

# Winters ahead

**Climate analyses predict north-central Wisconsin will be a different kind of place 50 years from now**

**Climate-watchers caution us** not to draw conclusions from a few days of balmy weather in one January. Scientists look at trends in 30-year blocks. And though "global" is always associated with the term climate change, geographic blocks also are part of the picture.

A diverse group called the Wisconsin Institute on Climate Change Impact makes predictions for areas in the state, and it says that north-central Wisconsin will be a different place by mid-century. It's not all about icebergs melting and sea levels rising on the coasts. The WICCI group is mainstream science and academics, not fringe-thinking predictors of doom, and their predictions offer insight for the winter sports industry, farmers, anglers and wildlife watchers.

The WICCI analyses and that of national experts say that in the years between 2050 and 2075, temperatures in a Wisconsin winter are on course to be 5 to 11 degrees higher than they are now. Summer temps will increase 3 to 8 degrees.

That means the experience of living in north-central Wisconsin will change. Statistically, if precipitation falls on Wausau this January, there's only a 5% chance it will fall as rain. In 50 years, the likelihood we'd get rain instead of snow quadruples to 20%.

When rain falls in January, it melts the snow presumably already on the ground. That alters the landscape not only visually, but also for winter sports. Already, community leaders in Hayward, home to the world-famous Birkebeiner cross-country ski race, are planning for other winter activities to organize in case they lose the huge tourism boost when the Birkebeiner has a good year.

Wausau/Marathon County Parks director Bill Duncanson hauls out an anecdote when he talks about climate change. His mother-in-law, now 89, was born Dec. 9 and as a girl could reliably plan on having an ice skating party on her birthday. "Now we have a difficult time providing dependable ice by Christmas break for school kids. That is a two- to three-week shift," Duncanson says. It's even to the point of people requesting artificially made ice on The 400 Block to have a more dependable skating season.

## Forestry more difficult, less trout fishing

Loss of snow cover in itself causes regional warming. Temperatures increase if the mid-winter sun shines on dark, exposed ground instead of the white, reflective snow.

In far northern climes, according to UW Marathon County biologist Paul Whitaker, soil exposed for more weeks per year will melt ice cover faster. Experts can even predict that, with reduced snow cover, winter overnight temperature drops will be less extreme.

Dan Vimont is in the atmospheric and oceanic sciences field at UW-Madison and chairs WICCI's science council. He says the increases in winter and summer temperatures average out to a year-round increase of 4 to 9 degrees. "Wausau's snow season will look more like Milwaukee's snow season." That would be four to six weeks less of snowfall.

The logging industry in northern Wisconsin already is being forced to change practices, Vimont says. Loggers long have counted on traveling across frozen ground to get into woods and wetlands. Multi-ton all-terrain vehicles leave hardly a trace on frozen ground, but the same equipment without deep frost leaves some areas practically inaccessible. "There are logging companies that are building gravel roads where they didn't have to before," he says. The added expense and impact are only going to increase with warmer temperatures.

The trees in the woods are going to be different, too. Paper birches, which add beauty to Marathon County scenes like those around Mission Lake south of Hatley, prosper in cold weather. Birch will find central Wisconsin less and less hospitable. In 50 years, these trees probably



**Ice fishing now on Lake Wausau** By mid-century, January precipitation will be 20% rain, and the "snow season" will shorten by four to six weeks

won't be around Wausau anymore; you'll need to drive to Duluth to find a grove of birch.

Trout anglers won't be happy about the prospects, either. A Department of Natural Resources study projects tough times for the cold-water species. As water temperatures go up, the miles of streams in which trout can survive go down.

- With a temperature increase of 3°, survivable habitat for brook trout decreases 44%.
- 5° increase: Brook trout habitat sinks by 91%.
- 8° increase: No brook trout will reproduce in Wisconsin.
- Brown trout are more tolerant of warm water, but an 8° increase means an 88% reduction in survivable habitat.

## Farming changes, soil concerns

The profession in north-central Wisconsin most closely linked to the environment is farming. Paul Daigle, conservation program manager for Marathon County, says farmers like Nate Weisenfeld, just into Lincoln County, and Joe Tomandl II, in northwest Marathon County, are already sorting the pros and cons. Both are graziers, relying primarily on pastures, rather than plowed fields, to feed their dairy cattle.

A longer growing season can mean increased pasture production and less expense for supplementary feed. Daigle is big on soil conservation and says perennial pasture (sod) best captures rainfall. Rain that would run off a tilled field stays on a pasture or hay field, thus increasing production. These types of farmers in this area might be able to add warm-season grasses that cannot now survive this far north.

Corn farmers will have better luck getting their corn to maturity, and might be able to switch to longer-maturing varieties with increased yields.

Rising temperatures already have resulted in verifiable changes. The growing season for farmers is now two weeks longer than it was in 1950, says David Liebl, a UW-Extension specialist.

The down side will be the summer heat. Hot weather stresses dairy animals, and milk yields fall when temperatures go above 85 degrees, Daigle says. Dairy operations might have to shift to more heat-tolerant breeds, he says, or even bring the pastured cows into buildings with cooling devices.

In the past, dairy barns were built with winter comfort in mind. In 50 years, Weisenfeld says they might need evaporative cooling systems to take the edge off the heat.

