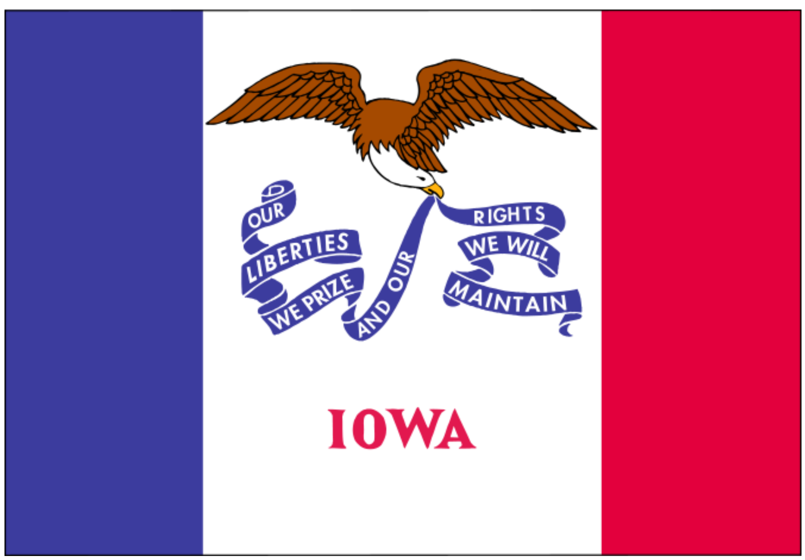
Observed Climate Change and the Negligible Global Effect of Greenhouse-gas Emission Limits in the State of Iowa



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Summary for Policy Makers

The Iowa Climate Change Advisory Council was established in the Iowa legislative session of 2007 and charged "with identifying opportunities for Iowa to respond to the challenge of global climate change by becoming more energy efficient and energy independent while spurring economic growth." In December of 2008, the Advisory Council submitted a proposal to Governor Chet Culver designed to meet the following requirements (as directed under Iowa Code section 455B.851):

- After consideration of a full range of policies and strategies, including the cost-effectiveness of the strategies, the council shall develop multiple scenarios designed to reduce statewide greenhouse gas emissions by fifty percent and ninety percent by 2050.

- The Council shall also develop short-term, medium-term, and long-term scenarios designed to reduce statewide greenhouse gas emissions and shall consider the cost-effectiveness of the scenarios.

- The Council shall establish 2005 as the baseline year for purposes of calculating reductions in statewide greenhouse gas emissions.

Astonishingly, the Climate Change Advisory Council was *not* required to outline how the proposed emissions reduction plans were going to impact the current and/or future *climate* of Iowa! What good is a plan if there is no assessment of its climate effectiveness—after all isn't addressing climate change the ultimate goal?

Action to limit greenhouse gas emissions in Iowa will have absolutely no meaningful impact on local, regional, or global climate.

Nor was the council asked to review the climate history of Iowa to assess how "global climate change" has impacted the state over the past 30 to 100 years—a time during which greenhouse gas emissions and atmospheric greenhouse gas concentrations have been increasing. How climate has varied in the past under growing greenhouse gas emissions is likely a clue to how it will evolve in the future.

The reason that neither of these two requirements was placed upon the Council was that they would have produced results that would have undermined the entire effort. First, the climate history of Iowa shows little if any indication of deleterious impacts of "global climate change." Second, action to limit greenhouse gas emissions in Iowa will have absolutely no meaningful impact on local, regional, or global climate.

In this report, we demonstrate these outcomes and provide the type of analysis that the Iowa Climate Change Advisory Council should have been required to perform.

Sadly, while no actions in Iowa will impact the future course of climate, they will most likely negatively impact the future economy of the state.

Summary Findings

Annual Temperatures

* Since 1920, there has been no long-term temperature change in Iowa
* The statewide average temperature for 2008 was the 11th coldest in 114 years
* The hottest annual temperatures occurred in the 1930s

Precipitation

* Total state precipitation from 1895-2008 increased about 10%

Drought

* Since 1895, there has been a slight trend toward wetter conditions
* Drought conditions experienced over the past 100 years are small compared to the persistent and frequent conditions hundreds of years ago
* Both droughts and wet periods are a natural part of the Iowa climate and thus neither should be exploited as examples of events caused by human activities

Crop Yields

* Yields from the state's major cash crops – corn and soybeans – have risen dramatically during the past 50+ years, for which factors other than climate are largely responsible

Prairie Pothole Region

* During the recent period of greatest increase in atmospheric green house traces gases, there was a general increase in moisture across the region. This is precisely the opposite pattern from climate model projections

Heatwaves

* Heat-related mortality trends across the nation and region are down, and are not closely tied to temperature changes

Vector-borne Diseases

* Diseases such as malaria, dengue fever and West Nile Virus are not "tropical" diseases and are largely unrelated to temperature
* Climate changes have negligible effect on transmission rates

* West Nile Virus was introduced in NY and spread to warmer regions, not the reverse

Impacts of Iowa mitigation proposals

* Iowa emissions of CO_2 are only 0.29% of total global man-made emissions
* The annual increase alone in China's emissions represents more than 12 times Iowa's total annual emissions
* Even the total elimination of 100% of Iowa emissions would be replaced in the atmosphere by the growth in world-wide emissions in one month's time
* Iowa's mitigation of CO_2 emissions at any rate will have zero effect on global climate
* A total elimination of Iowa's emissions – thus total economic shutdown – would result by 2100 in a global temperature reduction of two-thousandths of a degree C, and a sea level "saving" of two-hundredths of an inch – both values being irrelevant and virtually zero

Cost of Federal CO_2 Mitigation legislation

* Will cost Iowa jobs, a drop in household incomes, and increases in utility and gasoline prices
* At least 201 Iowa scientists, and over 31,000 US scientists, say government action on climate would damage both human prosperity and earth's environment

Recent Global Temperatures

* A decline in global temperatures has occurred in the last 7 years
* The fall in temperatures between January 2007 and January 2008 was the greatest Jan-Jan fall since records began in 1880

Additional Suggested Reading

A Storm of Errors
http://scienceandpublicpolicy.org/originals/storm_of_errors.html

SPPI Monthly CO2 Report: January
http://scienceandpublicpolicy.org/monthly_report/jan_co2_report.html

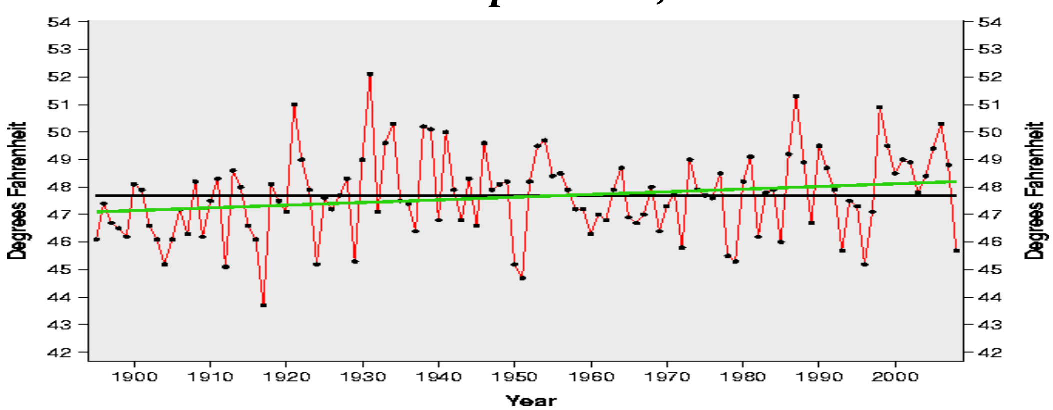
Carbon Credits: Another Corrupt Currency? The real hockey-stick graph
http://scienceandpublicpolicy.org/originals/another_currupt_currency.html

United States and Global Data Integrity Issues
http://scienceandpublicpolicy.org/originals/united_states_global_data_integrity.html

Observed climate change in Iowa

Annual temperature: The historical time series of statewide annual temperatures in Iowa begins in 1895. Over past 114 years there has been a slight overall rise in temperatures of about 1ºF; however, much of this rise took place during the early years of the 20th century—more than 80 years ago. In fact, since 1920, there has been no long-term temperature change in Iowa—the first decade of the 21st century is similar in character to the decades of the 1930s and 1940s, and as such, does not stand out as being unusual when viewed in its proper historical perspective. The statewide average temperature for 2008, 45.7ºF, turned out to be the 11th *coldest* in 114 years of record keeping. Iowa's temperature history is better described by multi-decadal variations rather than long-term trends—the decades of the early 20th century were relatively cool, the 1920s through the 1940s were relatively warm, the 1950s through the 1970s were cool again, and the 1980s to the present relatively warm again.

