

Ep15_Seed

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SPEAKERS

Rob Fitch, Jess Colby, Rhona Thomson, Alison Adams, Cate Kreider

A Alison Adams 00:16

Welcome to Restoration Roundup, a monthly podcast that explores recent research on, new and emerging best practices for, and stories about riparian forest restoration. I'm Alison Adams, and until recently, I was the Watershed Forestry Coordinator with University of Vermont Extension and Lake Champlain Sea Grant running the Watershed Forestry Partnership. And I'm Cate Kreider, a recent graduate of the University of Vermont with a major in environmental studies and a minor in journalism and documentary storytelling. I've recently taken a new position as the director of the Forest Ecosystem Monitoring Cooperative, so sadly, this is going to be my last episode on the podcast, but I'm happy to share that Cate will be taking over as host for the next few episodes, and we hope that the podcast will continue beyond that when the new Watershed Forestry Coordinator comes on board.

C Cate Kreider 01:15

In past episodes, we've discussed a number of reforestation and restoration efforts in riparian areas. Often that restoration includes replanting of native species. But where does that supply come from? How are those new trees sourced into greenhouses and the hands of restoration crews? With us today is Jess Colby and two riparian lands crew members from NorthWoods, Rob and Rhona. Jess is the riparian projects and forestry outreach coordinator at the NorthWoods Stewardship Center in East Charleston, Vermont. Rob studied environmental science at the University of New Haven and has since involved himself in several field projects including mosquito surveillance and seed packing. Rhona studied Conservation Biology at the University of Michigan before working as a biological science technician in refuges and national forests. This past season, Jess has been working on a direct seeding project, an effort to collect and prep wild collected seeds for planting, and has done a lot of work with her crew to find new methods and solutions for this work. Thanks for joining us all.

R Rob Fitch 02:13

Thanks for having us.

C Cate Kreider 02:16
Can you tell us a little bit about NorthWoods Stewardship Center?

J Jess Colby 02:20
Sure. So NorthWoods Stewardship Center was founded in 1989. We're based out of East Charleston, Vermont, and we've been working on conservation and education in northern Vermont and New Hampshire ever since. So our programs, we have four different groupings at NorthWoods: we have the Conservation Science Program, which is what the riparian lands work is through; we have the forestry department that houses sustainable forestry interns in the fall; we have our conservation corps department, that's out doing a bunch of trail work in both Vermont and New Hampshire, and that department also leads youth crews during the summer-- so high school aged students are out doing some of this this work. And then we also have our education department at NorthWoods. That does a lot of work with the local schools, and also programming for like adult learners and partners and just interested parties.

C Cate Kreider 03:20
And what is seed collecting or a direct seed project? And why is it important?

J Jess Colby 03:26
Seed collecting or direct seed project is kind of like what it says--it's collection of seeds: native shrubs and tree species. Some of the pros of direct seeding is that it tends to be better and quicker establishment of seeds in a field, you're getting 1000s of trees per acre compared to traditional tree planting, which is maybe 100-- couple 100 trees per acre, which then leads into better natural selection of trees and a more natural appearance on the landscape. You tend to have better adaptability of these tree species and the site conditions as they grow. Same thing of like trees that won't compete as well won't grow. But you have such a large number of seeds out on a site that it doesn't really matter. And along those lines, you have a better ability of withstanding predation by wildlife and other issues like climate change.

A Alison Adams 04:33
To clarify for folks who may be listening and maybe aren't aware, so direct seeding would be like putting the seeds directly in the ground for trees to grow, versus planting a small baby tree.

J Jess Colby 04:44
Correct.

A

Alison Adams 04:44

And that's more-- you can get more on the landscape because it's more labor efficient, is that right?

