

**Kelly van Frankenhuyzen** talks with U.S. Forest Service experts about the Hubbard Brook Ice Storm Experiment and the importance of studying ice storms.

**Jason Walker**, Forestry Technician, White Mountain National Forest District on the Pemigewasset Ranger District

**Lindsey Rustad**, Research Ecologist and Team Leader for the Hubbard Brook Experimental Forest , Durham, New Hampshire

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Narrator: I'm Kelly van Frankenhuyzen with the U.S. Forest Service Northern Research Station. Today I will be talking to a forester and scientist with the U.S. Forest Service about the Hubbard Brook Ice Storm Experiment and the importance of studying ice storms.

Jason Walker: My name is Jason Walker. I work for the White Mountain National Forest on the Pemigewasset Ranger District as a forestry technician.

Here in the Northeast it seems like more recently, in the last ten years or so, in my experience we've had more of these kind of warmer events where freezing rain or sleet and temperatures are just warm enough or borderline and we're not getting snow storms, it's not cold enough and we are getting more of these icing events. And if you look at the last two winters here in New England, we've kind of been set up that way, where we are getting these warmer precip events and its ice, sleet, or mixed precipitation that's falling from the sky and whether it's accumulating on the trees or not. I know we've had a few areas this year where we had light ice buildup and remember several storms last winter, the same. Not so much ice load that it has caused a lot of damage but certainly if weather events line up right and again, depending on elevations, that's typically where we see the damage- we start getting that quarter inch or greater buildup of ice.

Narrator: Jason Walker was part of the team that helped recreate the ice storm in 2016 to study the impacts of forest dynamics. Ice storms shape forests in terms of productivity and species composition.

Lindsey Rustad: My name is Lindsey Rustad. I am a research ecologist. I am also the team leader for the Hubbard Brook Experimental Forest and I work out of the Durham field office and of course in our great outdoor laboratory, the Hubbard Brook Experimental Forest in the White Mountains of New Hampshire.

At Hubbard Brook we've been looking at the hydrology and meteorology of the system for over 60 years. So we have a clear signal at Hubbard Brook of a changing climate, increases in temperature, changes in precipitation and one of the things we're very interested in increased in the frequency and severity of extreme weather events. Anybody who has grown up in New England knows that ice storms are a type of extreme winter weather event. And one thing I think people may not know, they are actually relatively common in the Northwoods of New England to the point that they are actually one of the major causes of disturbance in the North temperate and boreal forests in our region and actually worldwide. So this is a big deal for our forests, they shape our forests in terms of productivity, in terms of species composition, and they're also important for our social structure.

In 2008, 2009, we realized this was a really urgent issue to understand more about ice storms. So, Dr. John Campbell, who is also a research ecologist with US Forest Service and I began to scheme about how we might study ice storms. The first thing we did was we looked at the maps where these occur and we

thought we'll just wait it out, we'll be prepared for an ice storm and then we'll go out and study it. We quickly realized that was not practical, you don't know when they are going to occur, where they are going to occur, and how you are going to get there, and so we thought about instead of going to the ice storms, we would bring the ice storms to us.

Narrator: After months of planning, Rustad and a team of researchers did just that in 10 plots on the Hubbard Brook Experimental Forest in January of 2016.

Lindsey: We iced 10 plots. Each plot was roughly the size of a basketball court. The treatments included two plots that were controls that received no ice, two plots that received a quarter-inch of ice, this was a mild icing treatment, two plots that received half an inch of ice in one year, two plots that received half an inch of ice in two consecutive years -and these are pretty significant ice storms- and two plots that received three-quarters inch of ice in one year.

And so we actually did our icing at night because that was the coldest part of the day. We were out there with a couple dozen people in the field. We were doing our icing again with water from the Hubbard Brook with fire hoses, spraying water, up through gaps in the canopy, came down as a fine mist and it froze on the branches on surfaces of the tree on contact and the interesting part is when you're out there, we would start the icing and you have to imagine all- terrain vehicles going up and down the sides of these plots, the size of basketball courts, spraying water in the air and the trees beginning to accumulate ice, and when they first start to accumulate ice, it's actually quite extraordinary and is quite beautiful. People have described it as kind of a sublime experience to see, this early ice, very crystalline, this kind of tinkling sound as the branches move against each other.

So fast forward, we keep icing and keep icing and millimeter by millimeter. We keep building up this uniform layer of ice. and there's this transition where we go from a tenth inch of ice to two-tenths of an inch of ice and we go past a quarter-inch of ice and somewhere between a quarter-inch of ice and a half-inch of ice, we would guess somewhere around .4 inches of ice, all of a sudden the ice that is accumulated it goes from this beautiful and sublime experience to this absolutely terrifying experience and all of a sudden branches start cracking, and falling and cutting loose, and just crashing all around. And we are safely outside the plots so nobody is in danger but we can just imagine what it is like in a forest if all of these branches are breaking.

Lindsey: We are very happy to report that we just successfully finished icing our half-inch plots in our second consecutive year. And we did that on January 14th to 15th.

Lindsey: This project is funded by the National Science Foundation. We have a crew that is second to none. We have great people like Gabe Winnot, who's the ice storm lead and we have our site manager, Ian Halm, who are just unbelievable at figuring out how to do this. Charles Driscoll at Syracuse University and collaborators at the USDA Forest Service, Cornell University, Cary Institute for Ecosystem system studies, Texas Tech, University of Southern Maine, and the Hubbard Brook Research Foundation.

Narrator: For more information about the Hubbard Brook Experiment Ice Storm, visit <http://www.nrs.fs.fed.us> and in the search box type **Ice Storm Experiment**.

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