CSPP One-Page Climate Issues Index

Science-based analyses of America's key environmental issues

Center for Science & Public Policy

www.scienceandpolicy.org

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

20th Century hottest in 2,000 years?

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209 Penn. Ave., SE
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Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

Claim: *20th century warming is historically unusual.*

In a series of papers, Professor Michael Mann and colleagues concluded that late-20th century temperatures are likely the warmest in the past 2,000 years in the Northern Hemisphere. This has become an excuse calling for serious energy restrictions to remediate the non-existent crisis. However, it is becoming well known that the original IPCC Third Assessment's (Chapter 2) 1000-year "hockey stick" is mainly a **mathematical product unrepresentative of real-world** historical climate change.

It has been clearly demonstrated in a series of scientific papers published late last year and earlier this year that both the tree-ring- and instrumental thermometer-based results by the University of Virginia's Professor Michael Mann, are **failing** the important scientific tenet of **replication**. In simpler terms, Mann's results have been repeatedly found to be ***irreproducible*** by independent scientists and paleoclimate experts. **Mann's conclusions are not universally accepted, and have come under increasing challenge** as of late—challenges which have questioned not only the methodology (McIntyre and McKitrick, 2003; Esper et al., 2004) and the reliability of the results (Soon and Baliunas, 2003, Soon et al., 2003; 2004), but also scientific competence (Chapman, Bartlett, and Harris, 2004). A sample of these challenges is outlined below.

• Drs. Soon and Baliunas from the Harvard-Smithsonian Center for Astrophysics, along with Drs. David R. Legates, Sherwood Idso and Craig Idso published the results of their extensive survey of the scientific literature concerning the topic of past temperature reconstructions (W. Soon et al., 2003. Reconstructing climatic and environmental changes of the past 1000 years: A reappraisal. Energy & Environment, 14, 233-296). From their survey of more than 200 articles concerning local and regional-scale climate reconstructions, they **did not** find evidence that the climate of the late 20th century was unprecedented during the past 1,000 years.

• Researchers Steven McIntyre and Ross McKitrick determined that much of the Mann **results were irreproducible** without resorting to using **flawed data** sets, inappropriate **data manipulation**, or **ill-advised statistical procedures** (S. McIntyre and R. McKitrick, 2003. Corrections to the Mann et al. (1998) proxy database and Northern Hemispheric average temperature series. Energy & Environment, 14, 751-771). Examining the McIntyre and McKitrick corrections for these data and methodological flaws, one can conclude that temperatures in the early 1400s rivaled those of the late 20th century, indicating that human influences **have not** taken the climate to unprecedented territory.

• Paleoclimate researcher Jan Esper and colleagues recently published a paper pointing out that the tree-ring histories heavily relied upon by Mann in his temperature reconstructions were of **questionable quality** (J. Esper, D.C. Frank, and J.S. Wilson, 2004. Climate reconstructions: Low-frequency ambition and high-frequency ratification. Eos, 85, 133,120). Esper and colleagues then produced a temperature reconstruction showing that the past 1,000 years have been characterized by periods of warm and cold, including a period about 1,000 years ago that was *as* **warm or warmer** than temperatures in the late 20th century.

In another less publicized criticism of Mann's work published in the April 7 issue of *Geophysical Research Letters* (D. S. Chapman, M. G. Bartlett, R. N. Harris, 2004. Comment on 'Ground vs. surface air temperature trends: Implications for borehole surface temperature reconstructions' by M. E. Mann and G. Schmidt. Geophysical Research Letters, 2004, 31, doi:10.1029/2003GL019054), a group of geophysicists found a "misleading analysis made by Mann and Schmidt [2003] [where there was] **inappropriate** use of end-points in reaching a numerical conclusion." These geophysicists from the University of Utah concluded that the result by Mann and Schmidt is simply "based on using end points in computing changes in an oscillating series and is just **bad science**."

The latest in this alarming series of revelations is a June 5 publication of the "Correction to 'Optimal surface temperature reconstructions using terrestrial borehole data'" in the *Journal of Geophysical Research* by Mann and his associate themselves **admitting to significant errors** in previously peer-reviewed results.

Policy makers should take note of these serious scientific developments.

Antarctica Temperature Trends Summary

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209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: Proof ("canary in the coal mine") of man-induced global warming can be found in the recent, rapid rise of Antarctic surface temperatures.

Wrong. The **temperature history of Antarctica provides no evidence** for the CO2-induced global warming hypothesis. In fact, it argues strongly against it.

The IPCC, environmentalists, the Media and recent Senate hearings have for years crafted the public focus **only** on a tiny area of the Antarctic, the **Antarctic Peninsula**, a mere **2% of the total area** of the continent. That little area has experienced a recent **natural** warming due to interaction with the Southern Ocean. However, the other **massive 98%** of the continent has been in a **cooling trend** over the last 35 years **in complete defiance of** what the man-made **theory of global warming** says should happen.

A **major blow to** the CO2-induced global warming **hypothesis** comes from the instrumental **temperature record** of the more recent past. This setback is manifested in the **contradiction between observed and model-predicted** Antarctic temperature trends of the past three decades. According to nearly all climate models, CO2-induced global warming should be most evident in earth's Polar Regions; but analyses of Antarctic near-surface and tropospheric air temperatures tell a **radically different story**.

Antarctica. Comiso (2000) assembled and analyzed Antarctic temperature data obtained from **21 surface stations** and from **infrared satellites** operating since 1979. They found that for **all of Antarctica**, temperatures had **declined by 0.08°C and 0.42°C per decade** respectively, when assessed via these two data sets.

McMurdo Dry Valleys. Doran *et al*. (2002) examined temperature trends in this area of Antarctica over the period 1986 to 2000, reporting a **phenomenal cooling rate** of approximately **0.7°C per decade**. This dramatic rate of cooling, they state, "reflects longer term **continental** Antarctic **cooling between 1966 and 2000**," with the largest cooling centered around the South Pole and Dome C. In addition, the **14-year temperature decline** in the dry valleys occurred in the **summer and autumn**, just as most of the **35-year cooling** over the continent as a whole also occurred in the summer and autumn. The 13 authors laid down a challenge to the climate models which predict polar warming, not the cooling actually experienced, "Continental Antarctic cooling, especially the seasonality of cooling, **poses challenges to models** of climate and ecosystem change."

East Antarctica. Cremer et al. report that nearly all available Antarctic terrestrial and marine records show the **latest thousand-year** period "is generally marked by **distinct cooling** leading to glacial re-advances, more extensive sea-ice, lower precipitation, and lower bioproductivity."

Interior. Thompson and Solomon (2002) also report a **cooling trend** for the interior of Antarctica, while sea-ice concentration has **increased** and the length of the sea-ice season has **increased** over much of eastern Antarctica and the Ross Sea."

