

**Comment to the Environmental Protection Agency**

**Multi-Pollutant Emissions Standards for Model Year 2027  
and Later Light-Duty and Medium-Duty Vehicles**

**Proposed Rule**

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This comment paper addresses issues of economic and policy analysis relevant to the Environmental Protection Agency proposed rule on multi-pollutant emissions standards for model year 2027 and later light- and medium-duty vehicles.<sup>1</sup> The proposed rule is fatally flawed and should not be finalized. This comment is organized as follows.

Summary

- I. Fuel Savings Are Not an Appropriate Economic Benefit of the Proposed Rule.
- II. The Purported Climate Benefits of the Proposed Rule Are Illusory and the Social Cost of Carbon Parameter Is Fundamentally Flawed.
- III. The Purported Energy Security Benefits of the Proposed Rule Are Illusory.
- IV. Assertions of a Serious Anthropogenic Climate Threat Are Inconsistent with the Evidence.
- V. Conclusions.

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<sup>1</sup> The proposed rule is at <https://www.govinfo.gov/content/pkg/FR-2023-05-05/pdf/2023-07974.pdf>.

## Summary

The benefit/cost analysis published by the Environmental Protection Agency in its proposed rule “Multi-Pollutant Emissions Standards for Model Year 2027 and Later Light-Duty and Medium-Duty Vehicles” is fatally flawed; accordingly, the proposed rule should not be finalized.

EPA claims that the fuel savings attendant upon implementation of the proposed rule would yield benefits in present value terms of \$380-\$770 billion (net of EVSE port costs), depending on the choice of discount rate. But fuel savings are an illegitimate dimension of any such benefit/cost analysis because the value of fuel savings measured as a function of market prices represents no divergence *per se* between market prices and true resource costs in standard externality analysis. If “fuel savings” are to be considered relevant for purposes of benefit/cost analysis, then the adverse effects or costs of a (forced) reduction in fuel consumption in terms of the quality of transportation services must be included in the analysis also.

Were a regulatory rule simply to outlaw entirely the use of motor fuels by cars and light trucks, forcing consumers massively to use bicycles, horse-drawn carts, and similar substitutes technologically backward, the “fuel savings” under the EPA methodology would be enormous, but nowhere in the EPA methodology is there any cost in terms of the quality of transportation services. Does EPA believe that consumers of motorized transportation services powered with conventional fuel simply are stupid? This EPA analytic framework is not to be taken seriously.

The same is true for the asserted “climate benefits” of the proposed rule, which under the explicit EPA assumptions and estimates as published, would be about 0.023°C by 2100, using the EPA climate model under assumptions that exaggerate the effects of reduced emissions of greenhouse gases. That effect would not be detectable. Accordingly, the monetized climate benefits of the proposed rule asserted by EPA are an illusion.

EPA attempts to circumvent this obvious problem by substituting in place of any such analysis an application of the “social cost of carbon” to the asserted reductions in GHG emissions attendant upon implementation of the proposed rule, as estimated on an interim basis by the Biden Administration Interagency Working Group. The interim IWG estimates are deeply flawed, in that they (1) distort the actual economic growth predictions produced by the integrated assessment models, (2) base predictions of future climate phenomena on climate models that cannot predict the past or the present, (3) incorporate “co-benefits” in the form of a reduction in the emissions of other criteria and hazardous air pollutants already regulated under different provisions of the Clean Air Act, (4) incorporate the asserted benefits of GHG reductions on a global basis, and (5) employ discount rates that are inconsistent and inappropriate.

The asserted “energy security” benefits of the proposed rule are illusory. Because there can be only one world market price for such fungible commodities as crude oil, abstracting from such second-order differences as transportation costs, exchange rate impacts, and the like, nations that import all of their oil face the same prices and price changes as those importing none of their oil. Accordingly, the common view of “energy security” as a direct result of the level or proportion of imports is incorrect; but the EPA in effect endorses this view nonetheless. A U.S. that imports more oil is not less “energy secure” than a U.S. that imports less.

Similarly, a defense cost argument is not correct. The portion of the costs of the U.S. defense effort that can be attributed to defense of the sea lanes and the like is a hugely complex analytic calculation, dependent upon a large array of alternative assumptions about the allocation of the fixed costs of the physical and human force structures across military functions and missions. Because national security needs and force structures evolve only over decades, it is reasonable as a first approximation to assume that defense capital provides those multiple functions in more-or-less fixed proportions, which means that any allocation of those fixed costs across multiple functions is arbitrary.

EPA asserts that “there is consensus that the effects of climate change represent a rapidly growing threat to human health and the environment, and are caused by GHG emissions from human activity, including motor vehicle transportation.” This is not correct, even apart from the dubious premise that some sort of undefined “consensus” is a proper basis for policy formulation, and even apart from the failure of EPA even to attempt to separate anthropogenic and natural influences on climate phenomena.

There is no evidence of a climate “threat” or “crisis” as commonly asserted, in terms of temperature trends, polar sea ice, tornadoes, tropical cyclones, wildfires, drought, flooding, or ocean alkalinity. The Intergovernmental Panel on Climate Change is deeply dubious about the various severe effects often asserted as prospective impacts of increasing atmospheric concentrations of GHG. Moreover, NASA reports significant planetary greening as a result of increasing atmospheric concentrations of carbon dioxide, and data from the United Nations Food and Agriculture Organization show that global per capita food production increased 46 percent between 1961 and 2020, and 20 percent for 2000-2020.

The “crisis” narrative is derived wholly from climate models that cannot predict the actual temperature record. In particular, the suite of climate models underlying the IPCC 5<sup>th</sup> and 6<sup>th</sup> Assessment Reports overstate the mid-troposphere temperature record by factors of about 2.5. Moreover, the models are fine-tuned in such a way as to deny the importance of natural influences on climate phenomena, but that is inconsistent with a large body of evidence, in particular the substantial warming observed from 1910 to 1945, and the close correlation between the satellite temperature record and the El Niño/Southern Oscillation.

The analysis underlying the proposed rule is fatally flawed; it should not be finalized.

### **I. Fuel Savings Are Not an Appropriate Economic Benefit of the Proposed Rule**

The conceptual purpose of any proposed regulation is the correction of some set of purported inefficiencies inherent in market allocational outcomes, usually assumed to result from some social resource or other cost not reflected in market prices. This is the standard definition of an externality.<sup>2</sup> The value of fuel savings measured as a function of market prices represents no such divergence between market prices and resource costs apart from the climate effects (discussed below); other such assumed impacts not reflected in market prices already are regulated under different provisions of the Clean Air Act.

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<sup>2</sup> I shunt aside here the issue of whether government can be predicted to adopt policies yielding systematic allocational improvement. See section IV at <https://www.aei.org/wp-content/uploads/2023/06/Zycher-comment-OMB-Proposed-Circular-A-4-Regulatory-Analysis-June-2023.docx.pdf>.

Accordingly, fuel savings *per se* are not relevant analytically. The inclusion of fuel savings is illegitimate as a component of the “benefits” of the proposed rule because the economic benefits of fuel savings are captured fully by consumers of fuels. There is no “externality” attendant upon fuel consumption *per se*, and if “fuel savings” are to be considered relevant for purposes of benefit/cost analysis, then the adverse effects or costs of a (forced) reduction in fuel consumption in terms of the quality of transportation services must be included in the analysis. The EPA claims that the fuel savings attendant upon implementation of the proposed rule would yield benefits in present value terms of \$380-\$770 billion (net of EVSE port costs), depending on the choice of discount rate.<sup>3</sup> Those figures are much greater than any other of the asserted benefits from the proposed rule, except for the purported climate benefits, which, as discussed in section II, are wholly artificial constructs.

That the proposed rule would force consumers of fuels to change their consumption patterns in ways that would not be observed without the proposed rule demonstrates that the “fuel savings,” even if we accept the underlying calculations, must be accompanied by some explicit or implicit costs in terms of forgone quality dimensions of transportation services, which in turn must be greater than the value of the purported fuel savings. That obviously is why we do not observe the allocational outcomes envisioned in the proposed rule as a result of market forces. Why does market behavior not yield fuel consumption for the vehicle fleet envisioned in the proposed rule? Or does EPA believe that consumers of motorized transportation services powered with conventional fuel simply are stupid?

In order to see this clearly, suppose that the proposed rule were simply to outlaw entirely the use of motor fuels by cars and light trucks, forcing consumers massively to use bicycles, horse-drawn carts, and similar substitutes technologically backward. It is no answer to say that electric vehicles and the like would be substituted without loss of value in terms of the quality of transportation services; the fact that such technologies have not been adopted by markets in the aggregate, even given the subsidies embedded in current policies, demonstrates that these technologies must impose some set of disadvantages in terms of costs and/or performance. The data reported by the Energy Information Administration show that in 2021 expenditures on motor gasoline alone in the transportation sector were about \$386.9 billion.<sup>4</sup> Under the EPA methodology, that “fuel saving” *in total* would be an annual benefit of such a hypothetical rule outlawing the use of motor fuels, and the disadvantages of bicycles, horse-drawn carts, and the like — the marginal benefits of using motor vehicles — would be irrelevant. *Under the methodology underlying the proposed rule, the more stringent the constraint imposed upon fuel use, the greater the purported benefit from “fuel savings.”* In other words, the market spends scarce resources on the consumption of transportation fuels without any offsetting benefits at all! Amazingly, this implicitly is the analytic framework underlying this part of the estimated benefits asserted in the proposed rule. It is not to be taken seriously.

## **II. The Purported Climate Benefits of the Proposed Rule Are Illusory and the Social Cost of Carbon Parameters Are Fundamentally Flawed**

EPA asserts in the proposed rule that it would yield cumulative reductions in greenhouse gas (GHG) emissions of between 7.3 billion and 8.0 billion metric tons through 2055.<sup>5</sup> Using the

<sup>3</sup> See the proposed rule at Table 6.

<sup>4</sup> See [https://www.eia.gov/state/seeds/sep\\_sum/html/pdf/sum\\_ex\\_tra.pdf](https://www.eia.gov/state/seeds/sep_sum/html/pdf/sum_ex_tra.pdf).

<sup>5</sup> See the proposed rule at Table 3.

higher figure, that is an annual average reduction of about 276 million metric tons. U.S. emissions of GHG in 2021 were about 6.3 billion metric tons on a CO<sub>2</sub>-equivalent basis.<sup>6</sup> The Biden administration policy goal is net-zero emissions by 2050.<sup>7</sup> If we use the EPA climate model in order to estimate the prospective temperature effect of the entire Biden administration policy, under a set of assumptions that exaggerate the temperature effects of reduced emissions, that policy would yield a global temperature reduction of 0.062°C by 2050, and 0.173°C by 2100.<sup>8</sup>

The cumulative reduction in U.S. emissions under the net-zero policy, from 6.3 billion metric tons in 2021 to net zero by 2050, would total about 88.2 billion metric tons. For the 2027-2050 time period relevant in the proposed rule, the cumulative reduction would be about 60 billion tons. Accordingly, the cumulative emissions reduction of 8.0 billion metric tons asserted in the proposed rule would be about 13.3 percent of the total envisioned in the Biden net-zero policy, which as just noted, would yield a reduction in global temperatures of 0.173°C by 2100. A linearity assumption is not strictly correct, but it is wholly appropriate for purposes of close approximation. The “climate benefit” of the proposed rule, under the explicit EPA assumptions and estimates, would be about 0.023°C by 2100. Because the standard deviation of the surface temperature record is 0.11°C, that effect would not be detectable.<sup>9</sup> *Accordingly, the monetized climate benefits of the proposed rule asserted by EPA are an illusion.*

EPA attempts to circumvent this obvious problem by substituting in place of any such analysis an application of the “social cost of carbon” (SC-GHG) to the asserted reductions in GHG emissions attendant upon implementation of the proposed rule, as estimated on an interim basis by the Biden Administration Interagency Working Group.<sup>10</sup>

EPA estimated the climate benefits for the final standards using measures of the social cost of three GHGs: Carbon, methane, and nitrous oxide. The social cost of each gas (i.e., the social cost of carbon (SC-CO<sub>2</sub>), methane (SC-CH<sub>4</sub>), and nitrous oxide (SC-N<sub>2</sub>O)) is the monetary value of the net harm to society associated with a marginal increase in emissions in a given year, or the benefit of avoiding that increase. Collectively, these values are referenced as the “social cost of greenhouse gases” (SC-GHG).<sup>11</sup>

The interim IWG estimates are deeply flawed, in that they (1) distort the actual economic growth predictions produced by the integrated assessment models, (2) base predictions of future climate phenomena on climate models that cannot predict the past or the present, (3) incorporate

<sup>6</sup> See <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks#:~:text=In%202021%2C%20U.S.%20greenhouse%20gas,sequestration%20from%20the%20land%20sector.> U.S. GHG emissions in 2005 on a CO<sub>2</sub>-equivalent basis were about 7.5 billion metric tons; see Table ES-2 at <https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Chapter-Executive-Summary.pdf>.

<sup>7</sup> See <https://www.whitehouse.gov/briefing-room/statements-releases/2023/04/20/fact-sheet-president-biden-to-catalyze-global-climate-action-through-the-major-economies-forum-on-energy-and-climate/#:~:text=President%20Biden%20has%20set%20an,by%20no%20later%20than%202050.>

<sup>8</sup> Author computations using Model for the Assessment of Greenhouse Gas Induced Climate Change (MAGICC), version 7.0, at <https://magicc.org/>. Assumes equilibrium sensitivity of the climate system at 4.5°, with global baseline emissions path A1B from the IPCC 4<sup>th</sup> Assessment Report.

