June 05, 2009

To: Environmental Protection Agency
EPA Docket Center Mailcode 6102T
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Attention Docket ID No. EPA-HQ-OAR-2009-0171

Dear Administrator Jackson,

I respectfully submit comments to the Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act as posted in the Federal Register on April 24, 2009.

The U.S. Supreme Court's mandate to the EPA is that you must show convincingly that CO2 presents a danger to "human health and public welfare." The science used as a resource basis for your Technical Support Document relied upon an old 2006 AR4 publication of the IPCC. Subsequent research displays instructive and significant differences in data and effects. It does not support that mandated 'danger' finding. Additionally, some science research that was available and relevant is not referenced by the Technical Support Document. Some of that I, therefore, also include because it, also, does not support a 'danger' finding.

The alternative I offer, through provided references, is that your scientists visit or revisit the science in order to utilize the best available scientific information and to comply with the Information Quality Act. My comments need be treated as Requests for Correction under the Information Quality Act to modify substantially this Technical Support Document being used for an endangerment analysis.

As an individual following this issue closely since 1990, I have been an NGO representative to some twenty-two UN conferences, principally on climate change. I have conferred with many IPCC contributors and reviewers. I continue to attend presentations of fresh data and keep informed of discoveries. I earned both a B.S. and a J.D., was formerly with the University of Texas at Austin's Chair of Free Enterprise and an attorney-at-law in Texas and Florida. I am currently an adjunct faculty member at the Mises Institute. (The Ludwig von Mises Institute, 518 West Magnolia Avenue, Auburn, AL 36832.)

40 CFR Chapter 1 states within its Summary that, as Administrator, you have found that high atmospheric levels [of GHGs] are the unambiguous result of human emissions, and are very likely the cause of the observed increase in average temperatures and other climatic changes... the effects of such changes include but are not limited to the increased likelihood of more frequent and intense heat waves, more wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea level rise, more intense storms, harm to water resources, harm to agriculture, and harm to wildlife and ecosystems.

I offer best available scientific information through references grouped according to your twelve topics. I did not discover any of these references in your technical support document. Each reference contains data that supports my realist, not alarmist, views. I have generally added some short comment to clarify how the information in the scientific paper pertains to my views. The science presented here shows that CO2 does *not* convincingly present a danger to "human health and public welfare." In every case the alternative I offer is that the substantive science evidenced here be visited, or revisited, in order that the EPA utilize the best available scientific information and complies with the Information Quality Act.

(1) High levels of greenhouse gases are the unambiguous result of human emissions

Douglass, D.H., Christy, J.R., Pearson, B.D. and Singer, S.F. 2007. A comparison of tropical temperature trends with model predictions. *International Journal of Climatology (Royal Meteorol Soc.)* DOI:10.1002/joc.1651. The models show an increase in temperature trend with altitude but the observations show the opposite. This mismatch of observed and calculated fingerprints clearly falsifies the anthropogenic global warming (AGW) hypothesis. We must conclude that anthropogenic greenhouse gases can contribute only in a minor way to the current warming, which is mainly of natural origin. The use of 'range' in the CCSP summary is clearly inappropriate since it gives undue weight to 'outliers.'

Douglass, D.H., Pearson, B. and Singer, S. F. 2004. Altitude dependence of atmospheric temperature trends: Climate models versus observations. *Geophysical Research Letters* **31.** The models show an increase in temperature trend with altitude but the observations show the opposite. This mismatch of observed and calculated fingerprints clearly falsifies the anthropogenic global warming (AGW) hypothesis. We must conclude that anthropogenic greenhouse gases can contribute only in a minor way to the current warming, which is mainly of natural origin.

Dlugokencky, EJ, et al., 1998, Continuing decline in the growth rate of the atmospheric methane burden. Nature, 393,447--450. Methane levels are not so high.

Karl, T.R., Hassol, S.J., Miller, C.D. and Murray, W.L. (Eds.) 2006. Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences. A report by the Climate Change Science Program and Subcommittee on Global Change Research, http://www.climatescience.gov/Library/sap/sap1-1/finalreport/default.htm. The Climate Change Science Program result is unequivocal: no increasing warming, but rather a slight cooling, with altitude in the tropical zone. But, the CCSP executive summary claims the opposite of what the report itself documents. The CCSP report does not support anthropogenic warming.

