

# Climate Change: The Greatest Challenge to Society & Science

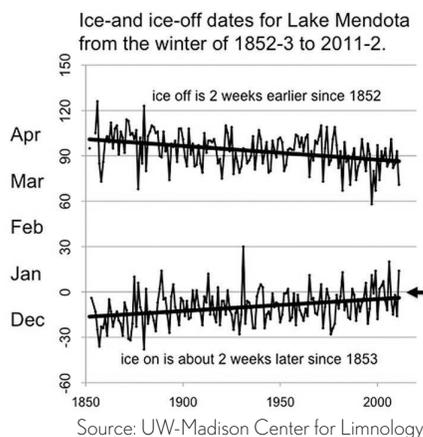
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Distinguished Chair for the Wisconsin Idea

As I begin my 50th year as a UW-Madison chemistry faculty member, I call for more action on the part of all Badger Chemists to better connect science and society—responsible action to address and to mitigate climate change. This is the greatest challenge that humanity has faced. We must act responsibly.

We know that the concentrations of greenhouse gases in Earth's atmosphere are higher and increasing faster than at any time in the past 1 million years. The average temperature of Earth is increasing, ice is melting, oceans are acidifying, and extreme weather events are more frequent. Human activities, principally the combustion of fossil fuels, are a major source of greenhouse gases and a major driver of climate change. To share this knowledge with the public and be credible, chemists must acquire a good grasp of the science of climate change and must also develop skills for affecting attitudes in and out of the classroom.

The effects of global warming are clear and well documented. For example, note the changes in the plant hardiness zones in Wisconsin between 1990 and 2012 in the upper right graphic.

Also, note the decrease of the duration of ice on the surface of Lake Mendota:



Graph by Cecilia Vollbrecht, Wisconsin Initiative for Science Literacy

Our department is home to excellent graduate research groups and centers in the chemical sciences. We thrive on the intellectual prowess of our faculty. Basic research can greatly increase our understanding of

## USDA PLANT HARDINESS ZONES

This is the USDA Plant Hardiness Zone Map for the state of Wisconsin. Plant hardiness zones are used to select perennials, landscape plantings and fruit trees that will survive over winter in specific locations.

■ -35° to -40° F ■ -30° to -35° ■ -25° to -30° ■ -20° to -25° ■ -15° to -20° ■ -10° to -15°

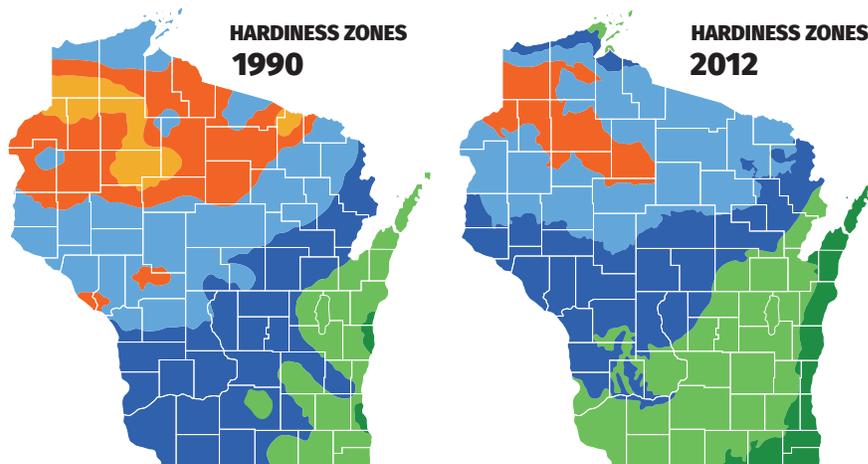


Illustration by Brandon Raygo, The Capital Times

SOURCE: U.S. Dept. of Agriculture, PRISM Climate Group, Oregon State University

The zone color key shows the lowest observed winter temperatures in that area.

nature, expand frontiers of inquiry, trigger creative waves of invention and innovation, and prompt technological breakthroughs—all to serve society. It is through research, education, and innovation that we contribute to advancing science and to serving society.

At Wisconsin and elsewhere, research is underway to deepen our understanding of the science of climate change. At Wisconsin and everywhere, teaching must effectively reach every student to learn the science of climate change and to take responsible action for benefitting Earth and its people. Our curriculum must deeply connect the science of climate change to societal progress. This requires integrating climate science with course content. For example, ocean acidification with acid base chemistry, IR spectroscopy with greenhouse gas properties, thermodynamics with the carbonate cycle, and isotope studies for prehistoric temperature analysis.

My research and public engagement group is sharply focused on reaching audiences everywhere. Our activities include workshops for faculty, teachers, and graduate students; events for musicians and other artists; visits to schools, libraries, farmers

market, service clubs, and other community groups; TV, radio, print, and electronic media programs; conversations with local and federal elected officials, and other public venues. Climate change is one of our major themes in fostering community appreciation of science.

What we do in our chemistry classrooms and research laboratories can have profound effects on the minds of students, staff, and the Campus community. What we do outside the classroom in reaching the public-at-large can also influence attitudes and behavior. Let us all strive to: reduce our dependence on fossil fuels for daily life needs; adopt a diet with less stress on natural resources; address the economic impacts of climate change; engage in civil and respectful conversations about all matters affecting the quality of life locally and globally; and demand government action locally and nationally to preserve and improve the quality of water, land, and air. Let us become better at connecting science to society.

Long Live the Wisconsin Idea!

Learn more at [www.scifun.org](http://www.scifun.org).