A Network Approach to Assisted Population Migration

This interview was conducted by Kayla Seaforth (BEF) with Rob Slesak, principal investigator for the Experimental Network for Assisted Migration and Establishment Silviculture (ENAMES) research project being led by the US Forest Service. To learn more about the project and its contributors, please visit the project website.

KAYLA SEAFORTH: Hi Rob, can you tell me a bit about the ENAMES Project?

ROB SLESAK: The overall goals of the project are pretty straightforward; we're trying to develop information that can be used by forest managers and landowners to guide how they go about doing reforestation, in the context of implementing climate adaptation strategies. Our big focus is on testing assisted population migration, where we're moving seed sources from areas where they were historically adapted to areas where we predict that they'll be adapted to under future conditions. We also couple that with testing various practices that can be done at the time of planting that may increase the successful establishment of seedlings. This is especially important since the seed sources won't initially be adapted to these climates, and we want to give them the best chance of survival. The main objective that drives the project is to provide useful information to forest managers. Because of that, we work with partners in a co-production type process, where we work very closely with individual landowners and land managers to develop treatments that are of interest to them, and allow them to pick which species they want to look at. This ensures they have a lot of buy-in and increases the relevance of the research.

The project is a collaboration between the Pacific Northwest and Pacific Southwest Research Stations. We also work very closely with Region Six of the US Forest Service, which services Oregon and Washington. All the geneticists that work within the region are highly engaged and committed to this project. They're the ones who got this project going through the identification and implementation of some of our first sites. We're working collaboratively to try to build the biggest tent possible in terms of covering as many different entities as we can. This fosters a shared community that we hope will yield positive outcomes. Our partners include

Photo Credit: Tessa Franklin

multiple National Forests, Washington DNR, Oregon Department of Forestry, BLM, and the Confederated Tribes of the Colville Reservation.

We're also trying to branch out to engage with industry. So far, industry hasn't been too interested in this work because they use genetically improved seed, which has been developed through a breeding program to grow trees with the characteristics that they want. Our project uses wild collected seed, so it isn't super applicable to their situation. However, we've recently initiated some conversations with some members of the Northwest Tree Improvement Co-op to see if we can involve them in some trials using improved seed.

Working with improved seed actually presents a unique opportunity for research. The idea is that we can use information from the parent trees that they use to create improved seed sources to come up with an average climate for each one of those and essentially do the same thing that we're doing for the other sites involved in ENAMES. It may take a couple of years to get going, but we're very excited about the prospect of working with them.

KS: How are you thinking about monitoring across implementation sites?

RS: Right now, we plant the seedlings, and after the first year, we go and assess immediate survival and first year growth. And then, the least we're going to do is every five years thereafter, go back and measure survival and growth. We'd like to go back more frequently, and we will if we have sufficient resources to do so. But we're up to around 35 sites all the way from California to Washington. It will take a lot of resources and personnel to get out to all of the sites, so we need to be practical with our monitoring commitments.

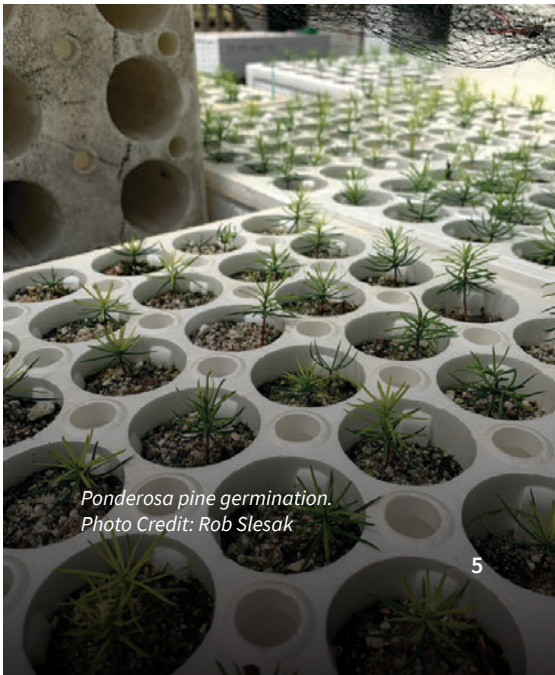
We're also taking some site characterization measurements; we're going to look at the physical and chemical properties of the soils, and we're also measuring some climate variables like air temperature and precipitation. For the seedlings, because of the scale of this, all we're committed to right now is very basic measurements of survival and height and diameter growth. I do expect that there's going to be interest from individuals to do additional monitoring projects. We have little clusters of certain site conditions and species, for example, we have a nice cluster of ponderosa pine in eastern Washington that I can see somebody doing much more detailed measurements with. We also have a cluster of Douglas-fir in the Willamette Valley, where we're looking at different vegetation control treatments. So that'd be a nice subset where maybe people would do more measurements related to things like quantifying competing vegetation, or drought stress or something along those lines. Right now, we're getting things established and continuing to get the word out that we're very open to collaborating with pretty much anybody on this.

Our experience has been that if we set up a well designed study, especially one that covers a wide geographic range, scientists are typically interested. At the same time, though, even just growth and survival will be enough to provide useful information in terms of determining the optimal climate transfer distance.

