Mast
REFORESTATION

Tree Seed Summit 2023

NEWSLETTER VOLUME 2

Cultivating and strengthening a community dedicated to the art and science of native tree seed procurement.

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In this Newsletter...

Background

The Tree Seed Summit is a gathering of stakeholders to work through the challenges in native tree seed procurement, through uniting the various stakeholders to tackle the challenges of finding and procuring native tree seeds. Currently, the summit focuses on the western United States, but stakeholders from Canada and other regions with temperate forests also participate. The goal is to ultimately expand the summit's reach and corresponding events to serve a broader region.

Collaborative learning is key to scaling up seed collection efforts, raising awareness of the different stages of the seed supply chain, and promoting sustainable practices for regenerating biodiverse ecosystems. Together, we strive to create a resilient future for our region and beyond.

While the Summit is currently designed to be an annual event, the learning should be continuous. Therefore, newsletters are periodically released to summarize outcomes from the event and share additional resources. This is the second Newsletter, posted on www.treeseedsummit.com (in the "Materials" section), where you can also find previous volumes, as well as presentations and photos from the event.

If you would like to contribute to future newsletters, or be added to (or removed from) the mailing list, please email: treeseedsummit@mastreforest.com

Interested in attending or participating at TSS in 2024?

Fill out this short survey and let us know!

About 2023 TSS

In 2023, Mast Reforestation partnered with the Society for Ecological Restoration (SER) Northwest Chapter to develop a program centered around the science and procurement of native tree seeds. Topics included assisted migration, seed and cone pests, inventory management, collection strategies, and engaging with communities. Smaller group breakout sessions allowed participants to dive deeper into the seed supply chain, learn about the different stakeholders and their perspectives and needs, and address some of the toughest challenges when it comes to increasing native seed supplies.

To see presentation slides and photos of the event, visit the Materials page on the Tree Seed Summit website. You can also view the VOA TEK Video to watch a short clip on one example of the extraction process from Silvaseed, a historic stakeholder in the global tree seed supply chain (timestamp between 11-23 min).

Breakout Session 2

Seed Perceptions & Considerations

We got right into debate with the second session, exploring the benefits and drawbacks of three key topics: Collections on public lands versus private; migrating seed versus never migrating seed; and orchard seed versus wild collected seed. For this activity, we asked people to move to one side of the space to "cast" their vote, and share their opinion on which of the options presented that they were in favor of.

Takeaway Summary

Collections on public land are challenging due to permitting structures, while private lands present opportunities to engage with locals.

Migrating seed may be better than not planting trees, but it does come with risk, and should only be done with guardrails.

Orchard seed has advantages in known genetics and operational efficiency, but wild-collected seed has the opportunity to address climate resiliency instead of timber, even though it is less efficient compared to orchard

Collections on public lands versus private

The biggest disadvantage to collecting on public land is managing the permitting structure and navigating bureaucracies. However, the large expanse of public land means there is great opportunity for large-scale collection efforts targeting a diversity of species. Additionally, private landowners, particularly the large industrial timber companies, have made long-term investments to secure desired genetics. Those investments are timber faceted. Beyond limiting species of interest, they also limit geographic/provenance representation outside of commercial timber producing regions. There is additional discussion to be had on the perception around who should be allowed access to seed collections on public lands, and whether such opportunities should be made available to all, or only for public use.

With private land, there were multiple benefits including fewer stipulations and lack of difficult bureaucratic overhead, as well as the opportunity to engage with local stakeholders in meaningful and lasting ways. However, there are still challenges in engaging with a large number of landowners from various backgrounds, as this group can span industrial, private landowners, family forest landowners, and large real estate investment trusts.

Migrating seed versus never migrating seed

Tracking seed sources helps ensure the appropriate seed is used for a project, leading to a better chance for the trees to grow and thrive. Migrating seed refers to the transfer of seed from the region where it was collected to a similar ecological landscape. Seed migration presents the potential for increased diversity and resilience, with the ability to introduce species that may be hardier to expected temperature thresholds and drier climates, among other factors driving the establishment and long-term health of planted trees.

However, this is a largely untested practice with tree seed, and there is a higher risk of failure with already limited seed supplies.

The alternative is to only use seed from its source location (or "seed zone" or "provenance") to reduce the risk of unanticipated outcomes. Migration is often dependent on modeling climate analogs, and this exercise is often imperfect, relying on some data and many assumptions of fit and condition. Similarly, the models do not account for biological layers very well, specifically species and trophic interactions. Put more plainly, seedlings planted from migrated seed lots may not survive if they are not adapted to conditions at the time of planting, or as conditions change into the future. We also don't know how those species will encounter competing vegetation, and what the risks are of transferring or vectoring insects or diseases.

