



Planting a Trillion Trees is Great, But Don't Neglect the Other Elements of the Reforestation Pipeline

A Conversation Between Diane Haase, Western Nursery Specialist, USFS and Kayla Seaforth, BEF

KAYLA: You co-wrote a great [paper](#) about the reforestation pipeline and all of the elements that are necessary to get it right. How do you think we're doing with that?

DIANE: I have spent my entire career working with nurseries. I'm going to be retiring next year and I have always seen nurseries as off the radar. I mean, I created a PowerPoint years ago when I worked at Oregon State University, trying to get students interested in nurseries and pursuing a nursery career. I had this radar screen with all these things about forestry in the radar, and nurseries and seedlings off to the side. I've used that same slide many times over the years to show that seedlings and nurseries are off the radar. So for the first time in my career, I'm seeing that nurseries are becoming front and center. But it's almost disproportionate because we need to see the entire pipeline. There's [currently] a lot of funding and interest from private investors that want to invest

in nurseries, expand nurseries, update their infrastructure, but we also need to focus on other parts of the reforestation pipeline. There are a limited number of seed collectors, and we also need to have the outplanting ability. Most tree planting is done with contract crews with guest workers, which is a labor pool that the agricultural sector also employs, so there aren't always enough workers to get the job done. The Forest Service in particular wants to scale up their outplanting and reforestation to fill in the backlog of some areas where they haven't been able to catch up with seedling planting due to wildfires, funding availability, seedling supply, and available personnel. That is one of the key bottlenecks: even if they have the outplanting crews, they don't have the capacity to go out and survey what needs to be planted and oversee it. There's also post planting care. One of my concerns about all of this attention focused on large-scale tree planting targets is, when you focus on how many

trees get planted it's not really the right measure of success. The measure of success needs to be how many trees survived and are thriving. I've seen these great articles that proclaim things like, "we planted 1 million trees in one day." But the first thing I want to know is what was the quality of those trees and how many are still alive a year later. The fourth piece of the reforestation pipeline that is really critical is the post-planting care. We can't just plant and walk away.

Overall, you have to plant the right tree in the right place at the right time for the right reasons. That's the [target plant concept](#). For example, if you're planting ponderosa pine, one ponderosa pine is not the same as another; the source of the seed matters. They have to be genetically adapted to the site. Seed collectors cannot just collect from one tree at one location, they have to collect for genetic diversity. They also have to collect from different elevation zones, and they have to keep track of where



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the seed came from. The nursery has to do all that too, they're making sure that their client is getting the correct seed source. Then the nursery has to know how to culture those trees and grow them up to specific specifications. If [the plant is] going to a dry site, that's where the **root:shoot ratio** comes in; you want a seedling that has bigger root mass than say one that's going to a very weedy site, in which case you'd want a really tall plant that can get above the competing vegetation. The nursery has to manipulate seedling quality to match it to the site. Labor is a big issue in the nursery industry, too. There are lots of people retiring. And there are too few young people wanting to pursue a career in nurseries.

When I was a college student, in my junior year, I got really disillusioned with forestry. All of my fellow students, this is back in the 80s, they all were wearing their red suspenders and their big boots. It was all about the culture of logging, and it wasn't really what I wanted to do. I wanted to work with trees, so I worked a summer job with the Forest Service. I was talking to my supervisor one day during lunch and I said "I just don't know where I'm going to fit in forestry. I don't want to go out and mark trees to

cut them down. What am I gonna do?" And he said, "well, maybe you'd like to work with seedlings." And, you know, I was about to be a senior in college, that had never been on my radar. That was a life changing moment. I mean, I couldn't even sleep that night. I was just like, "that's what I'm gonna do." It was a lightbulb moment. I went right back to the one teacher that had the one lecture about seedlings, and I said, "I want to do this." And so here I am, I became a nursery specialist. And so my point with that story is that it's just not on the radar for college students. They really like things that sound a lot more modern like ecology and climate change. Growing trees is more like farming, but it's still really rewarding. The people that do get into nurseries tend to stay there. They love it. It's the feel good side of forestry. And yet it's hard to fill the positions. So there's that bottleneck of labor in the nursery industry.