J

Jess Colby 04:50

It tends to be. There does tend to be a higher initial cost of collecting all the seed. There's a lot of time that goes into finding these sources and collecting them, processing 'em, and then getting them out on the landscape. But it benefits your labor costs in the long run, because you don't have as much of that follow-up cost of like going out and doing herbicide treatments or removing bindweed from-- from the few trees that you've planted out on the landscape. It tends to be labor heavy in the beginning, but less so as it goes on, mostly because you've got so many trees out there.

A

Alison Adams 05:32

The seed collecting that you have been doing is primarily for that kind of application.

J

Jess Colby 05:36

Yes.

A

Alison Adams 05:37

Can any of you describe what a typical day in the field seed collecting looks like? I know you all spent time doing that this summer.

R

Rob Fitch 05:45

Sure, yeah. So a lot of the times we would go out, and we would take something like a pouch or five gallon bucket, find the source for the seed--so for chokecherries example, you'd go on the side of roads, and, you know, collect off the side of the road, clip branches right off the tree, and put it in that five gallon bucket. And from there you'd, you know, transport it to where it needs to go, and store it for a bit.

R

Rhona Thomson 06:15

Yeah, I think it varied a lot, depending on the species that we were collecting, too. So the day in the field looked a lot different if we were collecting like chokecherry, or dogwood, which would grow in huge patches, and we could just go out for seven hours at a time and collect pretty easily. Versus like the spring species especially were a little more difficult because it's harder to find good trees to collect from a lot of them grow really quickly. And by the time they have

enough seed, the seeds will be like 40 feet in the air, and it's just a little bit more difficult to know how to approach that. Or like the fall species also, like black cherry, we would spend a lot more time kind of driving around looking for good places to collect from. So we would get less seed in the same amount of time, as we did when we were collecting some of the shrub species, so it was all super variable.

J Jess Colby 07:07

You might start out looking for one species, but you'll stumble across this other species that is just a great source for collecting. We obviously have a timeline of when to collect species, but Mother Nature has her own whims.

R Rob Fitch 07:23

I think it's kind of hard to distinguish a typical day because a lot of seed collecting is very different, especially for different species.

R Rhona Thomson 07:32

Some of them had longer processes for like processing the seed afterward and cleaning the seed, too, so--

C Cate Kreider 07:37

What does processing or cleaning the seed look like? Do you use any kind of special tools or--?

R Rob Fitch 07:45

The seed cleaning machine that we use to clean a lot of our berries is the Dybvig! It's pretty much a large bowl-like cylinder that has a blender at the bottom of it, but the blender has flat blades so it doesn't damage the seeds. And you put the seeds or the berries inside of the machine and you add water to that. Then the turbine inside of it turns and that mascerates the berries, getting rid of the flesh, the fruit, the stems, any leaves any other stuff you might have in there, and that gets shot out leaving you with some clean seeds. And then you have to dry out those seeds because they're wet.

R Rhona Thomson 08:26

I can add too that we haven't tested the Dybvig with cones and other types of seeds, we mostly use it for berries this year, but apparently it does work for pretty much any kind of seed. But for the cones, we had experimented with just a bucket shaking method and then filtering the seeds that fall out of the cones through these mesh sieve things. And then we had a separate method for processing the willow and aspen seeds and those ones that are just tiny seeds and fluff. And

we would vacuum--we used a shop vac with a towel rubber banded over the tube part of it--and vacuumed against the screen to separate the fluff from the rest of the seed. So yeah, there was a lot of experimentation with the seed processing techniques.

 Jess Colby 09:22


I just want to mention that last year, when we did the willow seed cleaning, it was like me just picking it out by hand. So like, towards the end of last season, we we figured out that shopvac situation and so like we're learning as we go, this crew at NorthWoods so it was really cool. We had them herbicide and pesticide licensed. They went and took [unclear] vlogging. We were going out doing tree ID walks with our forester at NorthWoods. This is the second year that we've hosted a riparian lands crew. The first year it was like a month and a half that we had them, it was just the spring. And he had like all of the different projects that Rob and Rhona were on this year, but we had it very truncated. And so just the the length of this crew season, it was way longer, and it really just helped this program thrive, so--

 Cate Kreider 10:21


All right, and can you give me an idea of what kinds of trees you were looking to identify and collect seeds from?