Iowa annual temperatures, 1895-2008



Iowa annual temperatures, 1920-2008

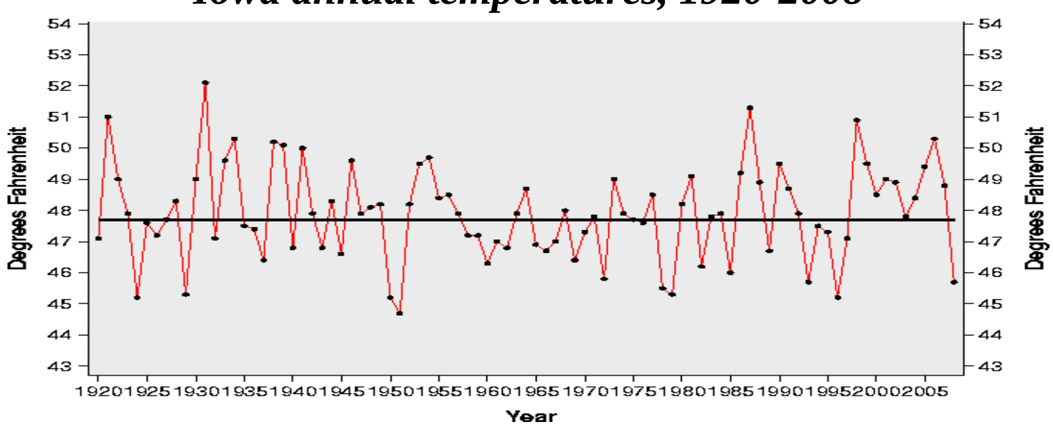


Figure 1. *Annual statewide average temperature history for Iowa, 1895-2008 (top), 1920-2008 (bottom) (available from the National Climatic Data Center http://www.ncdc.noaa.gov/oa/climate/research/cag3/ia.html).*

Seasonal temperatures: When Iowa's temperature history is broken down into the four seasons of the year, it can be seen that most of the annual warming has occurred in the winter and spring, with less warming in the summer and fall months. Again, even in the winter and spring, year-to-year and/or decade-to-decade variability is more strongly evident than is the overall change. Temperatures in recent years do not appear unusual when set against the long-term observed temperature history. There is little evidence of unprecedented "climate change" to be found in Iowa's temperature history.

Iowa seasonal temperatures, 1895-2008

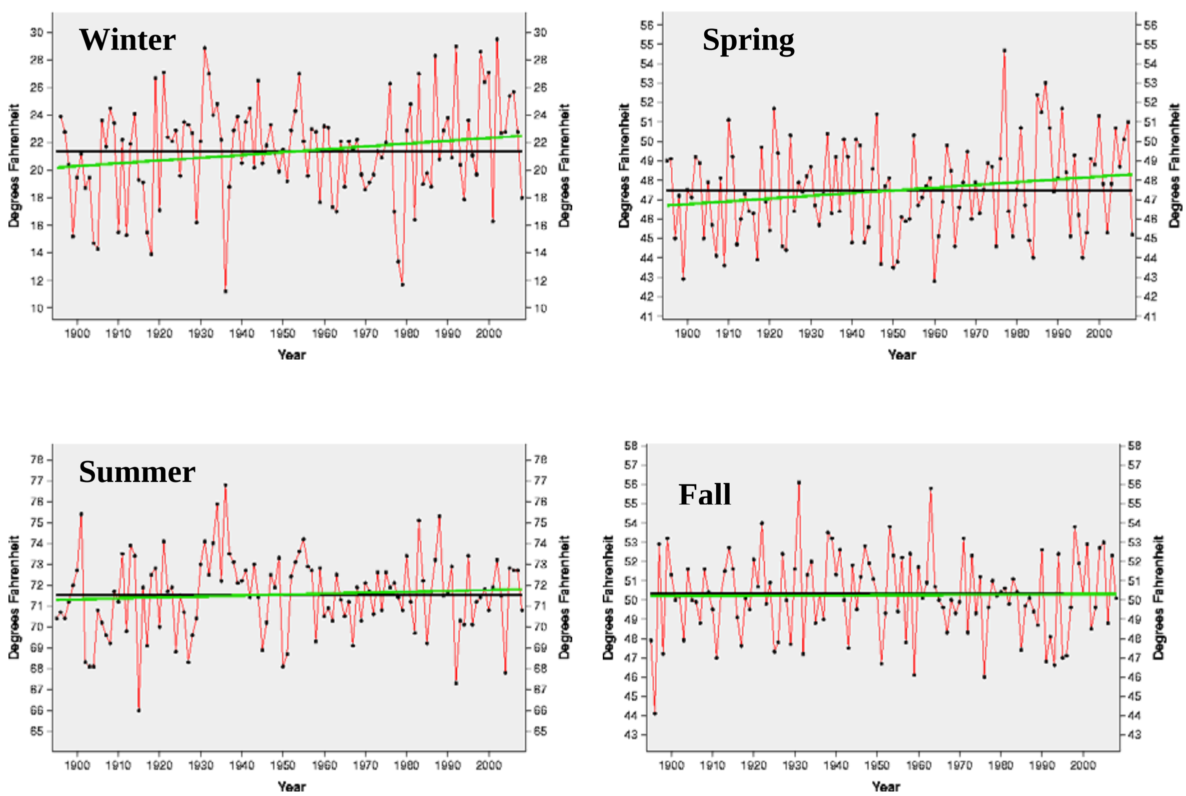


Figure 2. *Seasonal statewide average temperature history of Iowa. (source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/climate/research/cag3/ia.html)*

Precipitation: Averaged across the state of Iowa for each of the past 114 years, the statewide annual total precipitation averages about 32 inches per year. Iowa's annual precipitation is quite variable from year to year, and has varied from as much as 48.23 inches falling in 1993 to a little as 19.87 inches in 1910. In addition to the annual and decadal variability, the overall total precipitation across the state has increased by about 10% over the past century or so—primarily the result of a series of dry years in the 1930s coupled with a series of wet years in the 1980s.