<sup>9</sup> See <https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/1999JD900835>.

<sup>10</sup> The interim estimates are at [https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument\\_SocialCostofCarbonMethaneNitrousOxide.pdf](https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf).

<sup>11</sup> See the proposed rule at 29371.

“co-benefits” in the form of a reduction in the emissions of other criteria and hazardous air pollutants already regulated under different provisions of the Clean Air Act, (4) incorporate the asserted benefits of GHG reductions on a global basis, and (5) employ discount rates that are inconsistent and inappropriate.<sup>12</sup>

The available analysis suggests that the prospective economic growth risks of anthropogenic climate change, at least in the aggregate, are much smaller than many assert. Consider the predictions from the integrated assessment models, a central one of which is the Dynamic Integrated Climate and Economy Model, for which William D. Nordhaus won the Nobel Prize in Economics in 2018.<sup>13</sup> Under DICE, global gross domestic product (GDP) in 2100 varies by about 3 percent across policy scenarios, including no climate policies at all, a figure that is both very small and almost certainly not statistically significant given the vagaries of economic forecasting and the number of years remaining before the end of this century. (I exclude here Nordhaus’ “Stern discounting” policy scenario, as it assumes a discount rate effectively equal to zero, a fundamental analytic error.<sup>14</sup>) Per capita consumption varies only by about 1.3 percent across policy scenarios, also a very small number and almost certain not to be statistically significant.

The IPCC — even in its most alarmist analyses — arrives at a conclusion very close to that reported in the DICE analysis. In its “1.5 Degree C” report, it finds that the damage from anthropogenic climate change unmitigated by policy initiatives will reduce global GDP by 2.6 percent by 2100.<sup>15</sup> By that year, IPCC projects that individual incomes on average will be at least 400 percent greater than is the case today.<sup>16</sup>

The interim estimates of the SCC are driven by damage functions predicted by the various climate models — the EPA model in particular — the track records of which are poor.<sup>17</sup> McKittrick and Christy summarize the contrast between their predictions and the actual satellite record as

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<sup>12</sup> See Benjamin Zycher at <https://scholarship.law.tamu.edu/cgi/viewcontent.cgi?article=1154&context=lawreview>. The issue of discount rates is addressed in section III.

<sup>13</sup> See William Nordhaus and Paul Sztorc, “DICE 2013R: Introduction and User’s Manual,” Yale University, Department of Economics, October 2013, Figure 4 and Table 1, [http://www.econ.yale.edu/~nordhaus/homepage/homepage/documents/DICE\\_Manual\\_100413r1.pdf](http://www.econ.yale.edu/~nordhaus/homepage/homepage/documents/DICE_Manual_100413r1.pdf). See also Benjamin Zycher, “The Climate Left Attacks Nobel Laureate William D. Nordhaus,” monograph, American Enterprise Institute, July 2020, at <https://www.aei.org/wp-content/uploads/2020/07/The-Climate-Left-Attacks-Nobel-Laureate-William-D.-Nordhaus.pdf>.

<sup>14</sup> See Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge, UK: Cambridge University Press, January 2007), <https://www.cambridge.org/us/academic/subjects/earth-and-environmental-science/climatology-and-climate-change/economics-climate-change-stern-review?format=PB>. On the contrast between the climate predictions made by the Stern model and the actual record, see [https://rogerpielkejr.substack.com/p/off-target-an-evaluation-of-the-stern?utm\\_source=substack&publication\\_id=119454&post\\_id=104480671&utm\\_medium=email&utm\\_content=share&triggerShare=true&isFreemail=true](https://rogerpielkejr.substack.com/p/off-target-an-evaluation-of-the-stern?utm_source=substack&publication_id=119454&post_id=104480671&utm_medium=email&utm_content=share&triggerShare=true&isFreemail=true). See also David Kreutzer, “Discounting Climate Costs,” Heritage Foundation, June 16, 2016, at <https://www.heritage.org/environment/report/discounting-climate-costs>.

<sup>15</sup> See Marco Bindi, *et. al.*, “Impacts of 1.5°C of Global Warming on Natural and Human Systems,” at [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15\\_Chapter3\\_Low\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Chapter3_Low_Res.pdf), Chapter 3 of Valerie Masson-Delmotte, *et. al.*, eds., IPCC Special Report, *Global Warming of 1.5°C*, at [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15\\_Full\\_Report\\_High\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf).

<sup>16</sup> This implies average annual growth in per capita GDP of less than 1.5 percent for the rest of this century.

<sup>17</sup> The specifics of the CMIP5 and CMIP6 models, respectively, can be found at <https://pcmdi.llnl.gov/mips/cmip5/> and <https://pcmdi.llnl.gov/CMIP6/>.



follows:

The tendency of climate models to overstate warming in the tropical troposphere has long been noted. Here we examine individual runs from 38 newly released Coupled Model Intercomparison Project Version 6 (CMIP6) models and show that the warm bias is now observable globally as well. We compare CMIP6 runs against observational series drawn from satellites, weather balloons, and reanalysis products. We focus on the 1979–2014 interval, the maximum span for which all observational products are available and for which models were run using historically observed forcings. For lower-troposphere and midtroposphere layers both globally and in the tropics, all 38 models overpredict warming in every target observational analog, in most cases significantly so, and the average differences between models and observations are statistically significant. We present evidence that consistency with observed warming would require lower model Equilibrium Climate Sensitivity (ECS) values.<sup>18</sup>

Because no policy to reduce GHG emissions can satisfy any plausible benefit/cost test — their attendant future climate effects for the most part would approach zero — federal agencies often have included purported “co-benefits,” that is, the benefits of reductions in other pollutants, as factors to be considered in the evaluation of proposed regulations and projects. This is particularly the case for the asserted health benefits of reductions in the emissions of fine particulates (PM<sub>2.5</sub>).<sup>19</sup> Like many of the other pollutants included in the co-benefits methodology, fine particulates are a “criteria” pollutant,<sup>20</sup> as distinct from “hazardous air pollutants (HAP).” EPA already limits ambient levels of PM<sub>2.5</sub> in a separate regulation, and is required under the CAA to determine every five years whether that standard “accurately reflects the latest scientific knowledge” on the health effects of exposure to particulates.<sup>21</sup>

The Clean Air Act explicitly requires the EPA, upon finding that a given criteria pollutant endangers the public health, to promulgate a “national ambient air quality standard” (NAAQS) that “protects the public health” with “an adequate margin of safety.”<sup>22</sup> The CAA also empowers the EPA to regulate emissions of HAP. The law mandates that costs not be considered in the establishment of the NAAQS; this means that those standards are likely to be too stringent in a

<sup>18</sup> See <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2020EA001281>.

<sup>19</sup> The EPA discussion of particulate matter regulatory actions is at <https://www.epa.gov/pm-pollution/particulate-matter-pm-implementation-regulatory-actions>. For sharp critiques of the EPA analysis of the mortality and morbidity effects of fine particulate matter, see <https://www.regulations.gov/document/EPA-HQ-OAR-2015-0072-0260> and <https://www.sciencedirect.com/science/article/abs/pii/S0273230017301538>. See also <https://junkscience.com/2023/06/milloy-sets-off-greens-responds-to-politifact-inquiry-on-wildfire-smoke/#more-108474>.

<sup>20</sup> See the EPA summary discussion at <https://www.epa.gov/criteria-air-pollutants>.

<sup>21</sup> See the EPA requirements for fine particulates at <https://www.epa.gov/pm-pollution/implementation-national-ambient-air-quality-standards-naaqs-fine-particulate-matter>. The CAA sections are at <https://www.epa.gov/clean-air-act-overview/clean-air-act-title-i-air-pollution-prevention-and-control-parts-through-d#ia>.

<sup>22</sup> See §7409 (b)(1), “National primary and secondary ambient air quality standards” at <https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchap1-partA-sec7409.htm>.

benefit/cost sense. Lowering the emissions of those pollutants even more through insertion of a co-benefits calculation in a new regulation aimed at an entirely different type of emission means that the excess net costs of the regulation are likely to be driven up even more.

OMB Circular A-4 directs federal agencies conducting benefit/cost analysis of regulatory measures as follows: “Your analysis should focus on benefits and costs that accrue to citizens and residents of the United States. Where you choose to evaluate a regulation that is likely to have effects beyond the borders of the United States, these effects should be reported separately.”<sup>23</sup> The IWG analysis incorporates explicitly in its benefit/cost calculation the purported global climate benefits from reductions in U.S. GHG emissions, presumably on the grounds that the assumed GHG externality is global in nature.

This argument is fundamentally flawed, in substantial part because the global climate effect of *all* U.S. GHG emissions is very close to zero, as discussed above. Accordingly, the global “benefits” of U.S. GHG emissions reductions would be effectively zero. Neither the IWG nor EPA can dispute this because it is the EPA climate model used directly or indirectly through the IAMs applied to the analysis of the SCC. More generally, it is the EPA climate model that is used throughout the federal government for analysis of climate and energy policies.<sup>24</sup>

Furthermore, the inclusion of purported global benefits in the benefit/cost analysis of U.S. GHG policies would create a very large distortion in terms of an efficient international adoption of climate policies. An efficient promulgation of climate policies internationally would attempt to achieve both an equation of the global marginal benefits and costs of GHG emission reductions, *and* an allocation of emissions reductions that equates the marginal cost of such reductions across economies. If the U.S. is to promulgate domestic policies that equate domestic marginal costs with global marginal benefits, then other countries would have powerful incentives to obtain free rides on U.S. efforts. Given that the marginal cost function for reductions in GHG emissions almost certainly is upward sloping — the marginal cost of GHG reductions rises as such reductions increase — the outcome would be a global effort to reduce GHG emissions more costly than an international effort equating marginal costs across economies.<sup>25</sup> That is the central implication of the imperative incorporated in the IWG analysis of the SCC: Under any assumption about the global benefits of reduced GHG emissions, that cannot be an efficient outcome unless the U.S. is the low-cost source of *all reductions* in GHG emissions, an assumption that simply is not plausible.

With respect to the issue of the choice among discount rates, “climate policy” by definition is the allocation of resources away from current consumption and from productive activities that yield consumption goods during the current time period, in favor of a reduction in GHG emissions/concentrations that purportedly would increase the production of consumption goods during some series of future time periods. That is why EPA asserts that the proposed rule would

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<sup>23</sup> See OMB Circular A-4, “Regulatory Analysis,” September 17, 2003, at [https://obamawhitehouse.archives.gov/omb/circulars\\_a004\\_a-4/](https://obamawhitehouse.archives.gov/omb/circulars_a004_a-4/).

<sup>24</sup> See, e.g., Environmental Protection Agency and Department of Transportation, National Highway Traffic Safety Administration proposed rule, “Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles — Phase 2,” July 12, 2015, at <https://www.regulations.gov/document/EPA-HQ-OAR-2014-0827-0002>.

<sup>25</sup> This is true whether the marginal cost functions across economies are identical or differ, although the latter is far more plausible.



yield positive net benefits in present value terms, that is, increase the present value of the consumption stream. Accordingly, that use of resources during the current time period — again, by definition — is an investment, and it must be evaluated in comparison with the social return to alternative investments.

Therefore, it is the opportunity of cost of capital that is the appropriate discount rate to be applied to the evaluation of the proposed rule, because the allocation — the investment — of resources to such endeavors imposes an opportunity cost in the form of other forgone investments. Because the use of scarce resources for reductions in GHG emissions is an investment, whether promising returns low or high, the appropriate discount rate is the opportunity cost of capital for the economy as a whole. For the period 1928-2020, the average annual before-tax return to investment in the Standard and Poor 500, in real (inflation-adjusted) terms was 8.5 percent.<sup>26</sup> For the period 1960-2020, the figure was 7.61 percent. Such long-run historical figures are consistent with the directive in OMB Circular A-4 that a discount rate of 7 percent be the baseline parameter applied to regulatory analysis by the federal government.

EPA in previous analyses has justified a “consumption rate of interest” defined alternatively at 2.5 percent, 3 percent, or 5 percent, as follows.<sup>27</sup>

Second, the IWG found that the use of the social rate of return on capital (7 percent under current OMB Circular A-4 guidance) to discount the future benefits of reducing GHG emissions inappropriately underestimates the impacts of climate change for the purposes of estimating the SC-GHG. Consistent with the findings of the National Academies and the economic literature, the IWG continued to conclude that the consumption rate of interest is the theoretically appropriate discount rate in an intergenerational context... and recommended that discount rate uncertainty and relevant aspects of intergenerational ethical considerations be accounted for in selecting future discount rates. As a member of the IWG involved in the development of the February 2021 TSD, EPA agrees with this assessment and will continue to follow developments in the literature pertaining to this issue.

*That analytic argument is fundamentally flawed.* First: The “consumption rate of interest” is not the correct conceptual discount rate for analysis of the proposed rule because the use of resources for purposes of reductions in GHG emissions is obviously an investment, the opportunity cost of which is the marginal social return to investment. Even if we assume that the “consumption rate of interest” conceptually is the correct parameter for discounting purposes, the relevant metric is the real market rate of interest on intertemporal consumption shifts, one crude measure of which is the market rate of interest on unsecured consumer loans. Even given the recent years of low interest rates maintained by the Federal Reserve, that market rate appears to be over 7 percent in real terms.<sup>28</sup> For secured loans (new autos), the real interest rate appears to be at least 3 percent,<sup>29</sup>

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<sup>26</sup> The data on annual returns for several investment alternatives are reported by the Stern School of Management, New York University, at <http://www.stern.nyu.edu/~adamodar/pc/datasets/histretSP.xls>.