 Rob Fitch 10:30

A lot of the species that we do start in spring. So we started with aspen, that was one of the first species we started collecting. And that also is very ephemeral, so we had to collect from it very quickly, and then we also collected willow in the spring, silver maple, we collected serviceberry, red osier dogwood, pagoda dogwood, chokecherry--

 Jess Colby 10:54

--ended up with some Tamarack and speckled alder. Yeah, it's been a wide range of different species, so--

 11:03
yeah,

 Rhona Thomson 11:03

Whatever's there pretty much. We did a lot of ID earlier in the year, so if we looked it up and figured out it was native, we took it.

 Cate Kreider 11:10



Cate Kreider 11:12

Do you have any cool stories or like weird experiences from the field?



Alison Adams 11:18

Yeah, sure.



Rhona Thomson 11:19

Yeah, I was thinking, one of my favorite things about being in the field for seed collection specifically is that it took us to a lot of places that you wouldn't really think to go otherwise. So we spent a lot of time getting to know some of the less traveled and really cool areas of the NEK. And one of my favorite days earlier in the spring, we went out on the Moose River, we were looking for black cherries in the riparian area there, and we got to paddle sections of the Moose, which is always a good day. And the riverside trees especially are helpful because they'll have the low branches hanging over the river that you could theoretically just collect berries from the canoe.



Alison Adams 11:58

Yeah, I was gonna ask if you were collecting directly from the canoe was that precarious? I for sure would have been in the river, like without a doubt.



Rhona Thomson 12:06

We actually, um-- there was a big windstorm that knocked most of those trees down anyway. So we got kind of lucky in that we went out in the fall, and the trees were on the ground. So we just collected from those. But yes, it would have been precarious, I'm sure collecting from the canoe directly. But that's a nice thing about the riparian species, that there's lots of opportunities for paddling on the job.



Alison Adams 12:30

When I was out there with you guys, we were cutting down branches off of a tree on a very public main road-- did you guys run into questions from folks, concerns from people who maybe didn't know what you were doing about wildlife impacts that you mentioned, or things like that, and how did you deal with those?



Jess Colby 12:44

So just going off with the example that you just gave, for the ones that were very public, the ones that were like, right off of the main roads, I did do a lot of time beforehand, checking with the towns and making sure that people who potentially could be having very big problems with us out there cutting down a branch knew what the project was, and why we're there, and just

making sure that the public had an idea. And now, especially this past year, there seems to be a much bigger interest in the seed collecting effort. And I think we're coming to a point where we have been doing this work for a couple of years now. It obviously started well before I was on--I've been on here for about two years--and so like, there's enough people in the know about it that I feel like that kind of helps.

R Rob Fitch 13:37

Yeah, I think we got asked what kind of jam we were making about a billion times.

R Rhona Thomson 13:42

Which side note some of those berries don't taste too bad, actually.

A Alison Adams 13:47

Oh, really?

R Rob Fitch 13:48

Choke cherries are pretty good, if you get a taste for them. It's an acquired taste, but it's a good taste.

A Alison Adams 13:54

Were you guys under fed on your crews this summer? You were out there like "which of these can we eat?"

C Cate Kreider 13:59

They were out there for months, Alison!

R Rob Fitch 14:02

Months on end, Jess would just check us out there, we would have to feed on chokecherry and red osier. Gotta try every berry you collect.

A Alison Adams 14:11

I hear that's a real fast way to get real sick. So what happens to the seeds after they leave your hands? What's the ultimate home or sort of destination for those seeds?