Keenlyside, N. S. et.al. “Advancing Decadal-Scale Climate Prediction in the North Atlantic Sector.” *Nature* **453** (2008):84-88. There may be no additional warming until the middle or latter part of the next decade. Models do not reflect such a 15-20 year period with no net warming.

Michaels, P.J. and Knappenberger, P.C. 1996. Human effect on global climate? *Nature* **384**: 522-523.

Schiermeier, Q., 2006. The methane mystery. *Nature,* **442,** 730—731. Methane concentration increases began to slow in the 1980s and have actually declined in some recent years, rather than increasing as models project.

Singer, S.F. 1999. Human contribution to climate change remains questionable. Also, Reply. EOS: Transactions, *American Geophysical Union* **80**: 33, 186-87 and 372-73.

US EPA, http://www.epa.gov/airtrends/ozone.html Trends in ground level ozone concentrations across the US are generally downward. Ground level ozone levels not so high.

(2) High levels of GHGs are very likely the cause of the observed increase in average temperatures

Bellon, G., Le Treut, H. and Ghil, M. 2003. Large-scale and evaporation-wind feedbacks in a box model of the tropical climate. *Geophysical Research Letters* **30:** 10.1029/2003GL017895. Suggests the presence of an important and as-yet-unexplored feedback in earth’s tropical climate that could contribute to maintain the ‘lid’ on tropical SSTs.

Chambers, F.M., Ogle, M.I. and Blackford, 1.1. 1999. Palaeoenvironmental evidence for solar forcing of Holocene climate: linkages to solar science. *Progress in Physical Geography* **23**: 181-204. Most of the many nonlinear responses to solar activity variability are inadequately represented in the GCMs used by the IPCC to predict future greenhouse gas-induced global warming.

Chen, 1., Carlson, B.E. and Del Genio, A.D. 2002. Evidence for strengthening of the tropical general circulation in the 1990s. *Science* **295**: 838-841.

Christy, J.R., Norris, W.B., Spencer, R.W. and Hnilo, J.J. 2007. Tropospheric temperature change since 1979 from tropical radiosonde and satellite measurements. *Journal of Geophysical Research* **112**: doi: 10.1029/2005JD0068. Microwave sounding units (MSU) mounted on satellites are acknowledged to be a reliable source of information about temperatures in the troposphere.

Christy, J.R., Spencer, R.W., Norris, W.B., Braswell, W.D. and Parker, D.E. 2003. Error estimates of version 5.0 of MSU-AMSU bulk atmospheric temperatures. *Journal of Atmospheric and Oceanic Technology* **20**: 613-629. Microwave sounding units (MSU) mounted on satellites are acknowledged to be a reliable source of information about temperatures in the troposphere.

Christy, J.R., Spencer, R.W. and Braswell, D. 1997. How accurate are satellite “thermometers”? *Nature* **389**: 342-3. The discrepancy between surface temperatures and tropospheric temperatures is real, as tropospheric temperatures are also found in independent balloon comparisons. The surface measurements are suspect.

de Laat, A.T.J. and Maurellis, A.N. 2006. Evidence for influence of anthropogenic surface processes on lower tropospheric and surface temperature trends, *International Journal of Climatology,* **26**: 897-913. Findings continue to show that the local warming impact of human activity has not been sufficiently removed from the global surface land record.

Ghan, S.J., Easter, R.C., Chapman, E.G., Abdul-Razzak, H., Zhang, Y., Leung, L.R., Laulainen, N.S., Saylor, R.D. and Zaveri, R.A. 2001. A physically based estimate of radiative forcing by anthropogenic sulfate aerosol. *Journal of Geophysical Research* **106**: 5279-5293. Much remains to be done before the estimates are reliable enough to base energy policy decisions upon.

Harries, J.E. 2000. Physics of the earth's radiative energy balance. *Contemporary Physics* **41**: 309-322.

Hartmann, B., Wendler, G., 2005. On the significance of the 1976 Pacific climate shift in the climatology of Alaska. *Journal of Climate,* **18,** 4824-4839. The melting of glaciers in Alaska has much of its grounding in the recovery from the cold conditions and expanded glacial extent of the 19th century as well as in the periodic climate cycles related to the Pacific Decadal Oscillation. The positive PDO phase which began in 1976-77 has been linked to higher temperatures across Alaska.

