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Comment on the
5th National Climate Assessment 3d Order Draft

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**The 5th National Climate Assessment 3rd Order Draft is
Fatally Flawed Science Because it
Omits Contradictory Data,
Relies on Models that Do Not Work and
IPCC Government Opinions,
Omits the Extraordinary Social Benefits of
Fossil fuels and CO₂, and
Omits the Disastrous Consequences of Reducing
Fossil Fuels and CO₂ Emissions to “Net Zero”**

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I. SUMMARY

We (Happer and Lindzen) are career physicists who have specialized in radiation physics and dynamic heat transfer for decades. These are processes integral to atmospheric climate science.

Thank you for the opportunity to comment on the 5th National Climate Assessment 3rd Order Draft (NCA5) by 13 Federal agencies that comprise the U.S. Global Climate Research Program (USGCRP). Respectfully, in our scientific opinion, NCA5 is fatally flawed science for the following scientific reasons, separately and together:

- A. It omits data that contradicts its conclusions on extreme weather
- B. It relies on models that do not work, which are never relied on in science
- C. It relies on IPCC findings, which are government opinions, not science and are never relied on in science
- D. It omits the extraordinary social benefits of CO₂ and fossil fuels
- E. It omits the disastrous consequences of reducing fossil fuels and CO₂ emissions to “Net Zero”
- F. There is no risk of catastrophic global warming caused by fossil fuels and CO₂

As to the disastrous consequences of eliminating fossil fuels, it “is estimated that nitrogen fertilizer [derived from fossil fuels] now supports approximately half of the global population.”¹ As one of us (Happer) has made clear, without the “use of inorganic fertilizers” derived from fossil fuels, the world “will not achieve the food supply needed to support 8.5 to 10 billion people.”²

The recent experience in Sri Lanka provides a red alert. “The world has just witnessed the collapse of the once bountiful agricultural sector of Sri Lanka as a result of government restrictions on mineral fertilizer.”³ The government of Sri Lanka banned the use of fossil fuel-derived nitrogen fertilizers and pesticides, with disastrous consequences on food supply there. If similarly misguided decisions are made eliminating fossil fuels and thus nitrogen fertilizer, there will be a starvation crisis worldwide.

It is critical to repeat. Eliminating fossil fuel-derived nitrogen fertilizer will create a worldwide starvation crisis. And scientifically there is no risk of catastrophic global warming caused by fossil fuels and CO₂. (See parts III.E&F for details).

Scientific details follow.

¹ Ritchie, “How Many People Does Synthetic Fertilizer Feed?,” Our World in Data (November 7, 2017), [How many people does synthetic fertilizer feed? - Our World in Data](#).

² Happer *et al.*, “Nitrous Oxide and Climate,” CO₂ Coalition (November 10, 2022), p. 39 (emphasis added), link [Nitrous Oxide and Climate - CO₂ Coalition](#)

³ Happer, *supra*. Id.

II. RELIABLE SCIENTIFIC THEORIES ARE DETERMINED BY SCIENTIFIC METHOD, VALIDATING THEORETICAL PREDICTIONS WITH OBSERVATIONS, NOT BY MODELS THAT DO NOT WORK, GOVERNMENT OPINION, CONSENSUS, PEER REVIEW, OMITTING CONTRADICTIONARY DATA OR FABRICATING DATA

Reliable scientific knowledge is determined by scientific method, where theoretical predictions are validated by observations or rejected. Agreement with observations is the measure of scientific truth. Scientific progress proceeds by the interplay of theory and observation. Theory explains observations and makes predictions of what will be observed in the future. Observations anchor understanding and weed out the theories that don't work. This has been the scientific method for more than three hundred years.

Prof. Richard Feynman, a Nobel Laureate in Physics, incisively explained scientific method:

“[W]e compare the result of [a theory's] computation to nature, ... compare it directly with observations, to see if it works. If it disagrees with experiment it is wrong. In that simple statement is the key to science.” *The Character of Physical Law* (1965), p. 150.

Thus, scientific method is very simple and very profound: Does the theory work with observations? If not, it is rejected and not used.

However, scientific knowledge is not determined by:

Fabricated and Omitted Contradictory Data. Since theories are tested with observations, fabricating and omitting contradictory facts to make a theory work is an egregious violation of scientific method.

Richard Feynman stated this fundamental principal of scientific method:

“If you're doing an experiment, you should report everything that you think might make it invalid – not only what you think is right about it... Details that could throw doubt on your interpretation must be given, if you know them.” 1974 Caltech commencement address, *Surely You're Joking, Mr. Feynman!* (1985), p. 311-12

In our experience and as exemplified below, one of us (Lindzen) frankly explained: “Misrepresentation, exaggeration, cherry picking, or outright lying pretty much covers all the so-called evidence” marshalled in support of the theory of imminent catastrophic global warming caused by fossil fuels and of the urgent need to achieve “net zero” fossil fuel and other human CO₂ emissions by 2050.⁴

Models That Do Not Work. Models are a type of theory; they predict physical observations. Scientific method requires models be tested by observations to see if they work. If a model's prediction disagrees with observations of what it purports to predict, it is wrong and never used as science.

It is astounding that one of the most complex questions in physics (namely, the behavior of a multi-phase, radiatively active, turbulent fluid) should be labeled by the government — and funding agencies it controls — to be so settled that skeptics are told to be silent. That models supporting the climate-crisis narrative fail to describe observations of the phenomena they are supposedly designed to predict confirms that the puzzle remains unsolved. Making this peculiar situation particularly dangerous are world leaders who have abandoned the science and

⁴ Lindzen, "Global Warming for the Two Cultures," Global Warming Policy Foundation (2018), p. 10. Accord Lindzen, "The Absurdity of the Conventional Global Warming Narrative (April 20, 2022) & "Straight Talk About Climate Change," Acad. Quest (2017), p. 419.

intellectual rigor bequeathed to us by the Enlightenment and its forebears.

Government Opinion. Nobel physicist Richard Feynman put it unambiguously:

“No government has the right to decide on the truth of scientific principles.” *The Meaning of It All* (1998), p. 57.

The importance of the scientific principle that government does not determine science was chillingly underscored recently in Sri Lanka and earlier in Russia under Stalin.

“Ideologically driven government mandates on agriculture have usually led to disaster,” one of us (Happer) explained. “The world has just witnessed the collapse of the once bountiful agricultural sector of Sri Lanka as a result of government restrictions on mineral [nitrogen] fertilizer.”⁵

Earlier in Russia, Stalin made Trofim Lysenko the czar of Russian biology. False biology prevailed for 40 years in the Soviet Union because Lysenko gained dictatorial control, providing one of the most thoroughly documented and horrifying examples of the politicization of science. Lysenko was strongly supported by “scientists” who benefitted from his patronage. Millions died as a result. William Happer, Chapter 1 “Harmful Politicization of Science,” Michael Gough Ed., *Politicizing Science* (2003), pp. 29-35.

Consensus. What is correct in science is not determined by consensus, but by experiment and observations. Historically, scientific consensuses have often turned out to be wrong. The greatest scientists in history are great precisely because they broke with consensus. The frequent assertion that there is a consensus behind the idea that there is an impending disaster from climate change is not how the validity of science is determined. To quote the profoundly true observation of Michael Crichton:

“If it’s consensus, it isn’t science. If it is science, it isn’t consensus.”

Peer Review. Peer review can be helpful in many areas of science, but it does not determine scientific validity. Agreement of theoretical predictions with observation or experiment, scientific method, is the real touchstone of truth in science.

In our decades of personal experience in the field we have been dismayed that many distinguished scientific journals now have editorial boards that further the agenda of climate-change alarmism rather than objective science. Research papers with scientific findings contrary to the dogma of climate calamity are commonly rejected by reviewers, many of whom fear that their research funding will be cut if any doubt is cast on the coming climate catastrophe. Journal editors have been fired for publishing papers that go against the party line of the climate-alarm establishment.

Alas, peer review of the climate literature is a joke. It is pal review, not peer review. The present situation violates the ancient principle that “no man shall be a judge in his own cause.” Accordingly, all peer reviewed climate publications need to be viewed with skepticism. Some are right, but many have serious problems with confirmation bias.

When these fundamental principles of science and scientific method are applied to NCA5, it is demonstrated that NCA5 is fatally flawed science for multiple scientific reasons, elaborated next.

⁵ Happer, “Nitrous Oxide,” *supra*, p. 41.

III. SCIENCE DEMONSTRATES THE 5th NATIONAL CLIMATE ASSESSMENT IS FATAALLY FLAWED SCIENCE FOR MULTIPLE SEPARATE REASONS

A. NCA5 Omits Contradictory Data on Extreme Weather Events, Thus is Scientifically Invalid

NCA5 asserts that the risk of extreme weather events is becoming more frequent and severe because of human activities and CO₂ from the combustion of fossil fuel:

“2.2. Many extreme events are becoming worse ... Many extremes, including heatwaves, heavy precipitation, drought, flooding, wildfire, and tropical cyclones/hurricanes, are becoming more frequent and severe due to climate change, with a cascade of effects in every part of the country.” (NCA5, Chap. 1, p. 11, references omitted).

“Key Message 2.2. The Risk of Extreme Events Is Increasing, Observations show an increase in the severity, extent, and/or frequency of multiple types of extreme events...Heatwaves have become more common since the 1980s ... Drought risk has been increasing in the Southwest over the past century ... and decreasing elsewhere ... Rainfall has become more extreme in recent decades, especially east of the Rockies ... Hurricanes are intensifying more rapidly and causing heavier rainfall and higher storm surges... More frequent and larger wildfires have been burning in the West in the past few decades due to a combination of climate factors and policy.” (NCA5, Chap. 2, p. 14, references omitted).

NCA5 also asserts:

“4.2. Rising emissions are driving rapid global warming, with regional differences, Human-driven greenhouse gas emissions have caused nearly all global warming observed since the late 1800s, with only very small effects from natural sources. Global average temperatures over the past decade were approximately 2.2°F (1.2°C) warmer than the preindustrial period (1850–1900), with about three quarters of both the cause (emissions) and the effect (warming) observed since 1970. (NCA5, Chap. 1, p. 33, references omitted).

Note also the NCA5 analyzes very short time frames geologically speaking, hundreds of years and lower, up to 800,000 years, omitting hundreds of millions of years of geological data:

“2.1. The changes occurring now are unprecedented in human history and accelerating. Rising sea levels, melting ice, ocean warming and acidification, changing rainfall patterns, and shifts in timing of seasonal events. Human activities have increased the frequency and intensity of many extreme events, as well as the likelihood of sequential and concurrent extreme events. Many climate conditions and impacts being experienced today are unprecedented for thousands of years (Figure 1.3). (NCA5, Chap. 1, p. 10, references omitted).

USGCRP Omitted Contradictory Data and Fabricated Data on Extreme Weather

The omitted contradictory data about extreme weather events leading to conclusions opposite to those in NCA5 are presented below and also analyzed by Prof. Steven Koonin in his book *Unsettled* (2021). In 86 pages and five chapters he applies scientific method to the facts of extreme weather, including heat waves, hurricanes, tornadoes, sea level rise, wildfires, floods, droughts and precipitation shifts.

Koonin’s Opposite Conclusions. He demonstrates the opposite conclusion of NCA5:

“The science tells us a different story. Observations extending back over a century indicate that most types of extreme weather events don’t show any significant change –

and some such events have actually become less common or severe – even as human influences on the climate grow.”

“The bottom line is that the science says that most extreme weather events show no long-term trends that can be attributed to human influence on the climate.” Id. pp. 97, 99 (emphasis added).

We respectfully suggest that USGCRP has the scientific obligation in the next draft of NCA5 to apply scientific method and analyze the omitted contradictory facts and avoid fabricating facts. Doing so, in our opinion, will result in USGCRP adopting Prof. Koonin’s conclusions. Examples follow.

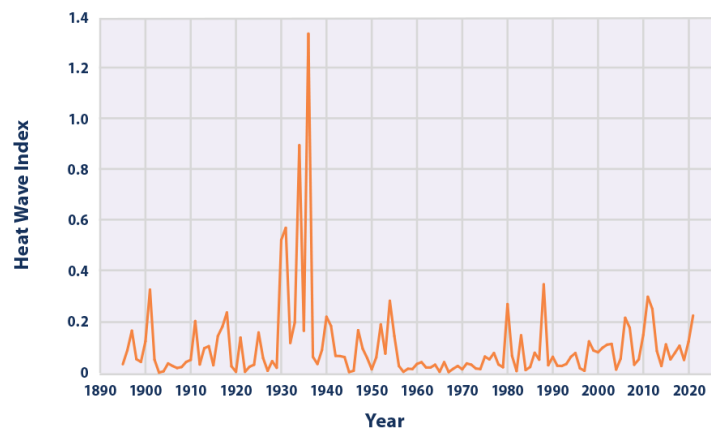
Heat Waves. As noted above, NCA5 states “heatwaves ...are becoming more frequent and severe due to climate change,” and “Since the 1970s, there has been a marked acceleration in the cause of climate change (human- caused greenhouse gas emissions) and its effects, including increasing temperatures.”

Koonin’s Opposite Conclusion: Prof. Koonin in “Hyping The Heat,” Chapter 5, reaches the opposite conclusion:

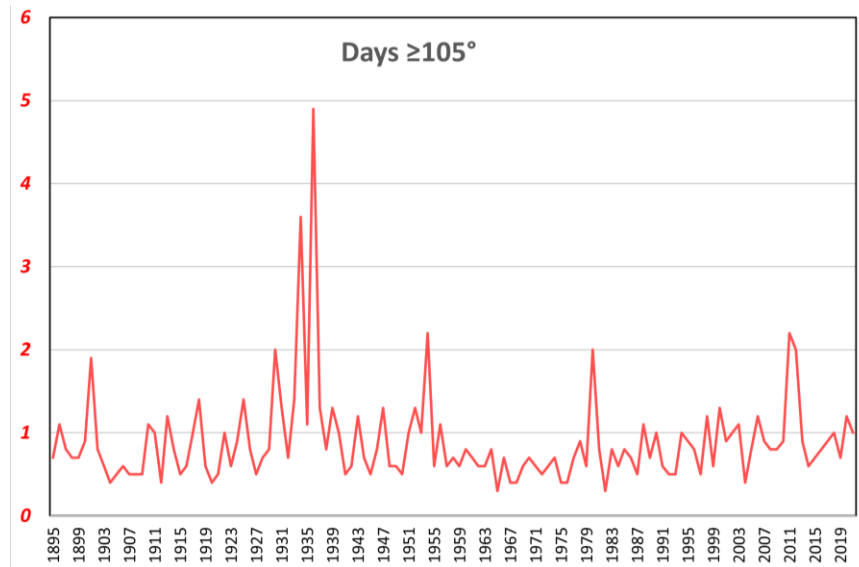
“In short, I would summarize the data on extreme temperatures ... *The annual number of high temperature records set shows no significant trend over the past century, nor over the past 40 years.*” Id. p. 110 (emphasis added).

“[T]he public perception that *extreme* high temperatures are on the rise – fostered by headlines like ‘Daily temperature records are running rampant as the globe roasts!’ – is simply incorrect.” Id. p. 100.

Claims of unusual heat and heat waves in NCA5 are not supported by long-term data. Beginning trends from the 1960s, when the world was cooling is a common tactic used to blatantly ignore the full range of data available. But as the graph below shows, there is nothing out of the ordinary about recent heatwaves:

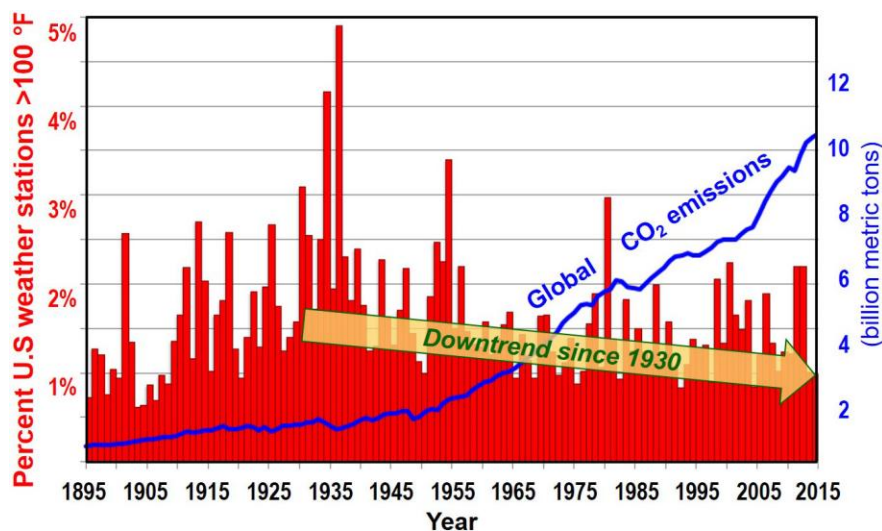


Days with temperatures of at least 105° peaked in the 1920s and 1930s, including during the Dust Bowl, and are currently a fraction of those numbers.



Courtesy Chris Martz

Dr. John Christy is the Distinguished Professor of Atmospheric Science and Director of the Earth System Science Center at The University of Alabama in Huntsville, where he began studying global climate issues in 1987. Since November 2000 he has been Alabama's State Climatologist. Below is a chart he prepared showing the percentage of U.S. weather stations that exceeded 100°F at nearly 1,000 stations across the country.