Iowa annual precipitation, 1895-2008

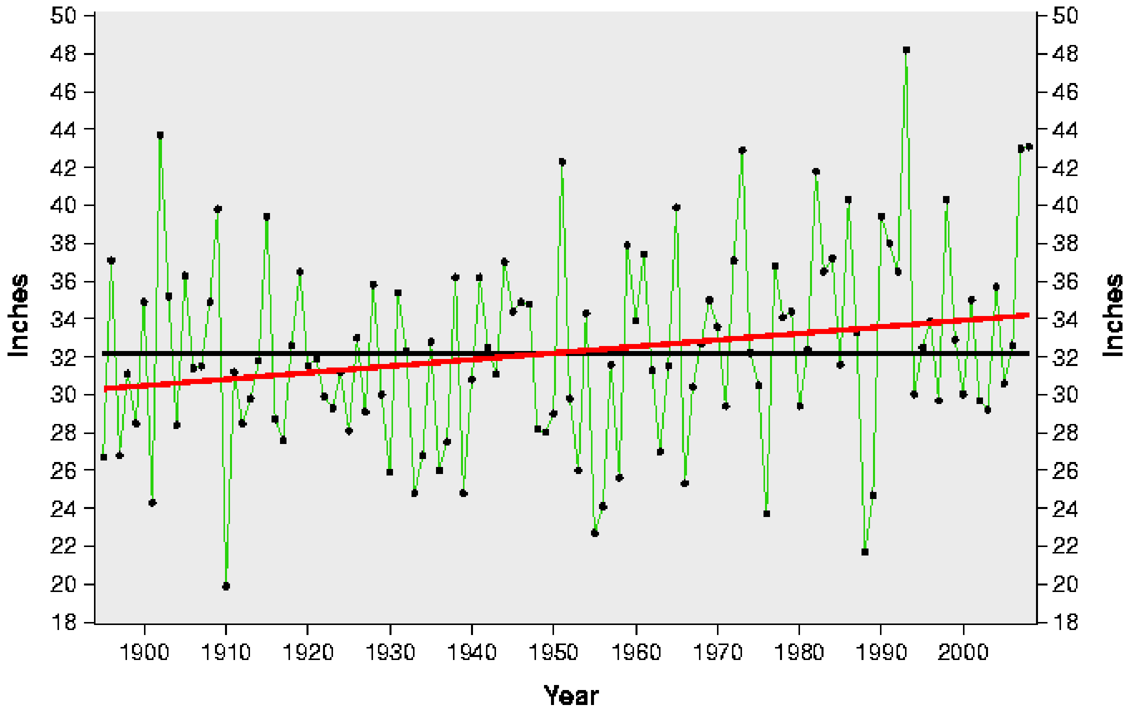


Figure 3. *Statewide average precipitation history of Iowa. There has been about a 10% increase in the statewide annual average precipitation from 1895 through 2008 (source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/climate/research/cag3/ia.html).*

Drought: Since 1895, there has been an overall trend towards slightly wetter conditions across Iowa, as the increases in precipitation have made up for any increases in evaporative loss that may have occurred as a result of the state's slightly warming temperatures. It is clearly evident from the history of the Palmer Drought Severity Index—a standard measure of moisture conditions that takes into account both inputs from precipitation and losses from evaporation—that neither the frequency nor the severity of extreme drought conditions has been on the increase across the state. Also evident from the state's drought history is the fact that annual and multiyear variations play a large role in the pattern of long-term moisture status across the state and both dry periods and wet periods occur with regularity in the natural climate of Iowa.

Iowa drought severity, 1895-2008
Palmer drought severity index

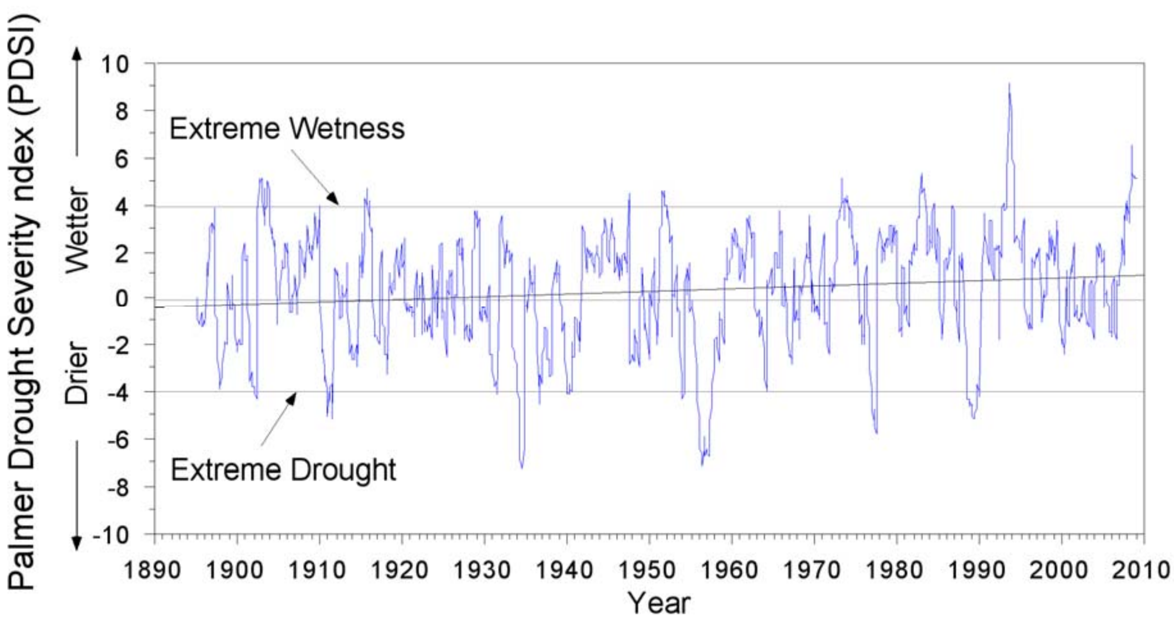


Figure 4. *Monthly statewide average values of the Palmer Drought Severity Index (PDSI) for the state of Iowa, 1895-2008 (data from the National Climate Data Center, www.ncdc.noaa.gov)*

Paleodrought: The role of natural climate variability is even more on display when we investigate the very long-term moisture records for the state. We find that the droughts experienced during the past century across Iowa—such as the Dust Bowl—pale in comparison to the long lasting and severe dry conditions that have occurred there in the more distant past.

The character of past climates can be judged from analysis of climate-sensitive proxies such as tree-rings. Using precipitation information about past precipitation contained in tree rings, Dr. Edward Cook and colleagues have been able to reconstruct a summertime moisture record for Iowa that extends back in time more than 800 years.

What is clearly evident in the paleo-reconstruction of soil moisture levels are the large and persistent swings from dry conditions to wet conditions and then back again. Drought conditions experienced over the past 100 years are small compared to the persistent and frequent dry conditions across the region hundreds of years ago. Importantly, the paleo-climate record gives us clear indication that both droughts and wet periods are a natural part of the Iowa climate system and thus neither should not be used as an example of events that are uniquely caused by human activities. Instead, they have been far worse in the past, long before any possible human influences.

Iowa's reconstructed paleo-drought severity

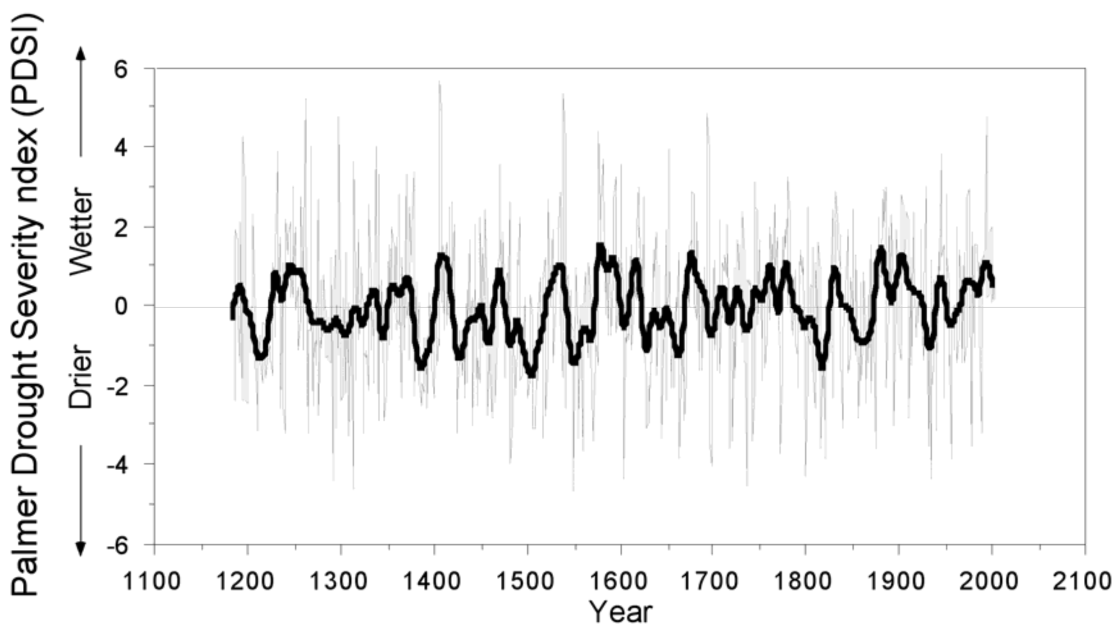


Figure 5. *The reconstructed summer (June, July, August) Palmer Drought Severity Index (PDSI) for central Iowa from 1186 A.D. to 2003 A.D. (grey lines) and the smoothed with a 20-yr lowpass filter (black line). (National Climate Data Center, http://www.ncdc.noaa.gov/paleo/pdsi.html)*

