Hello everyone and welcome to Northern Lights, the Harvard Arctic Initiative Student Podcast. Today, Chelsea Brown will be speaking with educators involved with the OneTree Alaska project in Fairbanks, Alaska. This project makes stewards of the forest and citizen scientists of anyone at any age through tree tapping and more. Like all of us, they have had to adapt to Covid-19 but for OneTree Alaska this has had some unexpected benefits.

Chelsea Brown is a master's student in the first-year cohort of the One Health Program at the University of Alaska Fairbanks and works at OneTree Alaska.

This is Chelsea Brown with: ‘Stewards of the Forest’

The boreal forest is a wonderful place where we have so much to learn, and it has so much to give. In Fairbanks, Alaska, there are many programs that get people in the forest. In this podcast, we will talk about one program in particular and how it is helping to make more stewards of the
forest. Let's meet Jan Dawe of One Tree Alaska.

**Jan Dawe**

Hi, I am Jan Dawe. I am a research assistant professor at the University of Alaska Fairbanks and lead a program called one tree Alaska, which I love because I'm a botanist and I love working with university students and K-12 students and teachers.

**Chelsea Brown**

So what does One Tree Alaska do?

**Jan Dawe**

The mission of One Tree Alaska is to engage learners of all ages in boreal forest education, citizen science, and forest product development. And we really do that 12 months a year. We work with Alaska white birch Betula neolaskana, and use that, both, to make all kinds of things out of them to use as much of the tree as possible. The wood, the bark, we make Birch syrup out of sap. And we also use it as the subject of many inquiry explorations, and also have a research plot to look at the growth and development of Birch trees and how the lengthening growing season of interior Alaska may or may not affect its growth. So it's my understanding that Birch trees are the main focus of this program. Why Birch trees? Oh, so many reasons. Every part of the white Birch can be used and has been used in cultures around the world in different countries. And there has been work making Birch bark canoes by many native American nations tribes in the lower 48. The Russians and Eastern Europeans use the bark in a different way. They use it for making different parts of - they make roofs out of it. They make shingles out of Birch bark because it's very water resistant, which is actually the job it does for the tree, too. It sheds water very nicely, but there are so many properties to anyone part of the tree. So the white Birch bark, besides protecting the tree from too much rain, also protects it because it has secondary compounds that make it very, not delicious for insects and browsing and the, the bark, but it's, it's special. The bark can be used for making paper, the inner bark makes dye for dyeing wool or cotton. And what we love to work with is we make things that we can make with schoolchildren,
like knitting needles out of the, out of a stick of fireweed, we turn it into knitting needles, but the most popular part of the program is in the spring when the sap begins to run in the tree and the tree goes from being winter dormant to getting ready to leaf out. And in that period of that transition, the tree sends sap up to the tree, which is watery, but it contains minerals and sugar that allow the buds to begin to grow as they then move into photosynthesis and making new sugar for the tree. So that's - sugar is the food for the tree and we capture some of it during the sap season to make syrup.

Chelsea Brown

Yes, that's right. Tell me how you got into tapping trees.

Jan Dawe

We started a program called tapping into spring at this other organization that I was part of, and it was so popular because there was very little understanding of the boreal forest, its structure, and how it functions and that there was just a lot of room to work with people of all ages to come to some kind of understanding about what the boreal forest actually is. It's an exciting place.

Chelsea Brown

And how did this sap co-op come along?

Jan Dawe

We started small with just a few teachers at a few schools. Once you start tapping with a few different schools and classrooms, then the word gets out to the families of the students who are tapping. And some of them went, Whoa, this is really fun. And so it went from, you know, seven teachers in four schools to probably 10 different sites, including the classrooms and the families the first year in 2016. And then it just grew and grew. So that by 2018 and 2019, we had between 50 and 60 places, whether those places were classrooms where the teacher would tap one or two trees at school or families who would tap one to 10 trees at their home.
Chelsea Brown
I know the pandemic must've changed the way you did things. Could you tell us about that?

Jan Dawe
In the spring of 2020, it became obvious that we couldn't work in the same way with the sap cooperative. So we still wanted to be able to work with all the students and families and teachers who had been planning on doing the sap season with us. We had to figure a different way forward. And so what we did is we made something like 225 home tapping kits complete with all the gear that you need for tapping, you know, the, the spile, the tap and the bucket and measuring tools, instructions on how to tap the tree and how to work with the tree and sent all that out with a daily sap collection data sheet.

And instead of working with about 200 children and 10 classrooms, we ended up working with about 1200 people who were learning remotely at home because those 220 students took their home tapping kits home, and the whole family got involved. So it was a great pandemic activity every day, a great learning experience and just got so many more people directly involved. So that was really fun. And what comes out of that for One Tree Alaska is the possibility for the first time to realize a goal we've had for a long time, which is to graph sap flow when it starts, when it reaches a peak flow, when it goes off, because it always turns cloudy at the end of the season, just before the leaf out comes out. So by having 220 people tapping at their own homes, we can now put the data from them onto a GIS map, a map, and see really begin to see visually how sap behaves - at what elevation does it come out first. We know that there's a big lag time between the North and South facing sides of the same hill. So it's really a dream come true that we're beginning to have that data. - That's right where we are right now, December 30th, 2020, because we just had a teacher meeting to talk with our teachers about their interest and to what extent they want to work with their students and collecting this kind of data.