Hartmann, D.L. 2002. Tropical surprises. *Science* **295**: 811- 812. If the energy budget can vary substantially in the absence of obvious forcing, as it did over the past two decades, then the climate of the earth has modes of variability that are not yet fully understood and cannot yet be accurately represented in climate models.

Jacobson, M.Z. 2001. Global direct radiative forcing due to multicomponent anthropogenic and natural aerosols. *Journal of Geophysical Research* **106**: 1551-1568.

Joughin, I., et al., 2008. Seasonal speedup along the western flank of the Greenland Ice Sheet. *Science,* **320:** 78 1-783. Shows minimal acceleration of outlet glaciers.

Karpechko, A. Yu., et al., 2008. Stratospheric influence on circulation changes in the Southern Hemisphere troposphere in coupled climate models. *Geophysical Research Letters,* **35**, L20806, doi: 10.1 029/2009GL03 *5354.* The modeled behavior of the Southern Annual Mode is far more influenced by ozone depletion than by global warming - which is shown to have little impact on the trends.

Kaufman,D. S., et al. “Holocene Thermal Maximum in the Western Arctic (0-180 degrees W).” *Quaternary Science Reviews* **23** (2004): 529-60. For two thousand years - from 9,000 to 11,000 years ago, Alaskan temperatures averaged three degrees Fahrenheit higher than now.

Keenlyside, N. S., et.al. “Advancing Decadal-Scale Climate Prediction in the North Atlantic Sector.” *Nature* **453** (2008):84-88. There may be no additional warming until the middle or latter part of the next decade. Models do not reflect such a 15-20 year period with no net warming. The multidecadal variations are potentially predictable if the current state of the ocean is known. Thus, attention should turn to natural cycles.

Lindzen, R.S., Chou, M.-D. and Hou, A.Y. 2001. Does the earth have an adaptive infrared iris? *Bulletin of the American Meteorological Society* **82**: 417-432.

MacDonald, G. M., et al., “Holocene Treeline History and Climate Change across Northern Eurasia.” Quaternary Research **53** (2000): 302-11. Northwestern and northeastern North America were more than four degrees Fahrenheit warmer than the baseline from 7,000-9,000 and 3,000-5,000 years ago respectively.

McKitrick, R. R., and P.J. Michaels. “Quantifying the Influence of Anthropogenic Surface Processes and Inhomogeneities on Gridded Global Climate Data.” *Journal of Geophysical Research* **112** (2007): D24S09, doi:10.1029/2007JD008465. Local impact of human activity has not been sufficiently removed from the global surface land record. As much as 50% of the land-only warming can be ascribed to “non-climatic” causes from 1979 to the present.

McPhaden, M.J. and Zhang, D. 2002. Slowdown of the meridional overturning circulation in the upper Pacific Ocean. *Nature* **415**: 603-608.

Michaels, P.J., et al.,”Revised 21st-Century Temperature Projections.” *Climate Research* **23** (2001):1-9. The coldest nights of the winter are warming more than any other diurnal/seasonal combination.

Pierrehumbert, R. T. 1995. Thermostats, radiator fins, and the local runaway greenhouse. *Journal of the Atmospheric Sciences* **52**: 1784-1806. Interactions between moist and dry regions are an essential part of tropical climate stability, which points to the adaptive infrared iris concept of Lindzen et al. (2001).

Satellite datasets, http://www.ssmi.com/msu/msu_data_description.html#msu_amsu_time_series. There has been no temperature trend in the satellite datasets of stratospheric temperatures since the mid 1990s.

Spencer, R. W., and W. D. Braswell, 2008. Potential biases in feedback diagnosis from observations data: a simple model demonstration. *Journal of Climate,* **21**, 5624-5628. The troubling lack of warming since 1998 implies a further delay for the water amplification, which itself may be overestimated.

Spencer, R. W., et al., 2007, Cloud and radiation budget changes associated with tropical intraseasonal oscillations. *Geophysical Research Letters,* **34,** Li 5707, doi: 10.1 029/2007GL029698.

Swanson, K.L. and Tsonis, A.A. 2009. Has the climate shifted? *Geophysical Research Letters* **36**: L06711, doi:10.1029/2008GL037022. A break in the global mean temperature trend from the consistent warming over the 1976/77-2001/02 period may have occurred. Moreover the episodic nature of temperature changes during the past century is difficult to reconcile with the presumed smooth evolution of anthropogenic greenhouse gas and aerosol radiative forcing with respect to time and suggests that a reorganization of the climate system may underlie such shifts.