<sup>27</sup> See the regulatory impact analysis for <https://www.govinfo.gov/content/pkg/FR-2021-08-10/pdf/2021-16582.pdf>.

<sup>28</sup> See the data reported by the Federal Reserve Bank of St. Louis at <https://fred.stlouisfed.org/series/TERMCBPER24NS>.

<sup>29</sup> See <https://fred.stlouisfed.org/series/RIFLPBCIANM60NM>.

but that is not the correct parameter because there is no collateral insuring against the possibility that government policies mandating reductions in GHG emissions will prove uneconomic. The EPA discount rate argument is fundamentally flawed analytically, and is inconsistent with the data for the U.S. credit market.

Note also that the use of a (low) “consumption rate of interest” for the evaluation of climate policy only would introduce an important bias in the allocation of resources among government policies and between government and private-sector resource use. EPA does not argue that the “consumption rate of interest” should be applied to the benefit/cost analysis of all government investment and regulatory activity; only climate policies are to be so treated, on the grounds of “intergenerational equity,” discussed below. Nor would the private sector choose to use an artificially-low discount rate for the evaluation of alternative resource uses. If it is only the climate dimension of investment and consumption choice dynamics that is to be shaped by the use of a low “consumption rate of interest,” it is obvious that important distortions would be the central outcome, with a smaller capital stock resulting.

Second: The implicit premise in the EPA discussion of intergenerational analysis and the discount rate is straightforward: Future generations prefer to avoid the damages that they ostensibly will bear because of the climate effects of resource allocation decisions made by the current generation, and because future generations cannot vote during the current time period, it is equitable to force the current generation to bear the costs of anthropogenic climate change that otherwise would be inflicted upon future generations.

*However seemingly straightforward, that argument is not correct.* Future generations prefer to receive a bequest of an aggregate capital stock more- rather than less valuable, an objective very different from a maximization of the value of one dimension — climate phenomena — of that aggregate capital stock. This requires efficient resource allocation by the current generation, and therefore the application of the correct discount rate. Consider a *homo sapiens* baby borne in a cave some 50,000 years ago. Despite the fact that at birth that child would have enjoyed environmental quality effectively unaffected by mankind, and *a fortiori* climate phenomena determined by natural processes only, the baby at birth would have had a life expectancy of only about ten years.<sup>30</sup>

Accordingly, it is obvious that given the opportunity to choose, that child would opt for less environmental quality and greater climate risk in exchange for a longer life expectancy engendered by a more valuable aggregate capital stock yielding improved shelter, expanded food supplies, a cleaner water supply, better medical care, *ad infinitum*. Greater wealth is the central objective of any generation, a reality shunted aside by the focus in the RIA upon only the climate dimension of the aggregate capital stock to be bequeathed to future generations.

In short: EPA uses the SCC as a substitute for estimation of the actual prospective climate impacts of its proposed rule because the latter cannot be asserted to be greater than zero operationally or as a matter of statistical significance. But the SCC is fundamentally flawed for the reasons summarized above, and is inconsistent with the evidence on climate phenomena and with the prospective effectiveness of climate policies in the EPA climate model.<sup>31</sup>

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<sup>30</sup> This life expectancy observation was provided by Professor Gail Kennedy, Department of Anthropology, University of California, Los Angeles, during a telephone interview conducted February 16, 2011.

<sup>31</sup> See <https://www.budget.senate.gov/imo/media/doc/Dr.%20Benjamin%20Zycher%20-%20Testimony%20-%20Senate%20Budget%20Committee.pdf>.

### **III. The Purported Energy Security Benefits of the Proposed Rule Are Illusory**

EPA argues that the proposed rule would provide “energy security” benefits in the form of a reduction in the prospective costs “caused by U.S. petroleum consumption and imports.” EPA views such benefits as a reduction in the adverse effects of future disruptions in the supplies of crude oil, refined products, and other liquid fuels, a reduction in the costs of public preparation as embodied in the Strategic Petroleum Reserve (SPR), and a reduction in the defense costs of defending sea lanes and other dimensions of national security spending. Each of those arguments is incorrect.

Because there can be only one world market price for such fungible commodities as crude oil, abstracting from such second-order differences as transportation costs, exchange rate impacts, and the like, nations that import all of their oil (e.g., Japan) face the same prices and price changes as those importing none of their oil (e.g., the UK).<sup>32</sup> Accordingly, the common view of “energy security” as a direct impact of the level or proportion of imports is incorrect. Japan is not less “energy secure” than the UK, and a U.S. that imports more oil is not less “energy secure” than a U.S. that imports less.

Note that the queues and market disruptions experienced in the U.S. in 1973 did not result from the oil “embargo” imposed by Arab OPEC and directed at the U.S., the Netherlands, and a few others. The targeted nations faced the same international prices, and the same changes in prices, as all other economies. Prices increased because of the production cutback in the Middle East in the Wake of the 1973 Middle East war; it was the imposition of price and allocation controls and other regulatory rigidities and constraints that yielded the market disruptions. Note that there was no “embargo” in 1979; but there was a production cutback in the wake of the Iranian revolution, higher international prices, the re-imposition of price and allocation regulations in the U.S. market, and resulting queues and market dislocations.<sup>33</sup> “Energy security” — the risk of disruptions from a given source and the cost of obtaining substitute supplies over some (short) time horizon — is an attribute of liquid fuels reflected fully in market prices. “Insecure” — that is, unreliable — suppliers will command market prices lower than those enjoyed by suppliers more reliable.

The market is fully capable of anticipating supply disruptions, even if not the precise magnitudes and timing, and then stockpiling supplies for periods when supply disruptions yield higher prices.<sup>34</sup> Market prices unconstrained by regulatory distortions provide efficient incentives for such preparation; it is the threat of price controls and “windfall profits” taxes and other such policies that are likely to yield investment in private sector preparation smaller than economically efficient in the aggregate.<sup>35</sup> This means that the costs of the SPR are the direct result of adverse government policies anticipated with some nontrivial probability.

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<sup>32</sup> Natural gas is a somewhat different case, in that delivery through pipelines cannot be shifted quickly. Deliveries of liquified natural gas can be expensive, but analytically are similar to deliveries of crude oil, although the importation facilities are more complex and cannot be created quickly.

<sup>33</sup> See Benjamin Zycher at <https://www.aei.org/wp-content/uploads/2016/06/14jun2016Zycher.pdf>, <https://www.aei.org/wp-content/uploads/2016/06/World-Oil-Prices.pdf>, and <https://www.econlib.org/library/Enc/OPEC.html>.

<sup>34</sup> See the Energy Information Administration data on U.S. oil stocks at <https://www.eia.gov/petroleum/data.php>.

<sup>35</sup> It is likely to be the case that the corporation income tax also, by forcing the private sector to use a before-tax discount rate higher than the after-tax return to investment, yields suboptimal investment.

Similarly, the defense cost argument is misguided. In a narrow context, the portion of the costs of the U.S. defense effort that can be attributed to defense of the sea lanes and the like is a hugely complex analytic calculation. More broadly, defense capital assets serve multiple functions; because national security needs and the physical and human force structures evolve only over decades, it is reasonable as a first approximation to assume that defense capital provides those multiple functions in more-or-less fixed proportions. It is axiomatic that the allocation of fixed costs across multiple functions in fixed proportions is arbitrary. Accordingly, the analysis of the purported benefits of a forced reduction in the consumption of transportation fuels in terms of an asserted reduction in (long-run) defense costs is illusory.

#### **IV. Assertions of a Serious Anthropogenic Climate Threat Are Inconsistent with the Evidence**

EPA asserts that “there is consensus that the effects of climate change represent a rapidly growing threat to human health and the environment, and are caused by GHG emissions from human activity, including motor vehicle transportation.” This is not correct, even apart from the dubious premise that some sort of undefined “consensus” is a proper basis for policy formulation, and even apart from the failure of EPA even to attempt to separate anthropogenic and natural influences on climate phenomena.

There is no evidence in support of the “rapidly growing threat” asserted by EPA. Anthropogenic climate change is “real” — increasing GHG concentrations are having detectable effects — and incontrovertible, but that does not tell us the magnitude of the observable impacts, which must be measured empirically.

Temperatures are rising, but as the Little Ice Age ended no later than 1850, it is not easy to separate natural from anthropogenic effects on temperatures and other climate phenomena, as discussed below in section VII.<sup>36</sup> The latest research in the peer-reviewed literature suggests that mankind is responsible for about half of the approximate temperature increase of 1.1 degrees C since 1880.<sup>37</sup>

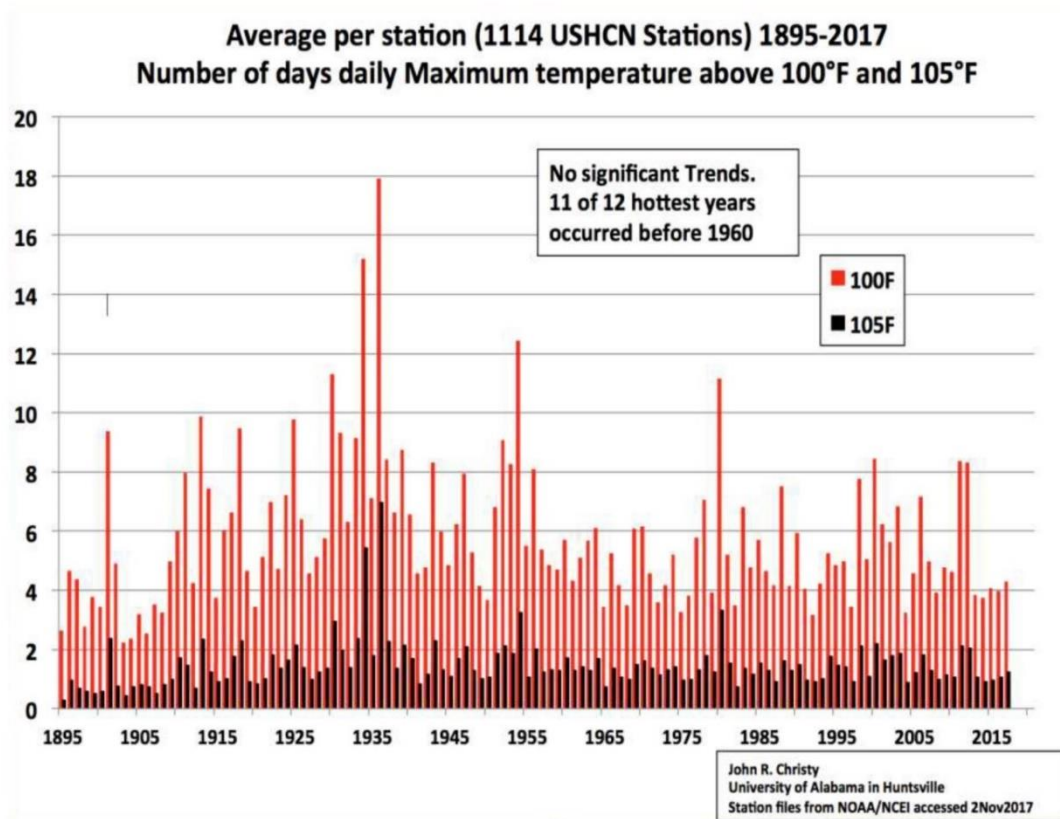
There is little trend in the number of “hot” days for 1895–2017; eleven of the 12 years with

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<sup>36</sup> On the Little Ice Age, see Michael E. Mann, “Little Ice Age,” in *Encyclopedia of Global Environmental Change, Volume 1: The Earth System: Physical and Chemical Dimensions of Global Environmental Change*, ed. Michael C. MacCracken, John S. Perry and Ted Munn (Chichester, England: John Wiley & Sons, 2002), [http://www.meteo.psu.edu/holocene/public\\_html/shared/articles/littleiceage.pdf](http://www.meteo.psu.edu/holocene/public_html/shared/articles/littleiceage.pdf).