Crop Yields: In Iowa, the annual yields from the state's major cash crops such as corn and soybeans have risen dramatically during the past 50+ years (USDA). In the 1950s, the state's corn crop was yielding 50-60 bushels per acre, now it typically yields more than 150 bushels per acre. Farmers' yield from soybean crops has also more than doubled over the same time period. While there have been some long-term trends in temperature and precipitation across the state, generally, these trends are insufficient to explain rapid rise in crop yields. In fact, factors other than climate and climate change are largely responsible for this big yield increase.

Iowa Crop Yields, 1950-2008

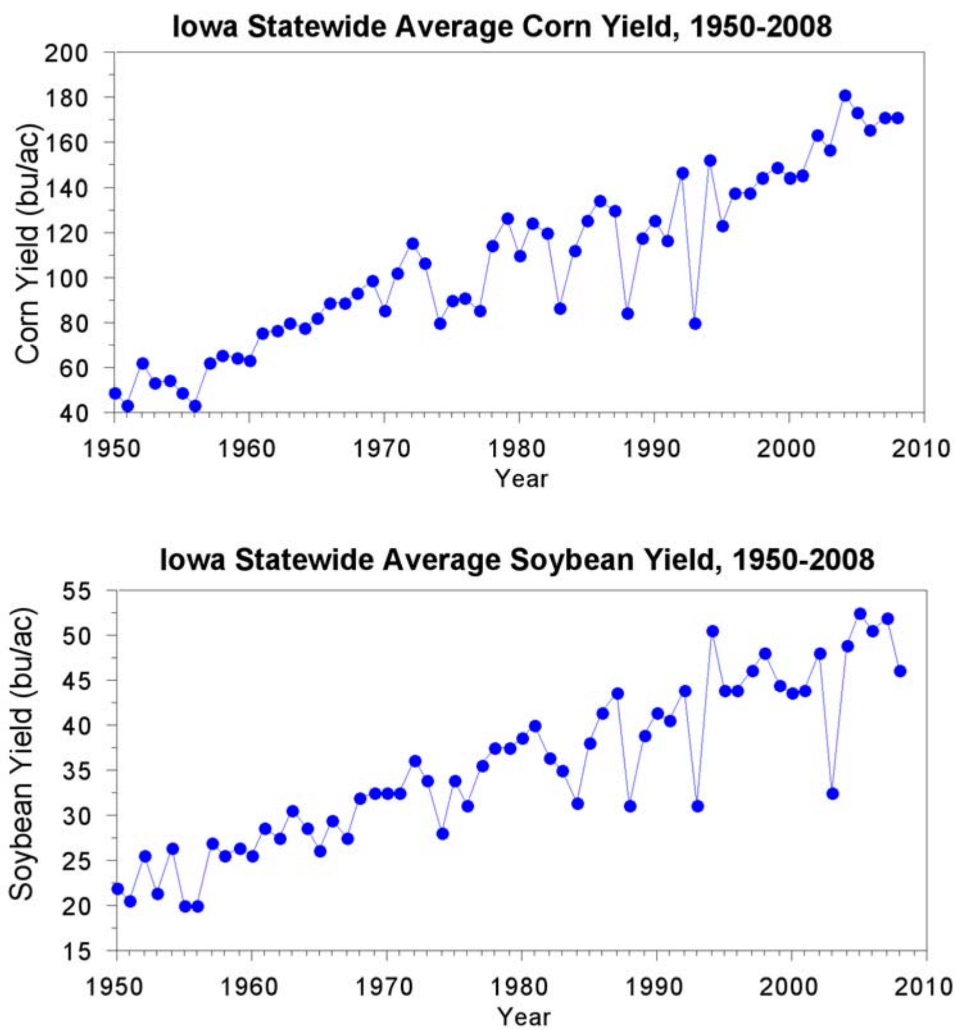
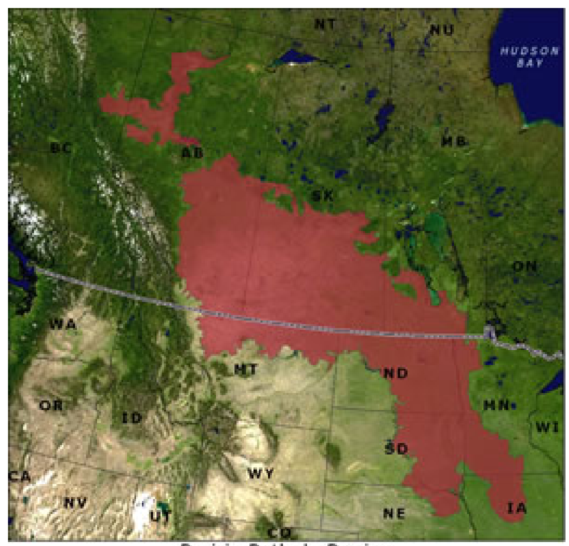


Figure 6. *History of crop yields (1950-2008) of two of the state's economically significant crops, corn (top), and soybeans (bottom). There is no indication that long-term climate changes are negatively impacting crop yields.*

Crop yields increase primarily as a result of technology—better fertilizer, more resistant crop varieties, improved tilling practices, modern equipment, and so on. The level of atmospheric carbon dioxide, a constituent that has proven benefits for plants, has increased as well. The relative influence of weather is minimal compared with those advances. Temperature and precipitation show only relatively weak trends; they are instead responsible for some of the year-to-year variation in crop yields about the long-term upward trend. Even under the worst of circumstances, minimum crop yields continue to increase. Through the use of technology, farmers are adapting to the climate conditions that traditionally dictate what they do and how they do it, while producing more output than ever before. There is no reason to think that such adaptations and advances will not continue into the future. Thus, projections of negative impacts to Iowa's agriculture that may result from climate change are largely pessimistic and unfounded.

Prairie Pothole Region

An area where there has been concern expressed over the future impacts of global warming is the Prairie Pothole Region—an area which includes much of the north-central portion of Iowa—and which is considered one the most important waterfowl breeding grounds in North America. Climate model projections suggest that the millions of shallow ponds and lakes that characterize the region will dry up or be wet for shorter periods making them less suitable waterfowl habitat. This premise is based upon droughts becoming frequent and severe across the region.



Prairie Pothole Region

However, observations of soil moisture trends do not support these model projections. A study was performed by researchers at the National Center for Atmospheric Research examining trends in soil moisture from around the globe (Dai et al., 2004). The researchers combined observed precipitation changes with observed temperature changes (which can influence the rate of evaporation) to derive historical values of the Palmer Drought Severity Index (PDSI).

Figure 7 shows the observed changes in the PDSI values during two different periods, 1900-1949 and 1950-2002. During the earlier period, there was a decline in the PDSI throughout the Prairie Pothole Region (coarsely marked by a black box in Figure 7). However, during the most recent period—the time of the greatest increase in atmospheric greenhouse gas concentrations—there was a general increase (more moisture) in the PDSI values across the Prairie Pothole Region -- just as has been the case for all of Iowa

(Figure 4). This is precisely the opposite pattern from climate model projections. This model/observation mismatch is an indication that climate models do not accurately capture observed climate behaviors at regional scales—and thus should not be trusted to provide reliable projections on such scales for future climate conditions.

