Ep11_ProcessBasedRestoration

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SPEAKERS

Kristen Balschunat, Shayne Jaquith, Gus Goodwin, Alison Adams, Cate Kreider

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A **Alison Adams** 00:08

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. I'm the Watershed Forestry Coordinator with University of Vermont Extension and Lake Champlain Sea Grant and I run the Watershed Forestry Partnership. This month we're excited to welcome a new assistant and co host of our podcast who will be taking over for Liz:

C **Cate Kreider** 00:31

Hi, I'm Cate Kreider, and I'm a senior Environmental Studies student with a minor in reporting and documentary storytelling in the College of Arts and Sciences. I'm really excited to be working with Alison on the Restoration Roundup podcast.

A **Alison Adams** 00:53

Process based restoration of streams and floodplains is a practice that's taking increasing hold in the work of environmental managers, river scientists and others in the Lake Champlain Basin and surrounding regions. Today we speak with Shayne Jaquith and Gus Goodwin of the Nature Conservancy and Kristen Balschunat, not of the Vermont Youth Conservation Corps, about a project they've been working on to restore the Hubbardton River Clayplain Forest in West Haven, Vermont to its natural state. Shayne is a watershed restoration scientist with the Nature Conservancy where he's been working for seven years. Prior to that he was a river scientist for the DEC Rivers Program.

S **Shayne Jaquith** 01:26

The Nature Conservancy has owned the Hubbardton Clayplain Preserve since-- it was about 2000. And we have been engaged in a number of different restoration efforts there. It's a neat example of clayplain environment, with part of it having a-- what is perhaps one of the larger

intact clayplain forests remaining in the Champlain Basin.

A **Alison Adams** 01:49

Gus is a senior conservation planner with The Nature Conservancy where he provides planning and project management support for land protection, stewardship, and science-based restoration work. And he's currently focused on floodplain restoration. He shared a little bit more about why they started working at this particular location.

G **Gus Goodwin** 02:06

We first started working at the site because it had this really particularly fine example of the remnant clay plain forest on it. But in the coming decades, as conservation sciences evolved, we've really learned a lot more about this place. There's these big forest blocks on the east side of Route 22 A that're owned by the Nature Conservancy. That's like our Great Ledge. There's forest blocks on the other side of 22 A and what separates them is this big field that's not as great for wildlife passages the continuous forest would be, so when we were examining our like overall management goals for that site the opportunity to do stream restoration and create these more functional riparian systems that would connect the forest blocks, it seemed like a total no brainer as probably one of the best things we could do to improve passage for wildlife in that area.

S **Shayne Jaquith** 02:51

What we're doing currently is focusing on a riverscape restoration on site. The site contains two very small streams that flow into the Hubbardton River. Over the years, probably going back to the European settlement time, those streams--which probably were not even streams at the time, the site probably was more like a forest swamp--but you know, through the settlement process and the agriculture that took place that swamp was cleared and it was drained and ditches were dug and those streams or ditches that now exist on site really don't interact with the surrounding landscape in any way that natural rivers that are well connected to their floodplains do, and we're trying to restore those waterways and reconnect them to their floodplains.

C **Cate Kreider** 03:37

This story is not so unusual in New England riparian ecosystems. Via many historical factors, we've arrived at a point where streams are often short on woody debris, and lacking the materials needed to evolve naturally.

S **Shayne Jaquith** 03:48

You know, our rivers have been severely degraded by both in-stream and surrounding landscape management. If we think about European settlement and what that really meant across the landscape. You know, the Vermont Department of Environmental Conservation has

shown that upwards of 75% of the 5000 river miles that it has assessed are in a condition that's severely degraded. There was also logging and the log drives that were super intensive, you know, throughout the Northeast really required streams that were devoid of any obstructions, right, you need to clean sluice ways to transport logs. And so there were significant efforts during the European settlement to clean all of the rivers of the woody material that they contained and to straighten them to drive logs.

A Alison Adams 04:40

I remembered learning about the ideal of a "clean" farm when I was a Master's student and asked Shayne if he thought this cultural push toward cleanliness in natural areas was related to what he was observing in river systems.