Note there is often an opposite relationship between temperature and CO₂, with the highest temperatures at low levels of CO₂ and lower temperatures in spite of the large increase in CO₂.

Prof. Koonin's analysis of the omitted contradictory facts also demonstrates there is no long-term or short-term trend that high temperatures are on the rise.

In so doing, he also provides frank and blunt examples of fabricated data in the NCA4 Climate Science Special Report (CSSR).

"The US government's ... Climate Science Special Report (CSSR) is not just misleading on this point [high temperatures] – it's wrong. I say that, to use the assessment reports' lingo, with *Very High Confidence* because of some sleuthing I did in the spring of 2019. What emerged is a disturbing illustration of how non-experts are misled and science is

spun to persuade, not inform. In fact, page 19 of the CSSR’s Executive Summary says (prominently and with *Very High Confidence*):

“There have been marked changes in temperature extremes across the contiguous United States. The number of high temperature records set in the past two decades far exceeds the number of low temperature records.” Id. p. 101 (emphasis added).

He explained the NCA4 CSSR presented the chart below, with the alarming heading “Record Warm Daily Temperatures Are Occurring More Often.”⁶

Note that the chart does not provide temperature data, but an unusual ratio, “the ratio of record highs to lows:”

Record Warm Daily Temperatures Are Occurring More Often

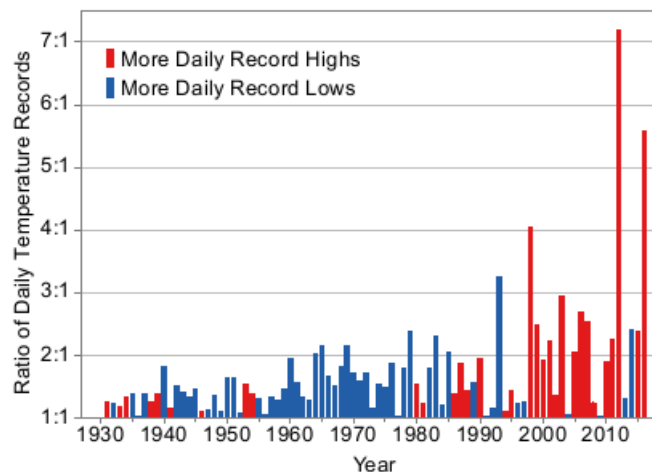
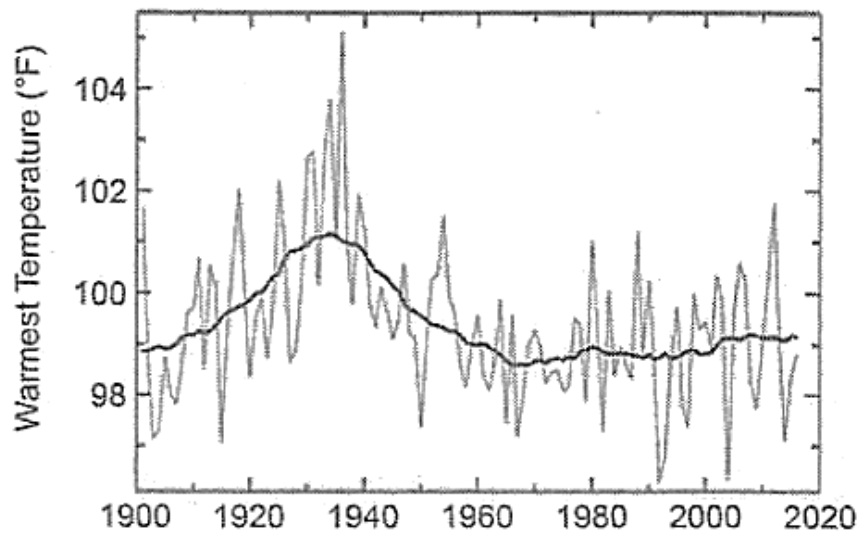


Figure ES.5: Observed changes in the occurrence of record-setting daily temperatures in the contiguous United States. Red bars indicate a year with more daily record highs than daily record lows, while blue bars indicate a year with more record lows than highs. The height of the bar indicates the ratio of record highs to lows (red) or of record lows to highs (blue). For example, a ratio of 2:1 for a blue bar means that there were twice as many record daily lows as daily record highs that year. (Figure source: NOAA/NCEI). From Figure 6.5 in Chapter 6.

He continued: “I suspect that most readers were shocked by that figure, as I was when I first saw it. Who wouldn’t be? An attention-grabbing title (“Record Warm Daily Temperatures Are Occurring More Often”) backed up by data with a hockey-stick shape veering sharply upward in recent years.... It sure looks like temperatures are going through the roof.” Koonin, *supra*, p. 102.

So he looked deeper. “I was disturbed by an apparent inconsistency between that figure and some others deeper in the report, particularly the figure reproduced in our figure 5.2.” Id. The dark line shows the average temperature, and the spiked lines show yearly values:

⁶ CSSR Figure ES.5 on p. 19, Fig. 5.1 in his book on p. 101.



CSSR Fig. 6.3, p. 190, his Fig. 5.2, p. 102.

This chart, deep in the CSSR at p. 190 clearly shows warm temperatures were not occurring more often, that the “average warmest temperature has hardly changed over the last 60 years and is about the same today as it was in 1900.” Id. 103.

He also confirmed this fact by contacting Prof. John Christy, who did an analysis of U.S. daily temperature extremes from 1895 until 2018. Prof. Christy’s results were similar to the CSSR chart above:

“The record highs clearly show the warm 1930s [during the Dust Bowl], but there is no significant trend over the 120 years of observations, or even since 1980, when human influences on the climate grew strongly.” Id. pp. 106-07.

“Inconsistencies are red meat to a scientist” Prof. Koonin emphasized (id. p. 103). Frankly, he did not mince words about the CSSR fabricating data:

“[T]he Executive Summary of the CSSR prominently features the ratio graph (our figure 5.1) with the legend ‘Record warm daily temperatures are occurring more often’ ... it is shockingly misleading.” Id. p. 107 (emphasis added).

“How could a report that proclaims itself ‘designed to be an authoritative assessment of the science of climate change’ so mischaracterized the data? After all, the CSSR was subject to multiple reviews, including one by an expert panel convened by the National Academies of Science, Engineering, and Medicine (NASEM).” Id. p. 108 (footnote omitted).

Koonin’s Conclusions. He concluded in even stronger terms, that the NCA4 CSSR is “a prominent misrepresentation of climate science:”

“I have *Very High Confidence* in identifying and correcting a prominent misrepresentation of climate science in an official government report. This isn’t picking at a nit; it really does matter. The false notion of more frequent U.S. high temperature records is likely to pollute subsequent assessment reports, which invariably cite prior reports. More generally, it matters for those who care about the quality of scientific input to societal decisions and the integrity of the processes by which it is generated. It should also matter to those who proclaim the unimpeachable authority of assessment reports. And it matters for media representations of climate science, which give voice to such misleading ‘conclusions.’” Id. p.109 (emphasis added).

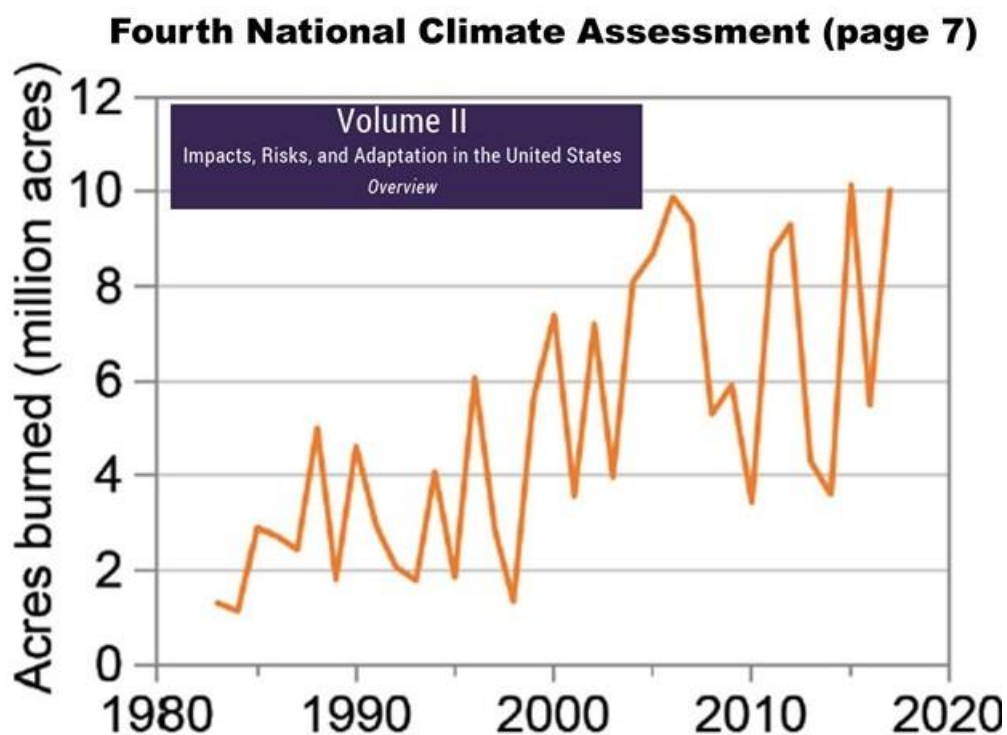
Therefore, we respectfully suggest that USGCRP has the scientific obligation in the next draft of NCA5 to apply the scientific method and analyze the omitted contradictory facts and avoid fabricating facts, which in our opinion will require USGCRP to change its conclusions and adopt Prof. Koonin's conclusions.

Further, there is no risk of increased damage by high temperatures as a result of increasing atmospheric CO₂ from fossil fuels. High temperatures may cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂ and fossil fuels.

Wildfires. As noted above, NCA5 states "wildfire[s]...are becoming more frequent and severe due to climate change."

In support of this notion of unprecedented recent fires, a chart of area burned was provided showing a period from 1984 to 2020 (NCA5, Appendix 4, p. 20). The original source for the data is the National Interagency Fire Center and is an updated version of the chart provided in NCA4 shown below.

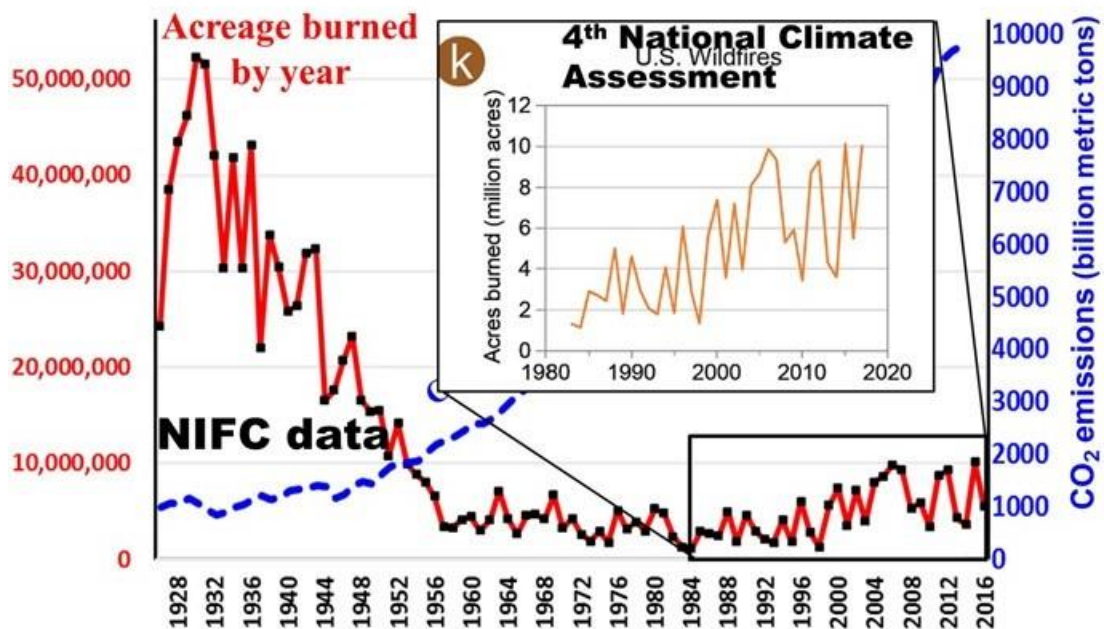
Note that the data begins in 1984, although data is available going back to the late 1920s.



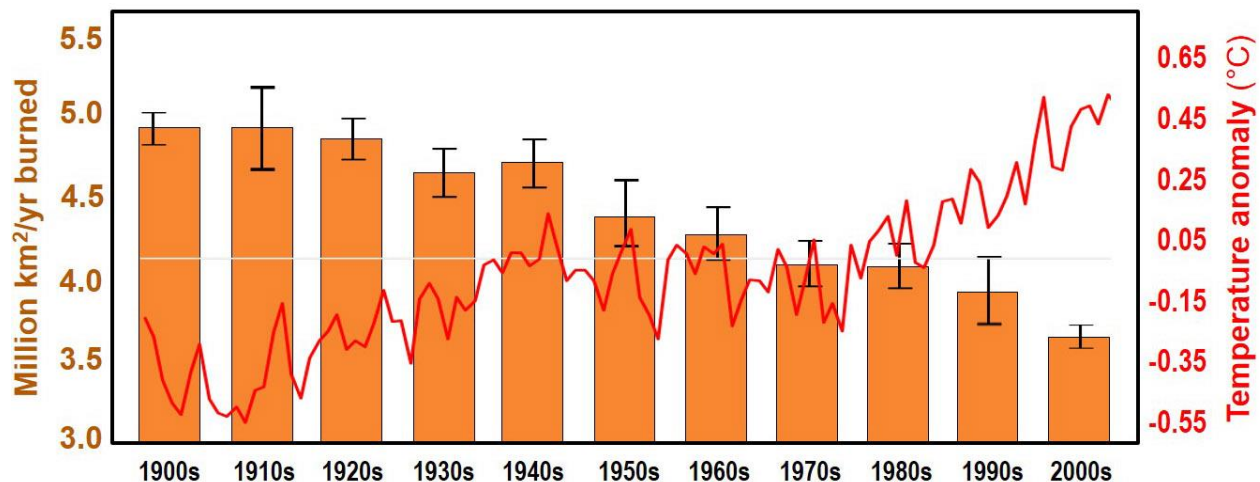
The National Interagency Fire Center (NIFC) and the U.S. Census Bureau provide data going back to 1928 and reveal that the number of fires in the United States and the area burned have been in a significant and long-term decline, both exhibiting a more than 75% reduction since their peak in the 1920s and 1930s, while CO₂ has been inexorably increasing.

Within the United States, even the data on the number of fires in California, show that the number of fires has been in a 30-year decline in the Golden State and is now half of that in 1987. [CITE?]

NIFC Acreage burned 1928 to 2016



Several large studies of the incidence of fire globally and in the northern hemisphere do not support the National Climate Assessment case linking fire to man-made warming.⁷



A study by scientists with the Canadian Forest Service compared temperatures and CO₂ concentration versus frequency of forest fires over the last 150 years in North America and northern Europe and catalogued a significant decline reaching back to 1850.⁸

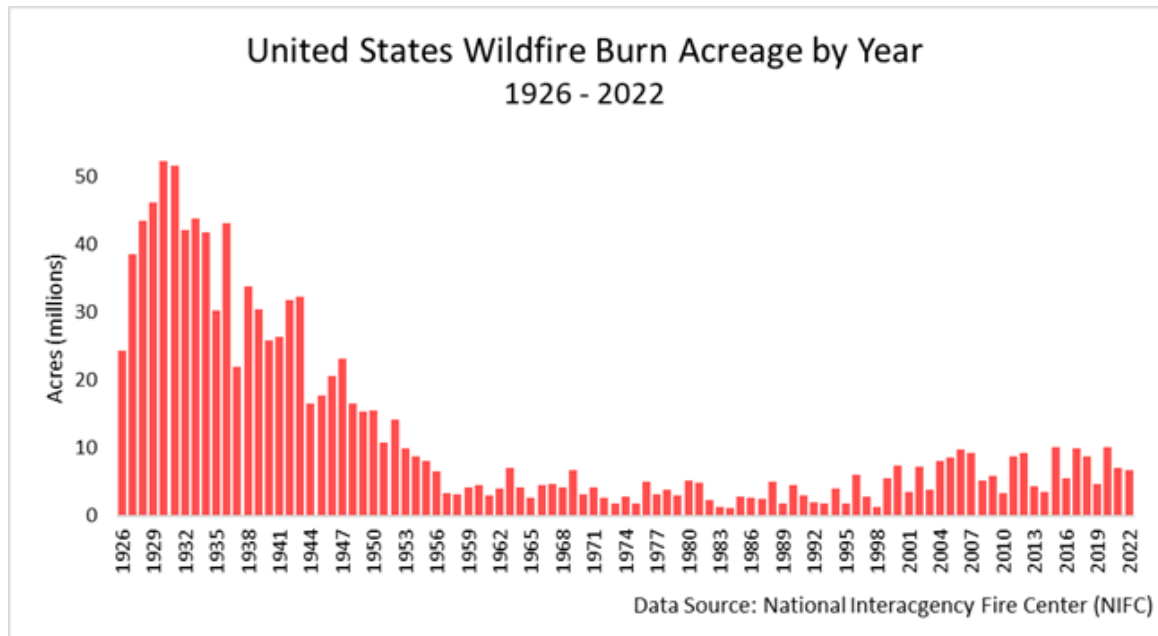
Nearly all these fire experts agree that increased soil moisture due to climate change is the causative agent. Warming temperatures lead to more water vapor and precipitation, and increasing CO₂ leads to less water use by plants.

