

# Weathering the storm

September 3 2014, by Beth Staples

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Old-timers sharing childhood stories about growing up in Maine sometimes recount hiking 10 miles uphill in 3 feet of snow to get to school—and home.

Turns out those tales, of Maine winters anyway, might not be all that exaggerated.

In the winter of 1904–05, horses pulled huge saws to cut channels in foot-thick ice on Penobscot Bay so maritime traders could deliver goods. And in the winter of 1918, people walked, skated and rode in horse-drawn sleighs across the frozen bay to Islesboro, according to the Belfast Historical Society and Museum.

That same winter, Albert Gray and his companions drove a vehicle

across the frozen-solid brine. According to a Bangor Daily News report, the group made several trips in a Ford Model T between Belfast and Harborside, just south of Castine.

Historical records indicate upper Penobscot Bay commonly froze during the winter in the 1800s and early 1900s, says Sean Birkel, research assistant professor with the University of Maine Climate Change Institute (CCI). "Not every year; maybe once or twice a decade."

February 1934 was the last time it occurred.

Today's climate is different, he says.

For instance, summer—when the mean daily temperature is above freezing—is about 20 days longer now than it was on average in the late 1800s.

"The lakes really do freeze up later, and ice out is earlier than it used to be," says Birkel, adding that computer models predict that over the next 40 years, the average temperature in Maine could rise 3–4 degrees Fahrenheit, with most of the warming taking place in winter.

And the number of extreme weather events—like the record-breaking 6.44 inches of rain that flooded Portland on Aug. 13—has spiked in the last 10 years. Birkel says a 50 to 100 percent increase in rainfall events with more than 2 inches per day has been recorded at weather stations across the state.

The rise of extreme events, including heat and cold waves, is likely tied to the steep decline of Arctic sea ice since about 2000, Birkel says. Studies show rapid warming over the Arctic is changing circulation patterns across the Northern Hemisphere.

In particular, jet stream winds are slowing, which increases the likelihood of blocking events that hold a weather pattern—including heat and cold waves—in place for several days, he says. When blocked patterns finally dissipate, they tend to do so with powerful storm fronts.

Computer models generally predict that in the future, [extreme weather events](#) will be the norm, he says.

Birkel and other CCI researchers have developed online tools to assist local community planners prepare for climate changes. The tools—Climate Reanalyzer, 10Green and CLAS Layers—will be explained at the CLAS (Climate Change Adaptation and Sustainability) Conference on Thursday, Oct. 23 at UMaine.

The tools provide users access to station data, climate and weather models, and pollution and health indices, he says.

Paul Mayewski, director of UMaine's CCI, says the CLAS software explains past, present and future changes in climate at the community level and introduces a "planning system that invokes plausible scenarios at the community level where local knowledge can be applied to produce local solutions."

For instance, city leaders considering opening a cooling center for residents can review projections for future frequency of heat waves. Medical care workers can assess the potential for increase in Lyme tick disease. And community planners preparing to replace storm water drains can examine predicted precipitation in coming decades.

Esperanza Stancioff, [climate change](#) educator with UMaine Cooperative Extension and Maine Sea Grant, says coastal residents and communities need strategies to address sea-level rise and coastal flooding which will result, in part, to melting glaciers and polar ice caps.

UMaine Extension and Maine Sea Grant are among those working with coastal community leaders to help minimize potential hazards to fisheries, aquaculture, working waterfronts and tourism by implementing resilient coastal development strategies and practices, Stancioff says.

Ivan Fernandez, Distinguished Maine Professor in the School of Forest Resources and CCI, says understanding how Maine's climate is changing is critical for informed risk assessment and cost-effective adaptation.

Warming of the Gulf of Maine impacts the risk of lobster disease as well as market uncertainty, Fernandez says. He points to summer 2012 when warming ocean water resulted in a glut of lobsters and a subsequent bust in prices. In agriculture, rising temperatures can result in an increase of insects and disease, Fernandez says, as well as crop damage and soil erosion due to intense precipitation events.

Opportunities also could result from the changing climate, says Fernandez, including longer growing seasons and emerging shipping lanes in the Arctic Sea due to the receding of the polar ice sheet.

It's important for businesses to prepare for such changes, says conference presenter John F. Mahon, the John M. Murphy Chair of International Business Policy and Strategy and Professor of Management at UMaine.

"Business has to be engaged with government and other organizations at the local and national level," says Mahon.

"One of the more useful tools for doing this is the use of plausible scenario planning (PSP). In PSP, we try to envision several plausible futures with equal likelihood of happening and develop a set of 'warnings' or 'indicators' that tell us which one of the several futures we have identified is unfolding so that we can adapt to it in the most

efficient, economical and effective manner."

On a global scale, Mayewski says climate change is a security issue, as it "impacts human and ecosystem health, the economy; intensifies geopolitical stress; and increases the likelihood of storms, floods, droughts, wildfires and other extreme events."

In 2012, for instance, 11 weather and climate disasters worldwide killed more than 300 people and caused more than \$110 billion in damage, according to the National Oceanic and Atmospheric Administration's National Climatic Data Center. The disasters included Hurricane Sandy and the largest drought since the 1930s—which also worsened wildfires that burned more than 9 million acres.

The CLAS framework soon will be expanded to encompass national and international planning capability, says Mayewski, who was featured in *Years of Living Dangerously*, a nine-part documentary about climate change that Aug. 16 won an Emmy Award for Outstanding Documentary or Nonfiction Series.

Provided by University of Maine

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