Soil Moisture Changes Across the Prairie Pothole Region

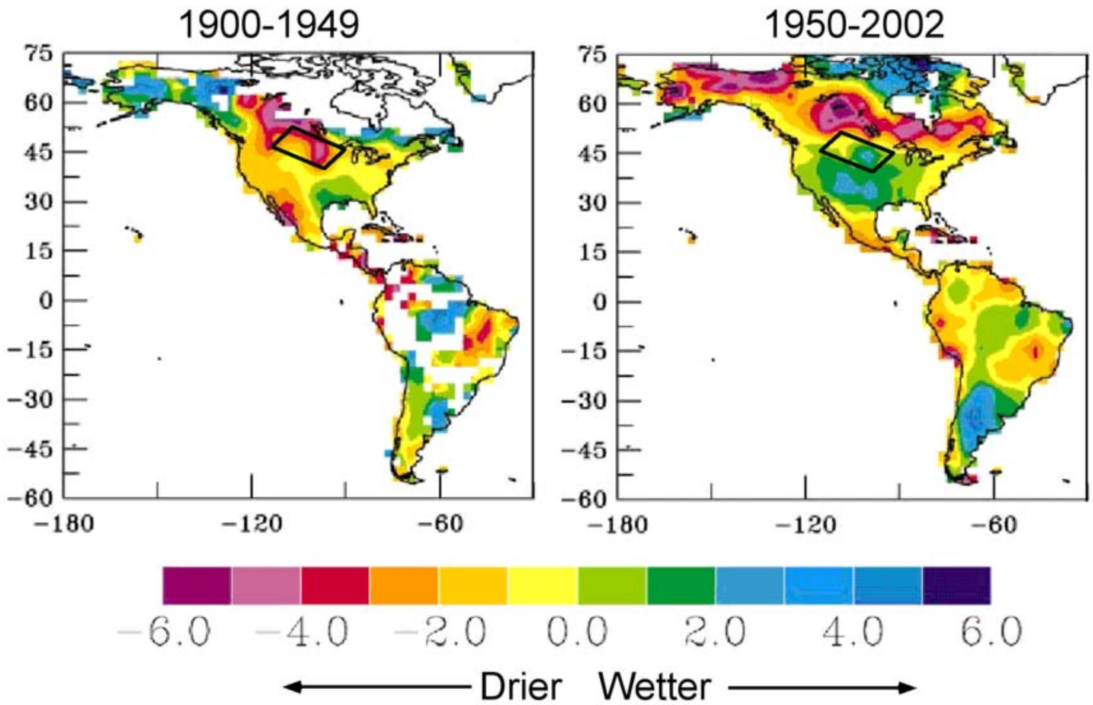


Figure 7. *Observed trend in Palmer Drought Severity Index values for two different time periods. The Prairie Pothole Region is marked roughly by the black rectangle in central North America. During the period 1900-1949 the Region grew drier, while during the more recent period, 1950-2002—the period most influenced by high atmospheric greenhouse gas concentrations—the Prairie Pothole Region became wetter. (source: Dai et al., 2004).*

Heatwaves: The urban populations of Iowa have most likely become less sensitive to the impacts of excessive heat events over the course of the past 30-40 years, as is true in most major cities across the United States—a result of the increased availability and use of air-conditioning and the implementation of social programs aimed at caring for high-risk individuals—despite rising urban temperatures artificially enhanced by heat-trapping structures of asphalt and concrete.

A number of studies have shown that during the several decades, the population in major U.S. cities has grown better adapted, and thus less sensitive, to the effects of excessive heat events (Davis et al., 2003a, 2003b). Each of the bars in Figure 8 represents the annual number of heat-related deaths in 28 major cities across the United States. There should be three bars for each city, representing, from left to right, the decades of the 1970s, 1980s and 1990s. For nearly all cities, the number of heat-related deaths is declining (the bars are get smaller). While there were no cities from Iowa included in the Davis et al. studies, major cities in several nearby states were analyzed (Minneapolis, Kansas City, St. Louis, and Chicago) and they all showed a decline in the sensitivity to heat waves. This is true in most cities in states in the upper Midwestern United States that were part of the investigation. All the nearby cities show that the heat-related mortality in the 1990s was significantly less, on a per capita basis, than the heat-related mortality in the 1960s and 1970s—meaning that the population of those cities has become better adapted to heat waves. This adaptation is most likely a result of improvements in medical technology, access to air-conditioned homes, cars, and offices, increased public awareness of potentially dangerous weather situations, and proactive responses of municipalities during extreme weather events. As figure 2 shows, there have been no significant summer-fall temperature increases in Iowa since records began in 1885. The hottest years occurred *naturally* in the 1930s – long before the increase of trace gases to the atmosphere.

Heat-related mortality trends across the U.S.

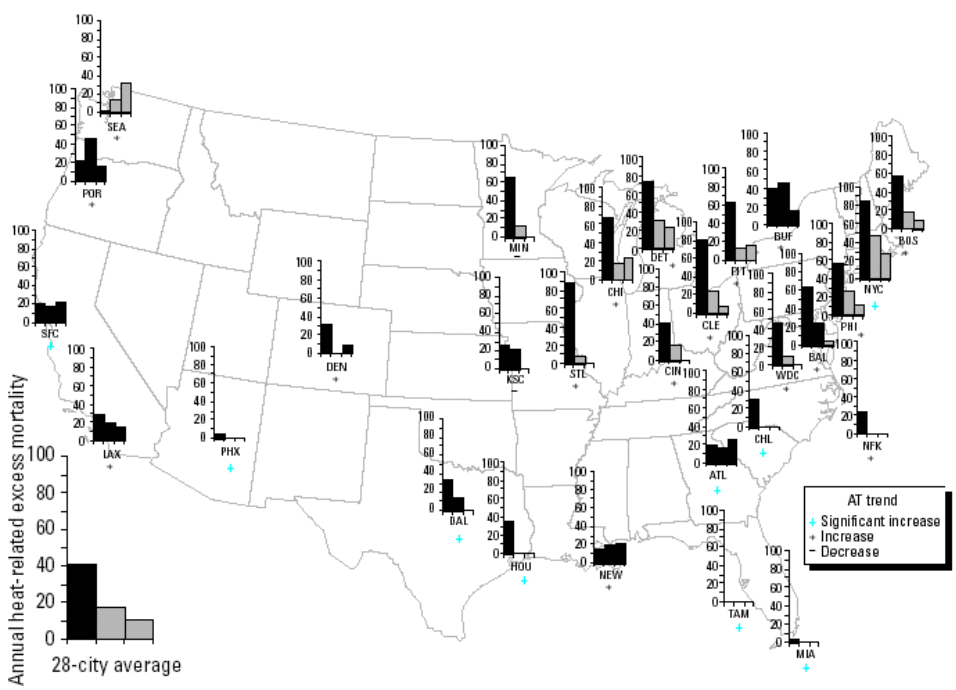


Figure 8. *Annual heat-related mortality rates (excess deaths per standard million population). Each histogram bar indicates a different decade (from left to right, 1970s, 1980s, and 1990s). (Source: Davis et al., 2003b).*

The pattern of the distribution of heat-related mortality shows that in locations where extremely high temperatures are more commonplace, such as along the southern tier states, the prevalence of heat-related mortality is much lower than in the regions of the country where extremely high temperatures are somewhat rarer (e.g. the northeastern U.S.). This provides another demonstration that populations adapt to their prevailing climate conditions. Contrary to pessimistic projections of increasing heat-related mortality, if temperatures warm in the future and excessive heat events become more common, there is every reason to expect that adaptations will take place to lessen their impact on the general population – unless ill-informed policy continues destroying and denying electricity-generation projects.