Overall, while seed migration may be better than not planting trees at all, there is still a greater chance of failure if models and expert opinions are not conservative enough. Migration should only be done with guardrails, including a high degree of planning and tracking of those lots when possible.

Additional Resources

Read more or watch a short video about how seed is tracked and seed migration

Seedlot Selection Tool (US based)

Climate Adapted Seed Tool (CA only)

Orchard seed versus wild seed

There were multiple advantages identified for orchard seed. These included the ability to leverage decades of seed selection and known stock/genetics, operational efficiencies, and the ability for insect control. However, the biggest drawbacks were the time to establish these orchards, and lack of diversity among species and represented provenances across broader western geographies.

Further, it is well understood that most orchards were implemented to improve timber yields, and functional traits were selected for parent material that biases towards form over function for high productivity

(high site class) forested regions. As we encounter more difficult climatic and edaphic conditions (e.g. post-wildfire environments), and move to conduct reforestation on low productivity sites with challenging climates, we are likely to need more resilient source material that is locally adapted. Another important consideration is the cost of operating these orchards and staffing them. The historical alignment of orchards to support timber economies meant a steady stream of revenue from companies or cooperatives that benefit the staffing and maintenance costs of the operations. Without a capital incentive that has a multi-decadal outlook, it will be difficult to establish (or re-establish) viable orchards. This means reliance on subsidies or federal/state funding initiatives should be carefully considered and managed appropriately.

Finally, although more challenging to acquire, we know that properly collected wild seed has the potential for greater genetic diversity of paternal lines, the ability to capture traits that address climate resiliency, and the opportunity to be used as the "library" for banks and orchards alike.

Breakout Session 3

Partners in Seed

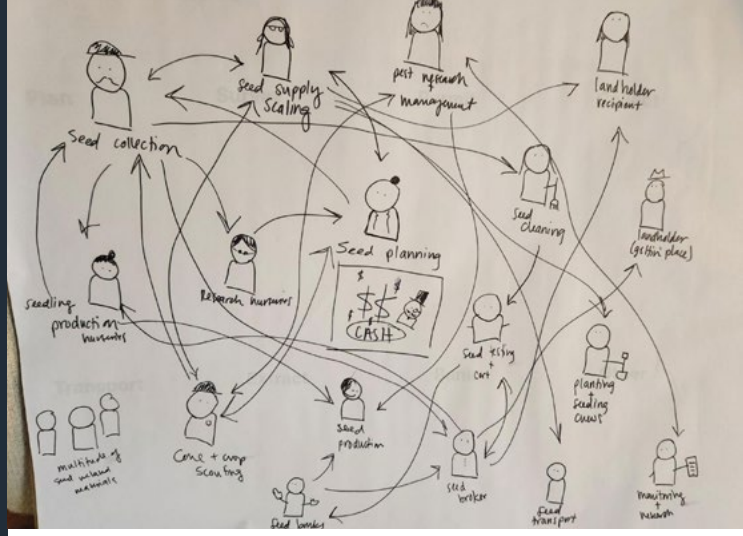
In the third session, we identified and discussed the different stakeholders across the seed supply chain, their individual objectives, and how they interact with each other.

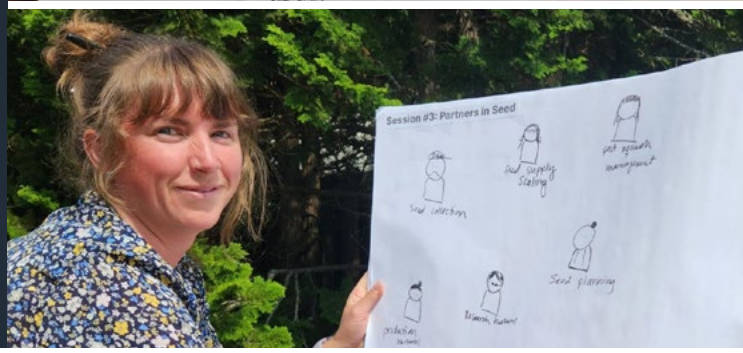
Takeaway Summary

There are a myriad of stakeholders involved in collections, which include those working in the field and those providing influence in policy and finance.

All stakeholders depend on someone, and usually multiple people.

Strong collaboration and communication are critical to successful collections.





