its sources or methods for calculating disaster losses.

NOAA's use of undisclosed non-traditional costs in its calculations can mislead and misinform the public about the relevant scale of the disaster losses reported in the Project's dataset.

Though the Billions Project claims it uses "[m]ore than one dozen public and private sector data sources help capture the total, direct costs (both insured and uninsured) of the weather and climate events" it reports,²⁶ the Project does not 1) identify these sources in relation to specific events, 2) explain how the estimates are derived from their sources, or 3) provide the estimates themselves.

The absence of this information is not an idle concern, as it prevents meaningful review of the Project's methods and calculations. For example, the NOAA employees who maintain the Billions Project have identified non-traditional cost considerations, like

²⁵ A preprint of the Pielke Paper is available online: <https://osf.io/preprints/socarxiv/3yf7b>.

²⁶ *FAQ: Billion-Dollar Weather and Climate Disasters*, National Centers for Environmental Information, <https://www.ncei.noaa.gov/access/billions/faq>.



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livestock feeding costs as a function of national feedstock trends, as a variable used in compiling the Billions Project's dataset.²⁷ But conventional disaster accounting methods do not consider livestock feeding costs in their calculations.²⁸ Because the Billions Project's sources, estimates, and calculation methods are neither transparent nor traceable, it is not clear why costs such as livestock feeding costs are part of its calculations or how many other non-traditional costs are used in NOAA's calculations, how they are used, and how much they affect the total disaster losses reported in the Project.

This opacity precludes other scientists, or even members of the public, from scrutinizing NOAA's decision-making and calculations in producing the Project's dataset and from evaluating the utility of its loss estimates. Furthermore, because NOAA does not disclose all the costs it considers in calculating its estimates and their details, it is impossible for independent sources to protect against the falsification and fabrication of data.

2. The Billions Project's accounting method for disaster loss estimates are undisclosed and produce suspect results.

Similarly, NOAA does not explain how it estimates the costs of disasters generally. This lack of transparency is particularly problematic given that NOAA's cost estimates appear to deviate dramatically from conventional accounting practices for disaster loss estimates.

This is exemplified in its loss estimates for hurricanes. The historical practice of NOAA's National Hurricane Center has been to double insured losses from hurricanes to estimate total direct losses.²⁹ But, for unexplained reasons, this is not the practice NOAA uses in the Billions Project, as demonstrated with its Hurricane Idalia estimates.

Hurricane Idalia hit Florida in September 2023. Initial catastrophe models estimated insured losses of \$2.5 to \$5 billion;³⁰ the Billions Project's initial estimate was \$2.5 billion. But actual insured losses recorded after Idalia hit were far less: approximately \$310 million.³¹ Under the National Hurricane Center's method, the estimated total direct losses would be about \$620 million. But the Billions Project's estimate *increased* after the insured losses from Idalia came in at 1/4th of the lowest

²⁷ Smith and Matthews, *Quantifying Uncertainty and Variable Sensitivity within the U.S. Billion-dollar Weather and Climate Disaster Cost Estimates*, Natural Hazards (2015), at 8. Available at <https://www.ncei.noaa.gov/monitoring-content/billions/docs/smith-and-matthews-2015.pdf>.

²⁸ Pielke Paper at 4.

²⁹ *Id.*

³⁰ RMS, *Verisk Weigh in With Insured-Loss Estimates in Low Billions of Dollars From Idalia*, Insurance Journal (Sept. 5, 2023), <https://www.insurancejournal.com/news/national/2023/09/05/738970.htm>.

³¹ OIR Hurricane Idalia Information, Florida Office of Insurance Regulation (Updated November 16, 2023), <https://www.floir.com/home/idalia>.



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initial estimate. The Project's ultimate estimate was \$3.5 billion,³² about six times higher than the National Hurricane Center's method would indicate. NOAA provides no explanation for why it increased its loss estimate after Idalia turned out to be *less* destructive than initially anticipated, nor does NOAA provide any explanation for why there is a massive disjunction between the Idalia loss estimates for two of its projects.

The absence of transparency and traceability in the Billions Project's estimate methodology raises direct concerns about potential falsification or fabrication of data: there is no indication why the Billions Project's loss estimate for Hurricane Idalia so far exceeds what it "should" have been, nor whether these accounting discrepancies are pervasive throughout the Project's dataset.