Vector-borne diseases: Malaria, dengue fever, and West Nile Virus, which have been erroneously predicted to spread owing to "global warming," are not tropical diseases. Climate change will accordingly have a negligible effect on their transmission rates. These diseases are readily controlled by well-known public health policies.

Malaria epidemics occurred as far north as Archangel, Russia, in the 1920s, and in the Netherlands. Malaria was common in most of the United States until the 1950s (Reiter, 1996). In the late 1800s, when the United States was colder than today, malaria was endemic east of the Rocky Mountains—a region stretching from the Gulf Coast all the way up into northern Minnesota and encompassing all of Iowa.

In 1878, 100,000 Americans were infected with malaria, and some 25,000 died. Malaria was eradicated from the United States in the 1950s not because of climate change (it was warmer in the 1950s than in the 1880s), but because of technological advances. Air-conditioning, the use of screen doors and windows, and the elimination of urban overpopulation brought about by the development of suburbs and automobile commuting were largely responsible for the decline in malaria (Reiter, 1996).

Malaria occurrence in the United States, 1880s

Figure 9. *In the late 19th century malaria was endemic in shaded regions, including the entire state of Iowa. (Source: Reiter, 2001)*

The effect of technology is also clear from statistics on dengue fever outbreaks, another mosquito-borne disease. In 1995, a dengue pandemic hit the Caribbean and Mexico. More than 2,000 cases were reported in the Mexican border town of Reynosa. But in the town of Hidalgo, Texas, located just across the river, there were only seven reported cases (Reiter, 1996). This is just not an isolated example. Data collected over the past decade have shown a similarly large disparity between incidence of disease in northern Mexico and in the southwestern United States, though there is very little climate difference.

Another "tropical" disease that is often wrongly linked to climate change is the West Nile Virus. The claim is often made that a warming climate is allowing the mosquitoes that carry West Nile Virus to spread into Iowa. This reasoning is incorrect. West Nile Virus, a mosquito-borne infection, was introduced to the United States through the port of New York in summer 1999. Since its introduction, it has spread rapidly, reaching the West Coast by 2002. Incidence has now been documented in every state as well as most provinces of Canada. Again, the disease spread from cooler regions to warmer ones – not the reverse.

Spread of the West Nile Virus across the United States after its Introduction in New York City in 1999

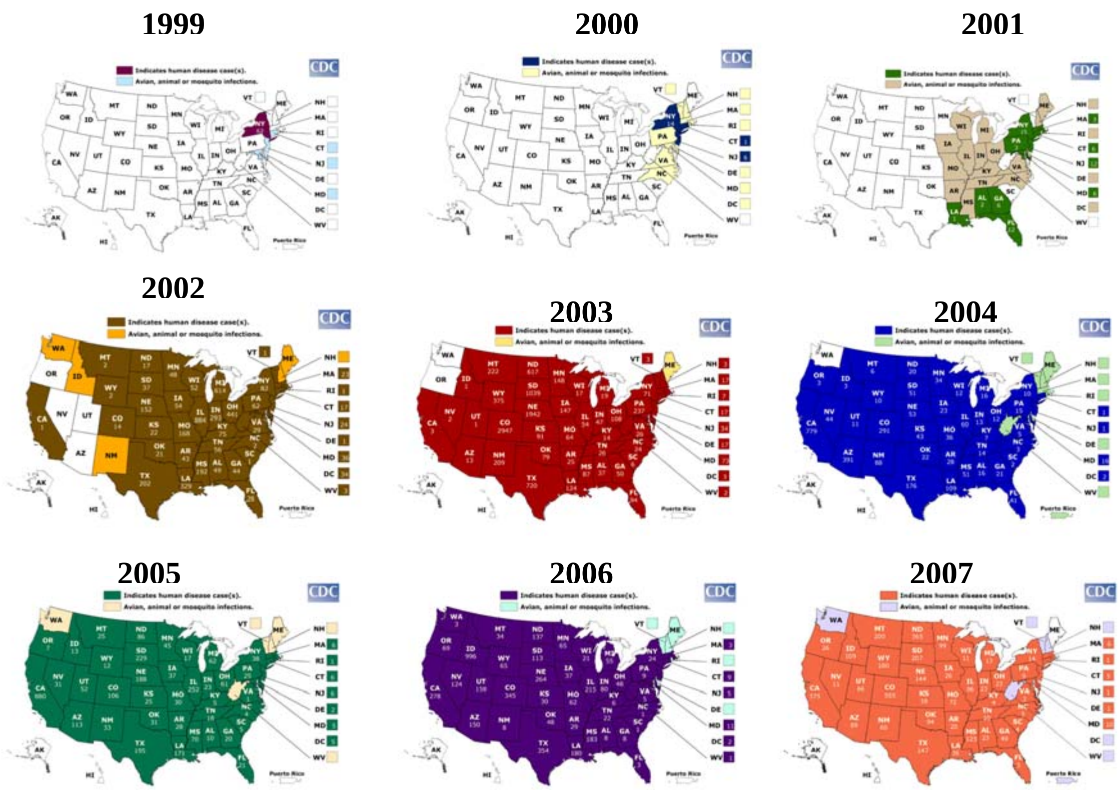


Figure 10. *Spread of the occurrence of the West Nile Virus from its introduction to the United States in 1999 through 2007. By 2003, virtually every state in the country had reported the presence of virus. (source: http://www.cdc.gov/ncidod/dvbid/westnile/Mapsactivity/surv&control07Maps.htm).*

The rapid spread of West Nile Virus across the U.S. and Canada is not a sign that temperatures are progressively warming. Rather, it is a sign that the existing environment is primed for the virus. In the infected territories, mean temperature has a range more than 40ºF. The virus can thrive from the tropics to the tundra of the Arctic – anywhere with a resident mosquito population. The already-resident mosquito populations of Iowa are appropriate hosts for the West Nile virus—as they are in every other state.

Impacts of climate-mitigation measures in the state of Iowa

Globally, in 2005, humankind emitted 28,193 million metric tons of carbon dioxide (mmtCO_2: EIA, 2007a), of which emissions from Iowa accounted for 81.3 mmtCO_2, or only 0.29% (EIA, 2007b). The proportion of manmade CO_2 emissions from Iowa will decrease over the 21st century as the rapid demand for power in developing countries such as China and India outpaces the growth of Iowa's CO_2 emissions (EIA, 2007b).

During the past 5 years, global emissions of CO_2 from human activity have increased at an average rate of 3.5%/yr (EIA, 2007a), meaning that the annual *increase* of anthropogenic global CO_2 emissions is more than *12 times* greater than Iowa's *total* emissions. This means that even a complete cessation of *all* CO_2 emissions in Iowa will be completely subsumed by global emissions growth *in just one month's time*! In fact, China alone adds about seven Iowa's-worth of *new* emissions to its emissions' total each and every year. Clearly, given the magnitude and growth of the global emissions and global emission growth, regulations prescribing a *reduction*, rather than a complete cessation, of Iowa's CO_2 emissions will have absolutely no effect on global climate.

The annual *increase* of anthropogenic global CO_2 emissions is more than *12 times* greater than Iowa's *total* emissions. This means that even a complete cessation of *all* CO_2 emissions in Iowa will be completely subsumed by global emissions growth *in just one month's time*!

Wigley (1998) examined the climate impact of adherence to the emissions controls agreed under the Kyoto Protocol by participating nations, and found that, if all developed countries meet their commitments in 2010 and maintain them through 2100, with a mid-range sensitivity of surface temperature to changes in CO_2, the amount of warming "saved" by the Kyoto Protocol would be 0.07°C by 2050 and 0.15°C by 2100. The global sea level rise "saved" would be 2.6 cm, or one inch. Even a complete cessation of CO_2 emissions in Iowa is only a tiny fraction of the worldwide reductions assumed in Dr. Wigley's global analysis, so its impact on future trends in global temperature and sea level will be only a minuscule fraction of the already negligible world-wide effects calculated by Dr. Wigley.