KS: You mentioned a number of elements that it takes to be a good nursery. Could you talk a little bit about what resources are available for folks who are struggling with a specific issue in their nursery or want to elevate their nursery practices?

DH: The Forest Service's Reforestation, Nurseries, and Genetics Resources Team (RNGR, the program I work in) provides publicly accessible resources on our website rngr.net. We are a really unique group in the Forest Service, because we are cross-deputy. The Forest Service has three deputy areas, which are state and private, national forests, and research and development, and the RNGR team operates across all three of those branches. Right now we're a seven-member team and we have members from each of those [deputy] areas. With the scaling up of reforestation, we're proposing that the RNGR team needs to scale up also, because we provide expert support to all of the parts of the pipeline, and we get stretched pretty thin. We do on-site visits, we produce research that's relevant to nurseries and outplanting, and we occasionally help with international programs. We also provide input on the national level when they're developing new policies. Right now, one of our people has been helping with the National reforestation strategy.

Our [website](http://rngr.net) has tons of resources. We have a directory of nurseries and something like 12,000 articles that are searchable and free to download. We publish a list of upcoming events,



nursery meetings, and conferences. There is also a page for tropical nurseries and a page for tribal nurseries. Recently, we added a page with education and employment opportunities.

Visit [RNGR.net](https://www.rngr.net) to explore technical assistance documents and manuals related to nursery management and to view the full archive of Tree Planter's Notes. The RNGR team also hosts regional conferences and offers consultations with Nursery Specialists to facilitate technology transfer.

KS: Of the nurseries that are producing native plants for reforestation, what proportion do you think seek guidance from RNGR?

DH: I think we reach most people through the website, which gets a lot

of traffic. We also reach people when we have our annual meetings. The audience for those is growers, nursery managers, and some people that are on the reforestation side, the people that get the seedlings. We mostly reach folks that are in the forestry realm. We're in the Forest Service, but RNGR is also into native plants of all kinds; forestry species are native plants. We also provide support beyond just forestry species. I have visited several native plant nurseries that are working in restoration or conservation, not just in reforestation.


KS: It goes back to what you were saying before; the pipeline for reforestation is all about having many people who are deeply engaged in the place that they work so they can know where the seeds are, know the phenology, know when they need to be collected, and then monitor the plants after they are planted and understand how the changes are playing out in their specific place. So it's great that you're getting interest from conservation and restoration folks.

DH: I have seen a lot of the same pipeline issues [in restoration]. For example, there's funding for a great restoration project and they get all the trees, shrubs,

forb, etc. in the ground. And then after two years the funding is up and they move onto a new project. If you do not get to the monitoring and post-planting care, what is the point of spending all that money on seed collection, seed storage, seed processing, and cleaning, sowing, culturing, lifting, pruning, storing the seedlings, transporting them, putting them in the ground only to have them die, or be outcompeted by invasive vegetation, or to be browsed heavily? If we're not taking care of them, or planting them properly there's really no point in the whole rest of the pipeline. We cannot just use the metric of how many trees went in the ground — that's the easy part. It's meaningless unless they are surviving and thriving. If you can do 10 acres really well, that's way better than doing 50 acres and having nothing to show for it.

KS: Over the course of your career, have you seen any improvements in effectiveness monitoring?

DH: Forestry companies are motivated to have success so they get good quality seedlings and do vegetation control because they need to have a new forest growing fast. When a planting project is not for profit, then I see some failures.



Large cottonwood seedlings and others have been well tended in preparation for outplanting at restoration sites in Skagit County.

