North Dakota Climate Solutions Partnership

SCIENTIFIC ADVISORY GROUP

Summary: Statement of Principles on Climate Science

October 2009

We, as independent members of the scientific community and members of the North Dakota Climate Solutions Partnership's Scientific Advisory Group, affirm our belief in the following facts and statements:

The earth's climate is warming.

Of the 10 hottest years recorded by National Oceanic and Atmospheric Administration (NOAA), eight have occurred since 2000. The year 2008 tied with 2001 as the eighth warmest year on record for the planet.

There is strong scientific consensus that human activity is a significant factor in the current climate change.

The existing consensus on climate change has been affirmed by international scientific bodies and polls of scientists' opinions.

Consequences from climate change in the Great Plains are likely to include:

- Increased vulnerability of natural ecosystems to invasive species, pests, and loss of native species
- More frequent and severe heat waves and droughts
- Heavy downpours leading to increased flash flooding
- Increased stress on waterfowl production in the prairie pothole region
- Greater pressure on crop yields due to rising temperatures and more extreme weather events.

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Of the 10 hottest years recorded by NOAA, eight have occurred since 2000. The year 2008 tied with 2001 as the eighth warmest year on record for the Earth, based on the combined average of worldwide land and ocean surface temperatures through December, according to a preliminary analysis by NOAA's National Climatic Data Center.[1]

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The scientific consensus on climate change has been affirmed by international scientific bodies and polls of scientists' opinions.

The Intergovernmental Panel on Climate Change (IPCC) states:

> The understanding of anthropogenic warming and cooling influences on climate has improved … leading to very high confidence that the global average net effect of human activities since 1750 has been one of warming ,..
>
> Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level …
>
> Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. [2]

The conclusions of IPCC were supported by one of the most rigorous scientific reviews, which continued for well over a year. Both the world scientific body and the participating governments affirmed the IPCC report. Multiple national and international scientific

organizations have supported IPCC and/or created independent surveys of scientific research with similar conclusions. Some examples include:

- American Geophysical Union[3];
- American Meteorological Society[4];
- American Chemical Society[5];
- World Meteorological Organization[6];
- Science Academies of the G8 Countries; including
- U.S. National Academy of Science.

The list of global and national assessments with similar conclusions to the IPCC include:

- US National Assessment of the Potential Consequences of Climate Variability and Change[7];
- United Nations Global Environment Outlook assessment[8];
- Stern Review Report on the Economics of Climate Change.[9]

Since 2001, the national science academies of thirty-two nations, including the US, confirmed anthropogenic climate change, supporting reduction of the GHG emissions globally. [10, 11, 12]

In May of 2009, the National science academies of the G8+5 nations issued a joint statement declaring:

> Climate change and sustainable energy supply are crucial challenges for the future of humanity. It is essential that world leaders agree on the emission reductions needed to combat negative consequences of anthropogenic climate change … The need for urgent action to address climate change is now indisputable. For example, limiting global warming to 2°C would require a very rapid worldwide implementation of all currently available low carbon technologies.[13]

The Center for Naval Analysis (CNA), a highly respected, non-partisan think tank known for objective analysis, brought together eleven retired three-star and four-star admirals and generals to develop a report on climate change and energy security. They were briefed on the latest science on climate change. Here is a brief statement:

> The MAB (Military Advisory Board) received numerous briefings on the available science on climate change, to include both empirical evidence of climate change that has already occurred and is occurring today, as well as projections of future climate change.

> They came to the conclusion that the evidence is sufficiently compelling and the consequences sufficiently grave that this issue requires substantially more analytical effort by the intelligence community and defense planners to mitigate and adapt to the potential threats of climate change.[14]

The largest poll of scientists' opinions on climate change ever conducted shows that over 80 percent state that humans are a significant factor of our current warming. More compelling, 97 percent of the climatologists responding to the survey, who are actively publishing their research, agree with that statement.[15]

The United Nations Global Environment Outlook assessment states:

> Climate change (including global warming) is under way, and an average temperature increase of 0.74°C over the past century has been recorded. This trend, in which 11 of the last 12 years (1995–2006) rank among the 12 warmest years since 1850, is virtually certain. Impacts are already evident and include changes in water availability, spread of waterborne disease vectors, food security, sea-level and ice cover as exemplified by melting of the Greenland ice sheet... Anthropogenic GHG emissions (principally carbon dioxide, CO2) are the main drivers of change.[16]

The 2009 joint report, produced by the scientists of 13 US government agencies, confirmed that "Global warming is unequivocal and primarily human-induced." According to the report, agriculture and livestock production will be one of the areas increasingly impacted by this trend. The report was produced over multiple years of research under both Republican and Democratic administrations. Some of the impacts for the Great Plains region include:

- More frequent and severe heat waves and droughts;
- Heavy downpours leading to increased flash flooding;
- Increased stress on waterfowl production in the prairie pothole region; and
- Greater pressure on crop yields due to rising temperatures and more extreme weather events.[17]

The Massachusetts Institute of Technology (MIT) has doubled its projections for temperature increases for the end of this century to 10 degrees Fahrenheit. Study co-author Ronald Prinn, director of MIT's Center for Global Change Science, calls for "rapid and massive" action to avoid this and says, it is important "...to base our opinions and policies on the peer-reviewed science. There's no way the world can or should take these risks."[18]

Taking action to prepare for climate change impacts can be incorporated into current decision-making and planning strategies. By combining mitigation efforts and adaptation strategies we can find win-win scenarios that allow us to take advantage of low-carbon opportunities in business, farming/ranching, energy development and other areas.

