Mast
REFORESTATION

Tree Seed Summit 2023

NEWSLETTER VOLUME 3

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 (TSS) is a gathering of stakeholders to unite and tackle the challenges of finding and procuring native tree seeds. Currently, the Summit focuses on the western United States, but participants hail from Canada and other regions with temperate forests. The intent is to ultimately expand the Summit's reach to serve a broader region.

Collaborative learning is key to scaling up seed collection efforts, from raising awareness of the different links in the seed supply chain, to promoting sustainable practices for regenerating biodiverse ecosystems. **Together, we strive to create a resilient future by restoring native ecosystems and the seed supply to sustain them.**

While the Summit centers around in-person events, the learning should be continuous. Therefore, newsletters are periodically released to summarize outcomes from the TSS, and share additional resources. This is our third Newsletter, previous volumes are posted in the Materials section at www.treeseedsummit.com, where you can also find presentations and photos from 2023 TSS.

If you have content to share in future newsletters, or you would like to be added or removed from the mailing list, please email:

treeseedsummit@mastreforest.com

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

The Seed Supply Chain

In the fourth small group breakout session, we looked at distinct stages of the seed supply chain. Some of the additional elements participants added include:

- Testing and certification
- Funding
- Communication and contacts
- Marketplace needs and demands
- Orchards
- R&D

Takeaway Summary

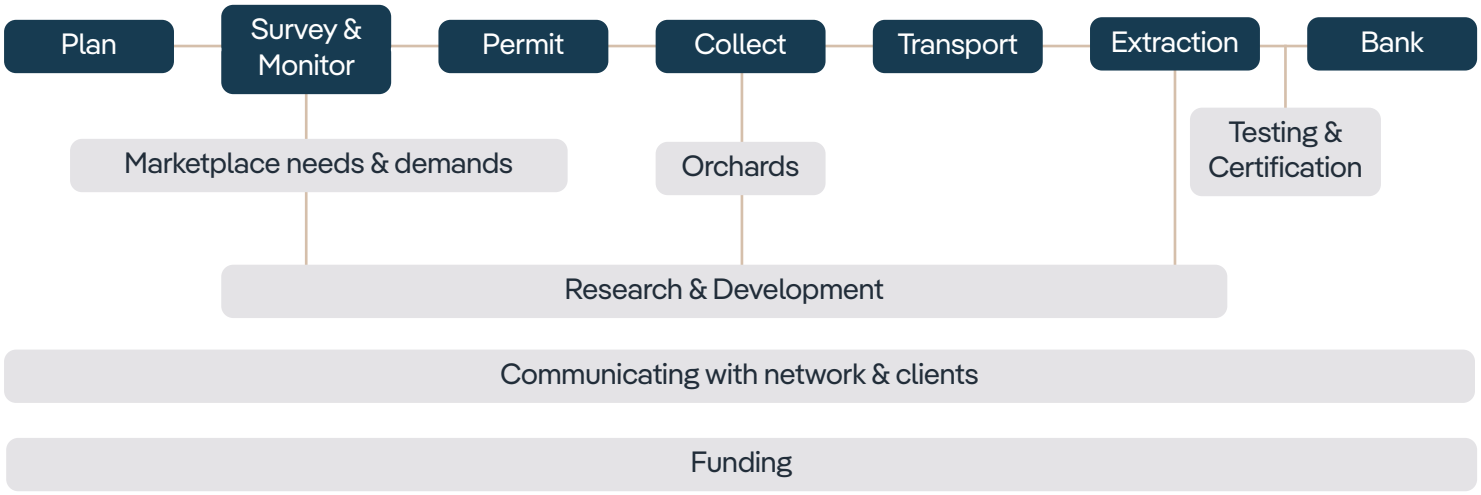
Every link in the seed supply chain was deemed critical by participants. Each brought experiential knowledge and faced difficult challenges needing attention.

Funding is a major challenge, especially in early planning and survey stages, when a return on investment is not guaranteed.

Ensuring high quality output from a collection is essential and this success is dependent on almost every stage, including transport, extraction, and banking.