Sea Ice. Further evidence that the Antarctic as a whole is in the midst of a **cooling trend** comes from the study of Watkins and Simmonds (2000). Reporting on trends in a number of Southern Ocean sea ice parameters over the period 1987 to 1996, they found statistically **significant increases** in sea ice area and total sea ice extent, as well as an **increase** in sea ice season length **since the 1990s**. Combining these results with those from a previous study revealed these **trends to be consistent back to at least 1978**. And in another study of Antarctic sea ice extent, Yuan and Martinson (2000) report that the net trend in the mean Antarctic ice edge over the last 18 years has been an equatorward **expansion** of 0.011 degree of latitude per year. More recently, LIU et al. (2004) confirmed a general increase of Antarctic sea ice, on going since the late 1970s.

Scientifically, IPCC and S.139 policy advocates have a lot of explaining to do before they can expect whole societies to undergo an economically impoverishing culture shift in deference to a **theory which appears so patently wrong** on one of its key pillars.

References. Full literature citations can be found at:
http://www.co2science.org/subject/a/summaries/antarcticatemp.htm
http://www.john-daly.com/press/press-02a.htm#antarctic

Arctic Temperature Trends Summary

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209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: *The earth's Polar Regions, including the Arctic, are experiencing an unprecedented, dramatic and accelerated 20th century warming due to gradual CO2-induced global warming.*

Response: The fundamental message of a summary of the most current literature is that study upon study of **real-world** Arctic temperature data, observations and variability records **conclusively and emphatically demonstrate the opposite to be true**.

According to nearly all climate models, earth's Polar Regions should be the most sensitive and vulnerable areas of the planet to potential climate change; and warming and cooling epochs should be seen most clearly here and should also occur earlier than in other parts of the world. However, on balance, the region shows either **no recent warming**, **no historically unprecedented warming** or **does** show a **cooling trend**. Simply, the projected climatic changes computed for the enhanced greenhouse effect significantly differ from those **actually observed** because the temperature predictions produced by **numerical climate models are invalid**. Hence, there is **no need to invoke** rising atmospheric CO_2 concentrations as the cause of the more ordinary climate changes of the past century, or even those predicted for the future.

Chukchi Sea shelf. A 10,000-year perspective by Darby *et al*. (2001) reveals that in the recent past the Western Arctic Ocean was **3-7°C warmer** than it is today, with "no evidence the air's CO_2 concentration was either higher or fluctuating wildly during this period."

Central Alaska and Yukon. According to Muhs *et al*. (2001), during the prior interglacial these regions experienced summers **3-5°C higher than present**, when CO_2 concentration was much lower. Jorgenson *et al.* (2001) find a 300-year record of permafrost degradation **absent of any evidence** of a dramatic, accelerated 20th Century warming.

Northern Quebec. A 4,000 year perspective by Kasper and Allard shows warming from about 1900-1945, and a **cooling** for the last five decades. Arseneault and Payette (1997) report the interval between 860 and 1000AD was about 1°C warmer than today.

Sibera. Naurzbaev and Vaganov (2000) developed a 2200-year temperature record shows present warming is "**not extraordinary**."

Baffin Island, Canada. Moore *et al*. (2001) derived a 1240-year record from AD 750 to 1990. The warmest decade ended about 1220. Beginning in the 1960s, **colder** conditions prevailed until the end of the record, where alarmist claim there should have been dramatic warming.

Asian Subarctic. A 600-year temperature record by Vaganov *et al*. (2000) shows a 130-year warming trend from about 1820-1950 (lower CO_2) and **cooling trend** for the last 50 years (higher CO2).

Eurasian Arctic. Zeeberg and Forman (2001) found that summer temperatures on Novaya Zemlya island in the four decades since 1961 have been 0.3 to 0.5°C **colder** than the prior 40 years, while winter temperatures have been 2.3 to 2.8°C **colder**. These observations, the authors note, are "counter to warming predicted for the twenty-first century by climate models."

The Greenland Sea. Comiso et al. (2001) depict temperatures on Jan Mayen Island as **cooling** 0.15°C per decade over the past three-quarters of a century.

All full literature citations can be found at:
http://www.co2science.org/subject/a/summaries/arctictemptrends.htm

A Discernible Human Influence?

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Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

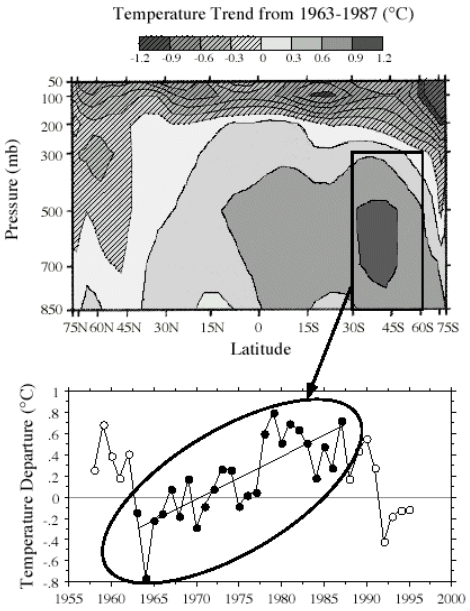
Claim: An "imprint of human influence" on the earth's climate has been found in observational temperature data of the upper troposphere, as recorded by sonde balloons.

This statement in Chapter 8 of the 1995 IPCC report has been **proven unsupportable**, having relied upon a then **unpublished** paper employing **data truncation and manipulation**. Yet, it is still faithfully and widely quoted.

In a major paper published in the British science journal *"Nature"* (Vol.382, 4 July 1996, p.39-46) Santer et al. claimed to have found the imprint of human influence in observations of upper troposphere temperatures as recorded by sonde balloons. This result then inspired the much quoted claim that there was "... **a discernible human influence on global climate**", a remark surreptitiously slipped into Chapter 8 of the 1995 IPCC Report **after** the meeting of drafting scientists in Madrid. Here is how the "discernible influence" was produced:

Santer et al. **choose** their dates (circled in the chart below) as a basis on which to compare observed conditions against those that the models would predict. Since the models predict upper troposphere warming under enhanced Greenhouse conditions, it was necessary to show that observed data agreed with the models, thus validating those models and proving that the Greenhouse human fingerprint was already evident.

However, when the **full** available time period of radio sonde data is shown (*Nature, vol.384, 12 Dec 96, p522*) we see that the warming indicated in Santer's version is **just a product of the dates chosen**. The full time period **shows little change** at all to the data over a longer 38-year time period extending both before Santer *et al*'s start year, and extending after their end year. The simple rule in science ignored by Santer is: **The longer the time span of a data series, the more reliable is the underlying trend.**



It was **5 months** before `Nature' published two **rebuttals** from other climate scientists, exposing the **faulty science** employed by Santer et al. (*Vol.384, 12 Dec 1996*). The first was from Prof. Patrick Michaels and Paul Knappenberger who observed the warming portrayed was "largely an artifact of the time period chosen."