3. *The Billions Project adds and removes disaster events from the dataset without acknowledgment or explanation.*

Because the Billions Project's dataset is "living" and new entries are added as disasters occur, it is expected for the dataset's count of disasters to increase over time. What is not expected is for disasters to be added *years* after they occur or for them to be removed from the dataset, and for it to do both without acknowledgment or explanation. Yet this occurs within the Project's dataset. Professor Pielke compared the version of the Project's dataset from late 2022 to an updated version published in mid-2023 and found that 10 new events were added and 3 were deleted in the mid-2023 version without any documentation or explanation reflecting these changes.³³ Professor Pielke further compared the mid-2023 version to a more recent version and found an additional 4 historical events were added.³⁴ While changes to the dataset to add or remove historical events may plausibly occur as a result of renewed research into the disaster records for particular years or as a result of clean up and re-evaluation of existing data, scientific integrity requires that such changes be documented with explanations of the analysis and decision-making behind them. Transparency and traceability require NOAA to disclose if it added historical events for reasons such as a change in its calculation methodology for disaster losses, or if it removed historical events because its calculations were incorrect, inflated, or based on an outmoded method.

Whatever the justification for NOAA's changes to the dataset, NOAA's scientific integrity principles require it to disclose that it changed its dataset and explain why. Instead, NOAA has provided no documentation, justification, or acknowledgement of these changes. In point of fact, Professor Pielke only discovered the discrepancy between these different versions of the dataset because he happened to download the publicly

³² *Events*, National Centers for Environmental Information, [https://www.ncei.noaa.gov/access/billions/events/US/1980-2023?disasters\[\]=all-disasters](https://www.ncei.noaa.gov/access/billions/events/US/1980-2023?disasters[]=all-disasters).

³³ Pielke Paper at 5.

³⁴ *Id.*



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available version of the dataset at different times and realized they had different information for historical disasters.³⁵

4. *The Billions Project adjusts its loss data beyond what inflation-adjustments require and does so for unexplained reasons.*

According to NOAA, the *only* annual adjustment to the Billions Project's dataset that it acknowledges is to account for inflation based on the Consumer Price Index ("CPI").³⁶ As inflation adjustments based on the CPI are uniform, NOAA's adjustments should be uniform as well. But this is not the case. From 2022 to 2023, adjustments to the loss data for historical disasters in the dataset were made individually, and multiple of the adjustments were beyond what would be reasonable for a CPI-based inflation adjustment.³⁷

Most disasters were adjusted between 4.5% and 6%. But 9 events were adjusted between 6.6% and 145%, and one was reduced by about 75%.³⁸ NOAA provides no documentation or explanation for why its supposed inflation adjustment is not uniform and contains an increase of 145% to one event and a reduction of 75% to another. The opacity of NOAA's adjustment method, which must necessarily incorporate considerations beyond a CPI-based inflation adjustment, raises strong concerns about potential intentional data manipulation, if not outright falsification and fabrication, given the absence of a justification for its non-uniform cost adjustments and its massive increases in the cost of certain events.

5. *The Billions Project "scales up" loss data based on various factors without disclosing the methodology for its calculation or the baseline data.*

According to NOAA, it "scal[es] up insured loss data to account for uninsured and underinsured losses, which differ[] by peril, geography, and asset class;" NOAA refers to these adjustments as "key transformations."³⁹ But these "key transformations," which all serve to raise the losses reported in the dataset, lack any transparency or traceability. NOAA adjusts the loss totals up using these transformations without providing any details on 1) the methodology for these transformations or their basis, 2) the impact these transformations have on loss estimates, 3) how these transformations may change over time or within the dataset, or 4) the baseline data on disaster losses prior to any transformations. NOAA admits that the losses it reports are higher than the baseline data would indicate but provides no way for its manipulations of the data to be scrutinized, evaluated, or replicated.

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ *Id.*

³⁹ *Calculating the Cost of Weather and Climate Disasters*, National Centers for Environmental Information (Updated: Apr. 21, 2022), <https://www.ncei.noaa.gov/news/calculating-cost-weather-and-climate-disasters>.