Thompson, D.W., et al., 2008. A large discontinuity in the mid-twentieth century in observed global-mean surface temperature. *Nature,* **453**, 646-650. Temperature decline in the decades immediately following WWII is likely a result of changing observing practices. The remedy of raising those temperatures will have the effect of *reducing* the temperature trend for the past 50 years.

van de Wal, R. S. W., et al., 2008. Large and rapid melt-induced velocity changes in the ablation zone of the Greenland ice sheet. *Science,* **321**: 111-113. Ice sheets are showing very limited response.

Vogelmann, A.M., Flatau, P.J., Szczodrak, M., Markowicz, K,M, and Minnett, P.J. 2003. Observations of large aeosol infared forcing at the surface. *Geophysical Research Letters* **30:** 10.1029/2002GL016829.

Webb, T., III, et al., 1998. Late Quaternary Climate Change in Eastern North America: A Comparison of Pollen-Derived Estimates with Climate Model Results. *Quaternary Science Reviews,* **16:** *587—606.* Northwestern and northeastern North America were more than four degrees Fahrenheit warmer than the baseline from 7,000-9,000 and 3,000-5,000 years ago respectively.

Wentz, F.J. and Schabel, M. 1998. Effects of satellite orbital decay on MSU lower troposphere temperature trends. *Nature* **394**: 661-664. As compared to conventional *in situ* observations, satellites provide daily near-global coverage with a very high statistical precision that results from averaging millions of individual observations.

Wielicki, B.A., Wong, T., Allan, R.P., Slingo, A., Kiehl, J.T., Soden, B.J., Gordon, C.T., Miller, A.J., Yang, S.-K., Randall, D.A., Robertson, F., Susskind, J. and Jacobowitz, H. 2002. Evidence for large decadal variability in the tropical mean radiative energy budget. *Science* **295**: 841-844. No model is exhibiting any significant decadal variability. They all failed to reproduce even the cyclical seasonal change in tropical albedo. The models are deficient.

Wigley, T.M.L., 1998. The Kyoto Protocol: C02, CH4 and climate implications. *Geophysical Research Letters, **25:*** 2285-2288. If adhered to, the Kyoto Protocol would have eliminated 0.07 degrees Celsius of warming by 2050, and 0.14 by 2100, an amount too small to measure accurately.

Wild, M. and Ohmura, A. 1999. The role of clouds and the cloud-free atmosphere in the problem of underestimated absorption of solar radiation in GCM atmospheres. *Physics and Chemistry of the Earth* **24B**: 261-268. GCM atmospheres produce a rather substantial mean error close to 20 percent below actual observations.

Wild, M. 1999. Discrepencies between model-calculated and observed shortwave atmospheric absorption in areas with high aerosol loadings. *Journal of Geophysical Research* **104**: 27,361-27,371. The models failed to properly account for spatial and temporal variations in atmospheric aerosol concentrations and they likely underestimated the amount of solar radiation absorbed by water vapor and clouds.

Wyant, M.C., Khairoutdinov, M. and Bretherton, C.S., 2006. Climate sensitivity and cloud response of a GCM with a superparameterization. *Geophys. Res. Lett* **33**, L06714. eos.atmos.washington.edu/pub/breth/papers/2006/SPGRL.pdf

Zender, C.S. 1999. Global climatology of abundance and solar absorption of oxygen collision complexes. *Journal of Geophysical Research* **104**: 24,471-24,484. The discovery of oxygen molecular collisions alters the long-standing view that H2O, O3, O2, CO2 and NO2 are the only significant gaseous solar absorbers in earth's atmosphere. The phenomenon should therefore be included in large-scale atmospheric models used to simulate climate and climate change.

Alaska Climate Research Center,
http://climate.gi.alaska.edu/ClimTrends/Change/TempChange.html
Warming in Alaska has been virtually nonexistent during the past 25 years, although Alaska has apparently been warming rapidly during the past 50 years.

(3) More frequent and intense heat waves are likely

Davis, R.E., P.C. Knappenberger, P.J. Michaels, and W.M. Novicoff (2004). Seasonality of Climate-human Mortality Relationships in US Cities and Impacts of Climate Change. *Climate Research,* **26:** 61—76. Seasonal mortality pattern in US cities is largely independent of the climate and thus insensitive to climate fluctuations, including changes related to increasing greenhouse gases.