The United States fared much better than in the past, with the decline in the amount of

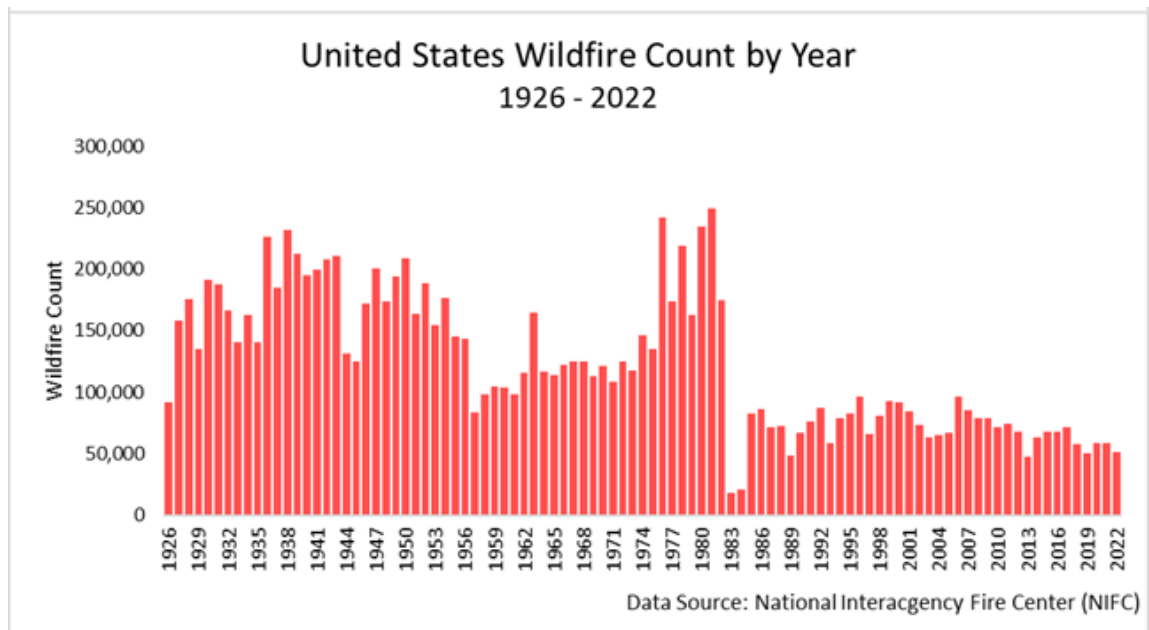
⁷ Yang, J, Tian H, Tao B, Ren W, Kush J, Liu Y, and Wang Y (2014) Spatial and temporal patterns of global burned area in response to anthropogenic and environmental factors: Reconstructing global fire history for the 20th and early 21st centuries, J Geophys Res Biogeosci, 119, 249 263, doi:10.1002/2013JG002532.

⁸ Flannigan MD, Bereron Y, Engelmark O, Wotton BM (1998) Future wildfire in circum-boreal forest in relation to global warming, Journal of Vegetation Science 9, pp 469–476

wildfire-burned acreage declining dramatically from 1929 to 1956 and has remained at a much lower level ever since then.⁹



Similarly, the total number of wildfires in the United States has dropped enormously since 1983: Id.



In addition, satellite-gathered data is totally contrary to what NCA5 states worldwide. Prof. Koonin explained, “Sophisticated satellite sensors first began monitoring wildfires globally in 1998.” He cited NASA data that shows the global area burned by fires each year from 2003 to 2015. “Unexpectedly, this analysis of the images shows that the area burned annually declined by about 25% from 1998 to 2015.” Further, “Despite the very destructive wildfires in 2020, that year was among the least active globally since 2003.” Id. p. 142.

Prof. Koonin suggested to reduce damage from wildfires, “the conversation about

⁹ NIFC (2017) National Interagency Fire Center - Total Wildland Fires and Acres (1960 – 2019)

wildfires [should change from] only one of unavoidable doom due to ‘climate change,’” to a conversation about how “to take steps that would more directly curtail these catastrophes” as “we have significant power to address ... human factors.” Id. p. 144. We respectfully suggest that USGCRP has the scientific obligation in the next draft of NCA5 to apply scientific method and analyze the omitted contradictory facts, which in our opinion will require USGCRP to change its conclusions and adopt Prof. Koonin’s conclusions.

Although CO₂ from fossil fuels has been increasing, scientific method implies there is no risk of increased damage by wildfires as a result of increasing atmospheric CO₂ from fossil fuels. Wildfires will cause damage, but the resulting increased losses will have nothing to do with increases of CO₂.

Hurricanes. NCA5 states: “Hurricanes are intensifying more rapidly and causing heavier rainfall and higher storm surges.” (NCA5, Chap. 2, p. 14).

Prof. Koonin’s “Tempest Terrors” Chapter 6 deals with this type of assertion: “Storms are becoming more common and more intense and rising greenhouse gas emissions are going to make it all a lot worse.” Id. p. 111.

After a deep analysis of the facts, he proves that “the data and research literature are starkly at odds with this message,” and that “hurricanes and tornadoes show no changes attributable to human influences.” Id. pp. 111-12.

His analysis includes the 3d National Climate Assessment in 2014, which asserts in “Key Message 8:”

The intensity, frequency and duration of North Atlantic hurricanes, as well as the frequency of the strongest (Category 4 and 5) hurricanes, have all increased since the early 1980s.... Hurricane-associated storm intensity and rainfall rates are projected to increase as the climate continues to warm. Koonin, p. 115 (emphasis added).

He explains, “The report backs up that statement with the graph reproduced in figure 6.3 showing a seemingly alarming increase in the North Atlantic PDI (that is, the strongest hurricanes),” and a “general upward trend is emphasized, so that in the non-expert eye, it looks like we’re in trouble – and headed for more.” Id. p. 115.

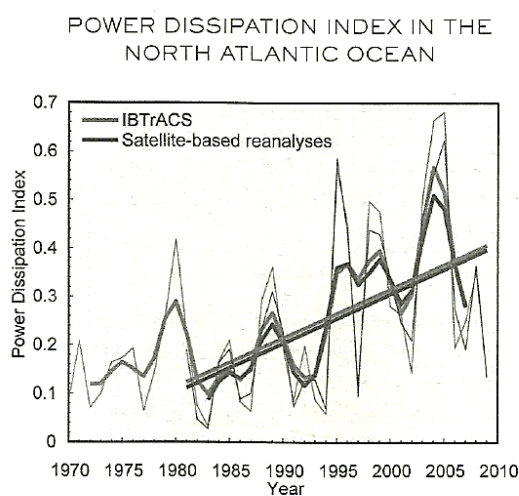


FIGURE 6.3 Power Dissipation Index in the North Atlantic Ocean. Two different analyses of the data are shown, along with straight lines indicating the trend in each. (NCA2014, Figure 2.23.)

Applying scientific method, Prof. Koonin examined the facts more deeply to see if they supported the theory that hurricanes were getting much stronger. Once again, he found that a USCCRP National Climate Assessment manipulated the facts and was wrong.

First, he looked at the main research paper cited by the 3d NCA assessment. “To my surprise, I found it stated quite explicitly that there are *no* significant trends beyond natural variability in hurricane frequency, intensity, rainfall or storm surge flooding.” Id. P. 115.

Next, he searched the 3d NCA more thoroughly and found on page 769, buried in the text of appendix 3, this statement:

“There has been no significant trend in the global number of tropical cyclones nor has any trend been identified in the number of U.S. land-falling hurricanes.” Id. p.117 (footnotes omitted & emphasis added).

Next, he examined the 2017 NCA4 CSSR to see if it corrected the 3d NCA. It did not. Indeed, it repeated the same false science:

“Human activities have contributed substantially...to the observed upward trend in North Atlantic hurricane activity since the 1970s.” Id. p. 118 (footnote omitted).

As a result, he again did not mince words:

“The discussion of hurricanes in the 2017 CSSR is a profound violation of Feynman’s... [scientific method] caution, that a scientist must ‘try to give all of the information to help others to judge the value of your contribution; not just the information that leads to judgment in one particular direction or another.’” Koonin, *supra*, p. 119.

That is, the NCA4 CSSR omitted contradictory information.

As noted, NCA5 reports: “Hurricanes are intensifying more rapidly and causing heavier rainfall and higher storm surges. (NCA5, Chap. 2, p. 14).

However, scientific method applied to all the facts shows that there is no risk of increased damage by hurricanes as a result of increasing atmospheric CO₂ from fossil fuels. Hurricanes will continue to cause damage, and the damages will increase with time as more valuable property is located in poorly drained and other hazardous areas. But the resulting increased financial losses will have nothing to do with increases in CO₂.

We respectfully suggest that USGCRP has the scientific obligation in the next draft of NCA5 to apply scientific method and analyze the omitted contradictory facts, which in our opinion will require USGCRP to change its conclusions and adopt Prof. Koonin’s conclusions.

Tornadoes. NCA5 reports: “There is evidence that tornado outbreaks have become more frequent, that tornado power has increased [and] that tornado activity is increasing in the fall.” (NCA5, Chap. 2, p. 17) (citations omitted).

Tornadoes are particularly feared in the United States because they kill and injure more U.S. citizens than any other type of storm. While many other countries are spared the twisters’ wrath, the United States is the world leader in the number of tornadoes per year—1,250—with Canada trailing in a distant second place, with just 100.

The National Oceanic and Atmospheric Administration NOAA says early historic records of tornadoes are unreliable: “One of the main difficulties with tornado records is that a tornado, or evidence of a tornado, must have been observed. Unlike rainfall or temperature, which may be measured by a fixed instrument, tornadoes are short-lived and very unpredictable. A tornado in a largely unoccupied region is not likely to be documented. Many significant tornadoes may not have made it into the historical record, since Tornado Alley was very sparsely populated during the early 20th Century.”

NOAA produced an alarming graph that indeed shows the annual number of tornadoes in the U.S. have more than doubled in frequency over the last 20 years compared to the 20 years from 1950 to 1970 Koonin, *supra*, p. 122:

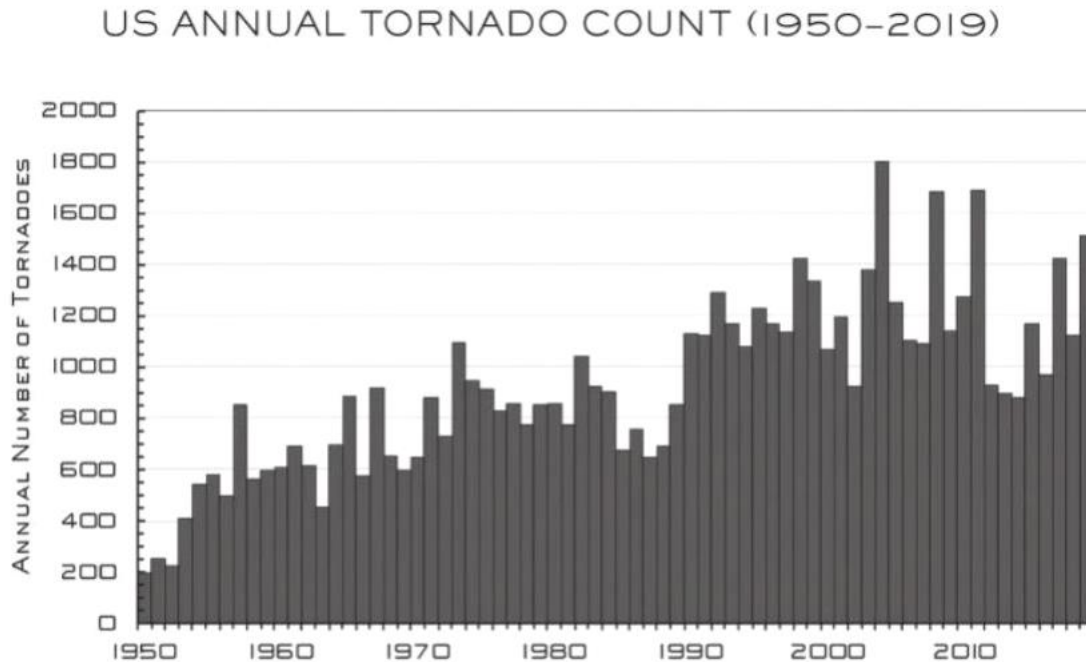
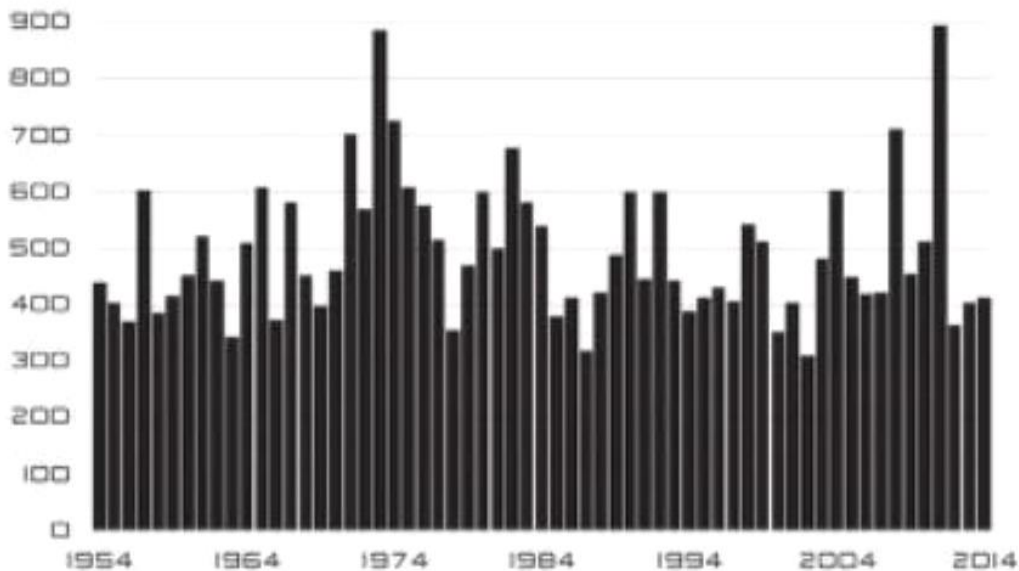


FIGURE 6.5 Number of tornadoes recorded by NOAA each year from 1950 to 2019 in the contiguous forty-eight states.²⁵

Prof. Koonin explained why this is false. He said that radar could only detect strong tornadoes, not weak ones, until the last 20 years or so. Thus, the alarming 1950 to 1970 NOAA graph could only include strong tornadoes because weak tornadoes could not be detected, but today's count includes both weak and strong. So, the increase could be simply the result of adding the count of weak tornadoes to the more recent tally and not being able to include the weak ones until 2007. Thus, to get an accurate comparison, it's necessary to include both weak and strong, which the top graph in his Fig. 6.6 does (EF measures tornado strength, from 0 the weakest and 6 the strongest).

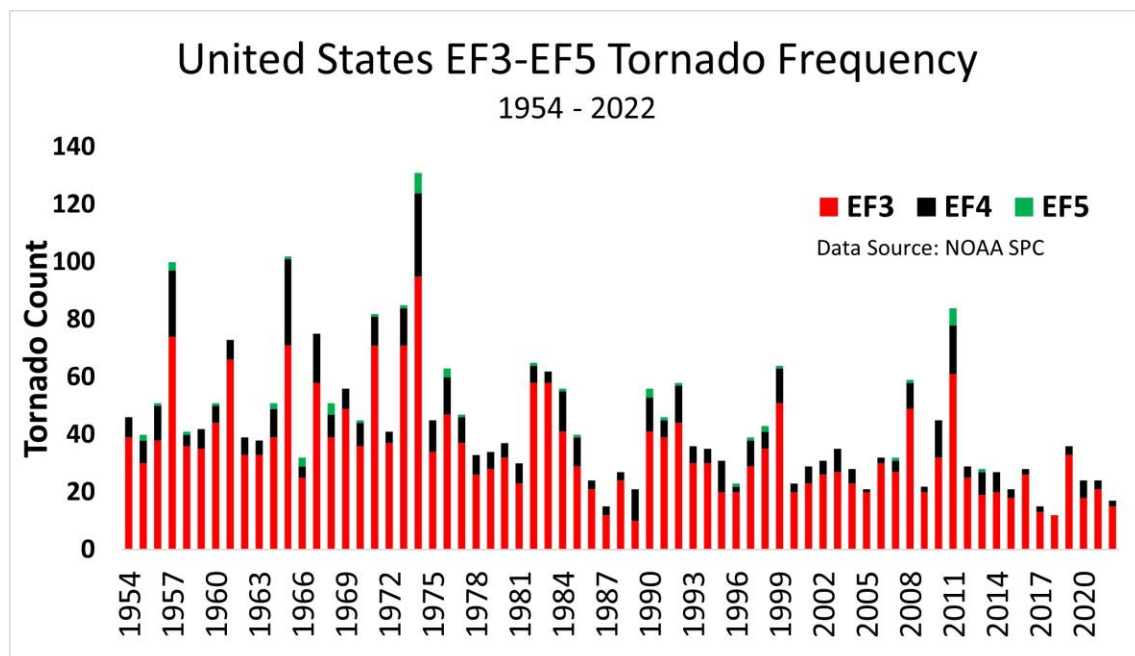
Good news. The combined graph of weak and strong tornados shows the number of tornadoes has not increased over the past 60 years.