Stages of Seed Procurement

Below are the stages presented at 2023 TSS (in blue). The bottom half (in grey) are additional elements identified by TSS participants, with a general indication of their likely position within the supply chain.



The following is a breakdown that participants identified as of some of the specific challenges, critical aspects, and knowledge gaps in each collection stage. Although there may be overlap – for instance, sometimes additional knowledge needed is also a challenge – certain insights emerged across the groups:

- Securing funding is a major challenge, especially in the early stages of planning and survey/monitoring.
- The challenge with funding is exacerbated because nature will not guarantee a return on investment (ROI), and the overall value of collected seed should be reassessed.
- Preserving genetic diversity and high-quality collections is also important, as well as proper seed banking practices and information sharing to address all needs and demands.

Plan "Money can't buy seed that doesn't exist"

Challenges, critical aspects, and knowledge we need

Challenges	Critical	Knowledge
Establishing networks for challenging situations and decisions.	Planning is important to prioritize, understand goals, and identify what we have, and what we need. Does demand = supply?	We need more knowledge about the performance of seedlings (trees) under future climates.
Hard to coordinate across stakeholders and partners.	Have backups and start early! It's easy to get pinched for time.	For scaling planting projects, are there enough seedlings on short notice?
Limited by the funding cycle, mismatched with a lead time for collections, nursery, and planting. Money can't buy seed that doesn't exist.	Critical to identify desired areas, how much is required, how much ground is needed to fulfill orders, as well as genetic diversity	
Feedback loops: communication between organizations regarding seed inventories and needs	At any scale - why are we collecting, and what are the short and long term goals?	
High bar for new entry	Cross jurisdictional cooperation	
	Not enough people are trained to scale this	

Survey & Monitor "Mother Nature can overrule the plan"

Challenges, critical aspects, and knowledge we need

Challenges	Critical	Knowledge
This stage is costly, having the funding at all is difficult	From a climber, the survey is the most important. Plus, it's the earliest step in the process	Lack of knowledge from foresters on what a good crop is
Large labor expense for potentially a small ROI	Ability to identify a quality crop	Need for accurate and reliable survey/monitoring data
Building into existing field work protocols	Mother Nature can overrule the plan; cone abortion, lower seed output than expected from cut tests, pests, etc.	
Time-consuming and resource-intensive		
Sharing observations		
Cooperation		
Conflicts with fire responsibility		

Permitting "Permitting can prevent or kill a collection"

Challenges, critical aspects, and knowledge we need

Challenges	Critical	Knowledge
Red tape – Many challenges with the feds	Most important to be able to collect	Lack of knowledge by federal personnel
Time intensive, can slow the process down	Can prevent or kill a collection	Timing year-to-year access
This needs to be done in coordination with planning & survey	Critical to satisfy the needs and concerns of landowners	Rules and regulations
Overlapping land ownerships		We need knowledge about how to resolve issues with USFS permits and access (except NM)
Uninformed personnel		

Collect "If the seed is no good, even if 'plan' and 'survey' were sound, it will fail."

Challenges, critical aspects, and knowledge we need

Challenges	Critical	Knowledge
Cone abortion and pests	The foundation of the supply chain	Field quality standards
Masting is unpredictable	This is the first concrete step that actually brings genetic diversity	Appropriate handling after collection
Seed pricing needs to adjust to a margin above the true cost of collection.	Handling and collecting seed determines project quality. If the seed is no good, even if the plan and survey were sound, it will fail.	
Labor and retention, team morale		
High turnover and loss of institutional knowledge		
Physically demanding and dangerous		

Transport "This stage is also physically difficult"

Challenges, critical aspects, and knowledge we need

Challenges	Critical	Knowledge
This stage is also physically difficult, and involves rough roads, distances, and remote storage	Important to prevent cone damage	*No additional detail provided*
How can we maintain the integrity of crops?		

