Collaboration & Connections: Building Blocks for Sustainable Communities
Wisconsin Initiative on Climate Change Impacts (WICCI)

Objectives:

- Assess and anticipate climate change impacts on specific Wisconsin natural resources, ecosystems and regions
- Evaluate potential effects on industry, agriculture, tourism, and other human activities
- Develop and recommend adaptation strategies
WICCI Collaborators

**Federal**
- U.S. Department of Agriculture
- U.S.D.A. Natural Resources Conservation Service
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Geological Survey

**State**
- State of Wisconsin Commissioner of Insurance
- Wisconsin Coastal Management Program
- Wisconsin Conservation Congress
- Wisconsin Council on Forestry
- Wisconsin Department of Transportation
- Wisconsin Department of Agriculture, Trade and Consumer Protection
- Wisconsin Department of Health and Family Services
- Wisconsin Department of Natural Resources
- Wisconsin Emergency Management
- Wisconsin Geological and Natural History Survey
- Wisconsin Public Service Commission
- Wisconsin State Climatology Office
- Wisconsin State Legislature

**Tribal Groups**
- Great Lakes Indian Fish & Wildlife Commission

**Local/Municipal**
- City of Fitchburg Engineering
- City of Madison Storm Water Utility
- City of Racine Water & Wastewater Utility
- Columbia County Land & Water Conservation
- Dane County Land Conservation Division
- Greater Milwaukee Committee
- League of Wisconsin Municipalities
- Madison & Dane County Public Health Department
- Madison Metropolitan Sewerage District
- Milwaukee Metropolitan Sewerage District
- Southeast Wisconsin Regional Planning Commission
- Wisconsin Towns Association

**Universities**
- Lakehead University
- UW Extension
- UW Sea Grant
- UW-Engineering Professional Development
- UW-Green Bay
- UW-La Crosse
- UW-Madison
- UW-Milwaukee
- UW-Milwaukee Great Lakes WATER Institute
- UW-Stevens Point

**NGO's**
- 1000 Friends of Wisconsin
- American Birkebeiner Ski Foundation
- Clean Wisconsin
- Education Communications Board
- Fox-Wolf Rivers Environmental History Project
- Grow North Regional Economic Development Corporation, Inc.
- Natural Areas Preservation Council
- Nature Net
- New North, Inc.
- Professional Dairy Producers of Wisconsin
- Second Look Holsteins
- The Association of State Floodplain Managers
- The Nature Conservancy
- Trout Unlimited
- Wisconsin Citizen-Based Monitoring Network
- Wisconsin Environmental Initiative
- Wisconsin River Alliance
- Wisconsin Paper Council
- Wisconsin Wetlands Association
- Wisconsin Wildlife Federation

**Private Sector**
- AECOM
- Alliant Energy
- HNTB Corporation
- Montgomery Associates-Resource Solutions
- MSA Professional Services, Inc.
- S.C. Johnson
- Short Elliott Hendrickson, Inc.
- We Energies
Climate Change in Wisconsin: Historical Trends
One of many signs of warming in Wisconsin...

Decrease in duration of ice cover on lakes

Lake Mendota Ice Duration 1855-6 to 2008-9

Duration (days)

10 longest

10 shortest

Source: J. Magnuson, UW-Madison
Water loss is compounded by increased evaporation and transpiration associated with warmer temperatures.
Wisconsin Precipitation Trends: 1950-2006

Annual

Summer

Devil’s Lake (Sauk Co.)
June 2008 storms

Total Precipitation (inches), June 1-15, 2008

• Massive flooding (810 sq. mi)
• Raw sewage overflows (90 million gallons from 161 wastewater treatment plants)
• Water from private wells contaminated (28%)
• FEMA paid $34 million in flood damage claims

Map: NOAA Midwestern Regional Climate Center

WICCI Stormwater Working Group
And groundwater flooding from water tables rising after prolonged periods of excessive precipitation. 

Flooding from streams and rivers overtopping their banks following extreme precipitation events.

Photo: Wisconsin DNR

Photo: Peter Gorman
Buildings, roads and water/sewer systems are not currently designed for the challenges from future climate change.

Photo: Michael Kienitz

Photo: Steve Zibell

WICCI Stormwater Working Group
Climate Change in Wisconsin: Future Projections
“Downscaling”
Focuses global projections to a scale relevant to local and regional climate impacts.
Wisconsin's “Tension Zone” is projected to move north due to a warming climate.
Brook trout

Projected changes in stream temperatures by mid-century impact fish under 3 climate warming scenarios.

- Current: 1.4°F = 44% loss
- 4.3°F = 94% loss
- 7.2°F = total loss

WICCI Coldwater Fisheries Working Group
Results reinforce expected northward movement of Tension Zone.

Source: Notaro, Lorenz & Vimont, UW-Madison
Soil Erosion
(loss in “natural capital” from agricultural landscapes)

- Cropping system changes, return of erodible land to cultivation, and changing precipitation patterns increase soil losses.

- Small number of intense precipitation events cause most of annual soil loss from agricultural fields.

- Soil and nutrient losses cause downstream water quality problems.
Human Health

Increase in waterborne infectious diseases due to more intense storms

Increase in vector-borne infectious diseases

Increase in respiratory health problems from air pollution and climate change
How will humans respond to climate change in a way that will make our natural and human systems more resilient?

Adaptation to climate change involves risk management.

Risk = (probability of impact occurring) X (degree of harm or benefit)

WICCI Adaptation Working Group
Mitigation vs. Adaptation

Mitigation:
Decrease the amount of warming by reducing GHG emissions

- Very little
- Minor
- Major

Change in rate of GHG emissions*

*Scenarios from IPCC 2007

Adaptation to a warmer climate required even with GHG reductions

3.6 °F

Global surface warming (°C)

Modified from: IPCC 2007
Keys to Adaptation

Triage

Determine which actions to implement first

Flexibility

Build flexibility into management practices

“No Regrets”

Choose strategies that increase resilience and provide benefits across all future climate scenarios

Precautionary Principle

Where vulnerability is high, it is better to be safe than sorry
“Wisconsin’s Changing Climate: Impacts and Adaptation” is the first in an ongoing WICCI assessment of climate change impacts and adaptation strategies in Wisconsin.
WICCI was created from a partnership between the UW-Madison Nelson Institute for Environmental Studies and the Wisconsin Department of Natural Resources.