ANNUAL COUNT OF US TORNADOES WITH EF1+ (1954-2014)



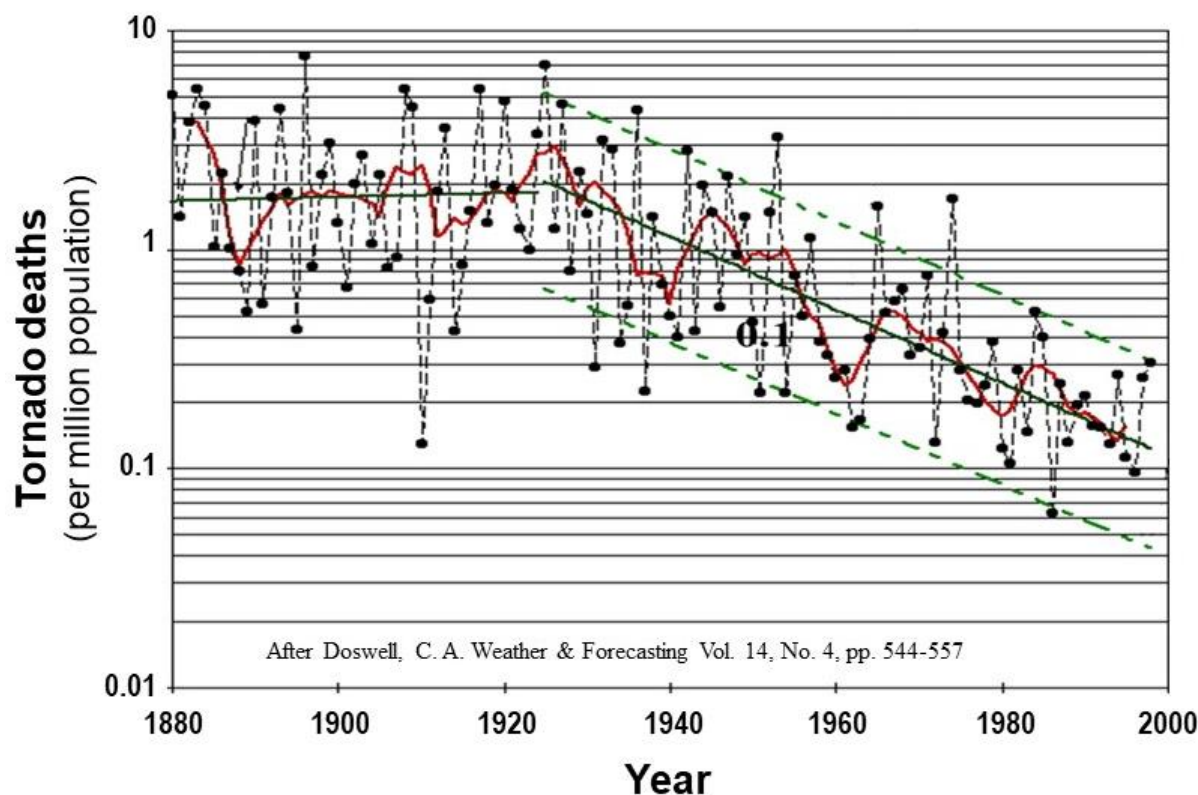
With increasing population, Doppler radar detection and better reporting, the number of tornadoes identified has significantly increased in recent years. Because of this, NOAA recommends only using the strongest tornadoes as a measure of pre-radar numbers. Large and violent tornadoes might well have been identified even in days before better reporting was in place.

A second graph has even better news. The chart below of these very strong tornadoes ($\geq F 3.0$) shows declining numbers of tornadoes over the last 60 years.



Outside the tropics (and probably within the tropics, too), storminess of all kinds is expected to decrease gently with warmer weather, because it is differentials between temperatures that cause storms, and warming reduces those differentials.

Greater improvements in detection and early warning are the primary reason that deaths per million due to tornadoes in the U.S. have been in a long-term decline but a decline in the number of the storms surely cannot hurt.¹⁰



Koonin Conclusions: Prof. Koonin concludes that “as human influences have grown since the middle of the twentieth century, the number of significant tornadoes hasn’t changed much at all,” and even better, “the strongest storms have become less frequent;” “U.S. tornadoes have become more benign as the globe has warmed over the past seventy-five years, and we have no credible method for projecting future changes.” Id. pp. 123, 126.

We respectfully suggest that USGCRP has the scientific obligation in the next draft of NCA5 to apply scientific method and analyze the omitted contradictory facts and avoid fabricating facts, which in our opinion will require USGCRP to change its conclusions and adopt Prof. Koonin’s conclusions.

Further, the NCA5 report that “there is evidence that tornado outbreaks have become more frequent, that tornado power has increased” is wrong and misleading. Applying scientific method and analyzing the facts show there is no risk of increased damage by tornados as a result of increasing atmospheric CO₂ from fossil fuels. Tornados will continue to cause damage, but the resulting increased financial losses will have nothing to do with increases in CO₂.

Sea-Level Rise. NCA5 asserts that “**Sea-Level Rise Will Continue to Accelerate,**” with “average sea level along the U.S. coast ... likely to be between 12 and 20 inches above 2000 sea levels in 2050,” and this “will likely lead to an increased frequency of coastal flooding:”

“On timescales relevant to infrastructure planning (around 30 years), sea level along U.S.

¹⁰ Doswell CA, Moller AR, Brooks HE (1999) Storm spotting and public awareness since the first tornado forecasts of 1948. *Weather & Forecasting* 14(4): 544–557

coastlines is expected to continue rising at accelerating rates above the global average. Under a range of potential global warming levels, average sea level along the U.S. coast is likely to be between 12 and 20 inches above 2000 sea levels in 2050. At these short timescales, regional variations in projected sea-level rise are large, with 4–12 inches of sea-level rise likely in the Pacific Northwest and 20–27 inches of sea-level rise likely in the western Gulf of Mexico. Future projected changes in sea level will likely lead to an increased frequency of coastal flooding events in the continental United States over the next 30 years, with a greater than tenfold increase in typically damaging flooding events (e.g., storm surge currently recurring every few years) and a fivefold increase in destructive flooding events (e.g., major storm surge events currently recurring once in many decades) over this time period.” (NCA5, Chap. 2, p. 27)(citations omitted).

NCA5 explains:

“Sea Level Rise and Coastal Flooding

“Global sea level is rising as warming ocean waters expand and glaciers and ice sheets melt. Along some US coastal areas, sea levels are rising faster than the global average, with the highest rates occurring along parts of the Atlantic coast and the Gulf of Mexico.” (NCA5, Appendix 4, p. 14, references omitted).

Prof. Koonin’s “Sea Level Scares” is the subject of Chapter 8.

As background, Prof. Koonin provides data on sea levels over large periods of time, reporting “repeating episodes” where the sea level has risen as much as 400 feet and fallen 400 feet. Since the Last Glacial Maximum 22,000 years ago, the sea level has risen about 400 feet. Id. p. 151.

Since 1880, the sea level has risen 10 inches, with the annual rate of increase varying substantially and averaging .07 inches per year.

Between 1925-1940, the average rate of increase was 0.12 inches per year.

Between 1993-2013, two decades, the average rate of increase was also .12 inches per year. Id. p. 151.

Examining the facts, he pointed out that the NCA4 CSSR unscientifically emphasized the sea-level increase between 1993–2013, but totally ignored the same increase between 1925-1940.

He published “an Op-Ed calling out one of the more egregious misrepresentations in the CSSR” in the *Wall Street Journal* (Nov. 2, 2017), “A Deceptive New Report On Climate” on sea level rise. He singled out both the CSSR and IPCC for cherry-picking the recent two-decade sea-level rise, but omitting data of a similar sea-level rise earlier in the century that contradicts their theory:

“Although decade-by-decade changes in the rate of sea level rise over the past century are central to untangling the effect of human influence from natural influences, the recent assessment reports (the CSSR and the IPCC’s 2019 SROCC [Special Report on the Oceans and Cryosphere in a Changing Climate]) hardly mention them. ***

“All of the assessment reports have plenty of text emphasizing that the rate of sea level rise in the past two decades is higher [.12 inches/year] than the average of the twentieth century [.07 inches/year]. ... The rate of rise over the most recent twenty-five-years should be compared to that other twenty-five year period [also .12 inches/year] to understand just how significant the recent rate is. ***

“The CSSR follows the lead of some prominent climate scientists in hiding the huge fluctuations in the rate of sea level rise over the past century... The report misleads by

omission in not mentioning either the strong decadal variability of sea level rise during the twentieth century or the fact that the then most recent values of the rate were statistically indistinguishable from those during the first half of the twentieth century.” Id. pp. 157-58.

Koonin Conclusions. Prof. Koonin concludes two things. First, omitting data that contradicts the CSSR theory that human influences are raising sea levels dangerously is a fundamental violation of scientific method:

“CSSR and other assessment discussions of sea level rise omit important details that weaken the case for the rate of rise in recent decades being outside the scope of historical variability, and hence for attribution to human influences.” Id. p. 165.

Second, his bottom line is:

“In summary, we don’t know how much of the rise in global sea levels is due to human caused warming and how much is a product of long-term natural cycles. The CSSR and other assessments discussions of sea level rise omit important details that weaken the case for the rate of rise in recent decades being outside the scope of historical variability, and hence for attribution to human influences. There is little doubt that by contributing to warming we have contributed to sea level rise, but there is also....there’s also scant evidence that this contribution has been or will be significant, much less disastrous.” Id. p. 165.

We respectfully suggest that USGCRP has the scientific obligation in the next draft of NCA5 to apply scientific method and analyze the omitted contradictory facts and avoid fabricating facts, which in our opinion will require USGCRP to change its conclusions and adopt Prof. Koonin’s conclusions.

Further, scientific method shows that there is no risk of increased damage from rising sea levels as a result of increasing atmospheric CO₂ from fossil fuels. Sea levels may rise and cause damage, but the resulting increased financial losses will have nothing to do with increases in CO₂.

Flooding. Prof. Koonin’s “Precipitation Perils – From Floods to Fires” is his Chapter 7. As to floods, he reports the U.S. data show only “modest changes in U.S. rainfall during the past century haven’t changed the average incidence of floods.” Factually, he concludes, “We don’t know whether floods globally are increasing, decreasing, or doing nothing at all.” Id. p. 137.

Thus, applying scientific method to the facts proves there is no risk of increased damage by flooding as a result of increasing atmospheric CO₂ from fossil fuels. Flooding will cause damage, but the resulting increased financial losses will have nothing to do with increases of CO₂.

Prof. Koonin also analyzes other extreme weather events in the 86 pages of his book that need not be presented here.

Koonin Conclusion. In conclusion as to all types of extreme weather, the enormously important good news, contrary to NCA5 and others, is that Prof. Koonin rigorously applied scientific method to the extreme weather events covered by NCA5 and demonstrated that “science says that most extreme weather events show no long-term trends that can be attributed to human influence on the climate.” Id. p. 99(emphasis added).

Accordingly, two things:

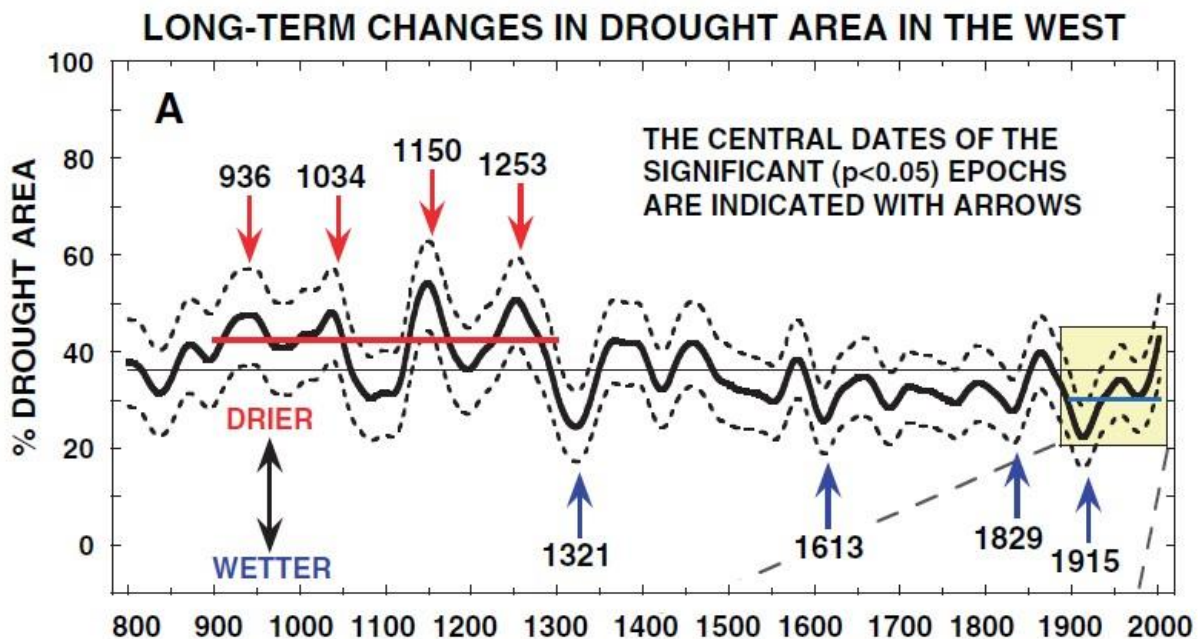
First, we respectfully suggest that USGCRP has the scientific obligation in the next draft of NCA5 to apply scientific method and analyze the omitted contradictory facts and avoid fabricating facts, which in our opinion will require USGCRP to change its conclusions and adopt

Prof. Koonin's conclusions.

Second, NCA4 CSSR is fatally flawed as science and should be viewed as government opinion, not science. Again Prof. Koonin did not mince words. "The world's response to climate changing under natural and human influences is best founded upon a complete portrayal of science. The U.S. government's Climate Science Special Report ... does not provide that foundation. Instead, it reinforces alarm with incomplete information and highlights the need for more-rigorous review of climate assessments." Koonin, "A Deceptive New Report On Climate," *Wall St. J.* (Nov. 2, 2017). As the Lysenko experience chillingly reminds us, the CSSR must be understood as having no value as science.

Drought. NCA5 states that "*The current drought in the western U.S. is now the most severe drought in at least 1,200 years and has persisted for decades.*"

That conclusion is contradicted by omitted contrary facts. Multiple long-term studies of drought in the southwest confirm that there were periods of horrific drought significantly longer and worse than the southwest drought (that just ended). Cook (2015) studied long-term changes in drought in the area and concluded that the current drought shows "that this drought pales in comparison to an earlier period of elevated aridity and epic drought in AD 900 to 1300." Their chart supporting this is shown below.¹¹



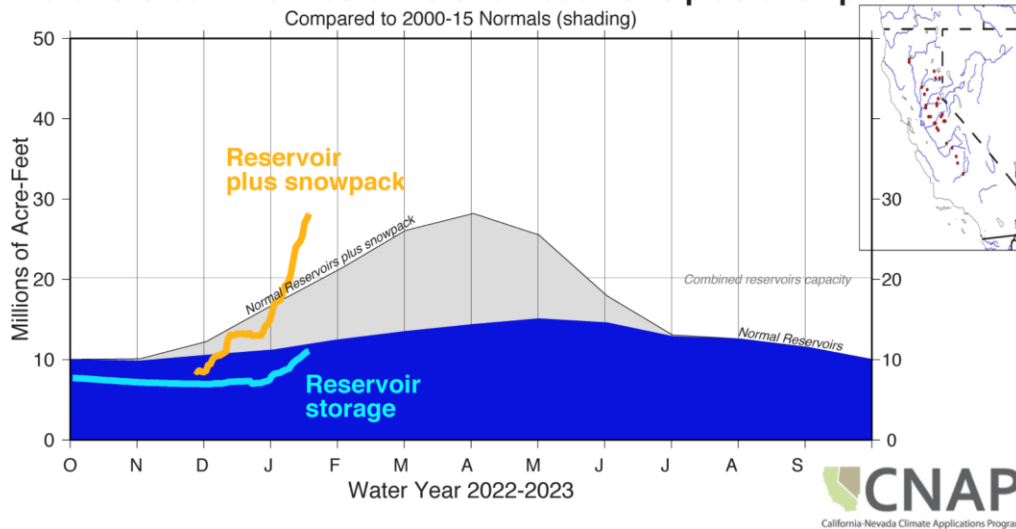
Confirming the existence of significantly longer and worse droughts are confirmed by others, including Kleppe (2011) who stated: "Evidence for Medieval droughts of duration and magnitude much larger than those in the instrumental record has been reported throughout much of the world, but a particularly robust signal is expressed in the western United States."