To demonstrate the futility of emissions regulations in Iowa, we apply Dr. Wigley's results to the state, assuming that the ratio of U.S. CO_2 emissions to those of the developed countries which have agreed to limits under the Kyoto Protocol remains constant at 39% (25% of global emissions) throughout the 21st century. We also assume that developing countries such as China and India continue to emit at an increasing rate. Consequently, the annual proportion of global CO_2 emissions from human activity that is contributed by human activity in the United States will decline. Finally, we assume that the *proportion* of total U.S. CO_2 emissions in Iowa – now 1.4% – remains constant throughout the 21st century. With these assumptions, we generate the following table derived from Wigley's (1998) mid-range emissions scenario (which itself is based upon the IPCC's scenario "IS92a"):

Table 1

Projected annual CO_2 emissions (mmtCO_2)

Year	Global emissions: *Wigley, 1998*	Developed countries: *Wigley, 1998*	U.S. (39% of developed countries)	Iowa (1.4% of U.S.)
2000	26,609	14,934	5,795	81
2025	41,276	18,308	7,103	99
2050	50,809	18,308	7,103	99
2100	75,376	21,534	8,355	117

Note: *Developed countries' emissions, according to Wigley's assumptions, do not change between 2025 and 2050: neither does total U.S or Iowa emissions.*

In Table 2, we compare the total CO_2 emissions saving that would result if Iowa's CO_2 emissions were completely halted by 2025 with the emissions savings assumed by Wigley (1998) if all nations met their Kyoto commitments by 2010, and then held their emissions constant throughout the rest of the century. This scenario is "Kyoto Const."

Table 2

Projected annual CO_2 emissions savings (mmtCO_2)

Year	Iowa	Kyoto Const.
2000	0	0
2025	99	4,697
2050	99	4,697
2100	117	7,924

Table 3 shows the proportion of the total emissions reductions in Wigley's (1998) case that would be contributed by a complete halt of all Iowa's CO_2 emissions (calculated as column 2 in Table 2 divided by column 3 in Table 2).

Table 3

Iowa's percentage of emissions savings

Year	Iowa
2000	0.0%
2025	2.1%
2050	2.1%
2100	1.5%

Using the percentages in Table 3, and assuming that temperature change scales in proportion to CO_2 emissions, we calculate the global temperature savings that will result from the complete cessation of anthropogenic CO_2 emissions in Iowa:

Table 4

Projected global temperature savings (ºC)

Year	Kyoto Const	Iowa
2000	0	0
2025	0.03	0.0006
2050	0.07	0.001
2100	0.15	0.002

Accordingly, a cessation of all of Iowa's CO_2 emissions would result in a climatically-irrelevant and undetectable global temperature reduction by the year 2100 of two *thousandths* of a degree Celsius. This number is so low that it is effectively equivalent to zero. Results for sea-level rise are also negligible:

Table 5

Projected global sea-level rise savings (cm)

Year	Kyoto Const	Iowa
2000	0	0
2025	0.2	0.004
2050	0.9	0.019
2100	2.6	0.039

A complete cessation of all anthropogenic emissions from Iowa will result in a global sea-level rise savings by the year 2100 of an estimated 0.04 cm, or less than two *hundredths* of an inch. Again, this value is climatically irrelevant and virtually zero.

Even if the entire Western world were to close down its economies completely and revert to the Stone Age, without even the ability to light fires, the *growth* in emissions from China and India would replace our *entire* emissions in little more than a decade. In this context, any cuts in emissions from Iowa would be extravagantly pointless. Iowa's carbon dioxide emissions, it their sum total, effectively do not impact world climate in any way whatsoever.

State CO_2 Mitigation Plans: Futility and Projected Climate "Savings"

State	2004 Emissions (million metric tons CO2)	Percentage of Global Total	Time until Total Emissions Cessation Subsumed by Foreign Growth (days)		Temperature "Savings" (ºC)		Sea Level "Savings" (cm)	
			Global Growth	China Growth	2050	2100	2050	2100
AK	47.0	0.17	18	28	0.0008	0.0013	0.0108	0.0217
AL	140.3	0.52	53	84	0.0025	0.0037	0.0321	0.0647
AR	63.7	0.23	24	38	0.0011	0.0017	0.0146	0.0294
AZ	96.9	0.36	37	58	0.0017	0.0026	0.0222	0.0447
CA	398.9	1.47	152	239	0.0071	0.0106	0.0914	0.1840
CO	93.1	0.34	35	56	0.0017	0.0025	0.0213	0.0430
CT	45.5	0.17	17	27	0.0008	0.0012	0.0104	0.0210
DC	4.0	0.01	2	2	0.0001	0.0001	0.0009	0.0018
DE	16.9	0.06	6	10	0.0003	0.0004	0.0039	0.0078
FL	258.0	0.95	98	155	0.0046	0.0069	0.0591	0.1190
GA	175.7	0.65	67	105	0.0031	0.0047	0.0402	0.0810
HI	22.7	0.08	9	14	0.0004	0.0006	0.0052	0.0105
IA	81.8	0.30	31	49	0.0015	0.0022	0.0187	0.0377
ID	15.6	0.06	6	9	0.0003	0.0004	0.0036	0.0072
IL	244.5	0.90	93	146	0.0044	0.0065	0.0560	0.1128
IN	239.9	0.88	91	144	0.0043	0.0064	0.0549	0.1107
KS	77.8	0.29	30	47	0.0014	0.0021	0.0178	0.0359
KY	151.5	0.56	58	91	0.0027	0.0040	0.0347	0.0699
LA	180.5	0.66	69	108	0.0032	0.0048	0.0413	0.0833
MA	83.6	0.31	32	50	0.0015	0.0022	0.0192	0.0386
MD	80.6	0.30	31	48	0.0014	0.0021	0.0185	0.0372
ME	23.3	0.09	9	14	0.0004	0.0006	0.0053	0.0107
MI	189.9	0.70	72	114	0.0034	0.0051	0.0435	0.0876
MN	102.8	0.38	39	62	0.0018	0.0027	0.0235	0.0474
MO	139.8	0.51	53	84	0.0025	0.0037	0.0320	0.0645
MS	65.1	0.24	25	39	0.0012	0.0017	0.0149	0.0300
MT	35.1	0.13	13	21	0.0006	0.0009	0.0080	0.0162
NC	152.3	0.56	58	91	0.0027	0.0041	0.0349	0.0703
ND	49.9	0.18	19	30	0.0009	0.0013	0.0114	0.0230
NE	43.6	0.16	17	26	0.0008	0.0012	0.0100	0.0201
NH	22.0	0.08	8	13	0.0004	0.0006	0.0050	0.0101
NJ	128.6	0.47	49	77	0.0023	0.0034	0.0295	0.0594
NM	59.0	0.22	22	35	0.0011	0.0016	0.0135	0.0272
NV	47.9	0.18	18	29	0.0009	0.0013	0.0110	0.0221
NY	216.7	0.80	82	130	0.0039	0.0058	0.0496	0.1000
OH	263.6	0.97	100	158	0.0047	0.0070	0.0604	0.1216
OK	100.4	0.37	38	60	0.0018	0.0027	0.0230	0.0463
OR	42.5	0.16	16	25	0.0008	0.0011	0.0097	0.0196
PA	282.5	1.04	107	169	0.0050	0.0075	0.0647	0.1304
RI	11.0	0.04	4	7	0.0002	0.0003	0.0025	0.0051
SC	87.5	0.32	33	52	0.0016	0.0023	0.0200	0.0404
SD	14.0	0.05	5	8	0.0002	0.0004	0.0032	0.0064
TN	123.6	0.45	47	74	0.0022	0.0033	0.0283	0.0570
TX	652.5	2.40	248	391	0.0116	0.0174	0.1495	0.3010
UT	65.7	0.24	25	39	0.0012	0.0017	0.0150	0.0303
VA	129.0	0.47	49	77	0.0023	0.0034	0.0295	0.0595
VT	7.0	0.03	3	4	0.0001	0.0002	0.0016	0.0032
WA	82.9	0.30	32	50	0.0015	0.0022	0.0190	0.0382
WI	108.8	0.40	41	65	0.0019	0.0029	0.0249	0.0502
WV	113.0	0.42	43	68	0.0020	0.0030	0.0259	0.0521
WY	63.9	0.24	24	38	0.0011	0.0017	0.0146	0.0295
U.S. Total	**5,942.2**	**21.86**	**2261**	**3558**				

Costs of Federal Legislation

However, what would be the potential costs to Iowa of legislative actions designed to cap greenhouse gas emissions? An analysis was recently completed by the Science Applications International Corporation (SAIC), under contract from the American Council for Capital Formation and the National Association of Manufacturers (ACCF and NAM), using the National Energy Modeling System (NEMS); the same model employed by the US Energy Information Agency to examine the economic impacts.

