

**ClimateCast, Episode 3: Climate Change on Lake Superior
Apostle Islands National Lakeshore
Transcript**

Music Begins & Fades Slightly

"For people living along the ocean coast melting glaciers and icecaps may mean rising sea levels. For people living along inland lakes, however, melting ice may mean just the opposite."

Music Fades in, then Fades out

"Hi, I'm Neil Howk from Apostle Islands National Lakeshore and I'll be your host for this episode of Earth to Sky's Climate Cast."

Music fades out and ends

Sound effects of waves and wind can be heard in the background

Apostle Islands National Lakeshore is the northernmost point in the state of Wisconsin. It includes 21 of the 22 Apostle Islands, and a 12 mile stretch of mainland shoreline along Lake Superior's south shore. Lake Superior defines the Apostle Islands, shapes its ecosystems, and sustains life in the region. Any changes in the lake may have significant long-term impacts on Apostle Islands' ecosystems.

Sound effects of waves and wind fades out

Research conducted by Dr. Jay Austin, from the University of Minnesota Duluth, showed rapid change in the summer water and air temperatures of Lake Superior between 1979 and 2006. Summer air temps around lake superior increased about 1.5 degrees celcius in that time. Surface water temperatures increased about twice as fast as the air temperatures, or about 3 degrees during the same period.

Trends also indicated decrease in ice cover on lake superior. Winter in the Apostle Islands means ice. The onset and disappearance of the ice greatly impacts the lives of people in area communities. Access to the islands, access to fishing grounds, the opening and closing of the navigation season are all dictated by the ice cover on the lake. I spoke with Forrest Howk about a recent study he did on the Lake Superior ice cover.

Second male voice:

Uh, my senior year of high school I compiled a hundred and fifty year dataset to research the changes to Lake Superior ice cover here in the harbor in Bayfield, Wisconsin. To do that, I looked at the length of time the channel between Bayfield and Madeline Island was blocked by ice each year dating back to the founding of Bayfield in 1856. Madeline Island is the largest of the Apostle Islands, and the only one that maintains a year-round community. I was able to get some of those records from the Madeline Island ferry line but I got most of my 150 year dataset by searching through microfilm copies of the Bayfield County Press Newspaper. The data showed that through the course of my study the ice season has been shrinking by an average of 3/10 of a day per year, three days per decade or 30 days per century. The ice is generally forming later and melting earlier each year. This means that while 150 years ago, the average ice season lasted for about 125 days and now the ice is only covering the lake for about 80 days per year.

First male voice:

Trends indicate that maximum ice cover on Lake Superior has decreased about 20-30% since the 1970's. Ice plays an important role in the lake's thermal cycle. The ice reflects sunlight, which is the primary source for heating the lake. Take away the ice, and the lake warms up faster, allowing more water to evaporate.

From 1997 to 2007, the Lake Superior area experienced increasing air temperatures and evaporation along with decreasing precipitation. This led to decreasing lake levels, with Lake Superior setting a new record low level in August and September of 2007. Levels have rebounded since then, but are still

below the long-term average.

It appears that winter evaporation, related to the amount and duration of ice cover, affects lake levels more than precipitation. Low lake levels adversely affect recreational boaters, marinas, commercial navigation, and hydro power. The United States Great Lakes Shipping Association reports that for every inch of lost clearance due to low water, an international vessel loses from 90 to 115 metric tons of cargo carrying capacity.

We asked small boat operator, Dave Wilkins, at Apostle Islands National Lakeshore about some of the effects of low lake levels on the park's boating operation:

Third male voice (sound of a motorboat humming in the background):

Well, with the low water levels all of our docks, most of our docks, we probably lost about a quarter to a half of the usable dock space cuz of the shallow water. In other areas, like in the south end of Devils, there was a big rock that was exposed that made it, ah, almost impossible to get into the little harbor out there with that rock. I can tell you one experience out on Outer, I've been here 8 years now, and that particular year on my approach to Outer I hit bottom three times with our landing craft, which I had never done in the past. And that day I took basically the same route I've always taken and I hit bottom three times with the propeller, so that was a pretty major impact.

Sound of motorboat fades, First male voice:

Low lake levels create other problems, like facilitating the drying up of freshwater estuaries along the edges of the lake that serve as important nursery areas for aquatic life. Increasing water temperatures may also make the lake more vulnerable to invasion by exotic species, like zebra mussels.

On the other hand, for beach lovers, lower lake levels do create much wider beaches. This might be beneficial for some species, such as the endangered Piping Plover, that depend on wide beaches for nesting habitat.

Apostle Islands National Lakeshore superintendent Bob Krumenaker feels strongly about National Park Service efforts to respond to climate change.

Fourth male voice:

At the Apostle Islands National Lakeshore I think we have an opportunity to really lead by example. We can show how committed we are to doing something about climate change. We can demonstrate to people that it's within their grasp to do it themselves. And, because people come here to learn we have a great opportunity to educate people.

On the islands we are running as many of our facilities by solar power as we possibly can. We're phasing out propane where it's possible to do it and we hope someday to be completely off of fossil fuels on the islands. Our boats, those that run diesel fuel right now are running on a mixture of at least 20% biodiesel, and we'll be increasing that, hopefully up to 100% at some point in the future. We've got a hybrid car and it's got a big NPS arrowhead on the outside and we are very proud to show we are trying to do something there.

We are using public transportation whenever we can to get our staff out to the islands, and we're really trying hard to maximize the efficiency of the boat trips we are doing ourselves so we don't waste any fuel and that every trip has multiple purposes. We were one of the first parks to engage in something called the Climate Friendly Parks Program, which is a joint park service and EPA program, where we have quantified our carbon emissions and we have made a plan for how we are going to reduce them.

I think we have a great chance here to show that climate change is really important it's affecting the places we care about deeply, it's affecting our lives, and people can make a difference and we're going to show them how they can be a part of that.

Music Fades In

Earth to Sky's Climate Cast is made possible through an innovative partnership between the National Park Service and NASA. The theme music was composed and performed by Karen Savoca. Each episode is written and produced by employees and partners of the National Park Service. For more information on the NASA Earth to Sky Project, and to learn more about how climate change is impacting our national park system, visit www.earthtosky.org.