The second rebuttal was from a German scientist, Gerd R. Weber, who drew attention to the fact that even the period of warming chosen by Santer et al. was largely explainable by known natural events (the eruption of Mount Agung, and several strong El Nino events) and not induced through any man-made cause.

So, did Santer et al. really discover a "discernible human influence on global climate"? Apparently not when the full record utilized in their paper is examined.

(For a fuller report, see http://www.john-daly.com/sonde.htm)

Global warming consensus

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Public Policy
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Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: *There is a scientific consensus about catastrophic man-made global warming.*

This has become a staple **assertion without foundation**, and is widely contradicted:

1. A petition compiled by a past president of the National Academy of Sciences has attracted the signatures of more than 17,000 American scientists (http://www.oism.org/pproject). All agree the science of climate change, and man's role in it, is uncertain.

The Petition reads in part: "There is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gasses is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate. Moreover, there is substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and animal environments of the Earth."

2. Forty-six leading climate experts wrote an open letter to Canada's National Post June 4, 2003) claiming that the Kyoto Protocol "lacks credible science." In the letter, they wrote: "Many climate science experts from Canada and around the world, while still strongly supporting environmental protection, equally strongly disagree with the scientific rationale for the Kyoto Accord (http://www.reveal.ca/friendsofscience/Martin_letter.pdf).

3. Fully 89 percent of respondents to a survey of state climatologists agreed that "current science is unable to isolate and measure variations in global temperatures caused only by man-made factors."

4. An independent organization, The European Science and Environmental Forum, has published two monographs, in which a few dozens of scientists present studies contradicting the conclusions of the IPCC.

5. Nearly one hundred scientists signed the 1996 Leipzig Declaration, protesting the alleged IPCC consensus and the implementation of the Rio de Janeiro treaty. The Leipzig Declaration termed the provisions of this treaty "drastic policies lacking credible support from the underlying science...ill-advised, wrought with economic danger, and likely to be counter-productive." (http://www.sepp.org/leipzig.html)

6. MIT professor Richard Lindzen, Ph.D., one of 11 scientists who prepared the National Academy of Sciences 2001 report on global warming has stated repeatedly that there were a wide variety of scientific views presented in that report, and that the full report made clear that there is no consensus, unanimous or otherwise, about long-term climate trends and what causes them.

7. AP wire stories for September 30, 2003 reported that at the U.N. World Climate Change Conference in Moscow Russian scientists expressed skepticism about the science behind Kyoto. Professor Kirill Kondratyev, an influential global climate expert with the Russian Academy of Sciences, said that theories linking global warming to greenhouse gas emissions ignored numerous other factors. "The only people who would be hurt by abandoning the Kyoto Protocol would be several thousand people who make a living attending conferences on global warming," said Kondratyev.

Global warming and coral bleaching

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Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: *Delicate coral reefs are being "bleached to death" in the wake of a warmer ocean.*

This is another example of the **false paradigm** concerning the fragility of nature — how small environmental changes upset the delicate balance between ecosystems.

Sen. John McCain (R-AZ) led a Senate debate on global warming on October 30, 2003 and worried about the destruction of "70% of the heat-sensitive coral reefs in the world due to increases in water temperatures—[that] place reef fisheries in jeopardy. I don't know what happens when the beginning of the food chain disappears."

But as one might expect, the subject is much more complicated than that. Corals enjoy a symbiotic relationship with certain photosynthetic algae of the genus Symbiodinium. The algae get their nutrients from the coral and the coral acquire photosynthetic products from the algae. There are different groups (or clades) of Symbiodinium that vary genetically and benefit corals in different ways.

Bleaching is evidence corals have rejected the Symbiodinium. They lose their color and when bleaching occurs, large numbers of corals die. But some corals manage to survive bleaching events. They acquire new Symbiodinium potentially better adapted to the new environment.

In a paper that appeared in Nature three years ago, Andrew Baker proposed that bleaching may be an excellent strategy employed by corals to sacrifice short-term benefits for longer-term gains. This line of thinking accounts for corals' ability to survive over millions of years and through *much harsher climate changes than those experienced over the last few decades*.

Two recent investigations into the health of the Great Barrier Reef (GRB) have been presented in Australia by the Queensland Chief Scientist and the Productivity Commission. Despite an exhaustive listing of the literature, neither of these reports was able to instance a single substantiated example of substantive damage to the GBR from an anthropogenic cause.

The Productivity Commission report (2003) concluded that there is "no conclusive evidence" of water quality decline within the GBR lagoon or of "any resulting damage to ecosystems..." But even more important, there is **abundant evidence that the GBR remains in excellent health** within the bounds of the variations which occur within its natural environment. In this context, coral bleaching outbreaks are entirely par for the course. **Natural** bleaching outbreaks have probably been occurring on the GBR for thousands of years in the past, and will continue to occur in the future.

References:

Little, A.F., M.J.H. van Oppen, and B.L. Willis, 2004, Flexibility in algal endosymbioses shapes growth in reef corals, Science, 304, 1492–1494, June 4, 2004.

Lewis, C.L., and M.A. Coffroth, 2004, The acquisition of exogenous algal symbionts by an octocoral after bleaching, Science, 304, 1490–1492, June 4, 2004.

Baker, A.C., 2001, Reef corals bleach to survive change, Nature, 411, 765 –766, June 14, 2001.

Global Warming and Coral Reefs

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Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

Claim: *Global Warming will destroy coral reefs.*

One of the **most false** and reddest of red flags around which climate alarmists rally these days is the devastation the ongoing rise in the air's CO_2 concentration is **predicted** to visit on coral reefs. They are particularly hard on global warming – man-made or natural -- in this regard, which they claim is responsible for the bleaching of corals that has occurred in many parts of the world over the past few years. True it is that coral reefs have suffered from human-induced ailments throughout the past few decades, but global warming likely is not one of them. Several scientific studies suggest this unfortunate phenomenon is more likely the consequence of a number of other human actions and that it is not in any way related to the historical increase in the atmosphere's CO_2 content. What is more, the persistence of coral reefs through geologic time provides substantive evidence that these ecological entities can successfully adapt to a dramatically changing global environment (Veron, 1995).

The earliest coral reefs date to the Palaeozoic Era, over 450 million years ago (Hill, 1956); while the scleractinian corals, which are the major builders of the reefs of today (Achituv and Dubinsky, 1990), appeared in the mid-Triassic some 240 million years later (Wells, 1956), when the earth was considerably warmer than it is currently (Chadwick-Furman, 1996). Although reef-building ceased for a time following the extinctions at the end of the Triassic, the Scleractinia came back with a vengeance during the Jurassic (Newell, 1971; Veron, 1995); and they continued to exhibit great robustness throughout the Cretaceous, *even when temperatures were 10-15°C higher than at present* (Chadwick-Furman, 1996).