<sup>37</sup> See, e.g., Nicholas Lewis, “Objectively Combining Climate Sensitivity Evidence,” *Climate Dynamics*, September 19, 2022, at <https://link.springer.com/article/10.1007/s00382-022-06468-x>; Ross McKittrick and John Christy, “A Test of the Tropical 200- to 300 hPa Warming Rate in Climate Models”; Nicholas Lewis and Judith Curry, “The Impact of Recent Forcing and Ocean Heat Uptake Data on Estimates of Climate Sensitivity,” *Journal of Climate* 31 (August 2018): 6051–71, <https://journals.ametsoc.org/doi/pdf/10.1175/JCLI-D-17-0667.1>; and John R. Christy and Richard McNider, “Satellite Bulk Tropospheric Temperatures as a Metric for Climate Sensitivity,” *Asia-Pacific Journal of Atmospheric Sciences* 53 (2017): 511–18, <https://link.springer.com/article/10.1007/s13143-017-0070-z>. For a chart summarizing the recent empirical estimates of equilibrium climate sensitivity as reported in the peer-reviewed literature, see Patrick J. Michaels and Paul C. Knappenberger, “The Collection of Evidence for a Low Climate Sensitivity Continues to Grow,” Cato Institute, September 25, 2014, <https://www.cato.org/blog/collection-evidence-low-climate-sensitivity-continues-grow>.

the highest number of such days occurred before 1960, as shown in the following chart.<sup>38</sup>



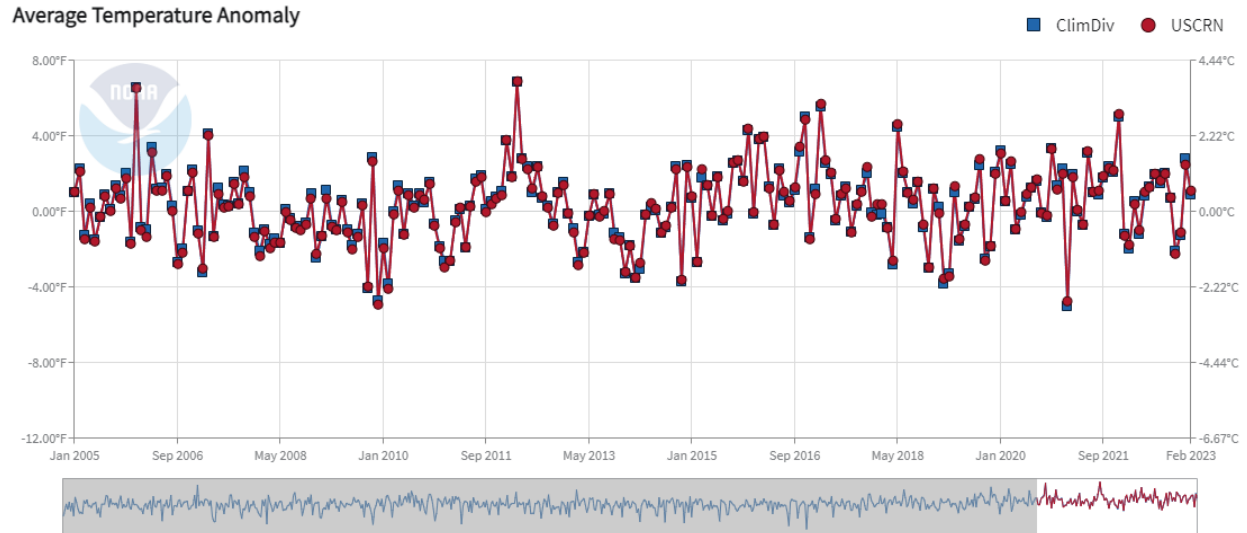
NOAA has maintained since 2005 the U.S. Climate Reference Network, comprising 114 meticulously maintained temperature stations spaced more or less uniformly across the lower 48 states, 21 stations in Alaska, and two stations in Hawaii.<sup>39</sup> They are placed to avoid heat island effects and other such distortions as much as possible; the reported data show no trend over the available 2005–2023 reporting period, as shown in the following chart.<sup>40</sup>

<sup>38</sup> For the reconstruction of the NASA data, see John R. Christy, “Average per Station (1114 USHCN Stations) 1895–2017: Number of Days Daily Maximum Temperature Above 100°F and 105°F,” [drroyspencer.com](http://www.drroyspencer.com/wp-content/uploads/US-extreme-high-temperatures-1895-2017.jpg), <http://www.drroyspencer.com/wp-content/uploads/US-extreme-high-temperatures-1895-2017.jpg>.

<sup>39</sup> For the Climate Reference Network program description, see National Centers for Environmental Information, “U.S. Climate Reference Network,” <https://www.ncdc.noaa.gov/crn/>.

<sup>40</sup> For a visualization of a prototypical station, see Willis Eschenbach, “NOAA’s USCRN Revisited—No Significant Warming in the USA in 12 Years,” *Watts Up with That?*, November 8, 2017, <https://wattsupwiththat.com/2017/11/08/the-uscrn-revisited/>. For the monthly data and charts reported by the National Oceanic and Atmospheric Administration (NOAA), see National Oceanic and Atmospheric Administration, “National Temperature Index,” [https://www.ncdc.noaa.gov/temp-and-precip/national-temperature-index/time-series?datasets%5B%5D=uscrn&parameter=anom-tavg&time\\_scale=p12&begyear=2005&endyear=2020&month=8](https://www.ncdc.noaa.gov/temp-and-precip/national-temperature-index/time-series?datasets%5B%5D=uscrn&parameter=anom-tavg&time_scale=p12&begyear=2005&endyear=2020&month=8), and the monthly data at <https://www.ncei.noaa.gov/access/monitoring/national-temperature-index/time-series/anom-tavg/1/0>.





Koonin notes for the U.S. as follows for 1900 through 2019:

... the average coldest temperature of the year has clearly increased since 1900, while the average warmest temperature has hardly changed over the last sixty years and is about the same today as it was in 1900.<sup>41</sup>

A NOAA reconstruction of global temperatures over the past one million years, using data from ice sheet formations, shows that there is nothing unusual about the current warm period.<sup>42</sup>

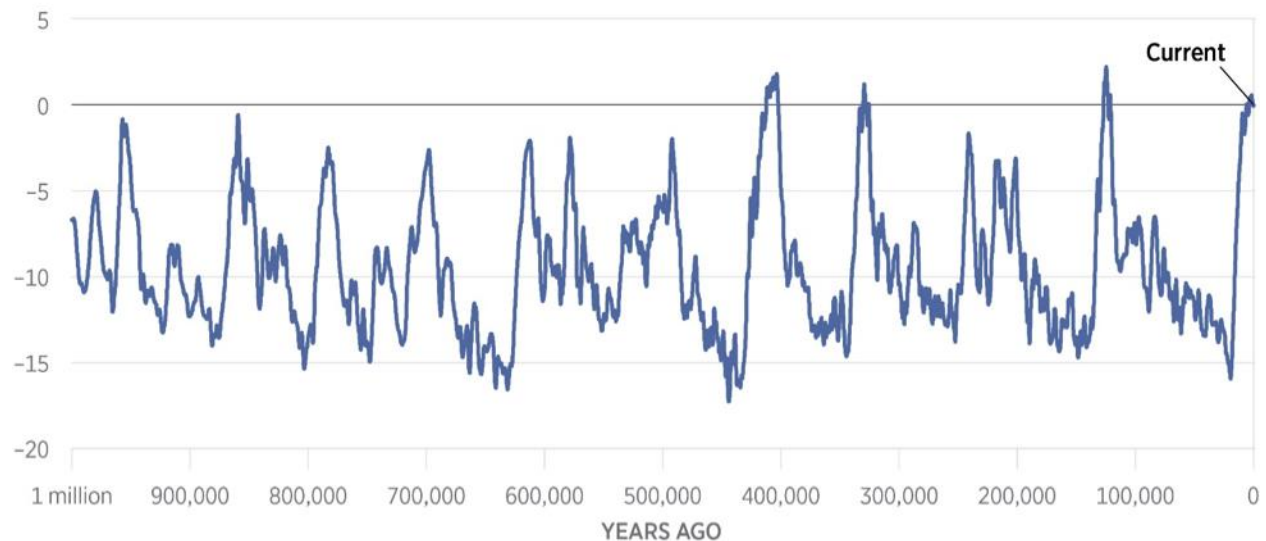
<sup>41</sup> See Steven E. Koonin, *Unsettled: What Climate Science Tells Us, What It Doesn't, and Why It Matters*, Dallas: BenBella Books, 2021, at p. 102.

<sup>42</sup> See <https://www.instituteforenergyresearch.org/wp-content/uploads/2020/03/temperature-fluctuations.png>, from R. Bintanja and R. S. W. van de Wal, "North American Ice-Sheet Dynamics and the Onset of 100,000-Year Glacial Cycles," *Nature* 454, no. 7206 (August 14, 2008): 869–72, [https://www.researchgate.net/publication/23171740\\_Bintanja\\_R\\_van\\_de\\_Wal\\_R\\_S\\_W\\_North\\_American\\_ice-sheet\\_dynamics\\_and\\_the\\_onset\\_of\\_100000-year\\_glacial\\_cycles\\_Nature\\_454\\_869-872](https://www.researchgate.net/publication/23171740_Bintanja_R_van_de_Wal_R_S_W_North_American_ice-sheet_dynamics_and_the_onset_of_100000-year_glacial_cycles_Nature_454_869-872). NOAA published the underlying data at R. Bintanja and R. S. W. van de Wal, "Global 3Ma Temperature, Sea Level, and Ice Volume Reconstructions," National Oceanic and Atmospheric Administration, August 14, 2008, <https://www.ncdc.noaa.gov/paleo-search/study/11933>.



## Temperature Fluctuations Over the Past Million Years

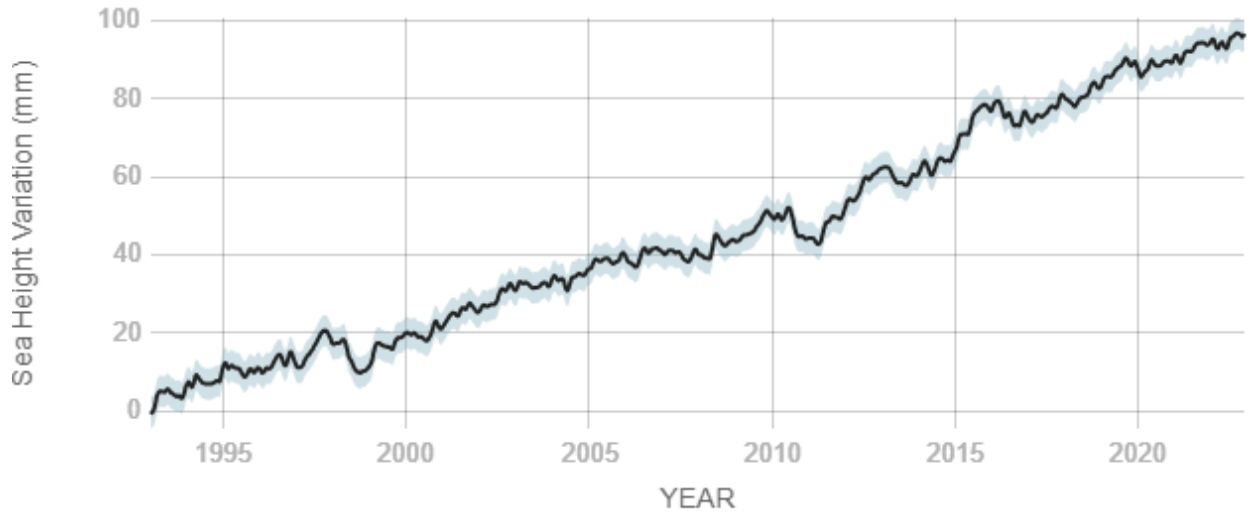
AVERAGE TEMPERATURE RELATIVE TO TODAY IN DEGREES CELSIUS, 45°N TO 80°N LATITUDE



**SOURCE:** R. Bintanja and R.S.W. van de Wal, "Global 3Ma Temperature, Sea Level, and Ice Volume Reconstructions." National Oceanic and Atmospheric Administration, August 14, 2008, <https://www.ncdc.noaa.gov/paleo/study/11933> (accessed April 5, 2016).

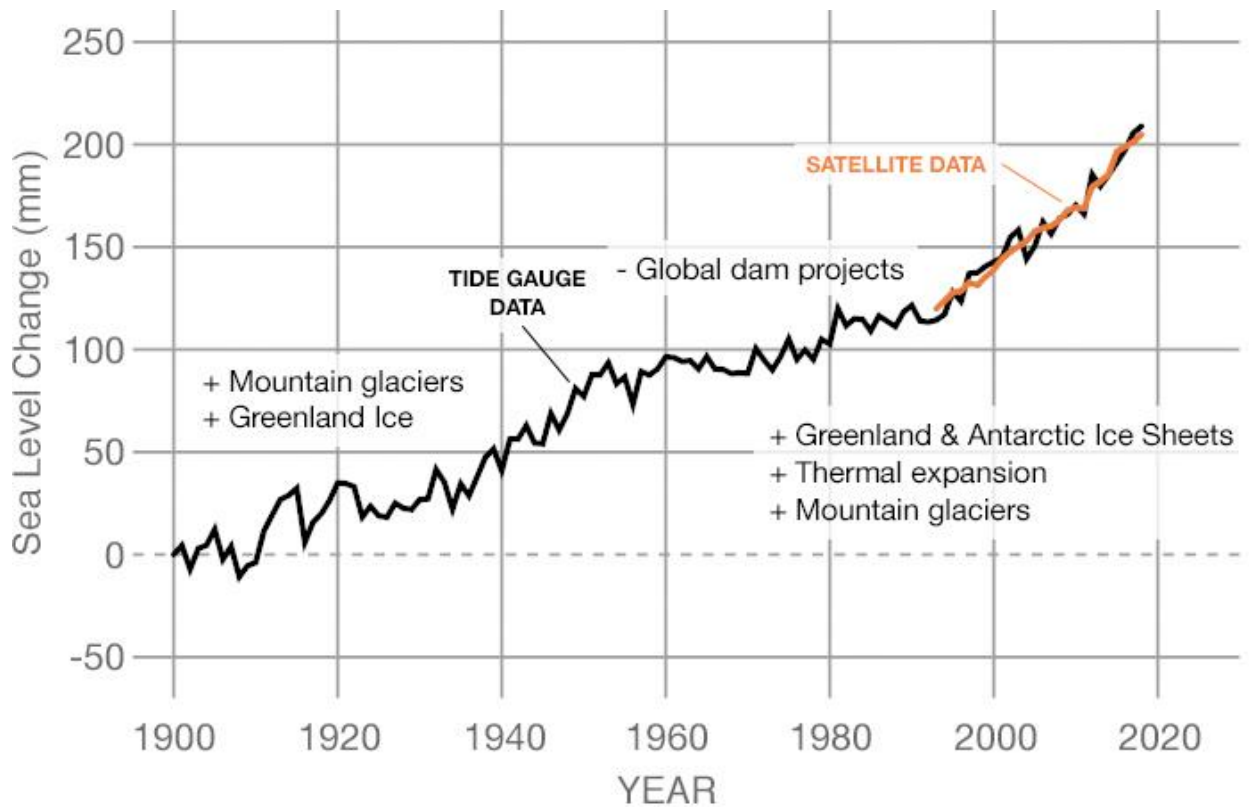
Global mean sea level has been increasing at about 3.3 mm per year since satellite measurements began in 1993, as shown in the following chart from NASA.<sup>43</sup> That ongoing sea level rise would be about 13 inches over the course of a century, an outcome very unlikely to prove a "crisis," in particular given the time available for adaptation.