As per Cliff Mass, the above discussion is irrelevant now that the southwest drought has ended with recent significant precipitation. For example, the total water available right now in the western Sierra snowpack is greater than normally available in April (yellow line is the 2022/2023 data). It is now over 200% of normal for all major Sierra regions...and nearly 300% for the south Sierra area.¹²

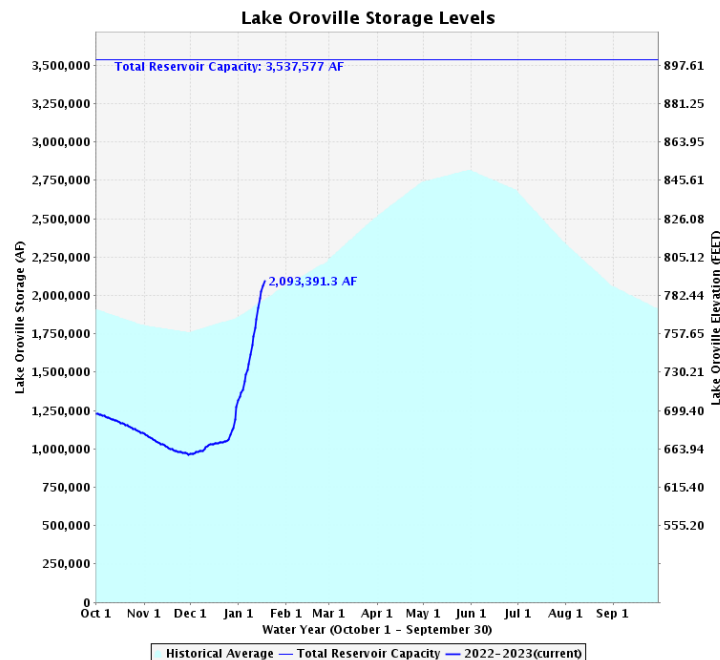
¹¹ Cook ER, Seager R, Cane MA (2007) North American drought: reconstructions, causes, and consequences. *Earth-Sci Rev* 81(1):93–134, doi:10.1016/j.earscirev.2006.12.002.

¹² <https://climatedataguide.ucar.edu/climate-data/palmer-drought-severity-index-pdsi>

Water Stored in 28 Western Sierra Reservoirs plus Snowpack



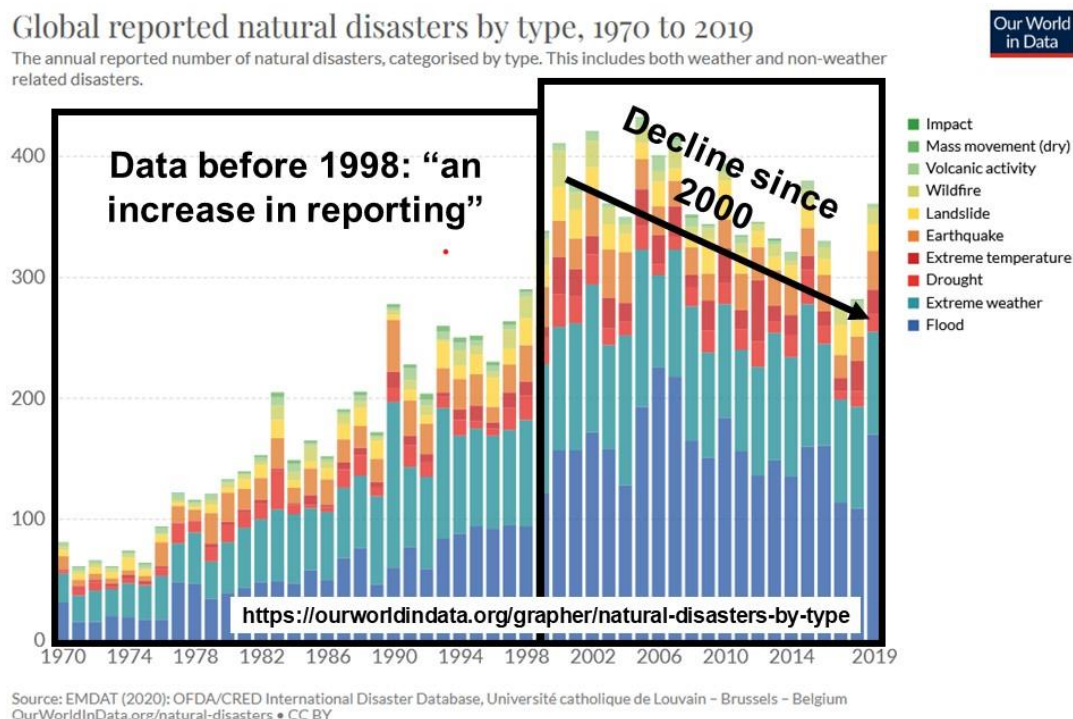
The previous deficit in California reservoir water storage is now gone. For example, consider the huge Lake Oroville Reservoir in northern CA during the past month it went from roughly 60% of normal to 106% (Mass 2023).



Natural Disasters and Extreme Weather Generally. Contrary to claims within NCA5 of increasing extreme weather and disasters, the data above and more below provide a stark contrast and reveal the peoples of the world and the United States are much safer from these events today.

The World Meteorological Organization (WMO) in 2021 published a review of extreme weather. The report was titled *The Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970 – 2019)*. The report drew on data gathered by the Centre for

Research on Epidemiology of Disasters (CRED), a Brussels-based organization that collaborates with the U.N. shown below.¹³



Be careful in analyzing this report. News reports used this chart to claim a “five-fold increase” in natural disasters, and indeed, there was such an increase from 1970 until 2000. It turns out the initial 30 years reviewed by the report (1970 to 2000) are when the system for collecting information on natural disasters was being developed by CRED. During the first few years of the system’s operation in the 1970s, external sources were reporting fewer than 100 disasters a year. In the 1980s, the count reached 200 a couple times. By the year 2000, annual disaster totals ranged between 300 and 400 and mostly remained that way until 2019, the last year shown.

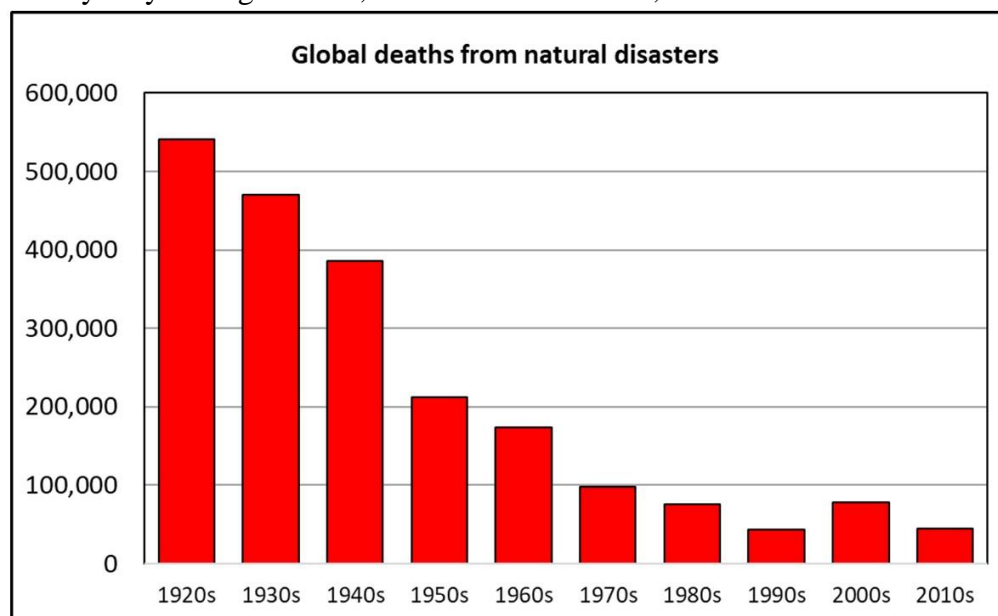
In other words, the CRED system’s counts rose as it received reports from more sources over the years. Comparing totals from the 1970s with 21st century data is not only inappropriate, but also a blatant misuse of statistics to bolster a pre-ordained conclusion — a classic apples and oranges pairing. Our suspicions were confirmed in an email exchange with Regina Below, CRED database manager and documentalist. When asked if the difference between disaster totals in 1970 and the late 1990s was the result of an increase in reporting rather than a greater incidence of disasters, she answered: “You are right, it is an increase in reporting.”

Since the complete build-out of their reporting network in 2000, the data show a 10 percent decline in natural disasters.

As reported above, the Centre for Research on the Epidemiology of Disasters does a fine job of collecting data on natural disasters for the World Health Organization and the Belgian

¹³ World Meteorological Organization (2021) The Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970–2019) WMO-No 1267, ISBN: 978-92-63-11267-5

Government. According to their data, deaths from natural disasters have plunged more than 90 percent from a yearly average of 540,000 in the 1920s to 45,000 in the last decade.¹⁴



EM-DAT CRED (2022)

The incredible reduction in natural disaster-related deaths is due to a combination of factors, including better forecasting and warnings ahead of severe weather events and also a buildout of infrastructure to protect the populace. Nonetheless, this flies in the face of NCA5 claims of increasing deaths from ever-increasing events.

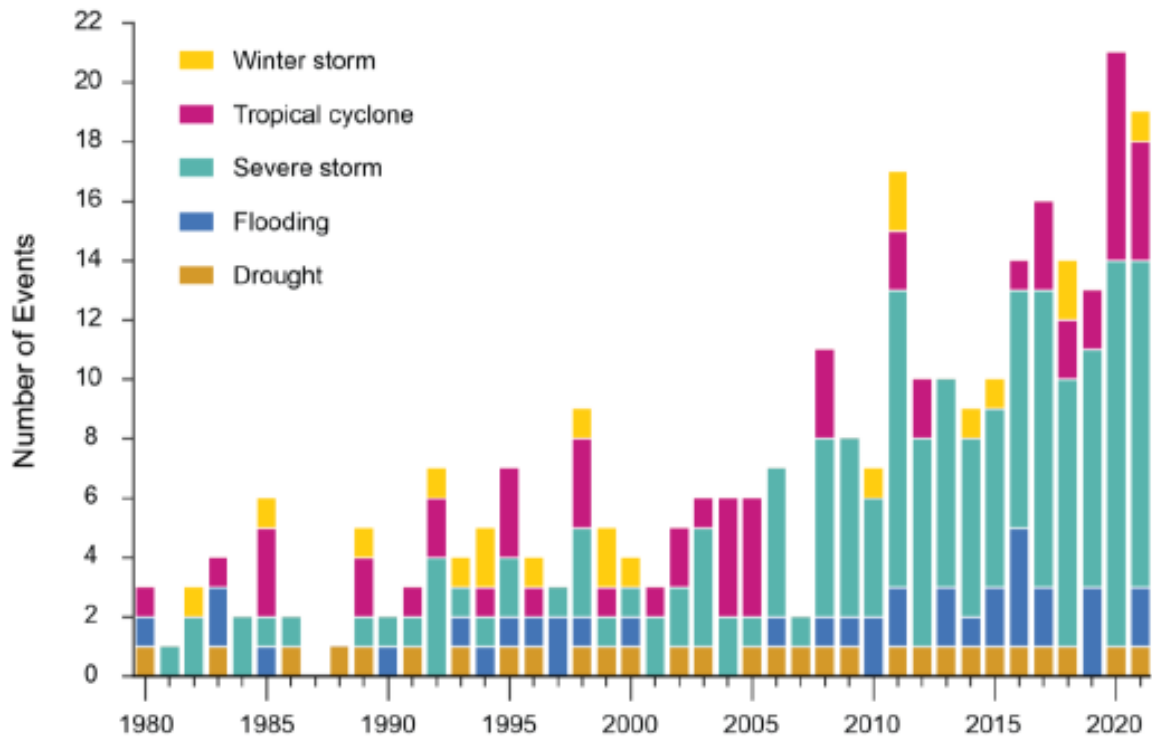
More good news about extreme weather that USGCRP must take into account as a matter of good science in its next version of NCA5.

Monetary Losses from Extreme Weather. NCA5 wrongly and routinely conflates an increase in monetary losses to increases in severe weather and natural disasters in order to bolster their case for ever-increasing disasters. For example, Figure 4.1. *Water-Related Billion Dollar Disasters* reveals that the number of billion-dollar water-related disasters in the U.S. has increased substantially over the last 60 years. No one disputes that fact, but it is a meaningless statistic due to inflation and an increase in expensive infrastructure development in high-risk areas.

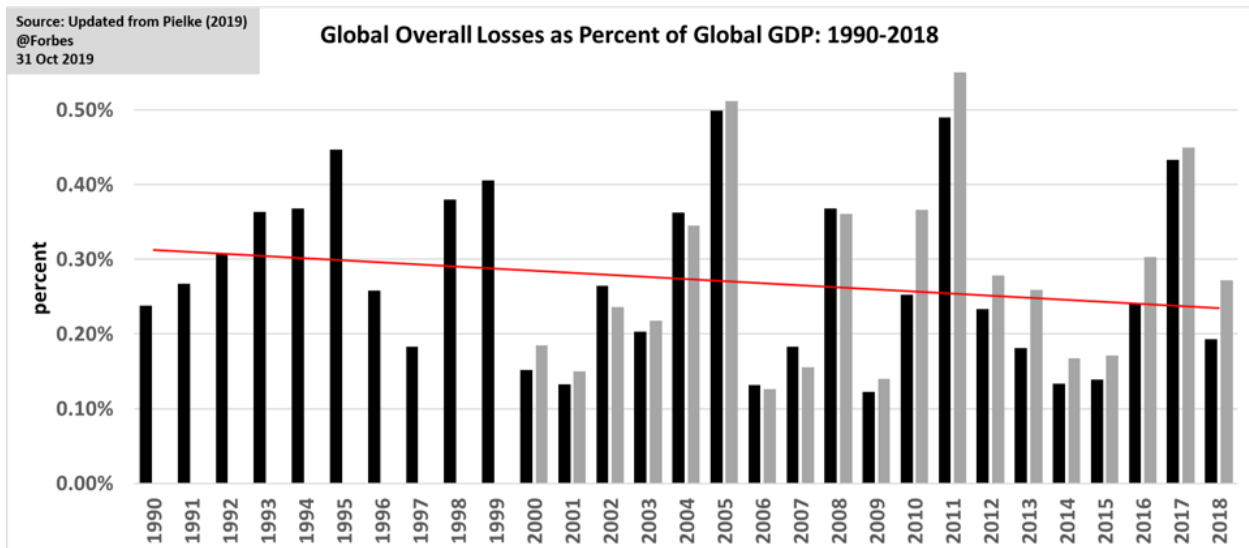
The dollar had an average inflation rate of 3.02% per year between 1980 and today, producing a cumulative price increase of 260.19%. This means that a \$300 million-dollar disaster in 1980 would be a \$1 billion-dollar disaster today without factoring in increased infrastructure.

¹⁴ EM-DAT (2022) EM-DAT Center of research on the Epidemiology of Disasters (CRED) <https://www.emdat.be/>

Water-related billion dollar disasters are increasing in the United States



This is a statistical sleight of hand used to exaggerate dangers. In order to use monetary data, it should either be adjusted based on inflation or compare it as a percentage of GDP. In this chart, Roger Pielke, Jr compared global losses from natural disasters to global GDP to reveal that there has been a decline in this metric.¹⁵



In conclusion as to extreme weather, we therefore respectfully suggest that USGCRP has a scientific obligation in the next draft of NCA5 to apply scientific method and analyze the omitted contradictory facts and avoid fabricating facts, which in our opinion will require USGCRP to adopt Prof. Koonin's conclusions, which are the opposite conclusion of NCA5:

¹⁵ <https://www.forbes.com/sites/rogerpielke/2019/10/31/surprising-good-news-on-the-economic-costs-of-disasters/?sh=66fb82561952>

“Observations extending back over a century indicate that most types of extreme weather events don’t show any significant change – and some such events have actually become less common or severe – even as human influences on the climate grow.”

“The bottom line is that the science says that most extreme weather events show no long-term trends that can be attributed to human influence on the climate.” Id. pp. 97, 99 (emphasis added).

B. NCA5 Relies on Models that Do Not Work, Thus is Scientifically Invalid

NCA5 relies, at its foundation, on theoretical models that project future temperatures, provide scenarios and other variables as to the future climate. The projections in all the NCAs are based upon climate models. If there is something big that is systematically wrong with them, then the projections can’t be used as science.

“A3.2. Projected Climate Variables

“The NOAA Technical Support Unit (TSU) provided authors with projected climate variable information from 43 CMIP6 models...Overall, CMIP6 models show an improvement over CMIP5 in their representation of Earth system processes.” (NCA5, Appendix 3, pp. 2-3) (There are over 150 citations to the dominant CMIP model).

“Computer modeling,” Prof. Koonin explained in *Unsettled*, “is central to climate science” as their “results underpin the reports of the other UN working groups [and NCA5] that assess the impact of a changing climate on ecosystems and society.” Id. p. 78.

Thus, computer modeling is also central to the theory that fossil-fuel CO₂ will cause catastrophic global warming. To be used as science, they must pass the fundamental test of scientific method: Do they work? As shown next, they do not and thus should not be used in setting science policy and particularly reducing fossil fuels and CO₂ to “Net Zero.”

