

CLIMATE TALK

Climate Change Impacts to the Apostle Islands and the Chequamegon Bay Region

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Bayfield



The brutal winter of 2013-14 is in the past and water levels are up in Lake Superior. Everything is returning to normal, right? We'd all prefer to be able to say yes... and that tomorrow's normal will look much like yesterday's. Despite the natural year-to-year variability, however, the debate among reputable climate scientists is about the magnitude and impact of climate change on the Great Lakes, not whether it's happening.

Many of us once believed that the deep waters of the Great Lakes would buffer us from the impacts of climate change. Stories of melting glaciers, rising sea levels, and endangered polar bears were about other places. We'd be OK. But the evidence of the last 30 years is clear: we're not immune.

In fact, one of the stark messages of the 2014 National Climate Assessment is that temperatures are increasing rapidly in the upper Midwest. The rate is increasing, especially nighttime and winter temperatures. The Lake and its ecosystem are responding.

We've come to recognize that at the Apostle Islands National Lakeshore, climate change is one of the most important issues we face in the coming decades. Fishermen, sailors, and those who harvest wild rice can all describe the changes they have seen here. They may not call it climate change, but they will tell you that the Lake is changing. The conversation is shifting to the economic and other impacts of those changes and the need for adaptation. For Lake Superior and the Apostle Islands, like everywhere else, how these changes will ripple through the ecosystem and human society will be far more important than whether it will be warmer or colder, wetter or drier.

Notwithstanding our cold winter of 2013-14, we are already seeing, and can expect with increasing frequency, both warmer summers and milder winters. Compared to the past, more winter precipitation is falling as rain rather than snow. (Winter 2012-13, I noted four rain-on-snow events, a first in my experience.) Most years, we are seeing later freeze-up and earlier ice breakup. There's also clear evidence of a greater frequency of irregular, high intensity storm events.

This means less winter ice, an increase in evaporation, and lower average lake levels. Each model published by the scientists refines the predictions and there remains a lot of uncertainty, but lake level declines are more likely than not. Ephemeral wetlands, hugely important biological areas, will be drier. Warmer water extending deeper in the Lake's water column

most summers affects turnover and nutrient cycling and is causing deeper and longer thermal stratification of Lake Superior.

The result: shrinkage or loss of both terrestrial and aquatic habitats for plants and animals at the edges of their ranges, including almost all of the unique species on the islands, as well as wild rice, so important to local tribes. Lake trout and whitefish habitat is shifting to deeper waters. We're seeing increases in invasive species and diseases. Our area experienced the first-ever toxic blue-green algal bloom on Lake Superior in 2012, a troubling distinction the national park could have lived without.

More generally, climate change makes ecosystems, including the Apostle Islands, more vulnerable to other stressors and far less resilient to additional disturbances.

Lower water levels also create expensive infrastructure problems: docks are too high and in some places water may be too shallow to access them. Navigation hazards are exposed. While these are inconveniences for boaters, they are also major safety issues. This will have tremendous economic implications as our coastal economy relies on tourism and expectations that the lake is safely accessible during the ice-free season.

When the lake level was at its record low a few years ago, I got calls from boaters asking me what I, as the park superintendent, was going to do about it. The implication was that I could (and should) do something to alleviate the problem. Further discussion usually led to the mutual realization that there are no easy solutions and little money to throw at it. *Thinking differently* and adapting to change will be more productive than railing against it.

Since then, while the Apostle Islands National Lakeshore tries to be on the leading edge of climate change education and is greening our own operation to the degree we can. And we are preparing by adapting our infrastructure. We've modified existing docks to make them more resilient to both lower and higher lake levels. We've replaced 4 docks and lowered their surfaces, and will do the same for the Sand Island dock in 2016. We're working closely with local governments and tourism organizations to educate visitors on what is happening to the Lake and the Lake experience. We are also communicating what we are doing to adapt to climate change and protect the Lake ecosystem.

I sometimes say that national parks are "in the perpetuity business." We're here for the long haul. Our mission, established by Congress in 1916, is "*to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.*" As we approach the NPS centennial, we are challenged to reconcile that mission with the transformations induced by climate change.

People live near and visit the Apostle Islands area *because* of the deep connection to Lake Superior. As we acknowledge the Lake's vulnerability to climate-induced changes, and share the stories of what we as a community are trying to do to adapt, we are seeing that the tourism

economy is resilient. People want to be part of a community –a place– that cares deeply about its environment. They want to embrace the cause of protecting what makes it special.

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