<sup>43</sup> NASA reports 96.7 millimeters of sea level rise for the period 1993-2022. See the NASA data at <https://climate.nasa.gov/vital-signs/sea-level/>.



Source: climate.nasa.gov

The tidal-gauge data before the altimeter era show annual increases of about 1.8 mm per year, as shown in the following chart.<sup>44</sup>



<sup>44</sup> *Ibid.*

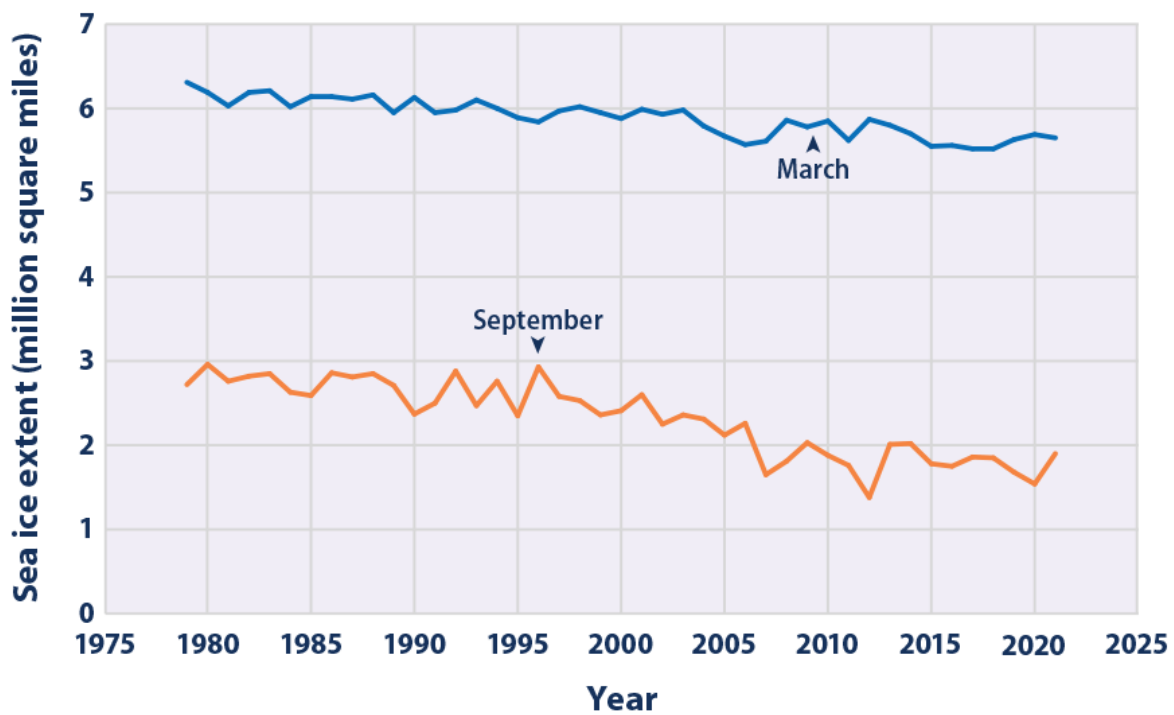
The two datasets are not directly comparable in that the tidal gauges do not measure sea levels *per se*; they measure the difference between sea levels and “fixed” points on land that in reality might not be fixed due to seismic activity, tectonic shifts, land settlement, precipitation, and other parameters. Accordingly, the data are unclear as to whether there is occurring an acceleration in sea level rise. It is reasonable to hypothesize that there has been such an acceleration simply because temperatures are rising due to both natural and anthropogenic influences, and such increases should result in more melting ice and the thermal expansion of seawater. But because rising temperatures are the result of both natural and anthropogenic causes, as discussed in section VII, we do not know the relative contributions of those causes to any such acceleration.<sup>45</sup>

The inconsistency of the northern and southern hemisphere sea ice changes add to the analytic complexity of anthropogenic climate change. The arctic sea ice has been declining, as shown in the following two charts.<sup>46</sup> For the second chart, however, note that the small number of years shown prevents a reliable derivation of inferences.

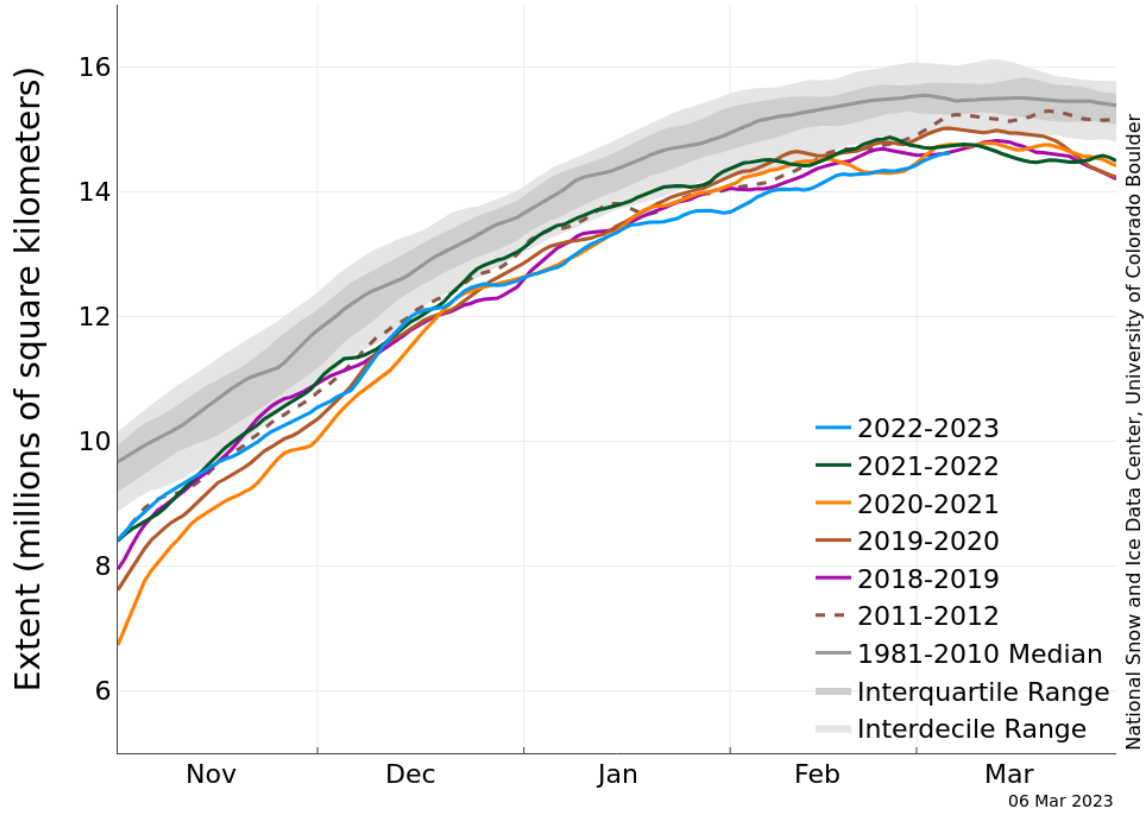
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<sup>45</sup> See Frederikse *et al.* at <https://www.nature.com/articles/s41586-020-2591-3>. As a crude approximation, the data suggest that about two-thirds of such sea level increases are due to ice melt, and one-third to thermal expansion of seawater. See Judith Curry, “Sea Level and Climate Change,” Climate Forecast Applications Network, November 25, 2018, <https://curryja.files.wordpress.com/2018/11/special-report-sea-level-rise3.pdf>. Curry cites research from Xianyao Chen and colleagues, the central finding of which is that “global mean sea level rise increased from  $2.2 \pm 0.3$  mm/year in 1993 to  $3.3 \pm 0.3$  mm/year in 2014.” See Xianyao Chen *et al.*, “The Increasing Rate of Global Mean Sea-Level Rise During 1993–2014,” *Nature Climate Change* 7 (June 26, 2017): 492–95, <https://www.nature.com/articles/nclimate3325>. Whether the trend from a 21-year period can yield important inferences is a premise problematic at a minimum. For a different empirical conclusion from the tidal gauge record, see J. R. Houston and R. G. Green, “Sea-Level Acceleration Based on U.S. Tide Gauges and Extensions of Previous Global-Gauge Analyses,” *Journal of Coastal Research* 27, no. 3 (May 2011): 409–17, <https://meridian.allenpress.com/jcr/article-abstract/27/3/409/28456/Sea-Level-Acceleration-Based-on-U-S-Tide-Gauges?redirectedFrom=fulltext>. For an example of temporary rapid sea-level rise in the 18th century, see W. R. Gehrels *et al.*, “A Preindustrial Sea-Level Rise Hotspot Along the Atlantic Coast of North America,” *Geophysical Research Letters* 47 (2020), <https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2019GL085814>. For further reported evidence of an acceleration, see Hans-Otto Pörtner *et al.*, *Special Report on the Ocean and Cryosphere in a Changing Climate*, Intergovernmental Panel on Climate Change, 2019, <https://www.ipcc.ch/srocc/>.

<sup>46</sup> See, respectively, <https://www.epa.gov/climate-indicators/climate-change-indicators-arctic-sea-ice> and <https://nsidc.org/arcticseaicenews/>.

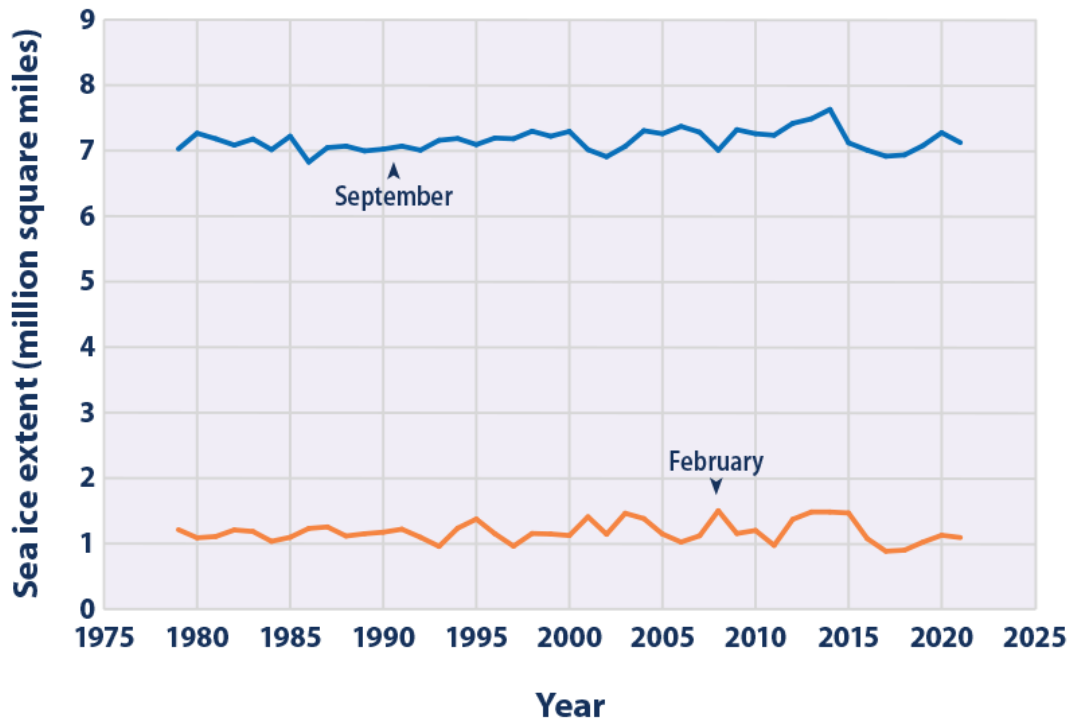


### Arctic Sea Ice Extent (Area of ocean with at least 15% sea ice)



There is no long-term trend in the Antarctic sea ice extent, as shown in the following chart from the EPA.<sup>47</sup>

<sup>47</sup> See <https://www.epa.gov/climate-indicators/climate-change-indicators-antarctic-sea-ice#ref5>.