At the end of the Cretaceous, 70% of the genera and one-third of the families of scleractinian corals disappeared (Veron, 1995) in the greatest biospheric extinction event in geological history. They developed again, however, throughout the Cenozoic, particularly the Oligocene and Miocene (Chadwick-Furman, 1996). Finally, throughout the past two million years of the Pleistocene, they survived at least seventeen glacial-interglacial cycles of dramatic climate change and sea level fluctuation, successfully adapting, over and over again, to these enormous environmental challenges (Kinzie and Buddemeier, 1996; Wilkinson, 1996; Pandolfi, 1999). In the words of Benzie (1999), this evidence suggests that "coral reef communities are relatively resilient, have survived previous global climate change, and appear likely to survive future changes." And this conclusion often leads one to wonder why corals should be succumbing to global warming now.

In the case of Australia's Great Barrier Reef, Jackson *et al*. (2001) list the offending anthropogenic activities as: (1) rising nutrient levels of coastal waters caused by runoff from agricultural activities on land, (2) increased sediment delivery to reefs, (3) tourists and the developers who build resorts and marinas for them, (4) huge catamarans and dive boats that take thousands of visitors to the Barrier Reef each day and dump their sewage in the sea on the way home, (5) sea life depleted to the point of exhaustion by over fishing, (6) physical damage caused by the barbed hooks and scything nets used in fishing, (7) the nets of prawn trawlers stirring up the growing load of sediments, (8) the 6-10 tons of "bycatch" for each ton of prawn caught that are left to die, (9) outbreaks of the coral-devouring crown-of-thorns starfish caused by removal of its major predators, (10) the live reef-fish trade, (11) fishermen using dynamite and cyanide, and (12) various types of pollution. Clearly, the time has definitely arrived where the further intensification of any one of these and a number of other contributing factors could well spell the end for many corals, as we indeed are seeing happen in many parts of the world.

Faced with a biological crisis that is so readily traced to the demonstrable local, as opposed to global, activities of man, it seems only logical that ameliorative measures should concentrate on these known local affronts to reef health that have known local antidotes, rather than on speculative global phenomena such as a planetary warming by carbon dioxide from human activities.

References:

Veron, J.E.N. 1995. Corals in Space and Time. Comstock, Cornel, Ithica, NY.

Newell, N.D. 1971. An outline history of tropical organic reefs. Novitates 2465: 1-37.

Kinzie, R.A., III and Buddemeier, R.W. 1996. Reefs happen. Global Change Biology 2: 479-494.

Global warming and disease

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Contact Information
209 Penn. Ave., SE
Washington, DC 20003
Tel: 202-454-5249
Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: *Global warming will expand the reach of vector-borne diseases.*

In the current debate over climate change, one of the issues most infected with alarmist claims **unsupported by both fundamental climate and medical science** is that of mosquito-borne diseases. Simplistic popular writings and models assume that mosquito-borne diseases like malaria are uniquely tropical, and warmer temperatures alone determine their incidence and distribution in northern latitudes. Thus, the **false**, incessant claim that reputed global warming, natural or man-made, would establish malaria in Europe and North America.

Dr. Paul Reiter, formerly with the Centers for Disease Control and Prevention, refutes these claims in the journal, Emerging Infectious Diseases ("From Shakespeare to Defoe: Malaria in England in the Little Ice Age," vol.6, No. 1, Jan-Feb 2000). Dr. Reiter points out that "until the second half of the 20th century, malaria was **endemic and widespread** in many temperate regions, with major epidemics as far north as the Arctic Circle. From 1564 to the 1730s, the coldest period of the Little Ice Age, malaria was an important cause of illness and death in several parts of England. Transmission began to decline only in the 19th century, when the present warming trend was well under way. The history of the disease in England underscores the role of **factors other than temperature** in malaria transmission."

According to Dr. Reiter and many other specialists, these "other factors" also apply to diseases such as yellow fever and dengue ("Climate Change and Mosquito-borne Disease," Environmental Health Perspectives, Vol. 109, supplement 1, March 2001).

These excellent and readable papers are available at:
http://ff.org/centers/csspp/pdf/reiter-climate-change-mbd.pdf
http://www.cdc.gov/ncidod/eid/vol6no1/reiter.htm
http://www.cdc.gov/ncidod/eid/press_r/reiter_pr.htm

A more recent paper investigates the **claim of a climate change induced resurgence of malaria in the East African Highlands**. Hay et al. took four mostly rural weather stations in the region and analyzed their meteorological data from 1911 to 1995. Their **verdict was both clear and blunt**: neither the climate (as measured by temperature, rainfall and vapor pressure) nor the number of months suitable for *P. falciparum* (malaria) transmission have changed significantly during the past century or during the period of reported malaria resurgence; and the high degree of variation in the climate of East Africa over the period studied suggests further that "claimed associations between local malaria resurgences and regional changes in climate are overly simplistic." In other words, when scientists expert in tropical medicine independently examined **real-world** climate data they found little change over an 85-year span, in spite of all **the spurious claims** from CRU and the IPCC about how the world is **supposed** to have warmed, even to the extent of **falsely** linking malaria and other tropical diseases to climate change.

Malaria kills more than **1 million people a year**, with 90% of these deaths occurring in Africa, **mostly in children under 5 years** of age. **False diagnosis** of global warming causation and **valueless energy restriction prescriptions** will only drain away vital resources, **assuring that death and suffering from vector-borne diseases will continue** or accelerate.

Reference:

Hay et al., *Climate Change and the Resurgence of Malaria in the East African Highlands*, Nature, v. 415, p.905, 21 Feb. 2002.

Global Warming and droughts

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Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

Claim: *Global Warming will increase severity of droughts.*

Through careful studies of growth-rings of long-lived trees, a record of drought conditions in the American Southwest extending back to 1200 A.D. (deMenocal, 2001) shows that drought conditions in the southwest **have not been especially worse in the last 40 years** when the carbon dioxide forcing on global climate are purported to be the most dominant. Expectations to the contrary are derived from climate model "scenarios." Are the more severe droughts of the past centuries – free of man-made CO_2 forcing – also in line with modeled expectations? **Not at all**.