Davis, R.E., P.C. Knappenberger, P.J. Michaels, and W.M. Novicoff (2003 a). Changing Heat-related Mortality in the United States. *Environmental Health Perspectives,* **111:** 1712-1718 (doi:10.1289/ehp.6336). Public health measures have significantly reduced our sensitivity to heat waves. There is a declining sensitivity to extreme heat events in the United States, even in the elderly population. Heat-related mortality *rates* are declining.

Davis, R.E., P.C. Knappenberger, W.M. Novicoff and P.J. Michaels (2003b). Decadal changes in summer mortality in U.S. cities. *International Journal of Biometeorology,* **47:** 166—175. In a long time-series, the changing age-structure should be accounted for, because an aging population will be more vulnerable and may bias temporal comparisons.

Fouillet, A.,G. Rey, V. Wagner, K. Laadi, Empereur-Bissonet, A. Le Tetre, P. Frayssinet, P. Bessemoulin, F. Laurent, P. De Crouy-Chanel, E. Jougla and D. Hemon, 2008. Has the impact of heat waves on mortality changed in France since the European heat wave of summer 2003? A study of the 2006 heat wave. *International Journal of Epidemiology,* doi: 10.1 093/ije/dym253. The population's rapid adaptation to heat has been demonstrated across Europe after the 2003 event.

Kalkstein, L.S. and R.E. Davis (1989). Weather and Human Mortality: An Evaluation of Demographic and Inter-regional Responses in the United States. *Annals of the Association of American Geographers*, **79**: 44-64. You are much more likely to see human mortality impacts in places where heat is less common, such as the Midwest or Northeast.

Palecki, M.A., S.A. Changnon, and K.E. Kunkel, 2001. The nature and impacts of the July 1999 heat wave in the Midwestern United States: Learning from the lessons of 1995, *Bulletin of the American Meteorological Society*, **82**: 1353-1367. Increasing summer heat does not increase human mortality because populations rapidly adapt to heat. Chicago didn't redesign its city, but it did redesign its response measures to heat waves.

(4) More wildfires are likely

McCabe, G.J., Palecki, M.A. and Betancourt, J.L. 2004. Pacific and Atlantic Ocean influences on multidecadal drought frequency in the US, *Proceedings of the National Academy of Sciences (USA)* **101**:4136-4141. Drought and wildfire are associated with warm phases of ENSO and PDO in the Pacific Northwest and northern Rockies while the opposite occurs in the Southwest and southern Rockies.

Riano, D., Moreno Ruiz, J.A., Isidoro, D. and Ustin, S.L. 2007. Global spatial patterns and temporal trends of burned area between 1981 and 2000 using NOAA-NASA Pathfinder. *Global Change Biology* **13**: 40-50. There was no significant global annual upward or downward trend in burned area. Latitude was not determinative, as divergent fire patterns were encountered for various land cover areas at the same latitude.

Schoennagle, T., Veblen, T.T., Romme, W.H., Sibold, J.S. and Cook, E.R. 2005. ENSO and PDO variability affect drought-induced fire occurrence in Rocky Mountain subalpine forests. *Ecological Applications* **15**: 2000-2014. There remains considerable uncertainty regarding the effects of CO2-induced warming at regional scales.

Westerling, A.L. and Swetnam, T.W. 2003. Interannual to decadal drought and wildfire in the western US. *EOS: Transactions, American Geophysical Union* **84**: 545-560. Drought and wildfire are associated with warm phases of ENSO and PDO in the Pacific Northwest and northern Rockies while the opposite occurs in the Southwest and southern Rockies.

(5) Degraded air quality is likely

EPA, http://www.epa.gov/air/airtrends/sixpoll.html. EPA publications tout its successes at improving the nation's air quality including ground level ozone and particulate matter despite increasing greenhouse gases.

Strong, C. and R.E. Davis, 2007. Winter Jet Stream Trends over the Northern Hemisphere. *Quarterly Journal of the Royal Meteorological Society,* **133:** 2109-2115,

DOI: iO.i002/qj.171. Given that there is no upward trend in pollution episodes over the last thirty years, the observations from this study call into question the likelihood of future air quality degradation from climate change.