S Shayne Jaquith 04:51

Historically, yeah, that has been the cultural vision of river systems that it has evolved and I think it probably has roots and our European heritage. I think if we visit Europe, we see much of the same very clean, tidy rivers and landscapes. We don't even know what these systems looked like prior to the European settlement.

C Cate Kreider 05:12

So if clean is no longer the goal, what are we looking for in these restoration projects? And how do we get there?

S Shayne Jaquith 05:18

We're using a pretty innovative approach which in some parts of the country has been dubbed process-based restoration.

C Cate Kreider 05:26

Process-based restoration helps reestablish various natural processes that sustain river and floodplain ecosystems where said processes have been disturbed. In this way, a river can remake itself once it is given the materials it needs to do so. What does that look like for the Hubbardton River site?

S Shayne Jaquith 05:42

Really just the activity of replacing the large woody structure and building mimic-type beaver dams that probably once existed in sites like this to really recreate and drive the natural riverine processes that maintain these systems over time. In some ways, it's not new at all: people have been putting wood into rivers trying to improve habitat since probably the 1800s. Angling enthusiasts certainly installed wood to provide cover for trout and other fish--other

game fish. And we know that particularly in Europe, people have been building woody beaver-like structures in gullies to try to stop gully erosion for quite some time. By adding small wood accumulations, or some might think of them as small logjams to these systems, we're really hoping to drive what is known as the channel evolution process, which is a process where when a river becomes disconnected from its floodplain, it goes through erosional and depositional processes that end up really filling the river channel back in so that it's better connected to the floodplain. And so that that landscape that now is largely dry becomes more regularly inundated by flows. And a lot of the wetlands that once were on site start to reemerge. So in a nutshell, what we're really trying to do is bring it back to a condition more like a forested wetland.

A Alison Adams 07:11

A lot of the work for the project at the Hubbardton River was done with the support of a VYCC crew, we caught up with Kristen Balschunat, the conservation water quality project manager with VYCC--and that stands for Vermont Youth Conservation Corps--to ask her a few questions about her role and the crew's involvement.

K Kristen Balschunat 07:27

So what we were doing was adding a lot of wood either in the form of a beaver dam analogue to actually stop and backflow the water or a post-assisted log structure to provide some habitat and additional structure within the stream that would also work as a sediment trap. So we were installing those two process-based restoration structures to even out the stream give it access to its floodplain again, and restore what is a hay field with a really incised stream to more of a marshy wetlandy area that will provide lots of habitat and also just be a healthier and more balanced stream.

A Alison Adams 08:12

There are a lot of good reasons to use a process-based restoration approach, including additional benefits to the ecosystem and utilizing upcycled or onsite materials to reduce the overall cost of the project.

K Kristen Balschunat 08:23

TNC actually acquired a number of Christmas trees that people put out on the curbside in one of the towns where they have a staff member. So the crew used approximately 50 upcycled Christmas trees as a base structure. And then we also had a complimentary crew that was harvesting honeysuckle branches, which is an invasive species that's readily available on site. So we were able to do some invasive management and also provide that woody structure in the stream.

S Shayne Jaquith 08:52

We're able to use materials that actually provide co-benefits. For example, we used a lot of

We're able to use materials that actually provide co-benefits. For example, we used a lot of gray dogwood for our wood accumulation structures, and we harvested that grey dogwood as part of management for golden winged warbler. But I learned that it's actually beaver that create the patchy structure of those gray dogwood stands that the golden winged warbler rely on. We were working to try to restore beavers using materials that would ultimately be managed by the beavers to manage habitat for a bird population. And that's just a long winded way of talking about how inexpensive and the co-benefits that are derived from this type of work, and that allows us to go back and do adaptive maintenance. I mean that's so very different than the traditional river restoration approach which really has kind of a set it and forget it mindset. You know you accumulate your permits, you amass all of your excavation equipment, you pay your $200,000 and you go in and you do the project and all of that is so time intensive and expensive that going back to maintain that project once or more times really just isn't feasible in most cases. So that's another aspect of this process based restoration approach.

G **Gus Goodwin** 10:08

River Restoration is something you have to like make getting your driveway repaved or like a road done. It's like engineers, it's equipment, it's expensive. And then this is more like a trail work, like volunteer work day.