Given the foundational importance of models to climate science, Prof. Koonin devotes an entire chapter to “Many Muddled Models,” pp. 77-96. He notes that he has been “involved with scientific computing for my entire career,” publishing his first paper in 1974 on computer modeling and wrote one of the first textbooks on computer modeling. Id. pp. 77-78.

He asks, “How good are our climate models? And how much confidence should we have in what they say about future climates?” Id.

Applying the basic test of scientific method – do the climate theoretical models’ predictions work – with observations, he demonstrated that they do not.

“Projections of future climate and weather events (rely) on models demonstrably unfit for the purpose.” Id. p. 24 (emphasis added). He elaborated:

“The uncertainties in modeling of both climate change and the consequences of future greenhouse gas emissions make it impossible today to provide real, quantitative statements about relative risks and consequences and benefits of rising greenhouse gases to the Earth system as a whole, let alone to specific regions of the planet.” Id. p. 96.

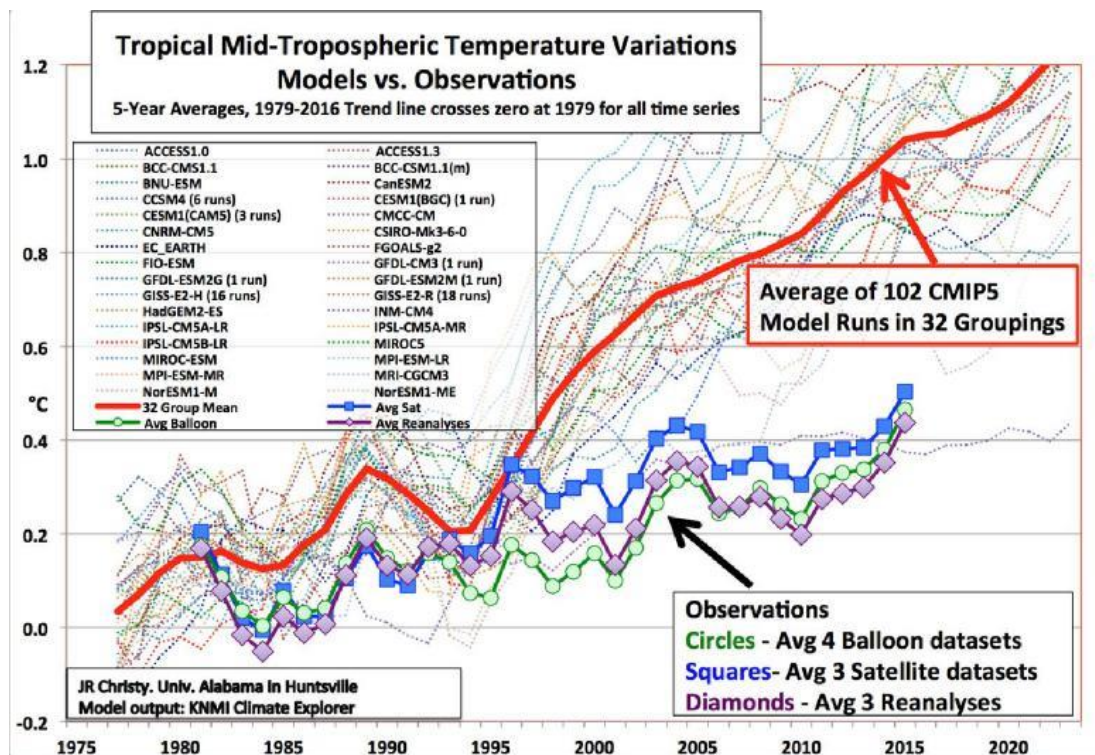
He focused on the dominant model used in NCA5 and by many others, the Coupled Model Intercomparison Project (CMIP) model, which has gone through six versions over time. The most recent is CMIP6. He demonstrated the CMIP6 theoretical model did not reliably predict observations in detail, and thus would not be used in science:

- “An analysis of 267 simulations run by 29 different CMIP6 models created by 19 modeling groups around the world shows that they do a very poor job [1] describing warming since 1950 and... [2] underestimate the rate of warming in the early twentieth century [1910-1940].” Id. p. 90 (emphasis added).

- “Comparisons among the [29] models [show]...model results differed dramatically both from each other and from observations...[and] disagree wildly with each other.” *Id.* p. 90 (emphasis added).
- “One particularly jarring failure is that the simulated global average surface temperature ...varies among models...three times greater than the observed value of the twentieth century warming they’re purporting to describe and explain.” *Id.* p. 87 (emphasis added).
- As to the early twentieth century warming when CO₂ levels only increased from 300 to 310 ppm, “strong warming [was] observed from 1910 to 1940. On average, the models give a warming rate over that period of about half what was actually observed. That the models can’t reproduce the past is the big red flag -- it erodes confidence in their projections of future climate.” *Id.* pp. 88, 95 (emphasis added).

Accordingly, the CMIP6 model fails the fundamental test of scientific method. It does not work. It is demonstrated to be incapable of predicting the past and a preposterous tool for predicting the future climate of the Earth. In science and for public decision-making, it should never be used.

John Christy, PhD, Professor of Atmospheric Science at the University of Alabama, analyzed CMIP5, the previous version. He demonstrated that its 102 predictions also failed miserably when tested by observations, as shown in the following chart:¹⁶



- The gray dotted lines are the CMIP5 model’s 102 predictions of temperatures (“simulations”) for the period 1979-2016.
- The red line is the average, called the “consensus,” of the models.

¹⁶ John Christy, House Comm. Science, Space and Technology (March 29, 2017), link ChristyJR.Written.170329.house.gov, pp. 3, 5.

- The blue, purple and green lines show the actual temperatures that were observed against which the models' predictions were tested.

The predicted values are from the 102 climate model realizations from 32 different base model groups. These models are from the most recent science compendium of the UN's Intergovernmental Panel on Climate Change (IPCC) and are the most comprehensive set available. Data for the chart were recently published in the *Bulleting of the American Meteorological Society*.

The squares are the average of the three extant datasets for satellite-sensed global temperatures in the same zone, the circles are the average of the four weather balloon records, and the diamonds are the fancy new "reanalysis" data, which uses a physical model to compensate for the fact that not all three-dimensional "soundings" of the atmosphere are from the same stations every day.

The difference between the predicted changes and observed is striking, with only one model, the Russian INCM4, appearing realistic. The graph clearly shows that 101 of the 102 predictions by the CMIP5 models (dotted lines) and their average (red line) failed to match the real-world observations significantly. Focusing on the consensus red line, he concluded:

"When the 'scientific method' is applied to the output from climate models of the IPCC AR5, ...I demonstrate that the consensus of the models [red line] fails the test to match the real-world observations by a significant margin. As such, the average of the models is untruthful in representing the recent decades of climate variation and change, and thus would be inappropriate for use in predicting future changes in the climate or related policy decisions." Id. P. 13 (emphasis added).

Simply stated, the CMIP model essential to NCA5 does not work and therefore is scientifically invalid. Thus, the next version NCA5 must delete all reliance and citations to the CMIP model, which number over 100.

C. NCA5 Relies Extensively on IPCC Findings, Which Are Government Opinions, Not Science, and Thus is Scientifically Invalid

NCA5 relies on the IPCC findings extensively, with over 150 citations. However, unknown to most, two IPCC rules require that IPCC governments control what it reports as "scientific" findings on CO₂, fossil fuels and manmade global warming, not scientists. IPCC governments meet behind closed doors and control what is published in its Summaries for Policymakers ("SPMs"), which controls what is published in full reports.

The picture below tells all.¹⁷

¹⁷ Donna Framboise. "US Seie Donna Framboise, ÜS Scientific Integrity Rules Repudiate the UN Climate Process (January29, 2017) link US Scientific Integrity Rules Repudiate the UN Climate Process | Big Picture News, Informed Analysis.



IPCC Summary for Policymakers writing meeting

Deliberation by politically designated officials is not how scientific knowledge is determined. In science, as the Lysenko experience chillingly underscores, and as Richard Feynman emphasized:

“No government has the right to decide on the truth of scientific principles.”

The two IPCC rules are:

IPCC SPM Rule No.1: All Summaries for Policymakers (SPMs) Are Approved Line by Line by Member Governments

“IPCC Fact Sheet: How does the IPCC approve reports? ‘Approval’ is the process used for **IPCC Summaries for Policymakers (SPMs)**. **Approval signifies that the material has been subject to detailed, line-by-line discussion, leading to agreement among the participating IPCC member countries**, in consultation with the scientists responsible for drafting the report.”¹⁸

Since governments control the SPMs, the SPMs are merely government opinions. Therefore, they have no value as reliable science.

What about the thousands of pages in the IPCC reports? A second IPCC rule requires that everything in an IPCC published report must be consistent with what the governments agree to in the SPMs about CO₂ and fossil fuels. Any drafts the independent scientists write are rewritten as necessary to be consistent with the SPM.

IPCC Reports Rule No. 2: Government SPMs Override Any Inconsistent Conclusions Scientists Write for IPCC Reports

IPCC Fact Sheet: “‘Acceptance’ is the process used for the full underlying report in a

¹⁸ Intergovernmental Panel on Climate Change, Principles Governing IPCC Work, the Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports , Appendix A Sections 4.4-4.6, https://archive.ipcc.ch/news_and_events/docs/factsheets/FS_ipcc_approve.pdf; <http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a-final.pdf> (Emphasis added).

Working Group Assessment Report or a Special Report after its SPM has been approved.... **Changes ...are limited to those necessary to ensure consistency with the Summary for Policymakers.**" IPCC Fact Sheet, *supra*. (Emphasis added).

IPCC governments' control of full reports using Rule No. 2 is poignantly demonstrated by the IPCC's rewrite of the scientific conclusions reached by independent scientists in their draft of Chapter 8 of the IPCC report *Climate Change 1995, The Science of Climate Change* ("1995 Science Report").

The draft by the independent scientists concluded:

"No study to date has positively attributed all or part (of the climate warming observed) to (manmade) causes."

"None of the studies cited above has shown clear evidence that we can attribute the observed [climate] changes to the specific cause of increases in greenhouse gases." Frederick Seitz, "A Major Deception on Climate Warming," *Wall Street Journal* (June 12, 1996).

However, the government written SPM proclaimed the exact opposite as to human influence:

"The balance of evidence suggests a discernible human influence on global climate." *1995 Science Report* SPM, p. 4 (emphasis added).

What happened to the independent scientists' draft? IPCC Rule No. 2 was applied, and their draft was rewritten to be consistent with the SPM in numerous ways:

- Their draft language was deleted.
- the SPMs opposite language was inserted in the published version of Chapter 8 in the *1995 Science Report*, on page 439: "The body of statistical evidence in chapter 8 ... now points towards a discernible human influence on global climate."
- The IPCC also changed "more than 15 sections in Chapter 8 of the report ... after the scientists charged with examining this question had accepted the supposedly final text." Seitz, *supra*.

As to the full IPCC reports, hundreds of world-class scientists draft some very good science. What to do? Use a presumption that anything in IPCC reports should be presumed to be government opinion with no value as reliable science, unless independently verified by scientific method.

NCA5 relies extensively on government dictated "science." The "USGCRP website states: 'When governments accept the IPCC reports and approve their Summary for Policymakers, they acknowledge the legitimacy of their scientific content.'"¹⁹ Id. (footnote omitted).

As Richard Feynman made clear, as noted: "No government has the right to decide on the truth of scientific principles." Legitimacy of scientific content is determined by scientific method. None of the IPCC SPMs, models, scenarios and other findings asserting that dangerous climate warming is caused by CO₂, GHG emissions and fossil fuels is valid science, they are merely the opinions of IPCC governments.

Thus, the next draft of NCA5 must delete all reliance on IPCC findings and IPCC

¹⁹ Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 *Fed. Reg.* 66496 (Dec. 15, 2009) ("Endangerment Findings"), p. 66511.

citations, which number over 150.

D. NCA5 Omits the Extraordinary Social Benefits of CO₂ and Fossil Fuels, and Thus Is scientifically Invalid

There is overwhelming scientific evidence that CO₂ and fossil fuels provide enormous social benefits for low-income people, people worldwide, future generations and the United States.

CO₂'s Six Extraordinary Social Benefits

1. CO₂ is Essential to Food and Thus to Life On Earth

We owe our existence to green plants that, through photosynthesis, convert CO₂ and water, H₂O, to carbohydrates with the aid of sunlight and release oxygen. Land plants get the carbon they need from the CO₂ in the air. Other essential nutrients — water, nitrogen, phosphorus, potassium, etc. — come from the soil. Just as plants grow better in fertilized, well-watered soils, they grow better in air with several times higher CO₂ concentrations than present values. As far as green plants are concerned, CO₂ is part of their daily bread—like water, sunlight, nitrogen, phosphorus, potassium and other essential elements.

Without CO₂, there would be no photosynthesis, no food and no human or other life.

2. More CO₂, including CO₂ from Fossil Fuels, Produces More Food

A major social benefit of increasing CO₂ in the atmosphere is that it increases the amount of food plants produce, through what is known as “CO₂ fertilization.” More CO₂ means more food for people around the world.

A graphic illustration of the response of plants to increases in CO₂ is shown below. Dr. Sherwood Idso grew Eldarica (Afghan) pine trees with increasing amounts of CO₂ in experiments, starting with an ambient CO₂ concentration of 385 ppm. He showed what happens when CO₂ is increased from 385 ppm to 535 ppm, 685 ppm and 835 ppm over 10 years:²⁰



Thousands upon thousands of experimental results demonstrate that more CO₂ increases the amount of food that a large variety of plants produce. See the Plant Growth Database on the Center for the Study of Carbon Dioxide and Global Change website

²⁰ CO₂ Coalition, [CO₂ 3.jpg \(1280×720\) \(co2coalition.org\)](https://www.co2coalition.org/)

(http://www.co2science.org/data/plant_growth/dry/dry_subject.php).

Mathematically, there are two formulas to calculate the amount of food that results from increasing CO₂ in the atmosphere.

Linear 15.4% Food Increase/100 ppm. Dr. Idso advised there is a linear relationship between CO₂ levels and the amount of food produced between 280 ppm and 800 ppm. “Generally, increasing CO₂ since the Industrial Revolution has elicited a linear response through the present. And that response remains linear for most plants through 800 ppm.” (Personal communication).

He further explained that the increase of CO₂ from 280 ppm to 800 ppm from 1750 to today increased the amount of food by approximately 80% or more. “[W]hat is the total benefit from [increasing CO₂ from] 280 to 700 or 800 ppm? When you use those values, your increase ...is probably closer to 70-80% (or more!).” Id.

Accordingly, this implies a linear formula. A CO₂ increase from 280 ppm to 800 ppm, a 520 ppm increase, produces approximately an 80% increase in crop production, which implies a 15.4% increase in food produced per 100 ppm increase of CO₂ in the atmosphere.

Happer Formula. The second formula is one of the author’s (Happer). Experiments with CO₂ enrichment show that many crop yields increase by a factor \sqrt{x} with adequate water and other nutrients, where x is the ratio of the current CO₂ ppm level to the former level.

Since 1750, How Much More Food Resulted From the 120 ppm Increase in CO₂? Applying these two formulas to the frequently cited 120-ppm increase in CO₂ since the beginning of the Industrial Age around 1750 shows the 120-ppm increase in CO₂ greatly benefited people around the world by increasing the amount of food available by about 20%!²¹

How Much More Food Would Result from Doubling CO₂ 400 to 800 ppm? What if the CO₂ in the atmosphere doubled from about 400 ppm today to 800 ppm, the number used for the Equilibrium Climate Sensitivity (ECS)?

Using the Happer formula, the amount of food available to people worldwide would increase by about 40%.²² Using the linear formula, the increase would be about $4 \times 15.4\%$, about 60%.

Thus, doubling CO₂ from 400 ppm to 800 ppm would increase the food available worldwide 40% – 60%.

What if the “Net Zero” fossil-fuel CO₂ policy was in effect worldwide in 1750? The amount of food available to people around the world would have been a disastrous 20% less!

What if the “Net Zero” fossil-fuel CO₂ policy stopped CO₂ from doubling 400 ppm to 800 ppm? The amount of food available to people worldwide would be 40%-60% less, greatly aggravating and hastening the looming massive human starvation.

3. In Drought-Stricken Areas, More CO₂ Produces More Food

Another social benefit of increasing CO₂ in the atmosphere is that drought-stricken areas will have more food. Science demonstrates that increasing CO₂ increases plant water-use efficiency by lessening water lost by plant transpiration.

²¹ Using the linear formula, $1.2 \times 15.4\% = 18\%$ increase. Using the Happer formula with an increase from 280 ppm to 400 ppm, $x = 410/280 = 1.46$ and $\sqrt{x} = 1.21$, a 21% increase in food.

²² $x = 800/400 = 2$ and $\sqrt{2} = 1.41$, approximately a 41% increase.

“In some cases, a doubling of the air’s CO₂ content may actually double plant” water use efficiency. C. Idso & S. Idso, *The Many Benefits of Atmospheric CO₂ Enrichment* (2011), p. 340.

4. Different Plants with More CO₂ Produce Vastly More Food

Another major social benefit of raising the amount of CO₂ in the atmosphere is there are huge variations in how different plants respond to increased CO₂.