There are a multitude of stakeholders when it comes to seed. These include those who may be obvious, but also the less obvious. Successful collections require more than just physical labor, and necessitate specific skills, expertise, and relationships to have positive outcomes. See the following table for the different stakeholders and their roles in the seed supply chain.

Part of the activity also included drawing arrows to connect stakeholders that depended on each other. This resulted in a large web, showing that everyone depends on someone, and many depend on multiple people. While these dependencies pose challenges, it also means robust communication, strong relationships and partnerships, and collaboration are critical to favorable collections.

Stakeholder	Seed Supply Chain Role
Scouter	These are trained experts that look for formation of cones or other seed, and also report on ripening or readiness for collection in the forest.
Collector	The crew that performs the physical collection of cones - typically by way of precision techniques like climbing, or branch stripping and ground foraging.
Landholder	Allows for collections on their property. Landholders may be public or private.
Planner	These people manage all of the logistics for successful collections, and includes brokers for coordinating supply and demand
Nursery Staff	These span multiple responsibilities, including: Extraction and banking - including cleaning, testing, and certification; growing seed into seedlings; and collaborating with planners or foresters to communicate seed demand.
Transporter	These are the people driving trucks and trailers to move bushels of cone from the forest to an extractory.
Financier	These are those who help pay for collections, partially or in full.
Registration Group & NGO	These groups can help in different ways, such as organizing collections, partnering to secure resources, and providing training.
Forester	This is the boots on the ground expert that often plays multiple roles, including scouter, landholder, planner, and more.
Vendor	Through purchasing and requesting seed, the vendors are critical in projecting seed demand.
Policy Makers	On both a local and national level, these people can influence the policy around collections, including funding and land access.
Grant Writer	Similar to financiers, they help secure funding for collections.
Press / Media	Press is essential for advertising and advocating about the requirements for seed, the demand, and the opportunity for a variety of people to get involved.

Reading & Resources

To read further on topics presented at Tree Seed Summit, below are links to additional material. This list is not exhaustive, and if you have material that should be shared in the next newsletter, please send to treeseedsummit@mastreforest.com. You can also view and download the full presentations in the "Materials" section at www.treeseedsummit.com.

NEW! We are also excited to announce the launch of an experimental website:

This site is designed to inform experts and lay stakeholders about the elements necessary for successful reforestation after wildfire, covering a range of topics including planning, financing, seed and seedlings.

Seed Needs & Collection

An Assessment of Native Seed Needs and the Capacity for Their Supply

Silvaseed Cone Scouting Guide

Got Seeds? Strengthening the Reforestation Pipeline in the Western United States

Reforestation is Great! But We're Running Out of Seeds (Wired)

Reduced fire severity offers near-term buffer to climate-driven declines in conifer resilience across the western United States (Davis et al, 2023)

To regrow forests, the U.S. needs billions of seed - and many more 'seed hunters' (National Geographic)

Insects & Pests

Northern Region Cone & Seed Insect Handbook (USDA)

Climate change and its possible influence on the occurrence and importance of insect pests

Policy

Bipartisan Infrastructure Law

REPLANT Act of 2021

State and Trends of Carbon Pricing 2020

National Forest System Reforestation Strategy

Assisted Migration and Genetics

USFS Climate Change Resource Center - Assisted Migration

Climate-based Seed Transfer (British Columbia)

Climate BC/NA - University of British Columbia, Centre for Forest Conservation Genetics

Reforestation & Nurseries

Forest Services Nurseries: 100 Years of Ecosystem Restoration

Challenges to the Reforestation Pipeline in the United States

Additional Resources

Tree Seed Working Group - Through the Canadian Forest Genetics Association, publishes biannual bulletin

Reforestation, Nurseries, and Genetic Resources (RNGR): https://rngr.net/

The Woody Plant Seed Manual

Tools to aid with seed transfer:

Seedlot Selection Tool

Climate Adapted Seed Tool

Climate Change Informed Species Selection Tool (British Columbia)

Community Share Out

This section features material that has been shared by Tree Seed Summit participants. If you would like to include something in future newsletters, please email: treeseedsummit@mastreforest.com

