

## Downscaling Wind and Other Climatological Parameters of Relevance to Energy Production in Wisconsin

**OVERVIEW:** The goals for this project fall into three main tasks: (1) develop high spatial resolution daily estimates of wind speed and direction, dew point temperature (i.e. humidity), solar radiation, sky cover and percent possible sunshine over Wisconsin for the coming century, (2) use the variables above together with the downscaled precipitation and maximum and minimum temperature to drive two macro-scale land/hydrologic models that will produce estimates of evapotranspiration, soil moisture, runoff, snow depth and snow water equivalent, and (3) develop high-resolution monthly data so that we can provide temporally continuous data from the present to several hundred years in the future (the daily data is restricted to the years 2046-2065 and 2081-2100).

**ABSTRACT:** Wisconsin's geographical setting gives rise to a rich set of climatic conditions that help shape our state's environmental, social and economic resources. In 2007 the Wisconsin Initiative on Climate Change Impacts was formed, with the goals of (i) assessing the impacts of climate change on Wisconsin's environmental, social and economic resources, and (ii) developing and recommending adaptation strategies related to the impacts of climate change. In support of the first goal, previous work funded under the EERD Program developed, implemented, and began dissemination of a set of climate projections for Wisconsin. That initial effort produced estimates of precipitation and maximum and minimum temperature that are now being used to assess impacts of climate change on forestry, wildlife, human health (as part of estimates of combined sewage overflows in Milwaukee), Green Bay ecosystems, flooding events and regional hydrology, coastal processes, and cold- and warm-water fish (to name a few). Results from the earlier project are being written up for peer reviewed publication, and have been shared (with enthusiastic responses) with other climate impacts groups around the country.

Despite the outstanding progress made possible by the 2008-09 EERD Program grant, additional climate variables have been identified for understanding further impacts. These variables include winds (alternative energy production, lake mixing, evapotranspiration, coastal processes), humidity (human health, evapotranspiration, hydrology, ecosystem impacts), evapotranspiration (lake levels, ecosystems, hydrology), and solar radiation (ecosystems, lake stratification, human health). The present document outlines a research proposal to extend the methodology developed under the previous EERD grant to develop estimates of daily and monthly climate data that will be used to assess impacts of climate change on Wisconsin. The involvement with WICCI ensures that the data will be broadly disseminated throughout the state and Upper Great Lakes region.

**PROJECT MANAGER:** David Lorenz, University of Wisconsin - Madison