Dr. Idso’s *Climate Change Reconsidered II: Fossil Fuels* reported six categories of plants responded to a 120-ppm increase in CO₂ ranging from 28% to 70%:²³

“Since the start of the Industrial Revolution, it can be calculated...that the 120 ppm increase in atmospheric CO₂ concentration [from 280 ppm to about 400 pm today] increased agricultural production per unit land area” for various crops averaging 57% and ranging from 28% to 70% as follows, listed in order of the largest increase:

“70% for C3 cereals”

“67% for root and tuber crops”

“62% for legumes”

“51% for vegetables”

“33% for fruits and melons”

“28% for C4 cereals.”

Similarly, *2050 Global Food Estimates* Table 2 shows that the 90 crops that make up 95% of the total food produced in the world respond to a 300-ppm increase in CO₂ over a wide range – a 176% increase for coffee, 135% increase for onions, 110% increase for pigeon peas and a 5% increase for pineapples. Id. p. 12.

Thus, the opportunity to significantly increase food production is to identify and harvest the plants that produce the most food in response to CO₂ fertilization.

5. Different Varieties of the Same Plant with More CO₂ Produce Vastly More Food

Another way more CO₂ produces more food is because different varieties of the same plant, called genotypes, respond to increased CO₂ fertilization in widely different amounts.

For example, 16 varieties of rice respond to CO₂ fertilization by producing an amount of rice that ranges from decreasing 7% to increasing 263%. Id. pp. 30-31.

Thus, identifying and harvesting the crop varieties that produce the most food in response to CO₂ fertilization, like the rice variety that increases the amount of rice produced by 263%, is another opportunity to significantly increase food production

Dr. Idso underscored the remarkable impact this method by itself can have reducing human starvation by 2050. If we “learned to identify which genotypes provided the largest yield increases per unit of CO₂ rise, and then grew those genotypes, it is quite possible that the world could collectively produce enough food to supply the needs of all of its inhabitants.” Id. p. 31 (emphasis added).

Accordingly, identifying and harvesting the crop varieties with the largest yield increases, for example, the rice variety that yields 263%, would have a major impact in helping to prevent massive human starvation by 2050.

²³ *Climate Change Reconsidered II: Fossil Fuels*, p. 322, section 3.3.2 Aerial Fertilization.

6. CO₂ and Other Greenhouse Gases Keep Us From Freezing to Death

CO₂ and other greenhouse gases hinder the escape of thermal radiation to space. We should be grateful for them. Greenhouse gases keep the Earth's surface temperature warm enough and moderate enough to sustain life on earth. Without them, we'd freeze to death.

Fossil Fuels' Four Extraordinary Social Benefits

There are four, little reported, extraordinary social benefits of fossil fuels.

1. Burning Fossil Fuels Creates More CO₂ and Thus More Food

As explained, increasing the CO₂ in the atmosphere can substantially increase the amount of food available to people worldwide. But where can we get more CO₂? Continue using, and even better, increase the use of fossil fuel. Fossil-fuel CO₂ has the same power to create more food through photosynthesis.

2. Fossil Fuels are Essential to Making Fertilizers

Also, as explained previously, in the early 1900s, Fritz Haber and Carl Bosch developed a process and method of production by which natural gas and atmospheric N₂ could be converted into ammonia (NH₃), an extraordinarily effective fertilizer for growing plants as shown above.

As noted, today it "is estimated that nitrogen fertilizer now supports approximately half of the global population." Thus, if "Net Zero" and "Carbon-0" policies and actions to eliminate fossil fuels are implemented, about half the world's population would not have enough food without fossil fuel derived nitrogen fertilizers.

3. Fossil Fuels are Essential to Making Key Pesticides

Many pesticides (and countless other chemicals in everyday use) are produced from gas and oil, including chlorobenzene, neonicotinoids, pyrethroids, and glyphosate. About one billion pounds of pesticides are used each year in the United States to control weeds, insects, and other pests.

The use of pesticides has resulted in a range of benefits, including increased food production and reduction of insect-borne disease. Those benefits would be greatly diminished and more expensive if nitrogen derived from fossil fuels were unavailable.

Thus, eliminating fossil fuels would be disastrous by itself for eliminating fertilizers and pesticides that the world's food supply depends on and without which there will be massive human starvation.

As noted previously, Sri Lankan President Rajapaksa in April 2021 banned "the importation and use of synthetic fertilizers and pesticides and ordered the country's 2 billion farmers to go organic."²⁴ The result was disastrous. "Its rice production has dropped more than 50%, while domestic rice prices have increased more than 80%." Id. This is a real-life warning of the worldwide disaster that will result by eliminating fossil fuels and implementing "Net Zero" and "Carbon-0" policies and actions.

4. Fossil Fuels are the Most Reliable, Low-Cost Source of Energy

The fourth extraordinary social benefit of fossil fuels of course is that they provide low-cost energy and resulting jobs.

By omitting the six extraordinary social benefits of CO₂ and omitting the four

²⁴ Raleigh, "Sri Lanka Crisis Shows the Damning Consequences of Western Elites Green Revolution," *Federalist* (July 15, 2022).

extraordinary social benefits of fossil fuels, NCA5 is fatally flawed science.

E. NCA5 Omits the Disastrous Consequences of Reducing Fossil Fuels and CO₂ to “Net Zero,” and Is Thus Scientifically Invalid

Eliminating Fossil Fuels Will Eliminate Nitrogen Fertilizer That Feeds Half the World. The importance of fossil fuel-derived nitrogen fertilizers cannot be overstated. It is “estimated that nitrogen fertilizer now supports approximately half of the global population” by itself.²⁵

As background, Fritz Haber and Carl Bosch in the early 1900s developed a process and method of production by which natural gas and atmospheric N₂ are converted into ammonia (NH₃), a game changing fertilizer for growing plants as shown in the following chart.²⁶

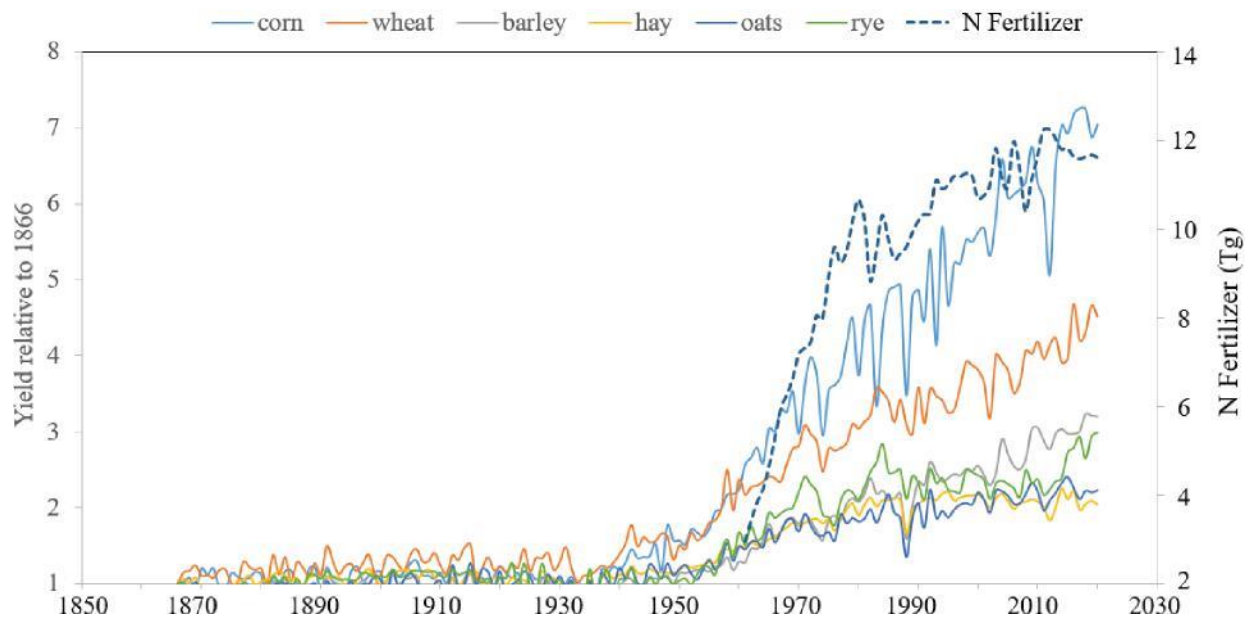


Figure 14: *Crop yields relative to yields in 1866 for corn, wheat, barley, grass hay, oats and rye in the United States. Also shown from the year 1961 is the annual mineral nitrogen fertilizer (in Tg = megatonnes) used in agriculture. Crop yields are from the USDA, National Statistical Service [62] and nitrogen fertilizer usage is from the Food Agriculture Organization statistical database [58]. Note the high correlation between yields and the use of nitrogen fertilizer.*

The chart shows a remarkable increase in crop yields after the widespread use of fossil fuel-derived nitrogen fertilizer began around 1950, compared to crop yields from 1866 to 1950.

The following chart shows more specifically what happened after the widespread use of nitrogen fertilizer started around 1950, with a threefold increase in cereal crop production between 1950 and 2020. Id. p. 38:

²⁵ Ritchie, "How Many People Does Synthetic Fertilizer Feed?," Our World in Data (November 7, 2017), [How many people does synthetic fertilizer feed? - Our World in Data](#).

²⁶ Happer *et al.*, *supra*, p. 39.

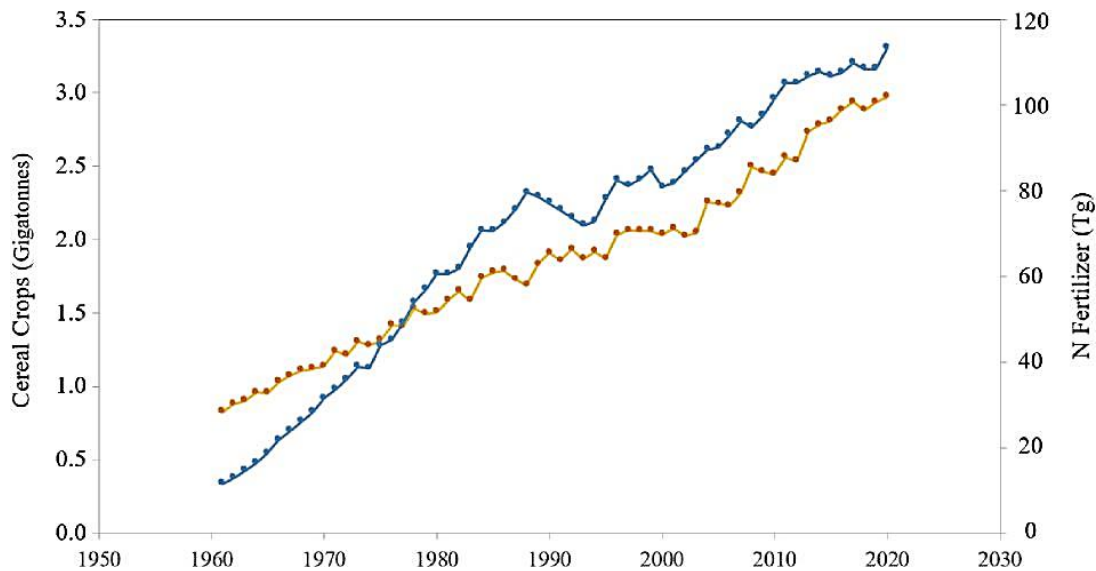
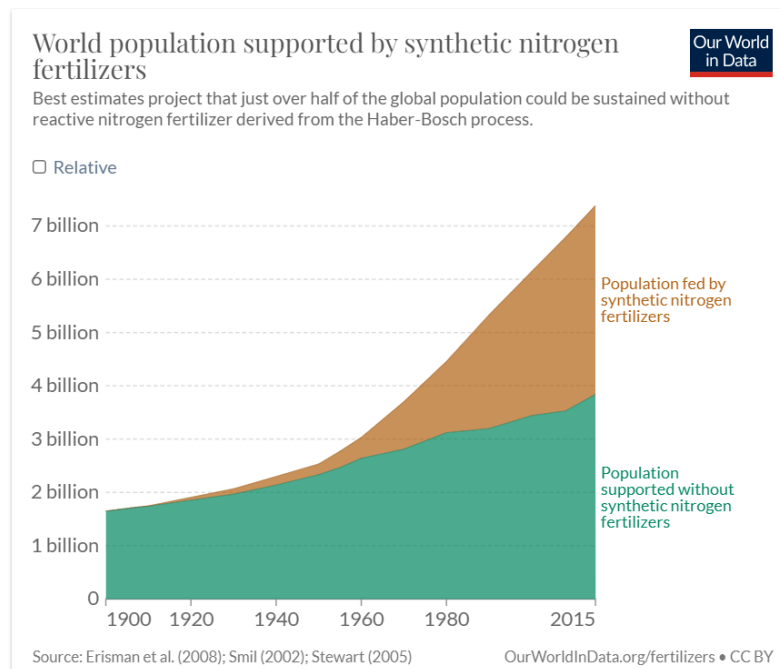


Figure 13: *Annual world production of nitrogen fertilizer used in agriculture (blue, in Tg) and world production of all cereal crops (orange, in gigatonnes) from 1961 to 2019. Data from reference [58]. The threefold increase of cereal crop yields was largely due to the use of mineral nitrogen fertilizer. Additional contributors to the increased yields were other mineral fertilizers like phosphorus and potassium, better plant varieties like hybrid corn, increasing concentrations of atmospheric CO₂, etc.*

Today, as noted, it “is estimated that nitrogen fertilizer now supports approximately half of the global population,” shown in the following chart: ²⁷



Accordingly, it cannot be overemphasized that eliminating fossil fuels and implementing “Net Zero” policies and actions mean the elimination of fossil fuel-derived nitrogen fertilizers and pesticides will result in about half the world’s population not having

²⁷ Ritchie, *supra*.

enough food to eat.

As noted, Sri Lanka recently demonstrated this is not mere theory by foreshadowing the human tragedy that the elimination of fertilizers and pesticides dependent on fossil fuels will cause. Sri Lankan President Rajapaksa in April 2021 banned “the importation and use of synthetic fertilizers and pesticides and ordered the country’s 2 billion farmers to go organic.”²⁸ The result was disastrous. “Its rice production has dropped more than 50%, while domestic rice prices have increased more than 80%.” *Id.* Hungry and angry Sri Lankans stormed the President’s office, and he fled the country.

For this reason alone, NCA5’s omitting these facts about nitrogen fertilizer renders the NCA5 fatally flawed as science. It also demonstrates that it is necessary to immediately stop all efforts to eliminate fossil fuels to avoid massive human starvation in the future

Further, eliminating fossil fuels eliminates all four of the extraordinary social benefits of fossil fuels detailed above, and reducing CO₂ emissions to “Net Zero” eliminates five of the extraordinary social benefits of CO₂, which would be disastrous for low-income people, people worldwide, future generations and the United States

By omitting the disastrous consequences of reducing fossil fuels and CO₂ emissions to “Net Zero,” NCA5 is fatally flawed science.

F. There Is No Risk of Catastrophic Global Warming Caused by Fossil Fuels and CO₂

Scientific knowledge, as detailed above, is determined by scientific method, which requires validating theoretical predictions with observations.

We are not aware of any reliable science that supports the NCA5’s or others’ theory fossil fuels and CO₂ will cause catastrophic global warming. We have written extensively on this issue for decades.

Specifically focusing on the use, or failure to use, scientific method provides three arguments, each of which alone demonstrates there is no risk of catastrophic global warming caused by fossil fuels and CO₂.

1. None of the Models Work. All of the models we are aware of use in NCA5 and elsewhere asserting fossil fuels and CO₂ will cause catastrophic global warming do not work: all of the model predictions fail miserably, as shown above. Thus, none of them can be used as science.

Thus, without models reliably predicting catastrophe, there is no risk of catastrophic global warming for this reason alone.