Chelsea Brown
Thanks, Jan, let's meet one of One Tree Alaska's teachers, Jennifer Anderson.
**Jennifer Anderson**

My name is Jennifer Anderson and I'm a teacher at Anne Wien elementary in Fairbanks, Alaska. I teach first grade. I actually got involved with One Tree though when I was teaching a second, third combined class. So a colleague of mine connected me with Jan and everyone at One Tree. And for that year we worked through second and third grade science and Grinnell nature journals. And ever since then, I've been involved, no matter what grade I've been teaching, um I've been involved with them, it with tapping and with providing resources and information and trying to continue the nature journaling as much as I can.

**Chelsea Brown**

So tell us, how does one tree Alaska fit in with your curriculum and what are your students learning from it?

**Jennifer Anderson**

In our science lessons, especially in first grade we talk about plant and animal adaptations and I always - in all of our science unit, I try to incorporate a lot of local science as much as possible. And we really with nature - through nature journaling, we really focus on close observation and we, we like to go outside as much as possible. And so with tapping it's, you know, changes in the weather and getting ready for it.

And so we really, the lessons though leading up to tapping start much sooner. Then we start learning about Birch trees and trees in general, but specifically Birch trees. Cause - because we have them around us. And so by the time we're getting close to tapping, we are using our knowledge of Birch trees to find a good tap, a good tree to tap, and we learn about what we need to observe and measure to find a tree that we think will be a good tree to produce sap. We also talk a lot about taking care of trees and what not to do when we are studying trees and what we can do to take care of trees and the areas around them. Um because when we tap trees in science, we for some kids, they are always like, well, isn't that bad for them? Doesn't that hurt them. And
I also want to be just a good model for the students as well as training them to be good stewards of the world around them and taking care of the trees. And so we spend a lot of time talking about how we tap and what it does for the tree and what it does not do. So, you know, it's not gonna kill the tree. It's not like we're going to hurt it by taking sap away from it or by drilling into it and putting a tap. So just a lot of that background builds up into tapping, but we are, weather is a big part of first grade science. And so again, that really fits in nicely with tapping because we're tracking the temperature. We're noticing changes in the weather around us and also plant and animal adaptations around tapping season. That's something they can really observe. Like we're going out and we're checking our tree every day. So they see changes. They feel changes around them. They see the change in the snow melting around them. And that's just all part of our observing and documenting in our nature journal as well.

**Chelsea Brown**

Thanks, Jennifer. It's really amazing that you can make scientists and stewards of the forest of anyone at any age. You're doing great work. Speaking of scientists, our next guest is climatologist, Rick Toman, who will give us his expert opinion on tree tapping.

**Rick Thoman**

My name is Rick Thoman and I currently work for the Alaska center for climate assessment and policy at the International Arctic Research Center, which is on the campus of the University of Alaska Fairbanks. And I work as the Alaska climate specialist. I've been involved with One Tree now for a number of years, building on a study of Birch tree, bud burst or leaf out, Greenup that we actually started in the late 1990s and over the last five years or so we've developed that relationship. And now every spring we make a forecast for when that leaf out is going to occur.

**Chelsea Brown**

Right. You guys do a lot of amazing work here. A lot of research. Rick, what can be learned from tree tapping?
Rick Thoman
So tree tapping, of course, lots of good reasons to do it here in interior Alask. Gets folks outside, gets them, observing the conditions around them. As we do this year after year at the same place, it helps build up that natural environment record that we can then use to investigate how the environment is changing, how climate is changing and Birch trees are responding in the changing world we live in.

Chelsea Brown
Yes, we had one of One Tree Alaska's teachers talking about making these same observations. Rick, what can be done with the community's observations seen while it's happening?

Rick Thoman
So any kind of observations of how our natural environment is responding is incredibly useful. We have lots of instrumental records of things that are pretty easy to measure. Temperature's not difficult to measure. Wind speeds, not difficult to measure. But having detailed observations of things like when does sap flow start? When does that sap get cloudy? Those are things, of course, that are more or less impossible to measure on a, on any kind of scale, except through these citizen observations. And we can use that information, not just in what do you do with, with tapped Birch sap, but what else does that tell us about our boreal forest environment? So, those are the kinds of things, again, only citizen science is going to get us those kinds of, of measurements. That's what they really are. You put a date on when the, when the sap starts, put a date on when it turns cloudy, those are measurements. And I think it's important to folks that if they want, sharing that information out, will have benefits long after the Birch syrup gone.

Chelsea Brown
Thanks, Rick. Any final words on tree tapping?

Rick Thoman
I think it's a fantastic way for, for anybody with access to trees and the interest to - not just contribute to their, to their own economies - but to increase our knowledge about the world around us.

**Chelsea Brown**

Thank you, Rick Thoman. And in closing, Jan Dawe, would you like to say some final words?

**Jan Dawe**

When you - you look at the boreal forest, you might think: Oh, it's just an endless rolling landscape of trees and then non-treed areas with - that are really wet boggy. But when you start to look more closely at where people choose to live and at when the sap begins to flow, you realize that there are so many environmental factors and climatic factors that are influencing sap flow. I think the forest is seen more as a multi-dimensional wonderful support system for earth, from which we can work with its resources if we work in a respectful, sustainable way.
Chelsea Brown
Thank you, Jan. And thank you again to Jennifer Anderson of Anne Wien Elementary School and Rick Thoman, UAF’s climatologist.

Sarah Mackie
Today’s episode was written and produced by Chelsea Brown.

We would like to thank Jan Dawe of OneTree Alaska, Jennifer Anderson from Anne Wien Elementary School in Fairbanks, Alaska and Rick Thoman from the Alaska Center for Climate Assessment and Policy at the International Arctic Research Center.

This podcast was created as part of the Harvard Kennedy School’s Arctic Initiative Podcast Project, led by Dr Sarah Mackie.