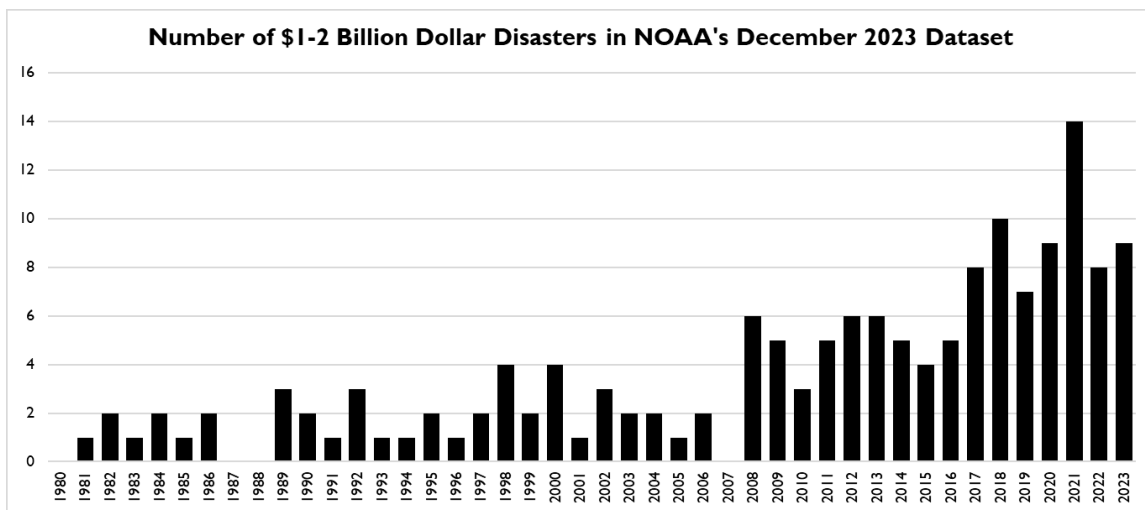
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Furthermore, these “key transformations” are not the only data manipulations. NOAA employees refer to an overall bias correction applied to the dataset in a 2015 paper,⁴⁰ and in another paper from 2013, NOAA employees refer to other data adjustments, such as adjustments based on U.S. flood insurance participation rates.⁴¹ Like with the “key transformations,” NOAA fails to disclose either the methodologies or effects of these adjustments or the baseline data they were applied to.

NOAA’s approach to these key transformations violates its scientific integrity commitments. Not only does NOAA’s approach to these key transformations eschew transparency and traceability, it also raises concerns about the potential for purposeful data manipulation, if not outright falsification and fabrication of the data, given that NOAA is manipulating the Project’s loss data without disclosing any details.

6. *The Billions Project appears to use inconsistent calculation methods over time for unexplained reasons.*

Within the Billions Project’s time series, there is an implausible and unexplained spike in billion-dollar disasters reported starting in 2008, followed by a second spike starting in 2017. Prior to 2008, no year from 1980 to 2007 had more than four reported disasters. 2007 reported none. But starting in 2008, the number of yearly reported disasters spiked tremendously, as reflected in the chart below:⁴²



As the chart shows, prior to 2008, only two years (1998 and 2000) had as many as four reported disasters. After the 2008 spike, only a single year had fewer than four disasters.

⁴⁰ Smith and Matthews at 4.

⁴¹ Smith and Katz, *U.S. Billion-dollar Weather and Climate Disaster: Data Sources, Trends, Accuracy and Biases*, Natural Hazards (2013).

⁴² The chart is taken from the Pielke Paper at 6.



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All other years but one (2015) reported more than four. Starting in 2017, there was a second spike and the number of yearly disasters increased precipitously. From 2017 to 2023, the average number of billion-dollar disasters each year was 9.2—more than 150% higher than the previous *record* for yearly disasters reported prior to 2017.

Because of their sudden and unexplained appearance in the data. These sharp increases in the number of reported yearly disasters suggest a change in disaster accounting methods. But because NOAA does not disclose either the methods or raw data used for producing its dataset, it is impossible to know the reasons for these jumps in the dataset or to evaluate the consistency and accuracy of NOAA’s calculations. The inability to investigate NOAA’s methodologies to understand the reasons for these implausible discontinuities demonstrates why transparency and traceability are such fundamental principles of scientific integrity. NOAA’s failure to abide by these principles leaves these discontinuities unexplained and raises the specter of intentional data manipulation, if not outright falsification and fabrication in the Project.

7. The Billions Project’s loss estimates for hurricanes are substantially and unexplainedly higher than the estimates produced by NOAA’s National Hurricane Center.