(6) More heavy downpours and flooding are likely

Downton, M., J. Z. B. Miller and R. A. Pielke, Jr., 2005. Reanalysis of U.S. National Weather Service Flood LoSS Database, *Natural Hazards Review*, **6**:13-22. Rainfall increases have not led to increases in flood events. No trends in flood-related damages - when properly accounting for increases in US wealth and property at risk - have been detected. The impact of flooding on American society has shown a slight decline of the 20th century.

Gerten, D., et al., 2008. Causes of change in 20th century global river discharge. *Geophysical Research Letters,* **35**, L20405, doi: 10.1 029/2008GL03 *5258.* Precipitation over the global land area has been highly variable and characterized by a large degree of interdecadal fluctuation. Virtually the entirety of the 20th century trend is dominated by fluctuations that occurred prior to the 1980s, not largely impacts by greenhouse emissions.

Michaels, P.J., et al., "Trends in Precipitation on the Wettest Days of the Year across the Contiguous United States." *International Journal of Climatology* **24** (2004): 1,872-82. Total rainfall falling in heavy events has increased, but the percentage of annual rainfall falling from such events is unchanged. Changes are not disproportionate to expectations. There is no general indication of a trend towards a more extreme precipitation climate in the US, allowing for the fact that precipitation itself has increased.

Small, D., and S. Islam, 2007. Decadal variability in the frequency of fall precipitation over the United States. *Geophysical Research Letters,* **34,** L02404, doi: 10.1 029/2006GL0286 10. The timing of precipitation increases has been responsible for increasing the streamflow during the lowest times of the year.

Small, D., et al., 2006. Trends in precipitation and streamflow in the eastern U.S.: Paradox or perception? *Geophysical Research Letters,* **33**, L03403, doi: 10.1 029/2005GL024995, 2006. Rainfall increases have not led to increases in flood events. Changes in recent US precipitation patterns are related to decadal variations rather than long-term changes. They are primarily confined to the fall season over large portions of the country, and they are driven by changes in frequency rather than in intensity.

Zhang, X., et al., 2007. Detection of human influence on twentieth-century precipitation trends. *Nature,* **448,** 461-466. A mismatch is found between model projections and precipitation trends in the latitude band that includes the majority of the US.

(7) Increased drought is likely

McCabe, G.J., Palecki, M.A. and Betancourt, J.L. 2004. Pacific and Atlantic Ocean influences on multidecadal drought frequency in the US, *Proceedings of the National Academy of Sciences*

(USA) **101**:4136-4141. Trends in the variability of drought frequency, as captured by the Palmer Drought Severity Index across the US, is explained by atmospheric/ocean cycles over the Pacific and Atlantic Oceans - the PDO and AMO. The pattern of drought does not indicate a propensity of net increased drought frequency. PDSI variability attributed to the AMO is not related to human greenhouse emissions.

National Climatic Data Center,
http://www.ncdc.noaa.gov/oa/climate/research/2007/ann/drought-summary.html
In this US percentage area wet or dry, there is no indication that the US moisture climate has been impacted by global temperature increases during the past century.

National Climatic Data Center: Statewide average total annual precipitation, New Mexico, 1985-2007. Projects a decline of less than 1.5 inches below where precipitation averaged in the early 20th century.

Seager, R., A. Tzanova and J. Nakamura, 2008. Drought in the Southeastern United States: Causes, variability over the last millennium and the potential for future hydroclimate change, *Journal of Climate,* Submitted. Recent droughts in the southeastern US do not show any indication of anthropogenic influences. Projected trends do not square with observed trends.

Shepherd, J.M., 2005. A Review of Current Investigations of Urban-Induced Rainfall and Recommendations for the Future. *Earth Interactions,* **9:** 1-27.Increased precipitation, not drought, is possible over urban areas because of the presence of the urban heat island coupled with a moister and more unstable atmosphere, resulting in more wet deposition.

Small, D., and S. Islam, 2007. Decadal variability in the frequency of fall precipitation over the United States. *Geophysical Research Letters,* **34,** L02404, doi: 10.1 029/2006GL0286 10.
US precipitation increases are found primarily in the fall season in the central US. Any increases resulted from changes in the number of events, not in the intensity of the events. Trends are related to decadal variability rather than slowly evolving changes in one direction.

Small, D., et al., 2006. Trends in precipitation and streamflow in the eastern U.S.: Paradox or perception? *Geophysical Research Letters,* **33**, L03403, doi: 10.1 029/2005GL024995, 2006.
Instead of being accompanied by more droughts, the timing of increased rainfall events has been responsible for increasing the streamflow during the lowest times of the year.