In the words of deMenocal (2001): "Water availability, rather than temperature, is the key climatic determinant for life in semiarid expanses across the planet. Drought often conjures up images of the Dust Bowl drought of the 1930s, which lasted 6 years (1933-38) and resulted in one of the most devastating and well-documented agricultural, economic, and social disasters in the history of the United States. The drought was triggered by a large and widespread reduction in rainfall across the American West, particularly across the northern Great Plains. It displaced millions of people, cost over $1 billion (in 1930s U.S. dollars) in federal support, and contributed to a nascent economic collapse. ... A subsequent decadal-scale drought in the 1950s was also severe but less widespread, mainly impacting the American Southwest, where improved land use practices and disaster relief programs mitigated its effects.

How did the 1930s and 1950s droughts compare with other historic and prehistoric droughts? In a comprehensive analysis of hundreds of tree-ring chronologies from across the United States, Cook and others established a network of summer drought reconstructions extending back to 1200 A.D. This reconstruction documents **much more persistent droughts before the 1600s**. The so-called "mega-droughts" were extremely intense, persisted over many decades, and recurred across the American Southwest roughly once or twice every 500 years. Reconstructed conditions during the largest of these multi-decadal droughts **far surpassed** those during droughts recorded within the past 150 years (the period for which extensive instrumental data are available). Evidence for these and other **mega-droughts** have been found in detailed lake sediment records, with additional evidence for even longer, century-scale droughts in California before 1350 and 1110 A.D."

Benson et al. (2002) studied cored sediments from Pyramid Lake, Nevada. Over the most recent 2740 years, drought durations there were found to have ranged from 20 to 100 years; while droughts of the historical period have generally lasted less than a decade. Likewise, Fritz et al. (2000) used sediment cores from three North Dakota lakes to construct a 2000-year history of drought in that part of the Northern Great Plains. Their data also suggested that "droughts equal or greater in magnitude to those of the Dust Bowl period were a **common** occurrence during the last 2000 years."

Tree-ring data were used by Hidalgo et al. (2000) to construct a history of stream flow in the Upper Colorado River Basin, where they found "a near-centennial return period of extreme drought events" that went all the way back to the early 1500s. Tree rings were also used by Stahle et al. (2000) to develop a long-term history of drought over all of North America. The results of their study indicated that the **1930s Dust Bowl** drought was the United States' most (1) severe, (2) sustained and (3) wide-spread drought of the past 300 years, but that it was eclipsed in all three categories by a 16th century "megadrought" that "far exceeded any drought of the 20th century." In fact, they say "the 16th century drought was the most extreme prolonged drought in the past 2000 years." All **before the industrial age**.

Finally, in a review of the subject, Woodhouse and Overpeck (1998) concluded "twentieth-century droughts are not representative of the full range of drought variability that has occurred over the last 2000 years." Indeed, they say that the last hundred years have been characterized by droughts of "**moderate severity and comparatively short duration**, relative to the full range of past drought variability."

Global warming and glacier/sea ice melting

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Center for Science & Public Policy
www.scienceandpolicy.org

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: *Global warming will melt the world's glaciers and sea ice.*

Most of the "sweeping" claims of polar ice cap melting and sea ice thinning are **derived from model-based extrapolations that are not internally consistent with observed realities**.

The full story must begin with a clear recognition of just how few glacier data exist. Of the 160,000 glaciers presently in existence, only 67,000 (42%) have been inventoried to any degree (Kieffer *et al*., 2000); and there are only a tad over 200 glaciers for which mass balance data exist for but a single year (Braithwaite, R.J. and Zhang, Y. 2000. Relationships between interannual variability of glacier mass balance and climate. *Journal of Glaciology* 45: 456-462). When the length of record increases to five years, this number drops to 115; and if both winter and summer mass balances are required, the number drops to 79. Furthermore, if ten years of record is used as a cutoff, only 42 glaciers qualify. This lack of glacial data, in the words of Braithwaite and Zhang, highlights "one of the most important problems for mass-balance glaciology" and demonstrates the "sad fact that many glacierized regions of the world remain unsampled, or only poorly sampled," suggesting that we **really know very little** about the true state of most of the world's glaciers.

Recognizing the need for "more comprehensive, more homogeneous in detail and quality" glacier data (Kieffer *et al*., 2000, *EOS*, Transactions, American Geophysical Union 81: 265, 270-271), we shift our attention to the few glaciers for which such data exist. During the 15th through 19th centuries, widespread and major glacier advances occurred during a period of colder global temperature known as the Little Ice Age (Broecker, 2001; Grove, 2001). Following the peak of Little Ice Age coldness, it should come as no surprise that many records indicate widespread glacial retreat, as temperatures began to rise in the mid- to late-1800s and many glaciers returned to positions characteristic of pre-Little Ice Age times. What may be surprising, however, is that in many instances **the rate of glacier retreat has not increased** over the past 70 years; and in some cases glacier mass balance has **actually increased**, all during a time when the atmosphere experienced the bulk of the increase in its CO_2 content.

Confirming sea ice melting or thinning is inherently a task requiring the resolution in 3 spatial dimensions. The problem is difficult to quantify simply because sea ice can move around from place to place, induced by ocean currents and prevailing surface wind conditions. Also, ice can be thinning in one place and thickening at other locations (Holloway and Sou, 2002).

For example, the April extent of sea ice around the Nordic Sea region is shown from 1864 to 1998 (Vinje, 2001). The record shows that sea ice around this region of the North Atlantic has decreased by 33% over the past 135 years with the most likely explanation as a rebound from the cold period known as the Little Ice Age (ca. 1300-1900). According to Vinje (2001): "Nearly half of this reduction…took place before 1900, that is, before the warming of the Arctic, which took place during the first three decades of the twentieth century ... The time series indicates that we are in a state of continued recovery from the cooling effects of the Little Ice Age during which a maximum sea-ice expansion was observed around 1800, both in the Iceland Sea ... and in the Barent Sea. [T]he mean annual reduction of the April sea ice extent is decelerating by a factor of 3 between 1880 and 1980." This last observation is **inconsistent** with the expectation of carbon dioxide warming of the global atmosphere and causing more rapid decrease of sea-ice extent, especially in the recent decades when the concentration of carbon dioxide in the air is the highest.

Global Warming and Hurricanes

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Center for Science & Public Policy

www.scienceandpolicy

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: *Global warming will lead to either more frequent or more intense Atlantic basin hurricanes.*

The intensity of Hurricanes over the Atlantic basin **did not increase** over time (from 1950 to 2002) when atmospheric carbon dioxide was rapidly increasing. **In fact, there is a slight decrease in the intensity** of the intense-hurricanes, thus dispelling the myth that with carbon dioxide global warming the coast of Florida will be increasingly damaged by more and more intense hurricanes.

In a November 2002 publication by Andrew Solow and Moore, it was concluded, "The detection of a trend in hurricane activity in the North Atlantic basin has been restricted by the incompleteness of record prior to 1946. In an earlier paper, the complete record of U.S. landfalling hurricanes was used to extend the period of analysis back to 1930. In this paper, a further extension is made back to 1900. ... The results show **no significant trend** [emphasis added] in the basinwide hurricane activity over the period 1900-98." This historical extension further confirmed the fact that no extraordinary or unusual hurricane activities can be tied to the consequence of increasing atmospheric carbon dioxide.