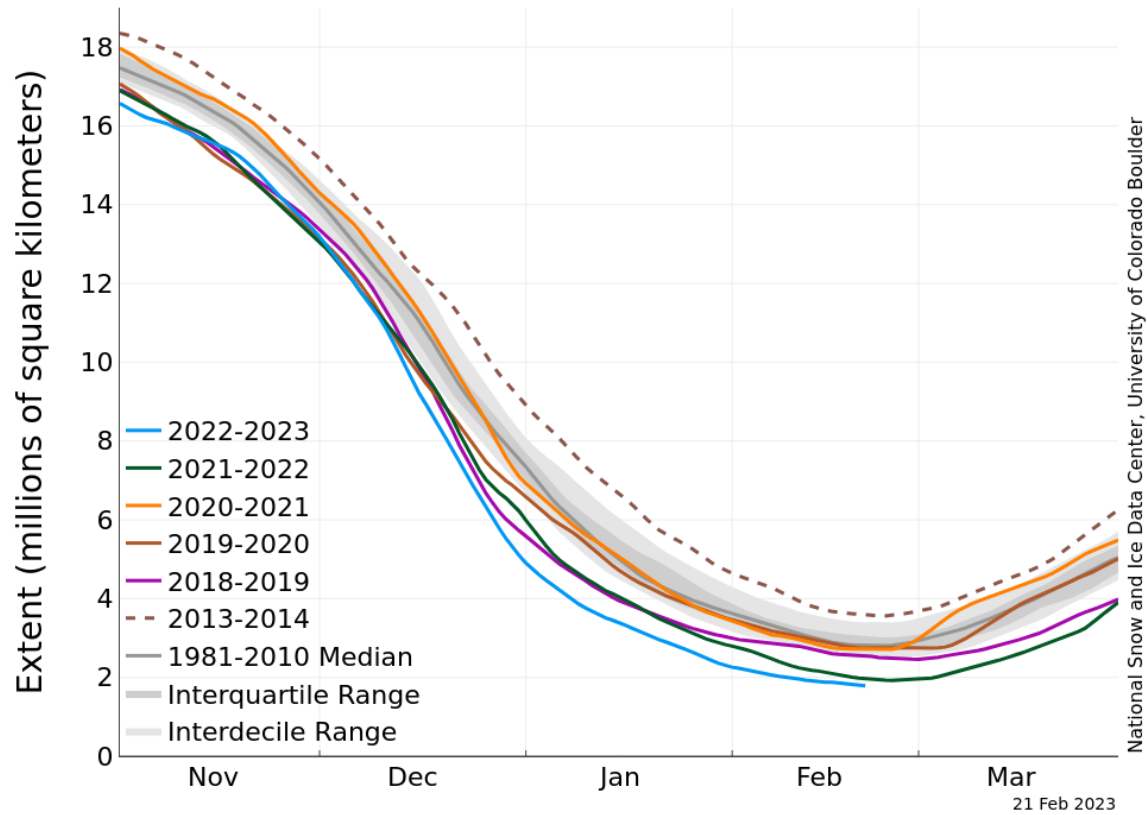


Even for the more recent years, the Antarctic sea ice appears to be stable as a matter of statistical significance, but, as noted above, it is inappropriate to derive inferences from a small number of year-to-year variations.<sup>48</sup>

<sup>48</sup> See <https://nsidc.org/arcticseaicenews/2023/02/antarctic-sea-ice-minimum-settles-on-record-low-extent-again/>, [https://www.thegwpf.org/content/uploads/2021/12/Bates-Sea-Ice-Trends.pdf?mc\\_cid=dac7df538b&mc\\_eid=ad653edd6d](https://www.thegwpf.org/content/uploads/2021/12/Bates-Sea-Ice-Trends.pdf?mc_cid=dac7df538b&mc_eid=ad653edd6d); and [https://www.thegwpf.org/content/uploads/2022/04/Humlum-State-of-Climate-2021-.pdf?mc\\_cid=dac7df538b&mc\\_eid=ad653edd6d](https://www.thegwpf.org/content/uploads/2022/04/Humlum-State-of-Climate-2021-.pdf?mc_cid=dac7df538b&mc_eid=ad653edd6d). See also Patrick J. Michaels, “Spinning Global Sea Ice,” Cato Institute, February 12, 2015, <https://www.cato.org/blog/spinning-global-sea-ice>.

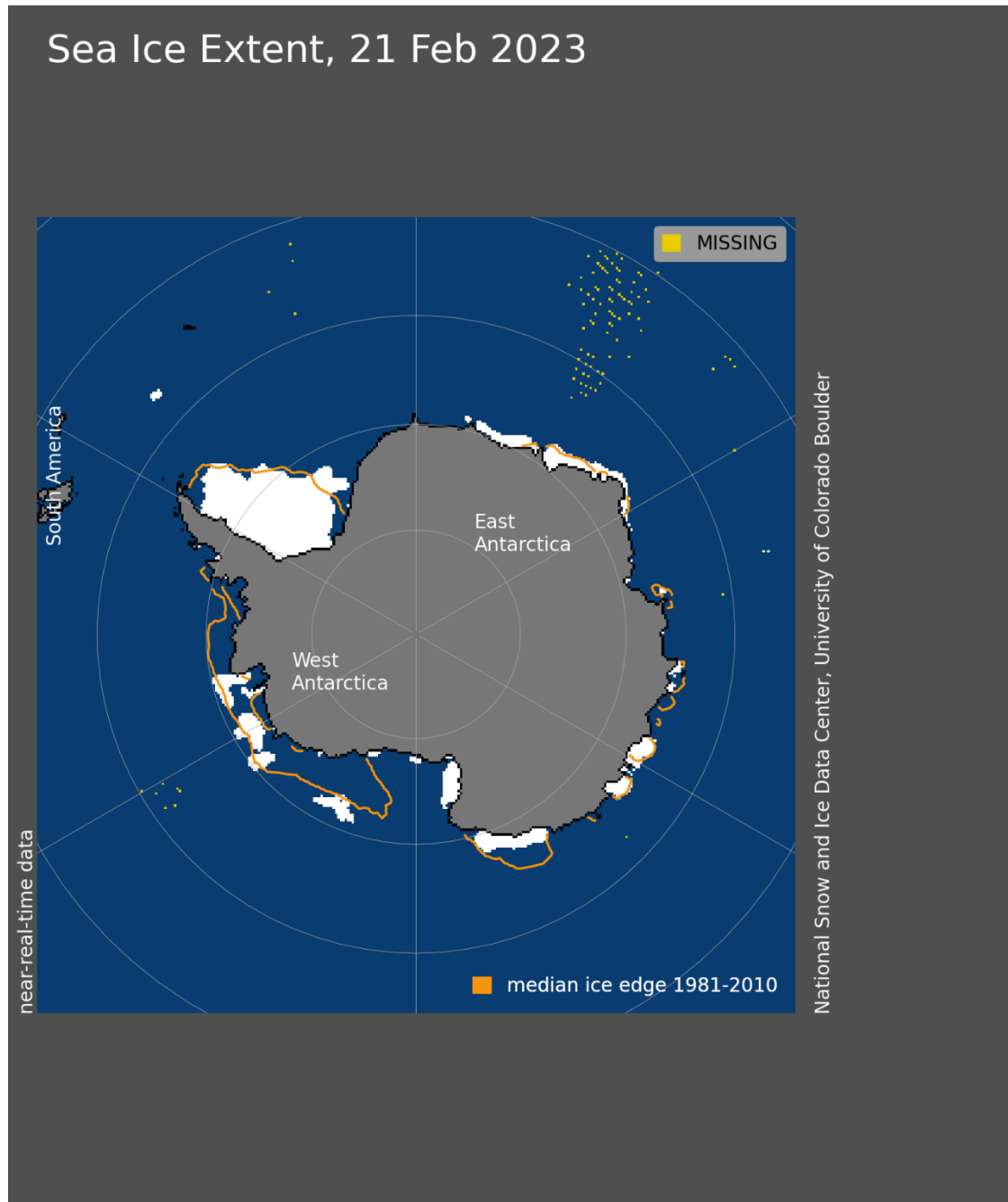


## Antarctic Sea Ice Extent (Area of ocean with at least 15% sea ice)



The data show that the Antarctic eastern ice sheet — about two-thirds of the continent — is growing, while the western ice sheet (and the peninsula) is shrinking, as shown in the following chart from the National Snow & Ice Data Center.<sup>49</sup> No agreed explanation for this phenomenon is reported in the literature.

<sup>49</sup> See <https://nsidc.org/arcticseaicenews/2023/02/antarctic-sea-ice-minimum-settles-on-record-low-extent-again/>. On the eastern ice sheet, see <https://www.nature.com/articles/s41561-022-00938-x>. On the western ice sheet, see <http://nsidc.org/greenland-today/>. See also <https://nsidc.org/arcticseaicenews/2023/02/antarctic-sea-ice-minimum-settles-on-record-low-extent-again/>.



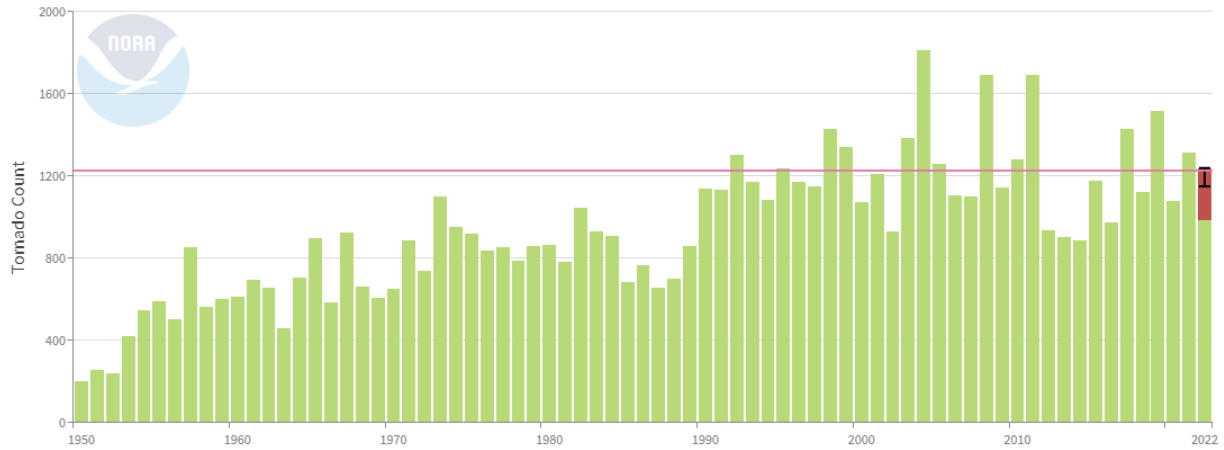
U.S. tornado activity for all EF (“Enhanced Fujita” scale) classes shows an upward trend since 1950, but, again, the issue of anthropogenic versus natural origins is unresolved.<sup>50</sup> The data for the period 1954 through 2014 for EF-3+ tornadoes show no trend or a downward trend. These trends are shown in the following two charts.<sup>51</sup>

<sup>50</sup> See <https://www.climate.gov/maps-data/dataset/monthly-and-annual-numbers-tornadoes-graphs-and-maps>.

<sup>51</sup> See NOAA, “Historical Records and Trends,” at <https://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornado-climatology/trends>; and <https://climateataglance.com/climate-at-a-glance-tornadoes/>. Note that the

### U.S. Tornadoes

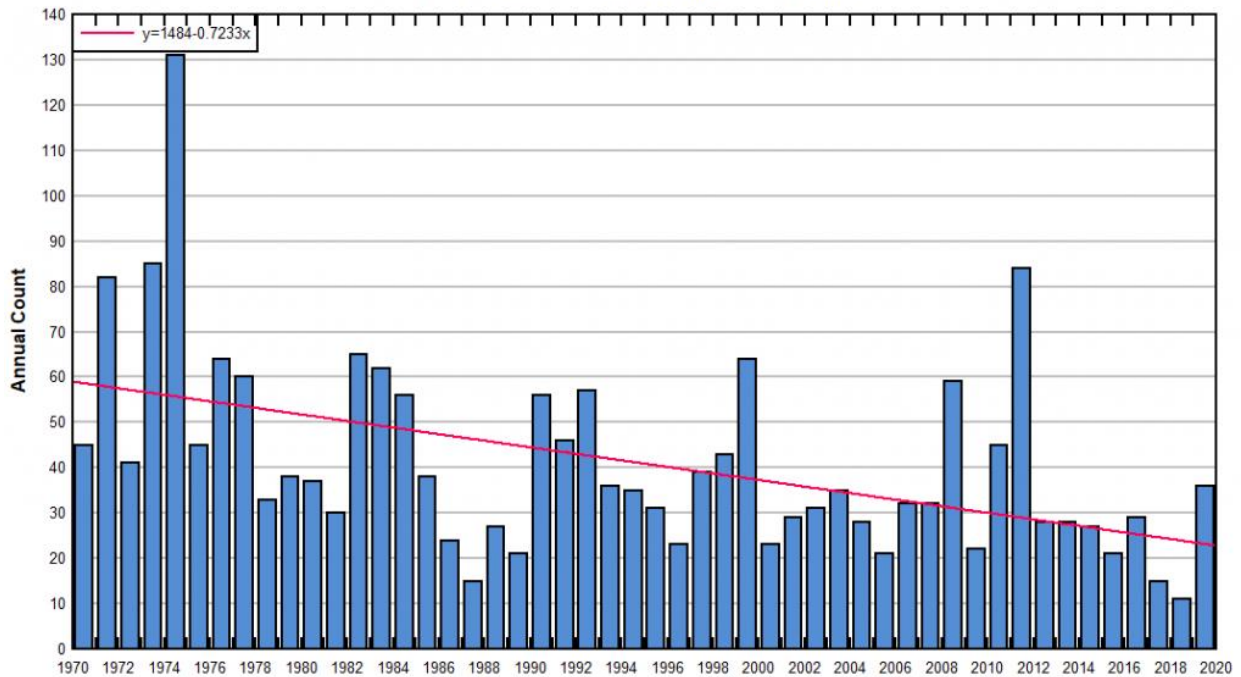
January-December



Source: Storm Prediction Center (SPC)