KS: What is the timeline for your findings becoming available to the general public?

RS: This information will start being useful about five years after planting. Now, that's on the practical science level, defining the climate transfer distance. But in the interim, there are going to be other opportunities to provide useful information to move forward the idea of assisted population migration as a climate adaptation strategy for reforestation. I hope introducing the concept to a broad audience will build momentum for all of the steps to make assisted population migration operationally feasible. For example, how do people locate seed from other regions? And how do they get that seed to the nurseries? I hope our project and others serve as catalysts to address some of those questions. I would love to see something like a seed clearing house where there could be an inventory system where all landowners have access to seed that is appropriate for future conditions. It's going to take time, so the sooner we can get going on this, the better.

Snowy planting in the McKenzie Ranger District. Photo Credit: Scott Kolpack



Ponderosa pine germination. Photo Credit: Rob Slesak

KS: Have you run into any issues sourcing the seed for the ENAMES project? What do the logistics look like?

RS: It hasn't been too bad, because each region does have its own list of what seed they have for a given seed zone. All of the landowners that we work with, in general, have access to seed in some form or another, whether it's wild collected seed or from an orchard. The quantity we've requested, compared to what they use over the course of a regular season, is relatively small. I think it's entirely a function of who we are and the access that we have. For other landowners who don't have the access that we do, this whole process would be pretty impossible. It's a huge barrier for private landowners, or people who don't have access to dedicated sources of seed, to actually implement an assisted population migration project.

KS: Has it been challenging to implement comparable projects across different ownership types?

RS: There are definitely differences amongst the sites but they largely have to do with how communicative partners are. I would say that's the biggest challenge: open communication and getting information back and forth at the rate we need in order to make decisions. Something we have to be aware of as we go forward and will become a factor when interpreting the data, is that the primary objectives of the different organizations differ slightly. The level of site preparation across partner sites varies greatly. Things like that can have a huge influence on survival. We'll see that pretty clearly in the data and just need to be aware of it.

Other things that are really important to keep track of are things like site conditions at the time of planting. This past spring, we planted five sites in Region Six, and it was a horrible year for planting. We had so much low elevation snow that we couldn't get into the sites until the end of April. Then the rains stopped shortly after, and things warmed up fast.

We haven't been back to the site yet, but I'm guessing we're going to have very high mortality. Once the seedlings are ordered and they're ready to be planted, they have to be put in the ground. It's actually a pretty relevant situation, because that's what managers have to do — they can't really wait for the perfect conditions or completely mitigate the conditions of a bad planting year.

KS: Is there any momentum toward moving from the current "local is best" seed policy to a more climate based seed transfer policy that might be informed by some of this work?

RS: That "local is best" mantra has historically fit really well, especially in the western US where we have a lot of species that are evolutionary specialists with narrow climatic ranges, and we have a lot of variation in climate. At this point, there's no concerted effort to create regulations about transfer distances. In fact, for a while there were questions at the Forest Service about whether or not federal policy prohibited use of seeds outside of the traditional zones. There's movement to clarify the language that will reduce ambiguity around considering alternative seed sources, outside of the historic seed zone. At the national level there are also efforts to develop guidance for the national forests about how they can go about doing assisted population migration.

KS: With the varied land ownership in the United States, what do you think is the right scale of coordination around this effort?

RS: For climate adaptation in general, I think a variety of scales is appropriate. Certainly the stand scale is the easiest; there's much more local control and you can influence exactly what's happening. As you get larger it gets more challenging, and maybe the objectives become more diffuse. I've had conversations with geneticists where we were trying to figure out, on a landscape scale, how much assisted population migration you need in order to make a difference. That it can be viewed in a couple of ways, like providing enough refugia for a given species and enough area where they're probably going to adapt to the future climate so they remain on the landscape, provide a seed source and so on. But also, how much assisted population migration and in what configuration do you need to do in order to start integrating the genetic material from the source climate into the local climate? Nobody ever has a good answer for that.

You could say more is better. But just the practical limitations alone are huge barriers. There's not enough capacity to do the things that we were supposed to be doing all along, much less adapting management in a way that's going to be responsive to climate in the future. More is better, larger scale is better. But there are practical limitations, and if we can start taking on some local efforts to get small scale projects implemented, that's a start. It serves as a baseline to build from.

KS: Is there anything else you'd like to share?

RS: One big piece of this project is developing really nice engagement tools, which we're doing through the development of a website. It'll be interactive, with some of the basic information about assisted population migration, key concerns, and a summary of existing literature. We'll also share our data and summaries as they become available for each site. It should go live sometime next year.

Rob Slesak is a Research Forester in the PNW Research Station based out of Olympia, WA. His professional interests incorporate silviculture, forest soils, forest hydrology, and applied forest ecology. He received his PhD in Forest Soil Science from Oregon State University and holds MSc and BSc degrees in Forest Science and Management from SUNY College of Environmental Science and Forestry. He is currently leading the development of a new experimental network across the western US to evaluate the use of assisted population migration and novel silvicultural practices to increase reforestation success.