

# Turfgrass, Greenhouse Gases, Climate Change, and the Role of Science

Those of you who have read *Turfnews*, or perhaps attended our annual Kansas Turfgrass Conferences in Topeka in recent years, may be aware of my occasional articles and talks about the potential relationships between turfgrass and global climate change. Because the events of the past year have exposed gross errors and perhaps even fraud and deceit at the highest international levels among global warming and climate change scientists, I thought it would be timely to revisit this topic as it relates to turfgrass and to give you my perspective on it.

As a brief review, some turfgrass/climate change topics I have discussed include emissions of nitrous oxide from turfgrass and carbon sequestration, or storage of carbon (carbon dioxide removed from the atmosphere via photosynthesis), in turfgrass soils. How are nitrous oxide and carbon dioxide related to climate change? Simply put, both are major greenhouse gases that have been implicated in global warming and climate change. For the sake of time I will not go into detail about our studies, but for those interested more information is posted online at (<http://www.ksuturf.com/Bremer/NitrousOxideEmissions.html>) and in our K-State Turfgrass Research Reports (<http://www.ksuturf.com/ResearchReports.html>). Suffice it to say, our overall goal is to minimize the potential impacts of the 50 million acres of turfgrass in the U.S. alone on climate change by reducing emissions of nitrous oxide and carbon dioxide from turfgrass.

The “scientific establishment” says that mankind is significantly affecting climate change via large emissions of greenhouse gases into the atmosphere, which exacerbate the greenhouse effect and cause global warming. This belief is the basis for our research at K-State. However, I want to address the sometimes confusing and nearly always controversial publicity that has surrounded this topic in the media in recent years. I’m probably oversimplifying, but for instructive purposes let’s say there are three camps of thought on man-caused climate change: Camps A, B, and C. Camp A, which is highlighted by Al Gore’s famous movie, *An Inconvenient Truth*, presents a very scary scenario of potentially catastrophic events that could take place, especially if we don’t intervene immediately and dramatically, presumably by ratifying a Kyoto Protocol-type treaty or passing some sort of climate change legislation like cap and trade. Camp A has called climate change a “moral” issue, which, in my opinion, moves it out of the scientific realm. Camp B also believes that man-caused climate change must be taken seriously and be addressed, but they do not believe climate change will be catastrophic or that we need to take drastic measures. The Danish scholar Dr. Bjorn Lomborg probably represents Camp B, and he calls climate change a practical problem, not a moral one. He suggests we need to address human effects on climate, but in a more measured, cost-effective manner than through expensive treaties or legislation like cap and trade. Finally, Camp C believes that anthropogenic effects on climate are probably negligible. Camp C could be represented by Dr. Roy Spencer, a climatologist and former NASA scientist who believes that the climate may not be as

sensitive to increases in atmospheric concentrations of greenhouse gases as some models have predicted. He argues that the Earth’s climate is more robust than we give it credit for and that most of the climate change we are witnessing is probably a part of the natural process; the climate has always changed and probably always will.

The most recent, authoritative report on climate change was in 2007 by the United Nation’s Intergovernmental Panel on Climate Change (IPCC). During the past year, however, there were some shocking revelations that came out of the 2007 report. For example, the report had predicted that the Himalayan glaciers could shrink by 80% by 2035, a claim that was later retracted because it was based on a magazine article rather than on a scientific study! Unfortunately, the proclamation of the incredible shrinking glaciers had already made quite a splash in the headlines by the time it was retracted, and it had no doubt generated considerable fear among the public. Other errors were revealed in the 2007 report and the interception of emails from climatologists at the Climatic Research Unit in the UK (dubbed Climategate) did little to demonstrate scientific integrity to an increasingly climate-change-skeptical public. Defenders of the IPCC say that mistakes are inevitable and that although unfortunate, they don’t change the reality of human influence on the climate. There are growing numbers of credible scientists, however, who are voicing their doubts about the magnitude of man-caused effects on climate change.