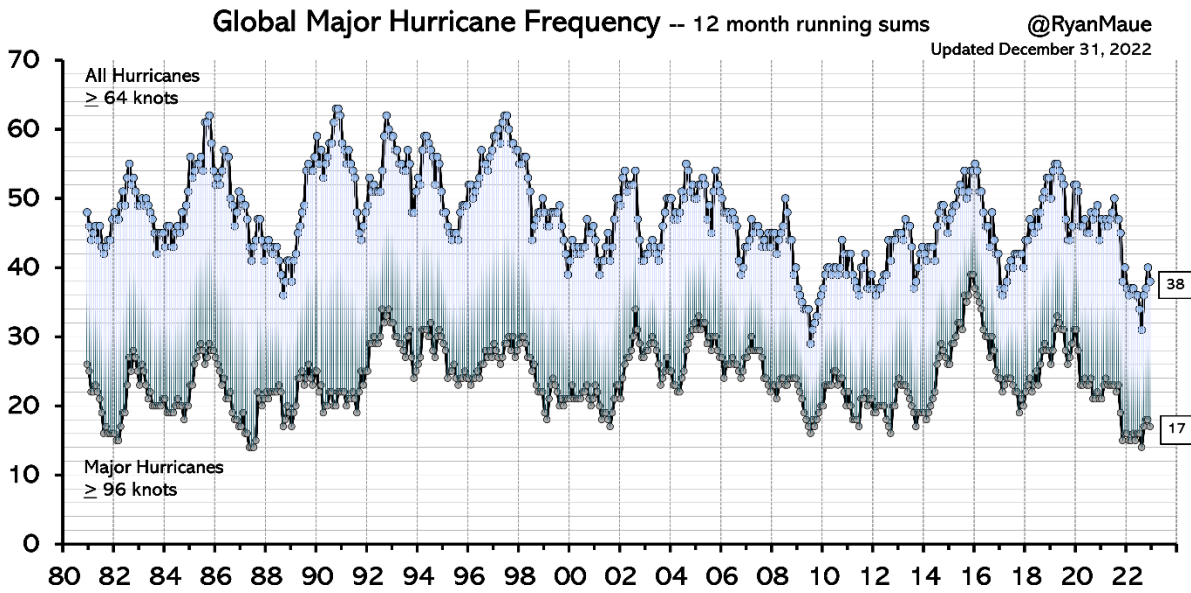
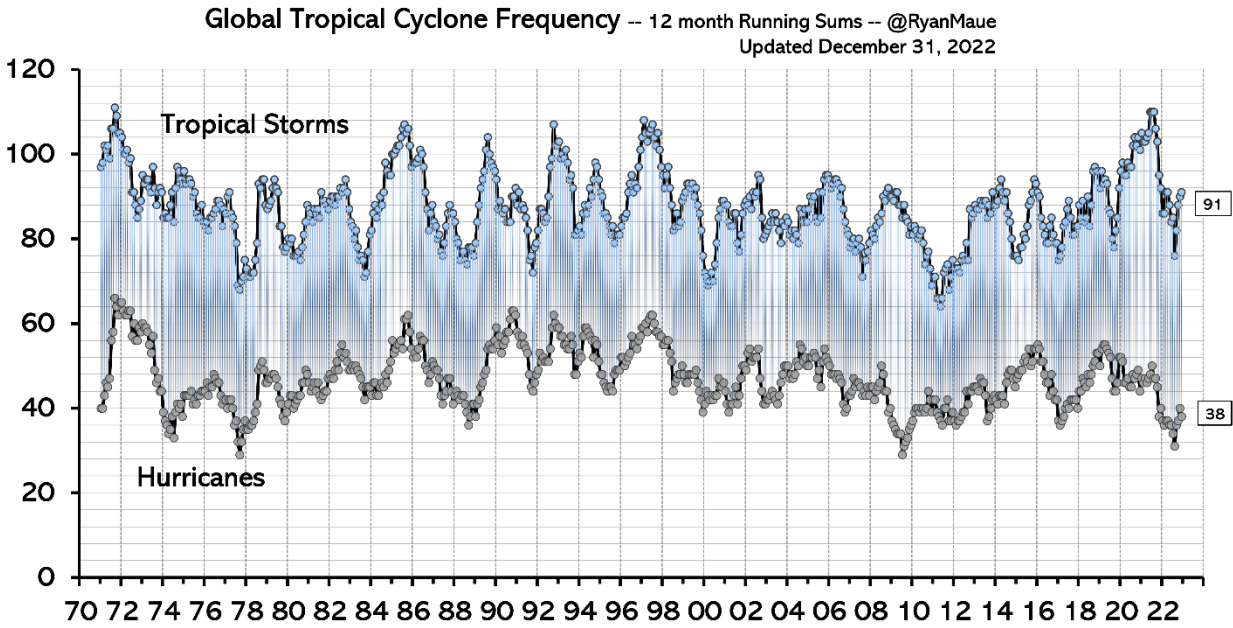
### U.S. Annual Count of Strong to Violent Tornadoes (F3+) 1954-2020

Data Source: NOAA/NWS Storm Prediction Center

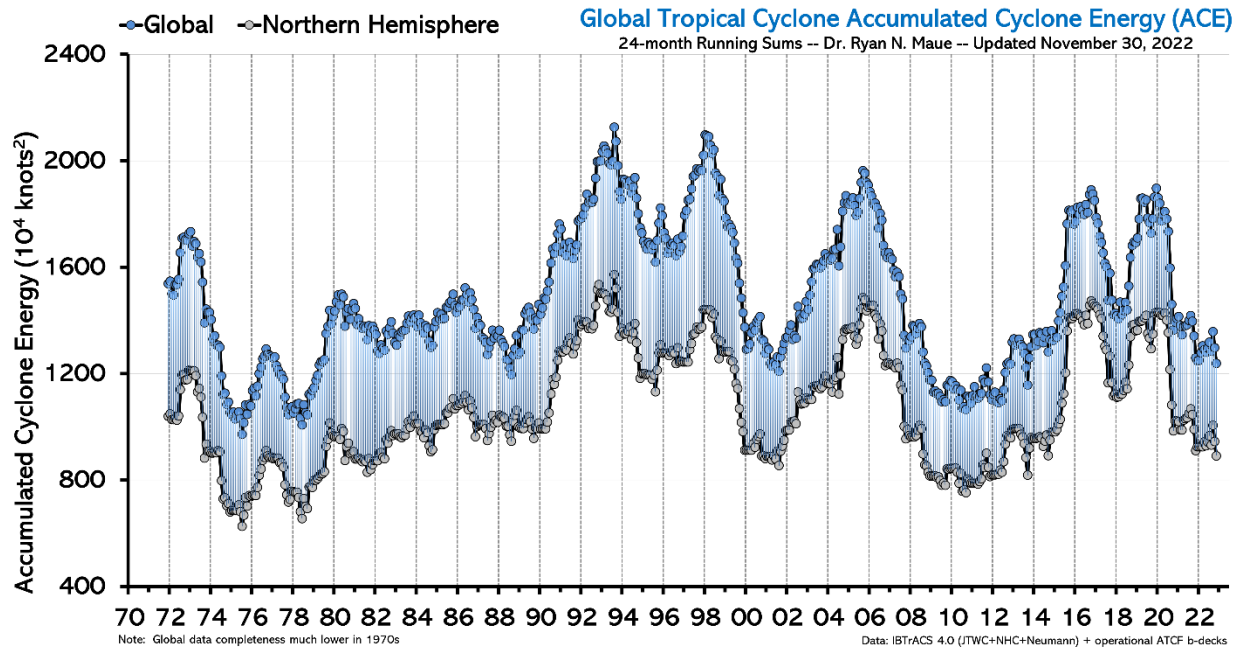


latter chart shows a heading of “1954-2020,” but the bar chart begins in 1970. This discrepancy is unlikely to change the overall inference.

Tropical cyclones and accumulated cyclone energy show little trend since satellite measurements began in the early 1970s.<sup>52</sup>



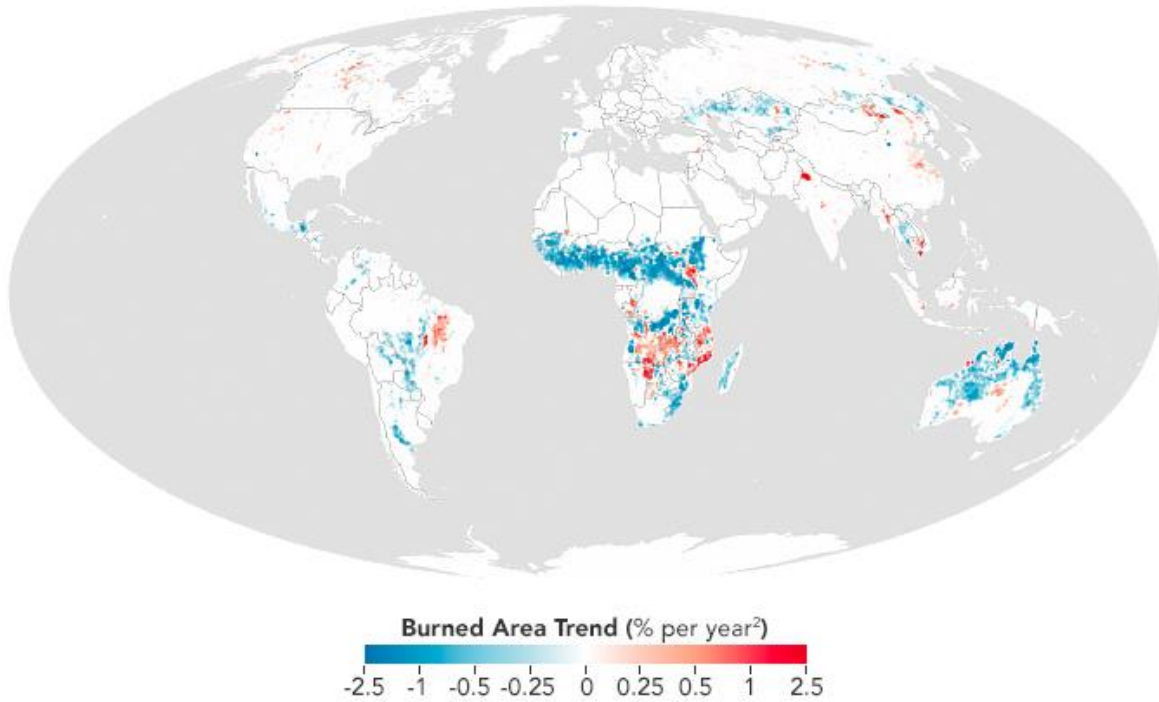
<sup>52</sup> For data on global tropical cyclone activity, see Ryan N. Maue, “Global Tropical Cyclone Activity, updated December 31, 2022, at <http://climatlas.com/tropical/>.



The number of U.S. wildfires shows no trend since 1985.<sup>53</sup> Global acreage burned declined sharply for 1998-2015, and by about 18 percent for the period 2003-2015 as reported by NASA, shown in the following figure.<sup>54</sup>

<sup>53</sup> For the reported U.S. wildfire data, see the EPA at <https://www.epa.gov/climate-indicators/climate-change-indicators-wildfires> and the National Interagency Fire Center, “Total Wildland Fires and Acres (1926–2019),” [https://www.nifc.gov/fireInfo/fireInfo\\_stats\\_totalFires.html](https://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html). Note that the recent U.S. wildfire phenomenon has been observed in government forests to a degree vastly disproportionate relative to private forests. See [http://nwmapsco.com/ZybachB/Articles/Magazines/Oregon\\_Fish\\_&\\_Wildlife\\_Journal/20220401\\_Global\\_Warming/Zybach\\_20220401.pdf](http://nwmapsco.com/ZybachB/Articles/Magazines/Oregon_Fish_&_Wildlife_Journal/20220401_Global_Warming/Zybach_20220401.pdf).

<sup>54</sup> On the decline in global area burned over past decades, see NASA at <https://earthobservatory.nasa.gov/images/90493/researchers-detect-a-global-drop-in-fires>; and Stefan H. Doerr and Cristina Santin, “Global Trends in Wildfire and Its Impacts: Perceptions Versus Realities in a Changing World,” *Philosophical Transactions of the Royal Society of London, Series B, Biological Sciences* 371, no. 1696 (2016), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4874420/pdf/rstb20150345.pdf>.