R

Rob Fitch 14:22

Yeah, so the seeds that we collected so far haven't really left our hands yet, well, left Fish and Wildlife's hands, because they're the ones who kind of own the seeds, I guess. So they're still in the Fish and Wildlife fridge right now, and they're going to be used for various hydroseeding projects. There's some on Johnson Farm, W. May Walcot, and LaPlatte Headwaters sites, and those are going to be used for that direct seeding process. So you know, an herbicided landscape that these seeds get directly put on and then are allowed to grow naturally.

J

Jess Colby 14:57

So NorthSoods Stewardship Center has been contracted by Vermont State Fish and Wildlife to go out and do all of these collections of native tree and shrub species for this hydroseeding project. Hydroseeding is this method of--it's like a slurry of seeds, and sometimes in like commercial uses, it's fertilizer, and it's not easily washed away. And it's just like, you're just using a big hose and spraying the bare ground with this mixture. So the state has purchased a big tractor, they have hydroseeding equipment that they're going to be using the seeds to broadcast onto state-owned lands that they used to be old, like agricultural lands, and a lot of these sites end up infested with invasive reed canary grass, and so the state has been doing some experiments on a lot of sites, namely at the LaPlatte Headwaters site to figure out what's the best method of treating the reed canary grass and getting trees to regrow, because the reed canary grass is just so thick, that it prevents any seeds from reaching the ground and growing. And so far, it seems that if you till it, and then you herbicide it, and I think you till it again, and then after that final treatment, you're able to throw all these seeds out, and it tends to revegetate, like very quickly. And so that's that's the process that we're trying to implement is to get all these trees out onto these areas that would end up just staying in like fallow field type situations.

A

Alison Adams 16:41

And I wanted to say it's-- it's interesting to hear you talking so much about reed canary grass and how that intersects with this issue, as it does with pretty much every issue related to riparian restoration. One of our recent episodes, we talked to Stever Bartlett, who just defended his Master's thesis on how to manage reed canary grass in riparian restoration projects and had some really interesting results, could be interesting to hear about those-- really relates to a lot of the topics we're talking about today, as well. You've mentioned that these seeds are going to be used primarily in hydroseeding projects, I could also imagine an end destination for seeds, maybe not these ones, but other ones that you collect, or that somebody else might collect, where they would go to a greenhouse and be grown up into little seedlings that then would be planted out on the landscape. Is there a way that the ultimate destination or use of the seeds might affect either how you're collecting them or how you're processing or storing them?

J

Jess Colby 17:31

For sure, yeah. For-- for our purposes, everything is going to be mixed together into a hydroseeder at some point and then thrown out on the landscape. But if you're approaching this from the lens of a nursery, or some other organization that's not going to be mixing all

this from the lens of a nursery, or some other organization that's not going to be mixing all their seeds together, it's important for them to make sure that they're keeping lots separate, and like they're making sure that all the seeds are cleaned. And then the equipment is VERY well cleaned in between, like, obviously, we clean our equipment in between all of that, but pests could be transferred in between the different collections that you're gathering--

A

Alison Adams 18:10

Like the different groups of species, you mean?

J

Jess Colby 18:13

Yes. And also like, like, if you're collecting black cherry from one site, and then you go two towns over and you're collecting from a different site, there's the potential that you're bringing stuff around. And like some sites might not be as genetically robust in the long term. We're more worried about getting a bunch of seeds, like it's just gonna be trying to outcompete the reed canary grass. But if you're working in a nursery setting, you're probably going to be more thoughtful towards collecting specimens that are going to have higher genetic diversity, and making sure that the species that you're collecting are going to do well in a greenhouse setting.

C

Cate Kreider 18:57

And for hydroseeding, you said before that you mix it all together. That mean, you just toss it all in?

J

Jess Colby 19:03

We have this fridge that's in the state building down in St. Johnsbury. And so we have all of our species that we've cleaned, we've used our Dybvig to clean it all up. And we've got them separated by species in their bins in our fridge. And then when hopefully we start our hydroseeding next year, we'll be taking percentages of each one, so like if we want to make sure that we have like 50% red osier dogwood on a site, we're going to be taking enough seeds from that lot, that species, to mix into our hydroseeder to put out on the site.