But let’s move back a little closer to “turfgrass” home. Last year an article came out in *Geophysical Research Letters*, a peer-reviewed scientific journal, which stated turfgrass management “creates significantly more greenhouse gas than turf plants remove from the atmosphere” and inferred that total emissions would be lower if there weren’t any lawns. This also created quite a splash and was widely reported on the internet and newspapers nationwide. Oh, did I mention that there was a “small” (well, not really small!) problem with the scientists’ research methods? As it turns out, they made a calculation error that inflated their estimates of carbon emissions from turfgrass by 10 times above its actual value! In fact, the corrected calculations showed that lawns are carbon neutral or perhaps even positive. As in the situation with the IPCC and the Himalayan glaciers, however, the public had already been told that lawns were large contributors to global warming. The fact that the report was flawed received much less attention; in effect, the damage was already done.



## Turfgrass, Greenhouse Gases, Climate Change, and the Role of Science (continued)



The late astronomer Carl Sagan said that “*It is the tension between creativity and skepticism that has produced the stunning and unexpected findings of science*”. This statement reveals two important aspects about science that are relevant to this discussion on global warming. The first is that the stunning and unexpected findings of science have improved our lives immensely, and science continues to play a crucial role in society. This is true in the realm of turfgrass as well, where scientific advances continue to improve our management capabilities to combat a seemingly never-ending parade of challenges. A second part of Dr. Sagan’s statement indicates the importance of skepticism in science. The peer-review process demands that the research of one group of scientists be critically reviewed by their colleagues with a healthy skepticism. Unfortunately in the global warming debate, it seems that those who consider climate change a moral issue (Camp A) have resorted to name calling and castigation in attempts to silence or discredit the more “skeptical” Camps B and C. The darker side of human nature has reared its ugly head within the scientific community and skepticism, which is so essential to the scientific process, is being trampled on by those in Camp A.

So, what is the public or even those of us in the scientific community to think about all of this? Well, for one thing scientists are human and therefore will make mistakes as has been demonstrated by the examples above. Presumably the peer-review process of science should catch most of this, but that doesn’t always happen. One thought is that because scientists are human they have prejudices and biases which may affect their interpretation of data and conclusions from their studies. Scientists are also under enormous pressure to obtain funding for their research (I can attest to that). Therefore, when considering controversial debates within the scientific community, it may be important to consider motives. While I believe most scientists are ethical, there are undoubtedly some who would use their platform to exploit a potential problem to further their agenda. Such agendas may be as simple as obtaining sizeable funding for their research or as obtuse as furthering their particular personal or political cause. In other words, “if we scare the public bad enough, then maybe we can get what we want.” Because this tactic can exist even in scientific circles, I think it is prudent for the public (which includes you!) and the scientific community as a whole (which includes me!) to maintain a healthy skepticism about some of the more spectacular doom and gloom scientific reports that appear in the media.

Jacob Bronowski, a mathematician and historian of science, once said that “*no science is immune to the infection of politics and the corruption of power.*” Has this happened to the science of climate change? I’ll let you be the judge. However, during the process please don’t toss the whole body of science, which continues to do a lot of good in our world. As turfgrass scientists at K-State, our goal is to help the turfgrass industry solve important issues of the day and hopefully a few issues that are coming down the pike. We enjoy what we do and look forward to partnering with you for many years to come. (**Dale Bremer**)

## K-State to Host Alumni and Friends Gathering at Golf Industry Show in Orlando

K-State alumni and friends are invited to join us in Orlando to meet fellow graduates and hear a brief update about your alma mater. The Heart of America Golf Course Superintendents Association has graciously allowed us to coordinate logistics for the reception with them. The HAGCSA’s reception will follow ours in the same room, beginning at 8 p.m.

**Event:** 2011 Golf Industry Show (GIS)

**Date:** Wednesday, February 9, 2011

**Time:** 7:00 p.m. to 8:00 p.m.

**Location:** Rosen Centre (GCSAA headquarters)

**Room:** Salon 5/6

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