Further, even in light of the global warming of the last hundred years, Easterling et al. (2000) report that "the number of intense and landfalling Atlantic hurricanes has declined." This is also the conclusion of Parisi and Lund (2000), relative to the time period 1935-1998. And in a detailed study of the period 1944-1996, Landsea et al. (1999) found **decreasing trends** for (1) the total number of hurricanes, (2) the number of intense hurricanes, (3) the annual number of hurricane days, (4) the maximum attained wind speed of all hurricanes averaged over the course of a year, and (5) the highest wind speed associated with the strongest hurricane recorded in each year. In addition, they determined that the total number of Atlantic hurricanes making landfall in the United States **decreased** over the extended period of time from 1899 to 1996, and that normalized trends of United States hurricane damage between 1925 and 1996 reveal such damage to be decreasing at a rate of 728 million dollars per decade.

Clearly, there appears to be little question but what **global warming in the past has tended to reduce both the frequency and intensity of Atlantic basin hurricanes**, as these many real-world studies spanning decades to millennia demonstrate.

In their review of Atlantic hurricane history, the Landsea research team, which includes some of the world's top hurricane researchers, asked and then answered a series of questions pertaining to whether climate change policy would be an appropriate method for controlling future hurricanes(Landsea et al., 1999), one of which is:

Q: *Is there reason to believe that policymakers should expect the policy actions now being contemplated will reduce the number of and intensity of future hurricanes that will impact society?*

A: There is **no evidence** to suggest that society can intentionally modulate tropical cyclone frequencies and magnitudes through energy policies. Therefore, policy responses to hurricanes ought to focus on the reduction of society's vulnerability to hurricanes, rather than on prevention of the storms themselves. For instance, in the context of insurance, Henderson-Sellers et al. (1998) recommend a focus on "appropriate reserves and restrictive underwriting" rather than on accurate predictions, or by extension, on controlling future hurricane incidences.

Global warming and Mt. Kilimanjaro glacier

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Center for Science & Public Policy

www.scienceandpolicy.org

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

Claim: *Global warming is melting Mt. Kilimanjaro's glacier.*

The consensus on Kilimanjaro's glacier recession is **wrong**.

The recession of Kilimanjaro's ice field has become the **poster child** for the impacts of global warming. Some scientists, politicians and Media have been religious in blaming human activities. However, new research shows that the causes of Mt. Kilimanjaro's well-documented glacier retreat is far more complex, **likely resulting from a natural climate shift** that occurred **more than 120 years ago**, long before widespread use of fossil energy. Thus, scientific evidence informs us that the shrinkage of Kilimanjaro's ice cap is simply part of the ebb and flow of the endless cycle of nature. This represents a perfect example of why scientific "consensus" does not equal scientific truth. And why **we should not act in haste**, basing our actions on scientific conclusions that have not been thoroughly examined and tested despite being widely quoted.

An international team of researchers led by Georg Kaser and comprising experts in tropical weather, mountain glaciers, and paleoclimate took a **behind-the-scenes look** at the Kilimanjaro ice melt and answered the question, "Is man-made global warming responsible for the loss of Kilimanjaro's glaciers?" The answer **was a resounding "no**."

They summarize their findings as follows: A synopsis of (i) proxy data indicating changes in East African climate since ca 1850, (ii) 20th century instrumental data (air temperature and precipitation), and (iii) the observations and interpretations made during two periods of fieldwork (June 2001 and July 2002) strongly support the following scenario:

"Retreat from a maximum extent of Kilimanjaro's glaciers started shortly before Hans Meyer and Ludwig Purtscheller visited the summit for the first time in 1889, **caused by an abrupt climate change to markedly drier conditions around 1880**. Intensified dry seasons accelerated ablation on the illuminated vertical walls left in the hole within Reusch Crater, probably a result of **volcanic activity**. The development of vertical features may also have started on the outer margins of the plateau glaciers **before 1900**, primarily as the formation of notches, as explicitly reported following field research in 1898 and 1912. Once started, the lateral retreat was unstoppable, **maintained by solar radiation** (emphasis added) despite less negative mass balance conditions on horizontal glacier surfaces, and will come to an end only when the glaciers on the summit plateau have disappeared." They go on to state that "positive air temperatures **have not** contributed to the recession process on the summit so far [emphasis added]." The authors conclude: "The scenario presented offers a concept that implies climatological processes **other than increased air temperature** govern glacier retreat on Kilimanjaro in a direct manner [emphasis added]. "
For full report, see (http://ff.org/centers/csspp/pdf/Kiliman-MAC-4-8-04.pdf)

Since other studies (Hay et al., 2002) of weather stations in that region also show **no temperature change** from 1911 to 1995, we can only conclude that the loss of Kilimanjaro glacier ice is **not caused by atmospheric warming**, but by something else, possibly the **sun or volcanic heat** from the ground.

Reference:

Hay et al., *Climate Change and the Resurgence of Malaria in the East African Highlands*, Nature, v. 415, p.905, 21 Feb. 2002.

Global warming and sea-level rise

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Center for Science & Public Policy

www.scienceandpolicy.org

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

Claim: *Global warming will cause massive sea level rise.*

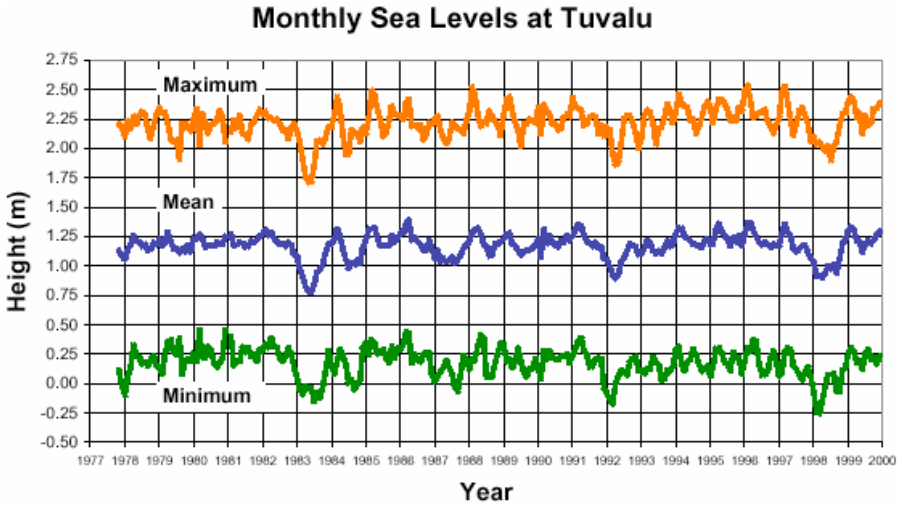
One of the major **untrue horror stories** to follow on the heels of CO2-induced global warming is a *predicted* increase in sea level that is said to be so large and rapid that *it's predicted* to devastate human settlements and natural ecosystems scattered throughout the world's low-lying coastal areas. Some claim this devastating rise is already underway.