Both the Billions Project and NOAA’s National Hurricane Center maintain loss estimates for various hurricanes that have hit the United States. And both ostensibly use CPI-based adjustments for their loss data to account for inflation. But the Billions Project’s loss data in almost all cases (with the exception of Hurricane Andrew from 1992) is substantially higher than the National Hurricane Center’s.⁴³ This is reflected in the below table:⁴⁴

Year	Hurricane	Official NHC Losses in Year of Event (current US Dollars)	NOAA BDD 2023	Official NHC losses adjusted for CPI to 2023	NOAA BDD as % of NHC CPI Adjustment
1983	Alicia	2.0	9.2	6.1	150.8%
1989	Hugo	7.0	22.1	17.2	128.5%
1992	Andrew	31.5	58.9	68.7	85.7%
1996	Fran	3.2	9.8	6.2	158.1%
1999	Floyd	4.5	11.9	8.2	145.1%
2004	Charley	14.0	25.9	22.7	114.1%
2005	Katrina	82.2	196.3	128.5	152.8%
2012	Sandy	60.3	86.5	80.0	108.1%
2017	Harvey	60.0	156.3	74.7	209.2%

⁴³ Pielke Paper at 6.

⁴⁴ *Id.*



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There is no obvious pattern to the discrepancies between the National Hurricane Center's CPI-adjusted data and that of the Billions Project. Because NOAA neither documents nor releases the methodologies or baseline data it uses in its calculations, it is impossible to evaluate why there are such large differences between the two datasets. The absence of transparency and traceability in the Billions Project's methods raises the concern that the unexplained increases in the Project's reported losses compared to the National Hurricane Center's reported losses are the result intentional data manipulation, if not outright falsification and fabrication in the Project.

NOAA misuses the Billions Project as evidence of increased disaster harms from climate change.

Alongside the lack of transparency and traceability in the Billions Project's dataset and the attendant concerns about data falsification and fabrication, NOAA misuses the dataset as evidence of increased harms from climate change.

Due to its design limitations, the dataset cannot serve as evidence that climate change itself is responsible for any increase in losses from natural disasters over time. This is because the dataset bluntly reflects total economic losses from disasters and does not breakdown and separate-out the influence of the various factors that contribute disaster losses. Intensity of weather events alone is not the sole, or even primary, cause for total losses suffered because the vulnerability and exposure to harm of the people and assets from disaster damage are key factors affecting total losses. For example, a super storm hitting a barren wasteland with no population will cause significantly less (or no) loss compared to a smaller storm hitting Manhattan. Concentrations of people and wealth, and the relative vulnerability of both to disaster damage, are essential factors in disaster losses.

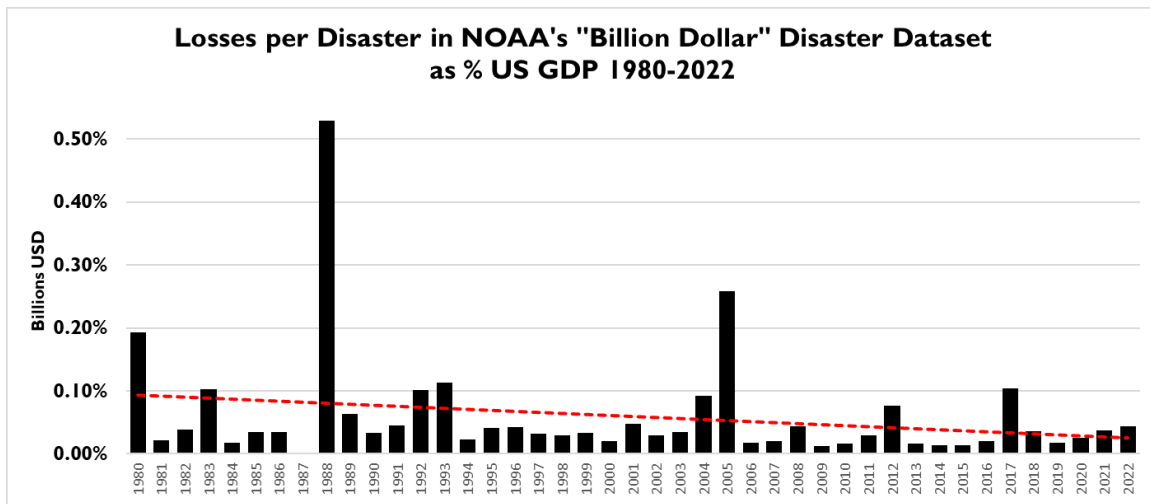
Because the Billions Project's dataset is solely derived from economic loss data, it does not (and cannot) conclusively disaggregate the effect of climate change on disaster losses over time from the effect of population growth and economic expansion. These human/economic factors alone can entirely explain an increase in losses from disasters: as the population and the economy grow, including in areas vulnerable to disasters, the potential damage from disasters increases simply because there is more wealth vulnerable to destruction. Without further data beyond mere economic loss, the Billions Project's dataset cannot detect the influence of climate change on disaster losses nor attribute any change in losses to climate change.