For a complete description of their findings please visit:
http://www.accf.org/pdf/NAM/fullstudy031208.pdf

To summarize, SAIC found that by the year 2020, average annual household income in Iowa would decline by $916 to $2,970 and by the year 2030 the decline would increase to between $3,866 and $7,050. The state would stand to lose between 13,000 and 19,000 jobs by 2020 and between 31,000 and 42,000 jobs by 2030. At the same time gas prices could increase by more than $5 a gallon by the year 2030 and the states' Gross Domestic Product could decline by then by as much as $6.3 billion/yr.

And all this economic hardship would come with absolutely no detectable impact on the course of future climate. This is the epitome of a scenario of all pain and no gain.

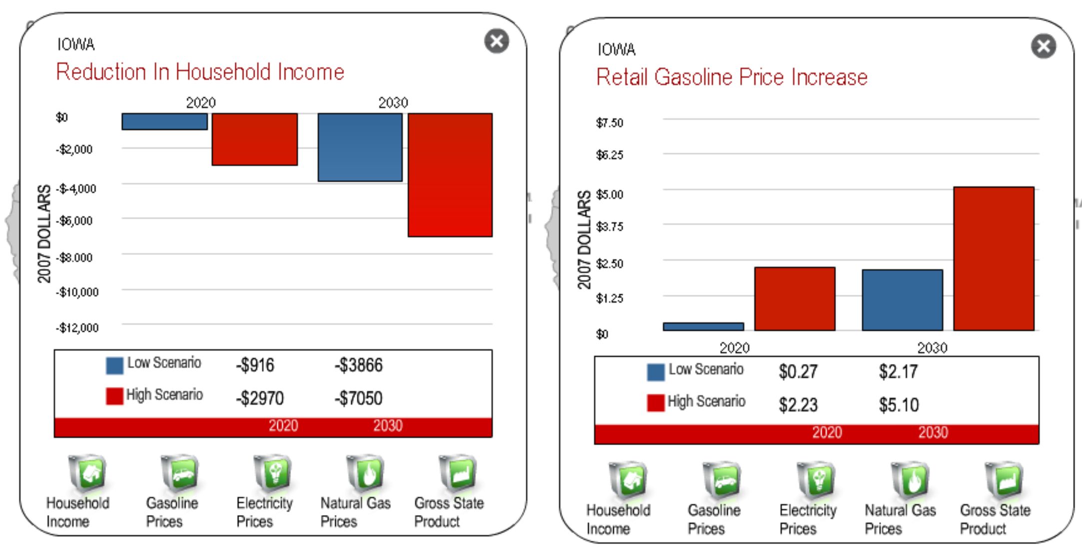


Figure 11. *The economic impacts in Iowa of federal legislation to limit greenhouse gas emissions green. (Source: Science Applications International Corporation, 2008, http://www.instituteforenergyresearch.org/cost-of-climate-change-policies/)*

Iowa Scientists Reject UN's Global Warming Hypothesis

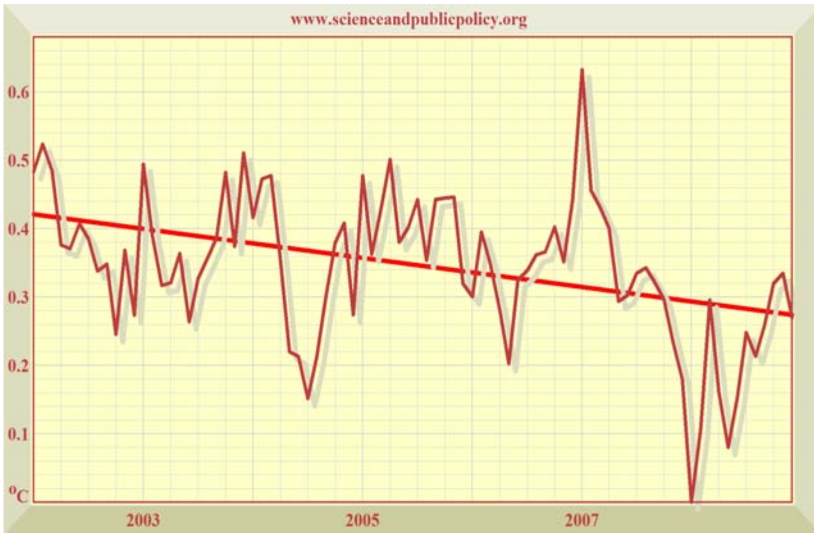
At least 201 Iowa scientists have petitioned the US government that the UN's human caused global warming hypothesis is "without scientific validity and that government action on the basis of this hypothesis would unnecessarily and counterproductively damage both human prosperity and the natural environment of the Earth."

They are joined by over **31,072** Americans with university degrees in science – including **9,021** PhDs.

The petition and entire list of US signers can be found here:
http://www.petitionproject.org/index.html

Appendix: **Recent *global* temperatures:** As the global temperature graphs below show, a decline in temperatures has now persisted for seven years. The fall in temperatures between January 2007 and January 2008 was the greatest January-January fall since records began in 1880.

Cooling at a rate equivalent to >2 Celsius/century
Global temperature anomalies & trend, 1991-2003: SPPI Index



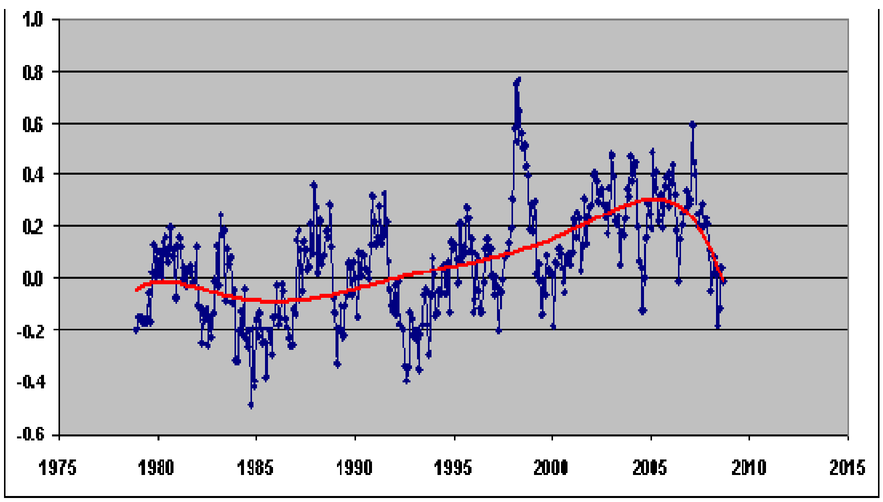


Figure 14. Lower-troposphere global surface temperature anomalies, 1979-2008 (UAH satellite data).

The year 2008 turned out to have been no warmer than 1980 – 28 years ago. This is not a short-run change: the cooling trend set in as far back as late 2001, seven full years ago, and there has been no net warming since 1995 on any measure. Also, see: http://scienceandpublicpolicy.org/monthly_report/jan_co2_report.html .

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