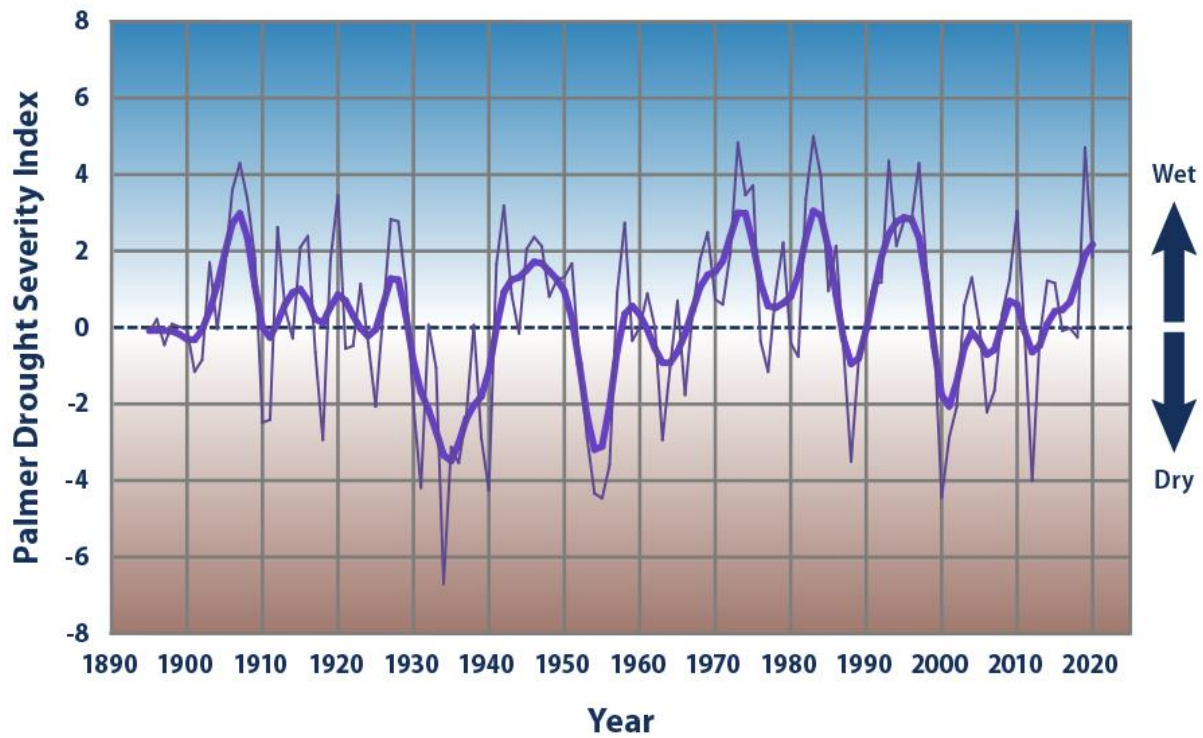
The Palmer Drought Severity index shows no trend since 1895, as shown in the following chart.<sup>55</sup> Vicente-Serrano, *et. al.* report that “Meteorological droughts do not show any substantial changes at the global scale in at least the last 120 years.”<sup>56</sup>

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<sup>55</sup> See US Environmental Protection Agency, “Climate Change Indicators: Drought,” <https://www.epa.gov/climate-indicators/climate-change-indicators-drought>; and US Department of Commerce, National Climatic Data Center, “Divisional Data Select,” <https://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp>.

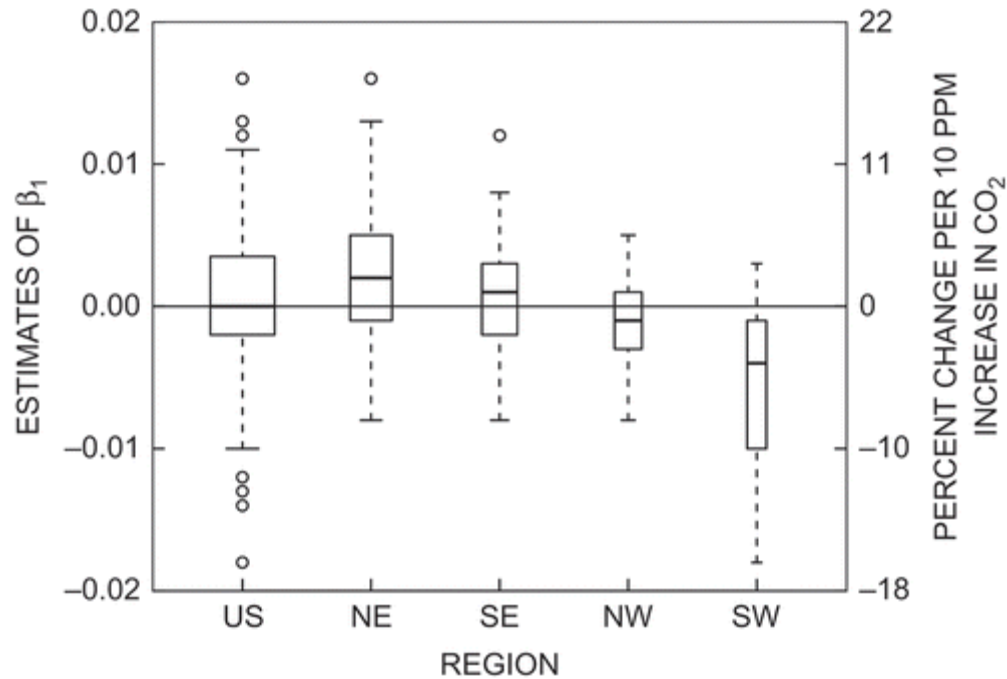
<sup>56</sup> See Sergio M. Vicente-Serrano, *et. al.*, “Global Drought Trends and Future Projections,” *Philosophical Transactions of the Royal Society*, October 2022, at [https://www.researchgate.net/publication/364672519\\_Global\\_drought\\_trends\\_and\\_future\\_projections](https://www.researchgate.net/publication/364672519_Global_drought_trends_and_future_projections).





U.S. flooding over the past century is uncorrelated with increasing GHG concentrations.<sup>57</sup>

<sup>57</sup> See R. M. Hirsch and K. R. Ryberg, "Has the Magnitude of Floods Across the USA Changed with Global CO<sub>2</sub> Levels?," *Hydrological Sciences Journal* 57, no. 1 (2012): 1–9, <https://www.tandfonline.com/doi/full/10.1080/02626667.2011.621895?scroll=top&needAccess=true&>.



The IPCC in the AR6 reports that “The SREX (Seneviratne et al., 2012) assessed low confidence for observed changes in the magnitude or frequency of floods at the global scale. This assessment was confirmed by AR5 (Hartmann et al., 2013).”<sup>58</sup>

The available data do not support the ubiquitous assertions about the dire impacts of declining pH levels in the oceans.<sup>59</sup> Goklany reports as follows.<sup>60</sup>

There is no likelihood of the ocean’s average pH getting anywhere near as low as 7 (neutral) because of elevated carbon dioxide concentrations during the next three centuries. Ocean pH currently averages about 8 and is forecast to fall by 0.2 pH units or so during the present century. This change is considerably smaller than the difference in pH between different parts of the ocean, different days in the same part of the ocean, and even different times of day in coral reef lagoons. An examination of upper-ocean pH for a wide variety of ecosystems ranging from polar to tropical, open-ocean to coastal, kelp forest to coral reefs, indicates that variations in month-long pH spanned a range of 0.024–1.430 pH units, and found that many organisms ‘are already experiencing pH regimes that are not predicted until 2100.

The IPCC in the *Fifth Assessment Report* was deeply dubious about the various severe

<sup>58</sup> See [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_Chapter11.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter11.pdf) at p. 1568.

<sup>59</sup> For a summary discussion, see <https://www.mattridley.co.uk/blog/thousands-of-results-on-ocean-acidification/>. A comprehensive database is at CO<sub>2</sub> Science, “Ocean Acidification Database,” <http://www.co2science.org/data/acidification/results.php>. See also Alan Longhurst, *Doubt and Certainty in Climate Science*, pp. 214–25, <https://curryja.files.wordpress.com/2015/09/longhurst-print.pdf>.

<sup>60</sup> See <https://www.thegwpf.org/content/uploads/2015/10/benefits1.pdf> at p. 16.

effects often asserted to be looming as impacts of anthropogenic warming; an example is a collapse of the Antarctic western and Greenland ice sheets. The IPCC analysis in the *Sixth Assessment Report* is almost identical.<sup>61</sup>

## V. Conclusions

The benefit/cost analysis published by EPA in support of its proposed rule is fatally flawed; accordingly, the proposed rule should not be finalized.

EPA claims that the fuel savings attendant upon implementation of the proposed rule would yield benefits in present value terms of \$380-\$770 billion (net of EVSE port costs), depending on the choice of discount rate. But fuel savings are an illegitimate dimension of any such benefit/cost analysis because the value of fuel savings measured as a function of market prices represents no divergence *per se* between market prices and true resource costs in standard externality analysis. If “fuel savings” are to be considered relevant for purposes of benefit/cost analysis, then the adverse effects or costs of a (forced) reduction in fuel consumption in terms of the quality of transportation services must be included in the analysis also.

Were a regulatory rule simply to outlaw entirely the use of motor fuels by cars and light trucks, forcing consumers massively to use bicycles, horse-drawn carts, and similar substitutes technologically backward, the “fuel savings” under the EPA methodology would be enormous, but nowhere in the EPA methodology is there any cost in terms of the quality of transportation services. Does EPA believe that consumers of motorized transportation services powered with conventional fuel simply are stupid? This EPA analytic framework is not to be taken seriously.

The same is true for the asserted “climate benefits” of the proposed rule, which under the explicit EPA assumptions and estimates as published, would be about 0.023°C by 2100, using the EPA climate model under assumptions that exaggerate the effects of reduced emissions of greenhouse gases. That effect would not be detectable. Accordingly, the monetized climate benefits of the proposed rule asserted by EPA are an illusion.

EPA attempts to circumvent this obvious problem by substituting in place of any such analysis an application of the “social cost of carbon” to the asserted reductions in GHG emissions attendant upon implementation of the proposed rule, as estimated on an interim basis by the Biden Administration Interagency Working Group. The interim IWG estimates are deeply flawed, in that they (1) distort the actual economic growth predictions produced by the integrated assessment models, (2) base predictions of future climate phenomena on climate models that cannot predict the past or the present, (3) incorporate “co-benefits” in the form of a reduction in the emissions of other criteria and hazardous air pollutants already regulated under different provisions of the Clean Air Act, (4) incorporate the asserted benefits of GHG reductions on a global basis, and (5) employ discount rates that are inconsistent and inappropriate.

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<sup>61</sup> For the AR5, see Julie M. Arblaster et al., “Long-Term Climate Change: Projections, Commitments and Irreversibility—Final Draft Underlying Scientific-Technical Assessment,” in *Working Group I Contribution to the IPCC Fifth Assessment Report (AR5), Climate Change 2013: The Physical Science Basis*, September 23–26, 2013, p. 12–78, at [http://www.climatechange2013.org/images/uploads/WGIAR5\\_WGI-12Doc2b\\_FinalDraft\\_Chapter12.pdf](http://www.climatechange2013.org/images/uploads/WGIAR5_WGI-12Doc2b_FinalDraft_Chapter12.pdf). See the analogous analysis in the AR6 at p. 12-115 at [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_Full\\_Report.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf).

The asserted “energy security” benefits of the proposed rule are illusory. Because there can be only one world market price for such fungible commodities as crude oil, abstracting from such second-order differences as transportation costs, exchange rate impacts, and the like, nations that import all of their oil face the same prices and price changes as those importing none of their oil. Accordingly, the common view of “energy security” as a direct result of the level or proportion of imports is incorrect; but the EPA in effect endorses this view nonetheless. A U.S. that imports more oil is not less “energy secure” than a U.S. that imports less.

Similarly, a defense cost argument is not correct. The portion of the costs of the U.S. defense effort that can be attributed to defense of the sea lanes and the like is a hugely complex analytic calculation, dependent upon a large array of alternative assumptions about the allocation of the fixed costs of the physical and human force structures across military functions and missions. Because national security needs and force structures evolve only over decades, it is reasonable as a first approximation to assume that defense capital provides those multiple functions in more-or-less fixed proportions, which means that any allocation of those fixed costs across multiple functions is arbitrary.

EPA asserts that “there is consensus that the effects of climate change represent a rapidly growing threat to human health and the environment, and are caused by GHG emissions from human activity, including motor vehicle transportation.” This is not correct, even apart from the dubious premise that some sort of undefined “consensus” is a proper basis for policy formulation, and even apart from the failure of EPA even to attempt to separate anthropogenic and natural influences on climate phenomena.

There is no evidence of a climate “threat” or “crisis” as commonly asserted, in terms of temperature trends, polar sea ice, tornadoes, tropical cyclones, wildfires, drought, flooding, or ocean alkalinity. The Intergovernmental Panel on Climate Change is deeply dubious about the various severe effects often asserted as prospective impacts of increasing atmospheric concentrations of GHG. Moreover, NASA reports significant planetary greening as a result of increasing atmospheric concentrations of carbon dioxide, and data from the United Nations Food and Agriculture Organization show that global per capita food production increased 46 percent between 1961 and 2020, and 20 percent for 2000-2020.

The “crisis” narrative is derived wholly from climate models that cannot predict the actual temperature record. In particular, the suite of climate models underlying the IPCC 5<sup>th</sup> and 6<sup>th</sup> Assessment Reports overstate the mid-troposphere temperature record by factors of about 2.5. Moreover, the models are fine-tuned in such a way as to deny the importance of natural influences on climate phenomena, but that is inconsistent with a large body of evidence, in particular the substantial warming observed from 1910 to 1945, and the close correlation between the satellite temperature record and the El Niño/Southern Oscillation.

The analysis underlying the proposed rule is fatally flawed; it should not be finalized.