The poster-child examples of warming alarmism are the island of Tuvalu and the Maldives. The Tuvalu government led the cry about small nations being swamped beneath the waves of rising seas, seeking wanted international compensation and for Australia and New Zealand to guarantee `residency' to their 12,000 islanders in the event of inundation.

All real measurements show that Tuvalu has suffered, at worst, no sea level rise. Now the National Tidal Facility, based in Adelaide, Australia, has dismissed the Tuvalu claims as unfounded. They have maintained accurate monitoring of sea level at Tuvalu, and report, "The historical record shows no visual evidence of any acceleration in sea level trends."

However, it is likely that beach erosion and building on the island to attract tourism have caused the sea flooding of areas over the last decade. But it is a *local* problem that will not be solved by massive cuts in carbon dioxide emissions.

Nor does there appear any sea level threat to Maldives, a coral atoll group in the centre of the Indian Ocean and inhabited for the last 1,500 years. The President of INQUA, the international commission with expertise in sea level, Nils-Axel- Mörner, had this to say recently, "It has been popular to threaten small islands and low-lying coasts with scenarios of disastrous future flooding. The Maldives has been the most utilized target. We have undertaken a careful analysis of actual sea level changes in the Maldives. *No rise* has been recorded either in the present or the past centuries. Instead we have documented *a significant sea level fall* in the last 20-30 years."



Reference:

INQUA. 2000. Homepage of the Commission on Sea Level Changes and Coastal Evolution, www.pog.su.se/sea. Sea Level Changes, News and Views, The Maldives Project.

http://www.john-daly.com/press/#maldives

Global warming and species extinction

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Center for Science & Public Policy

www.scienceandpolicy.org

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

Claim: *CO2-induced global warming will be so fast and furious that many species of plants and animals will not survive.*

A recent, exhaustive study reveals this claim as **demonstrably false**.

The Specter of Species Extinction
Will Global Warming Decimate Earth's Biosphere?
Center for the Study of Carbon Dioxide and Global Change
http://www.co2science.org/reports/extinction/mr1execsum.htm

It is said that CO2-induced global warming will be so fast and furious that many species of plants and animals will not be able to migrate towards cooler regions of the planet rapidly enough to avoid extinction. *It is said* that the process has already been set in motion by the global warming of the past hundred and fifty years. *It is said*, that "a significant impact of global warming is already discernible in animal and plant populations," and that, as a result, "we're sitting at the edge of a mass extinction."

Proponents of the CO2-induced global warming extinction hypothesis seem to be totally unaware of the fact that atmospheric CO2 enrichment tends to ameliorate the deleterious effects of rising temperatures on earth's vegetation. They appear not to know that more CO2 in the air enables plants to grow better at nearly all temperatures, but especially at higher temperatures. They feign ignorance of the knowledge (or truly do not know) that elevated CO2 boosts the optimum temperature at which plants grow best, and that it raises the upper-limiting temperature above which they experience death, making them much more resistant to heat stress.

The end result of these facts is that if the atmosphere's temperature and CO2 concentration rise together, plants are able to successfully adapt to the rising temperature, and they experience no ill effects of the warming. Under such conditions, plants living near the heat-limited boundaries of their ranges *do not* experience an impetus to migrate poleward or upward towards cooler regions of the globe. At the other end of the temperature spectrum, however, plants living near the cold-limited boundaries of their ranges are empowered to *extend their ranges* into areas where the temperature was previously too low for them to survive. And as they move into those once-forbidden areas, they actually expand their ranges, overlapping the similarly-expanding ranges of other plants and thereby *increasing local plant biodiversity*, which in turn supports *increased* wildlife diversity.

Amazingly, the vast bulk of the scientific studies that prompted media scare stories actually found just the opposite of what climate alarmists claim. Rather than suggesting earth's biosphere is about to suffer irreparable damage as a result of past natural warming and future predicted warming, they actually substantiate nearly everything scientifically deduced from what is known about the effects of atmospheric CO2 enrichment on plant physiology. Most importantly, they portray a biosphere of *increased species richness almost everywhere on earth* in response to the global warming and increase in atmospheric CO2 concentration of the past century and a half that has promoted a great expansion of species' ranges throughout the entire world.

Finally, the level of predicted future temperature increase alarmists claim will kill off over a million species has already occurred (by their reckoning) in the 20th century. Thus, by the alarmist hypothesis, we should *already* have recorded endless lists of mass climate-induced extinctions. Name just three.

Species Extinction - One Million, or Just One?

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Center for Science & Public Policy

www.scienceandpolicy.org

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

Claim: *A million of the world's species "could" become extinct by 2050 as a direct result of climate change.*

A recent **modeling** study published in *Nature*, (Thomas *et al*, v.427 p.145, 8 Jan 04) is **easily challenged** when matched with **real-word data and observations**. The study itself was **not based on real field studies**, but used unvalidated climate models matched against known habitat regions for various species and the **projected** changes to those habitats anticipated by climate models. It was a **speculative** statistical exercise, nothing more. The study focuses on several regions of the world including Australia, Brazil, Europe, Mexico, South Africa, and Costa Rica.

In one example, a BBC report on the study claims that nearly half of all protea flowering plants in South Africa "could" become extinct due to climate change. The habitat range of these plants is the Cape of South Africa, and the temperature record from Capetown, in the centre of that range, clearly shows the **warmest period** of the last 150 years was the 1930s, **not the present**. Equally clear, if the plants survived that period, they cannot be regarded as being vulnerable to "climate change". The claims are therefore entirely **speculative and without scientific foundation**.

In another example, this time a bird species, the BBC report on the study cited the Scottish crossbill as a candidate for extinction due to "climate change". Again, simple reference to real **meteorological records** of the habitat range (Tiree, Scotland) affords the means to determine the credibility of the claim. Tiree is located on Scotland's Inner Hebrides Islands, just off the west coast. The record shows the **warmest years were 1949 and 1959**. Again there appears **no justification** in the climate record to support warnings the Scottish crossbill may be in danger from climate change.

The media reports of "one million" species to become extinct begs the question what species have already become extinct in the wild as a direct result of climate change? A useful website for such a question is http://www.birdlife.org.uk/datazone/search/species_search.html which has a large database of the entire world's known bird species, making it possible to see which are endangered, threatened, or actually extinct. According to the database, "climate change" is **not implicated** in any of them; the small number cited being attributed to **non-climate factors** like hunting, land clearing, pests, etc.