Van der Schrier, G., Briffa, K.R., Osborn, T.J. and Cook, E.R. 2006. Summer moisture availability across North America, *Journal of Geophysical Research*, **111**, D11102, doi: 10.1029/2005JD006745. No trend is found in the percentage area of the contiguous United States experiencing either moderate of extreme moisture availability conditions for 1901-2002.

Zhang, R., 2008. Coherent surface-subsurface fingerprint of the Atlantic meridional overturning circulation. *Geophysical Research Letters,* **35,** L20705, doi: 10.1 029/2008GL03 5463.
New research on the origins of the AMO concludes that the AMO is largely a natural phenomenon not related to human atmospheric emissions as erroneously concluded by Mann and Emanuel (2006).

(8) Greater sea level rise is likely

Holgate, S. J., 2007. On the decadal rates of sea level change during the 20th century. *Geophysical Research Letters,* **34,** L0 1602, doi: 10.1 029/2006GL02 8492. Questions whether we can even determine sea level rise to be a short-term variation or a sustained change. Sea level has been rising without a clear human signal in its variability for more than one hundred years. The mean rate of global sea-level rise has *not* accelerated over the recent past, and has probably fallen.

Hu, F.S., et al., 2001. Pronounced climatic variations in Alaska during the last two millennia. *Proceedings of the National Academy of Sciences,* **98:** 10552-10556. Native Alaskans have dealt with coastal erosion for many thousands of years.

Hume, J.D., and M. Schalk, 1967. Shoreline processes near Barrow Alaska: a comparison of the normal and the catastrophic. *Arctic,* **20(2):** 86-103. Native Alaskans have dealt with coastal erosion for past one hundred years.

Hume, J.D., et al., 1972. Short-term climate changes and coastal erosion, Barrow Alaska. *Arctic,* **25(4):** 272-278. Native Alaskans have dealt with coastal erosion for past one hundred years.

Joughin, I., et at., 2008. Seasonal speedup along the western flank of the Greenland Ice Sheet. *Science,* **320**: 78 1-783. Different findings on Greenland ice loss and its effects on sea level rise. Warming should not lead to catastrophic ice discharge from increasing rates of glacial flow.

Luthcke,S. B., et al., "Recent Greenland Ice Mass Loss by Drainage System from Satellite Gravity Observations." *Science* **314** (2006): 1,286-89. Ice loss is very modest. Loss rate is 0.4% per *century*.

Pederson, G.T., Fagre, D.B. Gray, S.T. and Grumlich, L.J. 2004. Decadal-scale climate drivers for glacial dynamics in Glaciar National Park, Montana, USA. *Geophysical Research Letters* **31**: 10.1029/2004GL019770. The vast bulk of the glacial retreat occurred between 1830 and 1942, over which time the air's CO2 concentration rose by only 27 ppm. Then, from the mid-1940s through the 1970s, when the concentration rose another 27 ppm, retreat rates slowed substantially, and several modest advances were documented. This behavior provides no evidence for unprecedented CO2-induced global warming over any part of the twentieth century.

van de Wal, R. S. W., et al., 2008. Large and rapid melt-induced velocity changes in the ablation zone of the Greenland ice sheet. *Science,* **321**: 111-113. Greenland ice sheets are unlikely to dramatically speed up as a result of surface warming, thus countering claims of rapid sea level rise this century.

Willis, J. K., et al., 2008. Assessing the globally averaged sea level budget on seasonal to interannual timescales. *Journal of Geophysical Research,* **113,** C0601 *5,*doi: 10.1 029,'2007JC0045 17. Questions whether we can even determine sea level rise to be a short-term variation or a sustained change.

Wopplemann, G., et al., 2007. Geocentric sea-level trend estimates from GPS analyses at relevant tide gauges world-wide. *Global and Planetary Change,* **57:** 396-406.
Using a better model of crustal movement finds that the apparent sea level rise should be reduced for many US coastal locations.

Wunsch, C., et al., 2007. Decadal trends in sea level patterns, 1993-2004. *Journal of Climate,* **20**: 5889-5911. Questions whether we can even determine sea level rise to be a short-term variation or a sustained change.