And I don't know if I have seen that improving much. My concern is that [success] will actually decline with this fixation on the number of seedlings planted. I am also worried that and owners are not necessarily going to feel that they need to put much effort or investment into maintaining planted seedlings if they don't see any return in it. We have to really look at the big picture: what do we want it to look like in five years, 10 years, 20 years, regardless of whether it's going to be harvested. It still has value, and we need to really look at that value. So even if it's a non-commercial species, it still has value in its ecological function. We can't be looking at just how many trees got established, we have to look at making sure that they're providing the value that was initially intended. One thing that is driving the urgency around seedling production are GIS analyses of areas with potential to be reforested. Mostly it is marginal pasture land that used to be forest land. To convert those areas back to forests, you have to get the landowners on board with it; landowner participation is going to be a limitation. There is also a need for a workforce to do that engagement and provide landowners with appropriate information and incentives for this work.

Sometimes I think we're putting the cart before the horse a little bit with wanting to scale up seedling production. We need to make sure that those seedlings have a place to go, that they're the right seedlings for the right place, and that the people are engaged and enthusiastic and going to follow through.

KS: Private restoration on riparian systems and assistance with forest management is something that is supported by Conservation Districts across the Pacific Northwest, but I'm not aware of that sort of movement happening with reforestation. Are you aware of anything like that?

DH: Federal and state agencies have the Legacy Program, which exists mostly to maintain forests that exist already as well as stewardship programs to support new projects. States also have extension programs to provide technical support to landowners, but unfortunately, many of those have been watered down over the years. That's a support to the reforestation pipeline

that is not adequate if reforestation is to be scaled up at the levels proposed. It's barely serving what exists already, and to suggest that we need to do two and a half times as much without the people in place — it needs to be a coordinated effort. It'll take a while to get that moving but I'm excited. Even if we can only do half of what is suggested, and if we can do it well, then that's huge. But it's going to take a lot of coordination, a lot of people and monitoring to make sure it's successful.

KS: If you could wave a magic wand and describe the perfect reforestation pipeline, what would that look like?

DH: It would probably be doubling the workforce capacity that we currently have in every aspect. You know, seed collectors, nursery people, reforestation foresters, tree planters, plus the support network of extension people and other experts like the RNGR team, so people have the technical advice that they need.

KS: Hopefully, we'll get there. And like you said, even if we accomplish a fraction of this, that's better than where we're at today.

DH: Part of doubling that workforce is not just manual labor, but also getting the educated young people enthusiastic about wanting to spend their career in nurseries or reforestation. We need the next generation coming in and really running things effectively. Also, another concern for nurseries is market confidence, they are hesitant to scale up production for say five years, and then have the demand dry up. In order to do so, they have to expand their facilities and their storage capacity and recruit new employees. If suddenly, all the interest and demand for seedlings is gone, their business could collapse, and that's very, very risky for them.

KS: How do we bring more people in?

DH: Potential nursery workers can also come from areas like horticulture and other fields. Nurseries will recruit from those areas to try and find people who have some education and can become managers or growers. Technicians get trained up from entry level. We could be offering internships or getting high school students to work [in nurseries]. There are a lot of ideas being tossed

around to get more people involved and build enthusiasm around nursery sciences. We can't have this just be a flash in the pan. It makes me think of the Issue - Attention Cycle that we wrote about in "[developing and supporting quality nursery facilities and staff are necessary to meet global forest and landscape restoration needs](#)." First there's all this enthusiasm, but then people realize how much time and energy and expense are required, and then some new issue comes up and the enthusiasm shifts away. So with this current explosion of interest in scaling up reforestation, I hope that is not what happens when some new issue in the world diverts attention and funds elsewhere. Instead I'd like to see it really sustained to the point where the goals are met. Given the critical need for reforestation around the planet, I'm optimistic that could happen.

KS: Thank you so much, Diane. This has been illuminating and it all feels a little daunting, but I really appreciate your thoughts on everything.



Spruce seedlings.