A

Alison Adams 19:38

I have a follow up question, what are the characteristics that you would look for in a tree or a shrub to know that that would be a good source for collecting seeds? Like you had mentioned, you know, thinking about genetic diversity, and I'm sure there are other considerations too, like, what made you choose that one?

R

Rob Fitch 19:54

I think a big part of it is if there's a lot of the same species around. Just because you're not taking all of it from the wildlife around. There's definitely, you know, strong genetics there, if

taking all of it from the wildlife around. There's definitely, you know, strong genetics there, and there's a lot of that same species around.

R

Rhona Thomson 20:06

I think accessibility was also a big factor. So a lot of the time for some of those species like aspen and cherry, which I do keep mentioning those two specifically because I feel like they were some of the trickier wants to find, so we would look for them kind of in more open spaces or places where we knew that they would have the kind of growth pattern that would just be easier for us to reach with like a pole sock or something or a ladder. So kind of getting creative with figuring out how to reach some of the seeds on those types of species.

J

Jess Colby 20:42

And I think another way that we were thinking about this, especially this year, we spent a lot of time scouting out sites early in the year. And then as we're driving around throughout the summer, and in the fall, any site that we found that looked like a promising site, we were marking them on our maps, so that we could check them out later. And like we have sites all over the Northeast Kingdom of Vermont, and the Intervale Conservation Nursery has hired a seed coordinator for the state. And hopefully with that person on board, we'll be able to get a little bit more project area, or a little bit better coordination for the state on where we could go to collect seeds. Because there is a-- there's a definite line between like over here in the Champlain Valley, compared to the Northeast Kingdom, different species grow on both sides of the state. And also if there's any common species, like there's a time difference between when things are ripe to collect. I think for a lot of our species, we've noticed that it's like a week, maybe two weeks of a buffer time between when things are ripe over here in Burlington, compared to what we would find up in Northeast Kingdom, so--

C

Cate Kreider 21:57

How does seed collecting intersect with contemporary concerns in the forest such as climate change diseases or invasive species?

R

Rhona Thomson 22:06

I think one really interesting aspect of seed collection is the possibility of being able to cast out seed with, like the possible future impacts of climate change in mind, and thinking about how that might affect the species composition of forests. And using direct seeding as opposed to planting you are just kind of letting natural selection take its course, so you can throw out acorns, for example, in a place where red oaks aren't growing yet, or aren't dominating yet, and maybe just having the seeds there, and like kind of assisting with that potential migration of typically more warm climate, not necessarily warm but warmer than the Northeast Kingdom, like just putting those seeds out there, and maybe having a seed bank in place in case the oaks end up being more resilient.

R

Rhona Thomson 22:06

R ROB FITCH 23:00

Yeah, I think regarding the invasive side of that question, a lot of the sites do have invasive of species that we're playing the hydroseed on. So I know a lot of them have reed canary grass, like we talked about earlier. But there's also Japanese knotweed on one of the sites we visited. And I think we're gonna have to herbicide it all anyway. So planting after that is so necessary, because it's going to come back otherwise. So you plant these seeds, or you throw the seeds down, it reduces competition against each other, and reduces future cost.

J Jess Colby 23:35

Direct seeding and potential hydroseeding project is just another tool in the toolbox for all of these concerns that we're facing due to climate change and invasive species and diseases that are popping up.

A Alison Adams 23:51

I do think also, on the disease front, you mentioned that you guys pick trees to collect from that seem to be healthy, that are thriving, that have good genetics, and if any of those species are now or are in the future affected by disease, hopefully, maybe because you collected from strong trees, you'll be helping to regenerate a forest that is resistant to those diseases.