Tomandl says that he thinks a lot about climate change because he's outside almost daily, and it's factoring into his long-term decisions. "It just amazes me the people who don't or refuse to believe it."

Weisenfeld, 29, says he remembers when temperatures in January dropped below zero and stayed there for two weeks. The warmer weather in mid-century "is going to hit us hard-core," he says. He would not have believed, as a teenager, that he could leave animals outside all winter, "but now I'm doing it."

Learning about projected changes in the climate, he says, is "a little bit scary because there are some things I don't know how we're going to handle."

Crop farmers are concerned the longer growing season will also benefit the insects that damage those crops. That could bring more pressure for the farmers to spray their fields with insecticides.

Tomandl is concerned about more than the heat. More extreme weather means high winds and more rain falling in short periods of time. "Farmers really have to pay attention to big rains," he says. A pasture can handily absorb the first inch of rain in a week or so, but if another inch or two falls on saturated soil, it starts to run off. Tomandl says 95% of the phosphorous that people are trying to keep out of surface water like the Big Eau Pleine Flowage is attached to soil particles. The phosphorous does not dissolve and wash into the stream that is a tributary to the Big Eau Pleine, for example, but enters when topsoil is washed in as silt. The topsoil is not that deep, he says, and, "We have to be careful how much soil we lose up here."

Professional associations that Daigle belongs to are concerned about soil erosion issues because of climate change. That's why the Soil and Water Conservation Society calls climate change a two-pronged threat — plus it will come when it's more crucial than ever to maintain healthy soil to feed burgeoning populations around the world.

A practical nugget from the soil society: For every 1° Centigrade (1.8° F) rise, the ability of air to hold water vapor increases 7%. Thus plants and soil evaporate out more water, stressing the plants and leaving drier soils susceptible to wind erosion.

Also, the 7% means more rain can fall and cause more soil erosion. Tomandl says you can have all the terraces and other conservation practices you want in a tilled field, but if 3 inches of rain falls in a few hours, some soil will wash away.

Notable to climate change skeptics is an article in the SWCS journal. All 10 authors put their names to an opening paragraph that says climate change and increasing populations combine to form "a formidable food security challenge."

### Wildlife shifts

Over at UWMC, Whitaker says the only debatable point on climate change is the rate at which it is happening. Scientists and other observers, he says, are noting that some



natural processes are keyed to seasonal temperature swings and others — like bird migrations — are keyed more into photo period or length of day.

Cases have been found in Europe where songbirds have evolved over the eons to arrive in their northern range during a big insect hatch or plant bloom. Add in warmer temperatures, and the bloom or hatch takes place several weeks earlier, leaving the birds with a food supply that is scanty in comparison to when the weather is "normal."

Compared to the rate of climate change before 1900, Whitaker says the current rate is comparatively rapid. A public garden in Pennsylvania tracked the blooming date of some of its plants for 150 years and found that, every 10 years, they bloom a day earlier. That's dramatic on an evolutionary scale.

Whitaker says it will be important to learn more about how insect populations respond to warmer temperatures. If a particular insect now can raise two broods that mature and raise broods of their own, the longer summers might bring three broods — good news for anything that eats that insect, bad news for anything that insect eats.

Marathon County is in a natural "tension zone" with oak and hickory savannas to the south and northern hardwood forest to the north. The line is moving north.

Wildlife already are responding to the change in climate. It was odd that this past week a pair of bald eagles has been seen working on a nest downstream from the Weston power plant on the Wisconsin River. Bald eagle nesting usually occurs in February.

Marge Gibson at Raptor Education Group near Antigo says bald eagles that used to migrate further south are now sticking around, getting fish in open water below dams and from ice fishers who throw small or undesirable species out on the frozen lakes.

*UWMC's Whitaker: Compared to before 1900, the rate of climate change now is comparatively rapid. It will be important to learn more about how insect populations respond to warmer temperatures.*

Gibson says her father was a keen observer of nature and pegged with great accuracy the migration date of nighthawks as Aug. 22. "Now they're still around in September," she says.

Larger animals feel the impact, too, according to Olivia Ledee, a WICCI member who works with UW-Madison and the DNR. Some large mammals that have expanded their range are likely to reverse that trend. The Canada lynx and the moose suffer from heat stress that reduces their ability to ward off disease and infection. Expect the moose and lynx to retreat from Wisconsin and maybe even the Upper Peninsula of Michigan, she says.

The disease of botulism does well in shallow and warm water, Ledee says, and is a threat to waterfowl.

Odd things are already happening in the wild, she says. If all other things are equal, evolutionary forces favor the larger individuals in a population. Scientists in Scotland found a population of wild sheep with an average body size 5% smaller than was found 24 years earlier. Their conclusion is that milder weather is allowing smaller young sheep to survive.

### Pinpoint predictions

For an interactive map that allows site visitors to click on a spot in Wisconsin and see a comparable city to the south that has today what the clicked spot will have in the future, go to [www.wicci.wisc.edu/climate-map.php](http://www.wicci.wisc.edu/climate-map.php).

If you click on Wausau, the map highlights cities as close as Madison and as distant as northern Missouri to show the range of what could happen. If average temperatures increase 4 degrees, a climate like Madison's is likely. If it increases here by 9 degrees, a climate like mid-Illinois or northern Missouri is more likely. **en**