Reforestation Priorities Survey

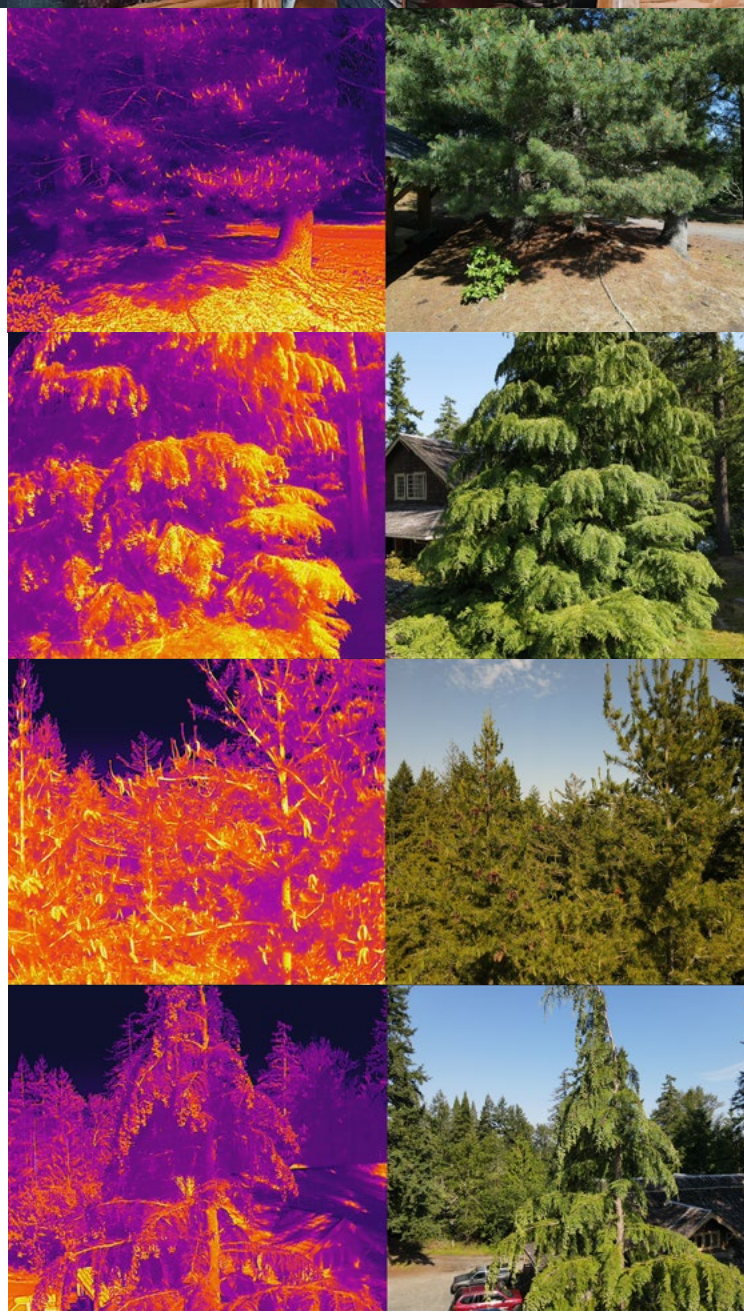
A group of researchers from public, academic, and private institutions are looking for participants to provide input on reforestation needs and trends in the western U.S. The survey should only take about ten minutes to complete, please consider providing your feedback if you are a landowner, land manager, or represent either:
Western US Reforestation Priorities Survey

Addendum

Viewing trees through drone imagery

In the first newsletter, we shared imagery Nick Kunz collected with his Mavic drone. We would like to provide some additional detail, courtesy of Nick: The images came from the thermal sensor on the Mavic 2 Enterprise Advanced. There was not a thorough analysis of thermal vs. multispectral imagery, but Nick used DJI's free Thermal Analysis Tool. He found when he constrained the thermal image threshold slider, the cones on the White Pine and Port Orford Cedar really illuminated. The suspicion is that this suggests the thermal is more useful than multispectral for cone detection, and with further testing the thermal imagery may even reveal a signature for infested cones.

Major thanks to Nick for his contribution to exploring how tech and tools may bring solutions for increasing seed supplies!



Photos Courtesy of Nick Kunz

Upcoming Events

National Native Seed Virtual Conference (2024)
February 7-8, virtual, 8am - 2pm PST
Website

22nd Annual Foresters Forum (2024)
Registration Opens Nov. 15
Website

Forest Vegetation Management Conference (2024)
January 9-11th, Location TBD
Website

International Union of Forest Research Organizations (IUFRO)
Jun 23-29, Stockholm Sweden (Registration open)
Website

National Tribal & Indigenous Climate Conference
September 9-12, 2024, Anchorage, AK
Save the Date

Send Us Feedback or Get involved

We want to hear from you!
If you have content you would like to share in future newsletters, or would like to see something in future versions, let us know!

Email feedback or future content to share to:

treeseedsummit@mastreforest.com

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