REFERENCES

1. NOAA National Climatic Data Center, *Climate of 2008 - in Historical Perspective Annual Report*, 14, January 2009. http://www.ncdc.noaa.gov/oa/climate/research/2008/ann/ann08.html

2. IPCC, 2007: *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland. HYPERLINK "http://www.ipcc.ch/index.htm" http://www.ipcc.ch/index.htm

3. American Geophysical Union, *AGU Position Statement: Human Impacts on Climate*, Adopted by Council December 2003, Revised and Reaffirmed December 2007. http://www.agu.org/outreach/science_policy/positions/climate_change2008.shtml

4. American Meteorological Society, *Climate Change Research: Issues for the Atmospheric and Related Sciences*, Adopted by AMS Council on 9 February 2003, Bull. Amer. Met. Soc., 84, 508—515. http://www.ametsoc.org/policy/climatechangeresearch_2003.html

5. American Chemical Society, *ACS Statement on Global Climate Change*, http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_SUPERARTICLE&node_id=1907&use_sec=false&sec_url_var=region1&__uuid=0cbd57b5-5766-456d-800b-680b88c1c8bf

6. *World Meteorological Organization, Statement at the Twelfth Session of the Conference of the Parties to the U.N. Framework Convention on Climate Change*, November 15, 2006. http://www.wmo.ch/pages/mediacentre/statann/documents/SG21_2006_E.pdf

7. US Global Change Research Program, *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*, National Assessment Synthesis Team, 21 April, 2004. http://www.usgcrp.gov/usgcrp/Library/nationalassessment/foundation.htm

8. United Nations Environment Programme, *Global Environment Outlook (GEO-4)*, October 25, 2007. http://www.unep.org/geo/geo4/media/

9. Nicholas Stern, *The Stern Review on the Economics of Climate Change*, Great Britain Treasure, January, 2009. http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

10. *The Science of Climate Change*, A joint statement issued by the Australian Academy of Sciences, Royal Flemish Academy of Belgium for Sciences and the Arts, Brazilian Academy of Sciences, Royal Society of Canada, Caribbean Academy of Sciences, Chinese Academy of Sciences, French Academy of Sciences, German Academy of Natural Scientists Leopoldina, Indian National Science Academy, Indonesian Academy of Sciences, Royal Irish Academy, Accademia Nazionale dei Lincei (Italy), Academy of

Sciences Malaysia, Academy Council of the Royal Society of New Zealand, Royal Swedish Academy of Sciences, and Royal Society (UK), May 17, 2001. http://royalsociety.org/displaypagedoc.asp?id=13619

11. *Joint science academies' statement: Global response to climate change*, June 7, 2005. http://royalsociety.org/document.asp?latest=1&id=3222 *Note: The eleven signatories were the science academies of Brazil, Canada, China, France, Germany, India, Italy, Japan, Russia, the United Kingdom, and the United States.

12. *Joint science academies' statement on growth and responsibility: sustainability, energy efficiency and climate protection*, May 2007. http://www.pikpotsdam.de/aktuelles/nachrichten/dateien/G8_Academies%20Declaration.pdf *Note: The thirteen signatories were the national science academies of Brazil, Canada, China, France, Germany, Italy, India, Japan, Mexico, Russia, South Africa, the United Kingdom, and the United States.

13. G8+5 Academies' joint statement: Climate change and the transformation of energy technologies for a low carbon future, May 2009. http://www.nationalacademies.org/includes/G8+5energy-climate09.pdf *Note: The thirteen signatories were the same national science academies that issued joint statements in 2007 and 2008.

14. CNA Corporation, National Security and the Threat of Climate Change, 2007. www.securityandclimate.cna.org

15. Doran, P. T., and M. Kendall Zimmerman (2009), *Examining the Scientific Consensus on Climate Change*, Eos Trans. AGU, 90(3), doi: 10.1029/2009EO030002.

16. *Ibid.*

17. National Oceanic and Atmospheric Administration (NOAA), *Global Climate Change Impacts in the United States*, June 2009. "http://www.noaanews.noaa.gov/stories2009/20090616_climatereport.html" http://www.noaanews.noaa.gov/stories2009/20090616_climatereport.html

18. David Chandler, *Climate change odds much worse than thought*, MIT News Office, May 19, 2009. "http://web.mit.edu/newsoffice/2009/roulette-0519.html" http://web.mit.edu/newsoffice/2009/roulette-0519.html