C **Cate Kreider** 10:20

Even with an inexpensive and group work approach, there are complications to restoring a clayplain forest as a whole ecosystem. The forest at the site also needs to be restored, both to support wildlife and to provide an ongoing source of woody debris for the stream. But this site has a long way to go, and obstacles to overcome.

G **Gus Goodwin** 10:38

Clayplain forest is really defined by having a really rich, dense mosaic of kind of upland and wetland. And this site is kind of the opposite of that right now--it's kind of a monoculture of microsites. And so by restoring this site complexity in this kind of rich density of microsites associated with the hydrologic restoration, we're hopeful that that will help facilitate the revegetation piece. We know that we may have to take some more heavy handed measures. So we may use some targeted fencing around there to try and ensure a much more successful outcome in some of these more critical areas. We've also been in a great partnership with Pete Emerson of Vermont Department of Fish and Wildlife, Annalise Carrington, who is formerly at the Intervale Center and US Fish and Wildlife Service, and the work they've been doing on direct seeding and site prep. And we established six acre plots using similar methods and in partnership with them to try and crack the code at this site about what it might take to more successfully establish revegetation.

A **Alison Adams** 11:35

Restoring an entire ecosystem is a big project; we asked Gus and Shayne how long they expected to be working at the site and how long it would take for it to return to its natural

state.

S Shayne Jaquith 11:44

We are hopeful that we are going to get to a self-sustaining system within 15 years. And in that 15 years, we may be out once every three to five years, adding new wood and patching up some of these beaver dam mimics that we have put in place. Going into these streams and dumping some wood in them is really just the very beginning. And what we're really after in the long term is a truly self-sustaining system. And that largely is dependent on the riparian forests coming back, and ultimately beavers coming back and inhabiting these sites.

G Gus Goodwin 12:20

The complexity caused by wood additions is going to increase the climate resilience of these streams, you know, it's going to create these microsites, and all these benefits we've just been talking about. And just realizing that in some ways, we don't have like time to wait for that. It was a fairly profound moment for me just you kind of have that faith in our ecological systems, particularly if you're working in ones that have high integrity already that they can be largely self managing and resilient that way. If the stream is degraded from a extirpation of beavers, the clearing, forestry, and then a lack of forest structure that's gonna recruit wood into the stream, I mean, we're looking at like 200 to 300 years before some of these forests start shedding enough wood to stabilize these streams.

S Shayne Jaquith 12:59

What we want to see on this site in the end is we want to see a landscape that is flooded much more regularly, and holds that water much longer.

C Cate Kreider 13:09

So we have a long term goal for the site. Do we have a long term goal for restoration as a practice? There are lessons to learn from sites like the Hubbardton River Clayplain, both in the realm of ecosystem science and in outreach and involvement.

K Kristen Balschunat 13:22

To actually allow our crew to do work in the stream and "think like a beaver" to try to make some changes to the actual hydrology of the area was a pretty new and exciting area of work. What I'm most excited about with these water quality projects is the opportunity for someone to receive education to learn about high phosphorus in Lake Champlain or to learn about invasive species, and then immediately take action. I like that VYCC is so immersive and our leaders and members really have a chance to learn about become invested in the waterways of Vermont and then immediately take action together.

G Gus Goodwin 14:02

I always just kind of assumed that like the streams were someone else's jurisdiction. And it's really cool to think about having this way that you can provide really great management for the stream resource, but also for the forested uplands, you know that floodplain connection is so critical for a lot of forested systems. Realizing that, as terrestrial;y-focused person, there was so much to be learned. That connection between the headwaters and the forested system is just so much tighter than I think I ever realized.

S Shayne Jaquith 14:29

I guess I really hope that the riparian planting focused folks can start thinking more like the in-stream folks, and that the in-stream folks can start thinking more like the riparian planting folks because for me, just the importance of wood, the very high importance of wood, is really focused-- and the idea of that we need that sustainability that long term self sustaining system-- has really forced me to acknowledge how important those riparian forests are beyond ways that I thought in the past.

A Alison Adams 15:15

Today's episode featured the call of the blue winged warbler. It was recorded by Phil Brown on May 23, 2018 in Essex County, Massachusetts. We downloaded the song from xeno-canto.org. 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 NEIWPCC in partnership with the Lake Champlain Basin Program.