2. Omitted Contradictory Data. NCA5 and all the theories we are aware of violate scientific method by either omitting data that contradict the theory, or worse, fabricating data. As noted, in our experience and as demonstrated above, “misrepresentation, exaggeration, cherry picking, or outright lying pretty much covers all the so-called evidence” marshalled in support of the theory of catastrophic global warming caused by fossil fuels and CO₂.²⁹

Focusing on the omitted hundreds of millions of years of data spanning geological time, the NCA5 and all other studies of which we know are limited to unusually short periods of time. One commonly used marker is the beginning of the Industrial Age in the 1700s and the use of fossil fuels, which is only a few hundred years ago. NCA5 in the following chart states, “Current Climate Conditions Are Unprecedented for Thousands of Years,” and refers to very short periods

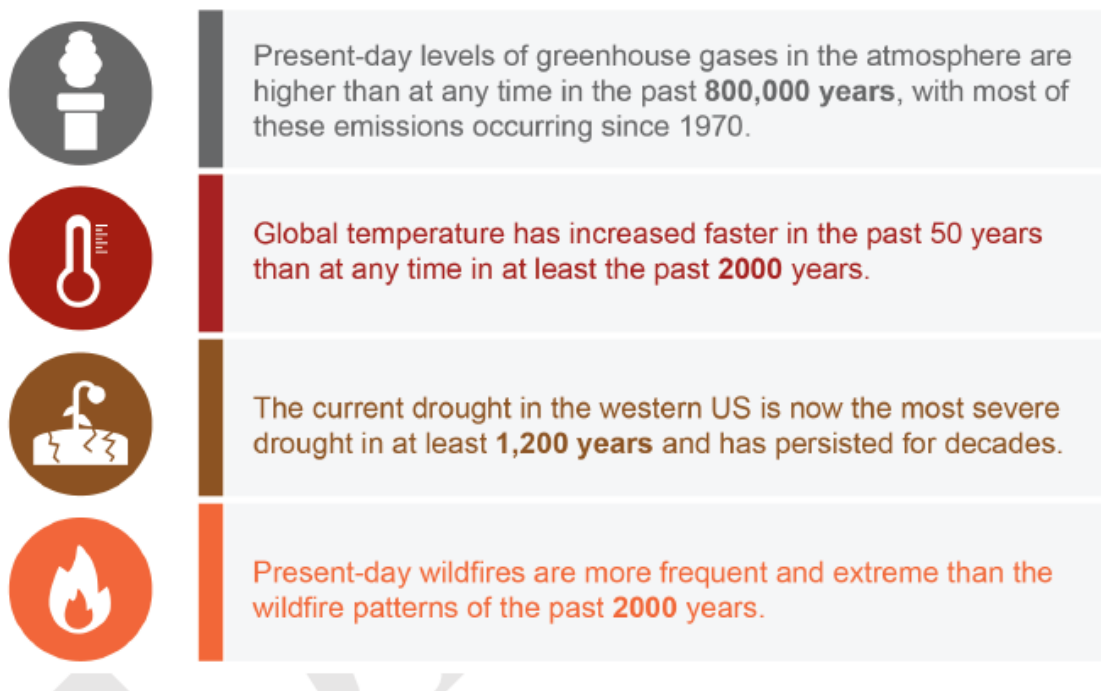
²⁸ Raleigh, “Sri Lanka Crisis Shows the Damning Consequences of Western Elites Green Revolution,” *Federalist* (July 15, 2022).

²⁹ Lindzen, *supra*.

of time: thousands of years, 50 years, 1,200 years, 2,000 years, 800,000 years.

Figure 1.3 Current Climate Conditions Are Unprecedented for Thousands of Years

Current Climate Conditions Are Unprecedented For Thousands of Years



NCA5, Chap. 1, p. 11.

The obvious question is, what happened over the hundreds of millions of years of geological time that is omitted?

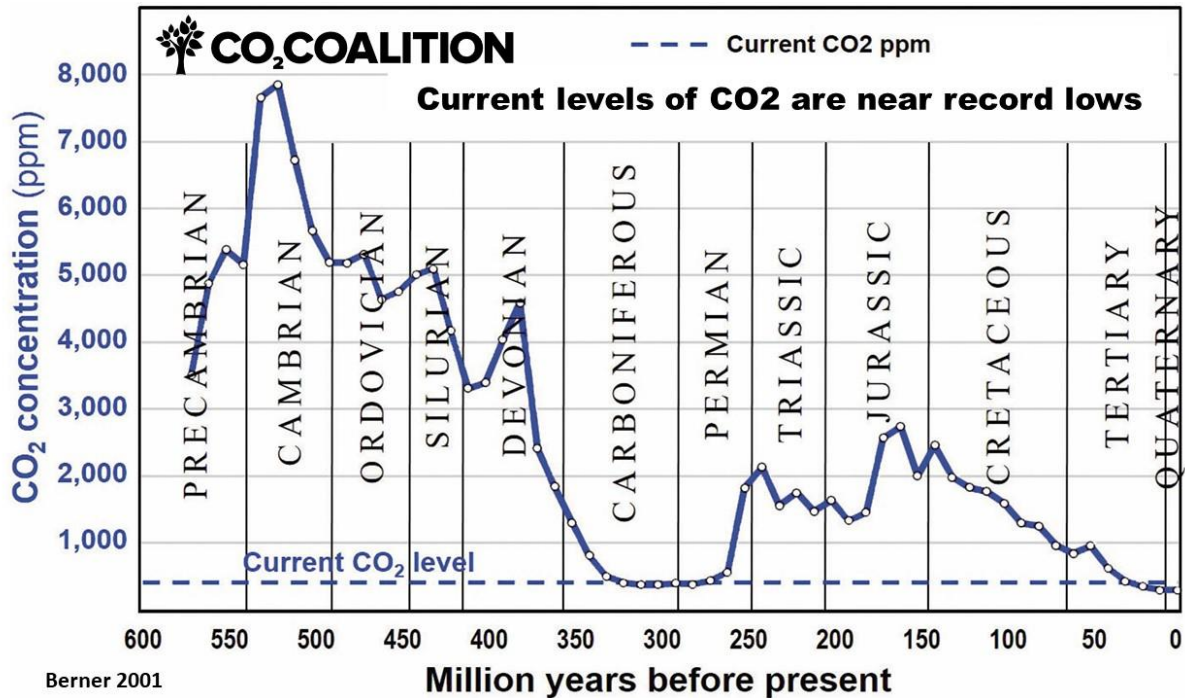
The answer we suggest is the omitted data contradicts the theory that fossil fuels and CO₂ will cause catastrophic global warming, demonstrated by the two charts below.

1. 600 Million Years of Data Show Today's 412-ppm CO₂ Level is Near a Record Low, Not Dangerously High

NCA5 reports ominously that, "Since 1850, CO₂ concentrations have increased by more than 47%," from 280 parts per million (ppm) to 412 ppm in 2020. (NCA, Chap. 2, p. 4). And it is commonly stated that today's 412 ppm level is dangerously high.

What is omitted is hundreds of millions of years of data on CO₂ levels that prove that today's 412 ppm CO₂ level is near a record low, not dangerously high:³⁰

³⁰ Gregory Wrightstown, *Inconvenient Facts* (2017), p. 16; CO2 Coalition, [CO2_07.jpg \(1280×720\) \(co2coalition.org\)](#)



What is omitted is hundreds of millions of years of data on CO₂ levels that prove that:

- CO₂ levels ranged from a high of over 7,000 ppm -- almost 20 times higher than today's 420 ppm, to a low of 200 ppm, close to today's low 420 ppm
- Today's 420 ppm is not far above the minimal level when plants die of CO₂ starvation, around 150 ppm, when all human and other life would die for lack of food.
- CO₂ levels were over 1,000 ppm for hundreds of millions of years
- The often highly emphasized 135 ppm increase in CO₂ since the beginning of the Industrial Age is trivial compared to CO₂ changes over the geological history of life on Earth.

What about temperatures?

2. 600 Million Years of CO₂ and Temperature Data Contradict the Theory that High Levels of CO₂ Will Cause Catastrophic Global Warming

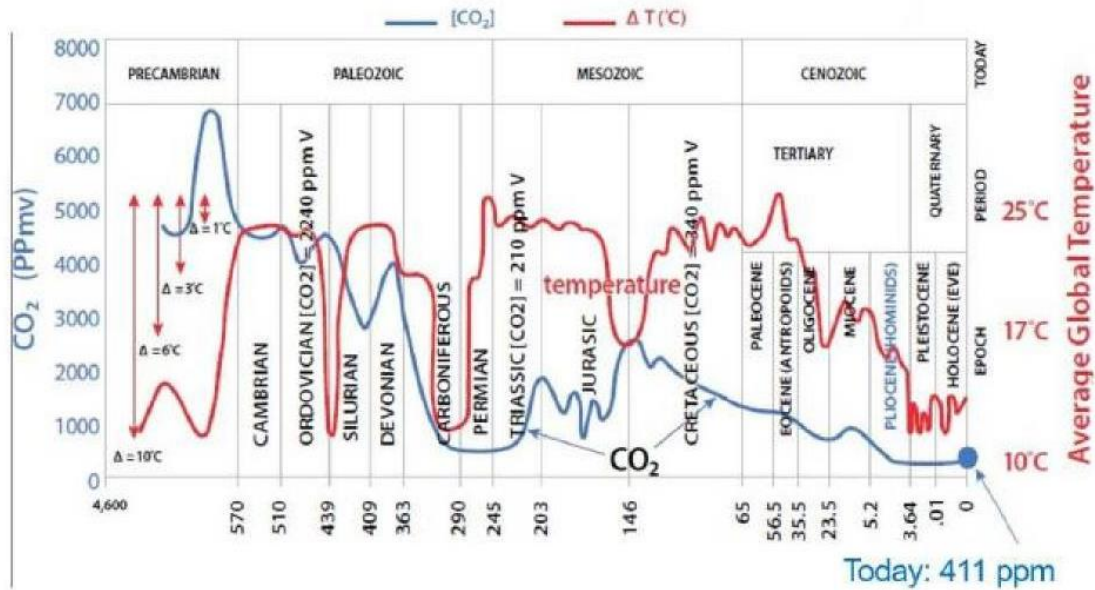
The chart below shows 600 million years of CO₂ levels and temperature data.³¹

The blue line shows CO₂ levels. The red line shows temperature.

It shows an inverse relation between CO₂ and climate temperatures most of the time, with higher levels of CO₂ correlated with lower temperatures, and vice versa, over 600 million years. Although the data are based on various proxies, with the attendant uncertainties, they are good enough to demolish the argument that atmospheric CO₂ concentrations control Earth's climate. They do not.

³¹ Nahle, "Geologic Global Climate Changes," *Biology Cabinet J.* (March 2007), Gregory Wrightstone revision.

Geological Timescale: Concentration of CO₂ and Temperature fluctuations



1- Analysis of the Temperature Oscillations in Geological Eras by Dr. C. R. Scotese © 2002. 2. Ruddiman, W.F. 2001. *Earth's Climate: past and future* W.H. Freeman & Sons, New York, NY. 3 - Mark Pagani *et al.* Marked Decline in Atmospheric Carbon Dioxide Concentrations During the Paleocene. *Science*, Vol. 309, No. 5734; pp. 600-603. 22 July 2005. *Corrected on 07 July 2008 (CO2: Ordovician Period)*.

Reconstructed atmospheric carbon dioxide concentrations (Berner, 2001) & global mean surface temperature (Scotese, 1999) over the last 550 million years

Specifically, the chart shows:

- For hundreds of millions of years, temperatures were low when CO₂ levels were high, and temperatures were high when CO₂ levels were low.
- When CO₂ was at a record high at about 7,000 ppm, temperatures were at a record low.
- CO₂ levels were low when temperatures were the highest they have ever been about 60 million years ago.
- CO₂ concentrations and temperatures are not correlated over the 600 million years.
- CO₂ levels have been relatively low for the last 300 million years, and have been declining from 2,800 ppm to today's 420 ppm over the last 145 million years.
- Temperatures have been higher than today over most of the 600 million years, and life flourished.

Thus applying scientific method to the 600 million years of omitted data contradicts the theory fossil fuels and CO₂ will cause catastrophic global warming. The theory does not agree with the observations. Scientifically, it must be rejected. For this reason alone, there is no risk of catastrophic global warming.

3. None Use Scientific Method The only arguments we are aware of that NCA5 and others marshal to support the theory of catastrophic global warming caused by fossil fuels and CO₂ do not rigorously apply scientific method. Instead, one or more of the following methods are used. They may, or may not, provide useful information. However, none determine scientific knowledge:

- consensus

- peer review
- government opinion
- models that do not work
- fabricating data
- omitting contradictory data
- ideology
- politicized science.

Accordingly, for this reason alone, none of these methods advocating the theory fossil fuels and CO₂ will cause catastrophic global warming is science and do not provide scientific knowledge.

In conclusion, focusing on scientific method, there are three reasons, separately and together, that there is no risk fossil fuels and CO₂ will cause catastrophic global warming.

V. CONCLUSION

Thus, in our scientific opinion, the 5th National Climate Assessment 3rd Order Draft is fatally flawed science for the each of the following scientific reasons separately:

- A. It omits unfavorable data that contradicts its conclusions on extreme weather
- B. It relies on models that do not work and thus would never be used in science
- C. It relies on IPCC findings, which are government opinions, not science
- D. It omits the extraordinary social benefits of CO₂ and fossil fuels
- E. It omits the disastrous consequences of reducing fossil fuels and CO₂ to “Net Zero”
- F. There Is No Risk of Catastrophic Global Warming Caused by Fossil Fuels and CO₂

We urge USGCRP in the next draft of NCA5 to apply scientific method and

1. Include and analyze the omitted facts and analysis by Prof. Koonin and others that contradict NCA5 conclusions on extreme weather
2. Delete any reliance on and citation to IPCC government controlled findings
3. Delete any reliance on and citation to CMIP models and any other models unless they have been proven to work
4. Delete any reliance on methods other than the scientific method, such as peer review and consensus
5. Include and analyze the enormous social benefits of CO₂.
6. Include and analyze the enormous social benefits of fossil fuels.

CURRICULUM VITAE

William Happer, Ph. D

I am a Professor Emeritus in the Department of Physics at Princeton University.

I began my professional career in the Physics Department of Columbia University in 1964, where I served as Director of the Columbia Radiation Laboratory from 1976 to 1979. I joined the Physics Department of Princeton University in 1980.

I invented the sodium guidestar that is used in astronomical adaptive optics systems to correct the degrading effects of atmospheric turbulence on imaging resolution. I have published over 200 peer-reviewed scientific papers, am a Fellow of the American Physical Society, the American Association for the Advancement of Science, and a member of the American Academy of Arts and Sciences, the National Academy of Sciences and the American Philosophical Society.

I served as Director of Energy Research in the U.S. Department of Energy from 1991 to 1993. I was a co-founder in 1994 of Magnetic Imaging Technologies Incorporated (MITI), a small company specializing in the use of laser-polarized noble gases for magnetic resonance imaging. I served as Chairman of the Steering Committee of JASON from 1987 to 1990.

I served as Deputy Assistant to the President and Senior Director for Emerging Technologies at The National Security Council in the White House from 2018 to 2019.

I am the Chair of the Board of Directors of the CO2 Coalition, a non-profit (501 (c)(3) organization established in 2015 to educate thought leaders, policy makers and the public about the vital contribution made by carbon dioxide to our lives and our economy.

Richard Lindzen, Ph. D

I am an Alfred P. Sloan Professor of Atmospheric Science Emeritus at MIT. After completing my doctorate at Harvard in 1964 (with a thesis on the interaction of photochemistry, radiation and dynamics in the stratosphere), I did postdoctoral work at the University of Washington and at the University of Oslo before joining the National Center for Atmospheric Research as a staff scientist. At the end of 1967, I moved to the University of Chicago as a tenured associate professor, and in 1971 I returned to Harvard to assume the Gordon McKay Professorship (and later the Burden Professorship) in Dynamic Meteorology. In 1981 I moved to MIT to assume the Alfred P. Sloan Professorship in Atmospheric Sciences. I have also held visiting professorships at UCLA, Tel Aviv University, and the National Physical Laboratory in Ahmedabad, India, and the Hebrew University in Jerusalem, the Jet Propulsion Laboratory in Pasadena, and the Laboratory for Dynamic Meteorology at the University of Paris.

I developed our current understanding of the quasi-biennial oscillation of the tropical stratosphere, the current explanation for dominance of the solar semidiurnal and diurnal tides at various levels of the atmosphere, the role of breaking gravity waves as a major source of friction in the atmosphere, and the role of this friction in reversing the meridional temperature gradient at the tropopause (where the equator is the coldest latitude) and the mesopause (where temperature is a minimum at the summer pole and a maximum at the winter pole). I have also developed the basic description of how surface temperature in the tropics controls the distribution of cumulus convection and led the group that discovered the iris effect where upper-level cirrus contract in response to warmer surface temperatures. I have published approximately 250 papers and books. I am an award recipient of the American Meteorological Society and the American Geophysical Union. I am a fellow of the American Meteorological Society, the American Geophysical Union and the American Association for the Advancement of Science, and a member of the National Academy of Sciences and the American Academy of Arts and Sciences.

I have served as the director of the Center for Earth and Planetary Sciences at Harvard, and on numerous panels of the National Research Council. I was also a lead author on the Third Assessment Report of the UN's Intergovernmental Panel on Climate Change – the report for which the IPCC shared the Nobel Peace Prize with Al Gore. I am currently a member of the CO2 Coalition.

Gregory Wrightstone

I am a geologist with degrees in geology from Waynesburg University (BS) and West Virginia University (MS). I was deeply involved in the early research and exploration for the vast shale gas reserves in the eastern United States. I was the co-author of the first peer-reviewed comprehensive paper on the Marcellus Shale Mega giant Gas Field, the largest natural gas accumulation in the world. I also authored studies on a previously undocumented Super-Giant field, the Burket Shale.

I am the author of the climate change-related Inconvenient Facts, a #1 bestseller. I was accepted as an Expert Reviewer for the Intergovernmental Panel on Climate Change (AR6). I am Executive Director of the CO2 Coalition.

CO2 Coalition

The CO2 Coalition is the nation's leading organization providing facts, resources and information about the vital role carbon dioxide plays in our environment. Membership is comprised of more than 90 of the world's foremost experts on climate change and represent a wide range of expertise including atmospheric physics, geology, geology, oceanography, economics and more. The Coalition provides facts and science without political ideology to the public through publications, public presentations, commentaries and interviews. Our membership has published many thousands of peer-reviewed scientific papers over a wide spectrum of climate-related topics.