The best Thomas et al. have to offer is that "climate change" over the past 30 years has been "implicated" (not proven) in **one** species-level extinction, the golden toad of Costa Rica (even this micro-climate change has been tied to **local land use changes, not global temperature changes**). So after several decades of "climate change" already, where are the extinctions? On their reasoning, there should be hundreds, thousands of them by now, not merely the lone problematic toad species they cite**.** Many, if not most, of the extinctions they "predict" are admitted by them to be a result **of non-climate factors** like land clearing, pest invasions and habitat loss. Yet the media reports attribute **all** the extinctions to climate alone.

Thomas *et al* also **contradict themselves**. On p.147 of their paper, they say "Many **unknowns** remain in projecting extinctions, and the values provided here **should not be taken as precise predictions** (emphasis added)." That was for the scientific readership. But in their abstract (the only part read by the media), they say "…**we predict** (emphasis added), on the basis of mid range climate warming scenarios for 2050 [these scenarios are themselves under serious scientific assault], that 15-37% of species in our sample of regions and taxa will be committed to extinction." So, is this a firm prediction or just a loose speculation?

Thomas *et al* further muddy their "predictions" or "projections" with this piece of confusing hair-splitting, "We estimate **proportions** of species committed to future extinction as a consequence of climate change over the next 50 years, **not the number** of species that will become extinct during this period." So are we to take this to mean that the "million" might not really be a million after all?

A climate researcher, the late John Daly, concluded, "That such **speculative nonsense** could be published in a major scientific journal is simply further evidence that the greenhouse sciences are collectively incompetent and deserve to be disregarded by the wider public." (http://www.john-daly.com/press/#species)

Sea level – The Thames Barrier Statistics

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Center for Science & Public Policy
www.scienceandpolicy.org

Contact Information
209 Penn. Ave., SE
Washington, DC 20003
Tel: 202-454-5249
Fax: 202-454-5223

Robert Ferguson
Executive Director
bferguson@ff.org

Claim: *The Thames flood control barrier, built to protect London from flooding, is used more often now than when it first started operation in 1983. Mr. David King, British Science advisor, uses this information as evidence for sea level rise and increased storminess resulting from climate change.*

This claim has been **discredited** in an official British report.

It is true that the Thames Barrier has been closing with increased frequency; however, the reasons behind this have little to do with global climate change. According England's Centre for Ecology and Hydrology (from a report developed in cooperation with England's Department for Food, Environment and Rural Affairs):

"Historical records of rising tide levels in London reflect the fact that SE England is **tilting downwards** at around 30 cm a century, and that **settlements have narrowed the river** - the width of the Thames at Westminster is now about one-third of its width in Roman times."

"Because the Thames River Barrier is now **subject to different operating rules**, it may be less useful as an indicator. The barrier is now closed to retain water in the Thames River as well as to lessen the risk of flooding. (It was closed on 9 successive tides at the start of 2003.) Thus, the number of closures has increased greatly in recent years. This indicator would only be useful if it were possible to distinguish the number of closures made specifically to lessen flood risk."

Obviously, not only is the frequency of the closing of the Thames Barrier **not a good indicator** of potential flooding as rules for its closure have changed over time, but since the river channel has been greatly modified and since the region has been **sinking due to development and other geological influences**, even a true indicator of flooding potential would not clearly reflect the influence of climate changes. Thus, the use of the Thames Barrier statistics by Mr. King to demonstrate climate change is **not a fair use of the data**.

Reference:

Indicators of Climate Change in the U.K., 2003. Centre for Ecology and Hydrology. (http://www.nbu.ac.uk/iccuk/)

Global warming and Western water

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Center for Science &

Public Policy

www.scienceandpolicy.org

Contact Information

209 Penn. Ave., SE
Washington, DC 20003

Tel: 202-454-5249

Fax: 202-454-5223

Robert Ferguson

Executive Director

bferguson@ff.org

Claim: *Global warming will drastically reduce water resources in the West.*

First, such exaggerated claims, produced only by climate models, are **dead wrong** when measured against real-world observations. Secondly, reputed climate change has and does occur without any human inducement.

This fanciful claim stems from a report (L. Ruby Leung) in the journal Climatic Change which examines the implications of a warming climate for water resources in the western United States, finding that the amount of water stored in the snow pack in the coastal mountain ranges of the western United States will decline by up to 70 percent as a result of global warming in just the next 50 years. Dr. Leung described this as the "best case scenario" warning that things could potentially be even worse.

A closer examination of Dr. Leung's report uncovers a **strange definition of "best case scenario**." The climate model that the results were based upon **assumed** an atmospheric concentration increase of greenhouse gases of 1 percent per year through the year 2100. One would think that "best case" would in some sense be grounded in reality, but this is not the case in this report. **Reality shows** that the observed atmospheric growth rate of carbon dioxide—the primary greenhouse gas—in the atmosphere is actually constant, that is, the rate of growth is not increasing at all. This fact is supported by the grow rate of atmospheric carbon dioxide measured at Mauna Loa observatory since 1958. The average growth amount during the past 25 years or so has been 1.57 parts per million per year. Starting from a year 2000 value of 370 ppm, using the observed linear increase of 1.57 ppm/yr produces a value of 527ppm by the year 2100, while using the growth rate assumed as "best case" by Dr. Leung produces a carbon dioxide concentration by the year 2100 of a whopping 1000ppm—**nearly twice as great as the projection based upon the observations!**

Since the warming effect of carbon dioxide is roughly proportional with the percentage increase in its concentration, a quick back of the envelop calculation shows that had Dr. Leung been using as a "best case scenario" one that was a simple extension of the past 25 year's behavior, the warming produced by her model would have been about **75 percent less**. Instead of a warming of 1.5 to 2ºC in the next 50 years, as she reported, a value of 0.375 to 0.50ºC would have been a more appropriate "best case."

Such a slight warming would have **far less impact** on the hydrology of the Western United States; and when combined with enriched atmospheric C02, water conservation will be achieved in agriculture use.

An analysis of the peer-reviewed literature of the past decade of experiments on over 150 individual plants found that atmospheric CO2 enrichment **increased plant water-use efficiency** more than 90% of the time. In addition, elevated CO2 **reduced total water uptake** in more than 50% of the studies, while slowing the development of water stress as indicated by plant water potential data.

Thus, as the authors conclude, plants growing in future atmospheres of higher CO2 concentration "will probably **survive eventual higher drought stress** and some species may even be able to extend their biotope into less favorable sites." (Pospisilova, J. and Catsky, J. 1999. Development of water stress under increased atmospheric CO2 concentration. *Biologia Plantarum* **42**: 1-24.)