J Jess Colby 24:10

Yeah, and I just want to reiterate again, that it is like a numbers game with direct seeding, like we're collecting as many seeds as we possibly can, without affecting regeneration on the sites that we're collecting from and potentially harming wildlife in the way that we're taking away food. And so, like, the sheer number of seeds that we're collecting off of the landscape would also help the potential for diseases because one of those seeds must be resistant to some of the diseases that might be out there such as like Dutch elm disease or emerald ash borer.

C Cate Kreider 24:47

What do you see yourself changing about next year's collection process? Do you see anything shifting in the usual practices amongst other practitioners?

J Jess Colby 24:55

So I would say the biggest thing is we're currently expanding the number of people who are involved in the project. Like I mentioned earlier, the Intervale Conservation Nursery has hired that statewide seed coordinator. So that should help us as an organization also try to collect even more seeds. And the other thing is, we're constantly learning about the different species and like how to best collect the seeds themselves. I know Rob and Rhona were rock stars this year, and put together all of our NorthWoods protocols on each of the species that we were collecting this year. So that will definitely be an important document going forward. And that

will constantly be evolving as we learn more things about each of the species and different methods for collection and cleaning and storage and how they work when we actually start doing the hydroseeding, so--

C Cate Kreider 25:54

And you mentioned maps, are you building on old maps to get this year's? And do you expect to use those next year or does it change?

J Jess Colby 26:04

So I had some points from last year that were kind of what started this year's collection map. And like I had mentioned earlier, Rob and Rhona were out scouting for so many days this year, we sent them out with the iPad, it had Field Maps, and all they had to do is just like plot where they found each of our species. And so like that map has just grown exponentially over the year, and we're looking forward to adding to it next year. And of course, with the statewide coordinator that will hopefully expand to include the entire state of Vermont.

A Alison Adams 26:41

It really sounds like you guys are kind of trailblazing. I mean, at least for Vermont like it sounds like you're learning a lot, you're trying a lot of stuff and it never once were you like "oh yeah, there's other people doing this that we could talk to." It seems like you're kind of figuring it out on your own. Is that right?

J Jess Colby 26:57

Kind of! Like I've mentioned, we do have partners, we're working with Intervale Conservation Nursery, Fish and Wildlife, we're working with the Nature Conservancy, Connecticut River Conservancy. So like we have input from all of these different sources. But it's not something that's really been done here in Vermont. So we are, like you said, kind of at the forefront of all this work. They do have similar projects happening out West, especially out on the prairies, they're doing a lot of seed collecting for grasses and herbaceous plants. But there hasn't been a whole lot with trees and shrubs. So it's-- it's been a learning process. And we're just trying to reach out to as many people as possible to try to pick their brains.

C Cate Kreider 27:45

So if you're reaching out, this is a good time to ask: do you have any kind of plugs you want to give for organizations or like volunteer opportunities, or Rob and Rhona, if you're headed other places, how can people get in touch about doing this kind of work?

J Jess Colby 28:01

So I will make the plug right now that NorthWoods will be hiring for another two-person crew for next year. Similar setup, it's going to be from March until November. Otherwise, you could reach out to any of the organizations that I kind of mentioned before, if you're interested in trying to either learn more about the project, or if you're interested in potentially helping out on seed collecting efforts.

C Cate Kreider 28:28

I think that just about covers it. So thank you so much for joining us and telling us about this amazing work you've done.

R Rob Fitch 28:36

Thank you so much!

C Cate Kreider 28:46

Today's episode featured the call of the Common Merganser. It was recorded by Andrew Spencer in Lake County, Minnesota on June 6 of 2012.

A Alison Adams 28:56

For more information about today's topic and other topics related to riparian forest restoration, visit the Restoration Roundup Podcast tab of Lake Champlain Sea Grant's Watershed Forestry Partnership website. This project has been funded wholly or in part by the United States Environmental Protection Agency under an assistance agreement to NEIWPC in partnership with the Lake Champlain Basin Program.