No trend in level of Lake Ontario since 1918 record.
http://www.waterlevels.gc.ca/C&A/netgraphs_e.html

(9) More intense storms are likely

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(10) Harm to water resources is likely

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Reynaud, S., Ferrier-Pages, C., Meibom, A., Mostefaoui, S., Mortlock, R., Fairbanks, R. and Allemand, D. 2007. Light and temperature effects on Ar/Ca and Mg/Ca ratios in the scleractinian coral *Acropora* sp. *Geochimica et Cosmochimica Acta* **71**: 354-362. The temperature and CO2 increases appear to not have been hurtful at all, and in fact appear to have been helpful.

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(11) Harm to agriculture is likely

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Kimball, B.A. 1983. Carbon dioxide and agricultural yield: An assemblage and analysis of 430 prior observations. *Agronomy Journal* **75:** 779-788. A 300 ppm increase in the atmosphere's CO2 concentration would increase the productivity of earth's herbaceous plants by 30 to 50 percent.

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concentration raised rates of net photosynthesis in several C3 grasses by 44-46 percent. Clover experienced a 38 percent increase. Wheat and ryegrass experienced 10-18 percent average increases.

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Smart, D.R., Ritchie, K., Bloom, A.J. and Bugbee, B.B. 1998. Nitrogen balance for wheat canopies (*Ttiticum aestivum* cv. Veery 10) grown under elevated and ambient CO2 concentrations. *Plant, Cell and Environment* **21**: 753-763. Many plants increase their photosynthetic nitrogen-use efficiency when atmospheric CO2 concentration is raised.

Zerihun, A., Gutschick, V.P. and BrassiriRad, H. 2000. Compensatory roles of nitrogen uptake and photosynthetic N-use efficiency in determining plant growth response to elevated CO2: Evaluation using a functional balance model. *Annals of Botany* **86:**723-730. Whole plant biomasses of sunflowers increased with CO2 enrichment.

Economic Research Service of the USDA, http://www.ers.usda.gov/data/biotechcrops/
Rapid growth in adoption of genetically engineered crops continues in the US. In all aspects of agriculture technological advances continue to improve farmers' ability to grow productive, healthy food crops in ample supply.

(12) **Harm to wildlife and ecosystems is likely**

Delisle, G. "Near-Surface Permafrost Degradation: How Severe During the 21st Century?" *Geophysical Research Letters* **34** (2007): L09503, doi:10.1029/2007GL029323. Continuous permafrost in Alaska and Siberia will survive over the next one hundred years, even if significant warming takes place. There appear to be no significant methane excursions in ice core records of Antarctica or Greenland during the previous periods of climatic warming which might otherwise serve as evidence for a massive release of methane.

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McCabe, G.J., Palecki, M.A. and Betancourt, J.L. 2004. Pacific and Atlantic Ocean influences on multidecadal drought frequency in the US, *Proceedings of the National Academy of Sciences (USA)* **101**:4136-4141. In general, forests thrive under increases in the growing season and elevated levels of CO2 concentration. Habitats ought to benefit. Forest fires and insect outbreaks are complex and largely driven by changes in SST in the Pacific and Atlantic Oceans.

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Reynaud, S., Ferrier-Pages, C., Meibom, A., Mostefaoui, S., Mortlock, R., Fairbanks, R. and Allemand, D. 2007. Light and temperature effects on Ar/Ca and Mg/Ca ratios in the scleractinian coral *Acropora* sp. *Geochimica et Cosmochimica Acta* **71**: 354-362. The temperature and CO2 increases appear to not have been hurtful at all, and in fact appear to have been helpful.

Riebesell, U. 2004. Effects of CO2 enrichment on marine phytoplankton. *Journal of Oceanography* **60**: 719-729. A moderate increase in CO2 facilitates photosynthetic carbon fixation of some phytoplankton groups.

Webb, T., III, et al., 1998. Late Quaternary Climate Change in Eastern North America: A Comparison of Pollen-Derived Estimates with Climate Model Results. *Quaternary Science Reviews,* **16:** *587—606.* End-of-summer Arctic sea-ice had to be substantially degraded, or even gone, for many, many years in prior ages. Northwestern and northeastern North America were more than 4 degrees F warmer than the baseline from 7,000-9,000 and 3,000-5,000 years ago respectively. Obviously the polar bear survived.

http://www.fs.fed.us/database/feis/plants/graminoid/spaalt/all.html Salt marsh species have a wide natural range.