NOAA researchers admitted this limitation in a 2013 paper on the Billions Project: "the billion-dollar dataset is only adjusted for the CPI over time, not currently incorporating any changes in exposure (e.g., as reflect by shifts in wealth or



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population).”⁴⁵ Other researchers have attempted to “normalize” disaster data to account for changes in exposure and vulnerability.⁴⁶ A simple method used to normalize disaster losses over time is to use GDP as a proxy for increasing population and wealth and analyze disaster losses as a percentage of US GDP.⁴⁷ Professor Pielke provides a graph demonstrating how this analysis would apply to the Billions Project’s dataset:⁴⁸



The graph reflects that losses from disasters are *down* as a proportion of GDP since 1980 according to the Project’s own dataset. This trend is reflected in other normalization analyses that use more sophisticated and detailed methods.⁴⁹ These analyses reflect that hurricane, flood, and tornado losses have all *decreased* as a proportion of GDP on climate time scales—as has the aggregate for disaster losses overall.⁵⁰

NOAA’s failure to account for changes in exposure and vulnerability of people and assets to harm from disasters introduces a significant bias into the Billions Project and obscures that a significant portion (or all) of the increases in loss totals it reports over time are a result of population and economic growth, not climate trends. NOAA researchers acknowledged as much over a decade ago, stating that “the magnitude of such increasing trends [in disaster costs] is greatly diminished when applied to data normalized for exposure.”⁵¹ Claims that the Billions Project provides evidence of increasing harms

⁴⁵ Smith and Katz at 24.

⁴⁶ Professor Pielke reviewed 54 papers on normalization in a 2020 paper. See Pielke, *Economic ‘normalization’ of disaster losses 1998-2020: a literature review and assessment*, Environmental Hazards Vol. 20, 2021.

⁴⁷ Pielke Paper at 8-9.

⁴⁸ *Id.* at 9.

⁴⁹ See *id.* at 10 (collecting six research papers reflecting the same downward trend in disaster costs relative to GDP).

⁵⁰ *Id.*

⁵¹ Smith and Katz at 24.



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from climate change are therefore misleading and unscientific. Not only is it impossible for the Billions Project to provide such evidence because it does not normalize for increases in vulnerability and exposure, but such normalization analyses show that the relative harm of disasters has diminished over the lifetime of the Billions Project.

Despite these issues with the Billions Project and despite NOAA's direct acknowledgment of the role vulnerability and exposure play in disaster losses, NOAA officials and staff have repeatedly made misleading and unscientific claims that the Billions Project indicates ever-worsening harms from climate change. In a statement to CBS News, a NOAA official responsible for the Project's dataset claimed that "climate change is supercharging many of these extremes that can lead to billion-dollar disasters."⁵² And at a 2022 press conference where an update to the Project's dataset was released, a NOAA administrator claimed that the dataset indicates that "climate change is creating more and more intense extreme events that cause significant damage."⁵³

Conclusion

The American people deserve to have their tax dollars fund science that satisfies all the rigors of scientific integrity, to have their agencies abide by their own standards, and to have their government produce and rely on only the highest-quality scientific research. It is therefore imperative that the apparent scientific integrity issues in the Billions Project be addressed. The national conversation on climate change and disaster-response should not be tainted by inaccurate, misleading, and self-serving scientific analysis. Accordingly, we request an immediate investigation into NOAA's apparent violations of its scientific integrity principles in its operation and promotion of the Billions Project.

Sincerely,

Michael Chamberlain
Director
Protect the Public's Trust

⁵² 18 extreme weather events caused \$165 billion in damage last year, NOAA says, CBS News (Jan. 10, 2023), <https://www.cbsnews.com/news/noaa-billion-dollar-weather-disasters-2022-hurricane-ian-drought/>.

⁵³ Nathan Rott, *Extreme weather, fueled by climate change, cost the U.S. \$165 billion in 2022*, National Public Radio (Jan. 12, 2023), <https://www.npr.org/2023/01/12/1148633707/extreme-weather-fueled-by-climate-change-cost-the-u-s-165-billion-in-2022>.