Extract "This requires capital investment, space, and equipment"

Challenges, critical aspects, and knowledge we need

Challenges	Critical	Knowledge
Having the labor	*No additional detail provided*	Handling, process, and banking knowledge is all needed
Capital investment, space, and equipment		
Whether or not the survey found a viable crop, or found any signs of bugs or other diseases		

Banking "If seed isn't properly stored, it is a huge waste of resources"

Challenges, critical aspects, and knowledge we need

Challenges	Critical	Knowledge
Vulnerability to catastrophic loss	The bank is all of the species and genetics we process for projects	We need to know what seed we have, and what we need across all seed holders
Succession	If the seed isn't properly stored, it is a huge waste of resources	Information sharing (a marketplace)

Breakout Session

Seed Solutions

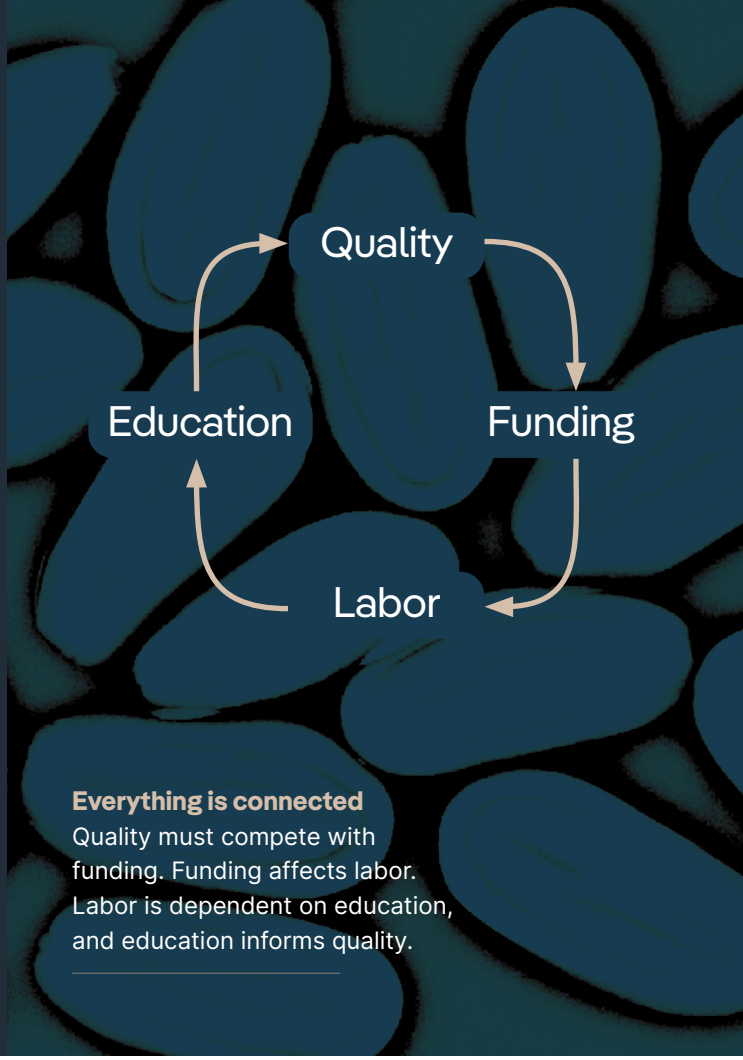
This was the final breakout session of the event and served as a chance for participants to reflect, share, and identify opportunities for growth. In these discussions, four key insights among the groups emerged: quality, funding, labor, and education. These insights are connected, and each one is dependent on another.

Takeaway Summary

Quality, funding, labor, and education were major challenges and themes discussed, and they are all interconnected.

There is opportunity to scale successful models for providing economic incentives to increase wild collected seed, and boost rural communities.

Tree seed procurement isn't cheap. In order to achieve success in the industry, the true value of seed must be calculated, respected, and shared.



Everything is connected
Quality must compete with funding. Funding affects labor. Labor is dependent on education, and education informs quality.

What will you do to address the challenges in native seed procurement?

When we posed this question to TSS participants, there were multiple answers speaking toward the challenges in quality, funding, labor, and education. This included building robust systems that will enable success through paying a living wage, recruiting labor, and training. Others stated they would share what they've learned and considered becoming a guest lecturer at local colleges. There are abundant opportunities when it comes to addressing barriers in scaling seed supplies, and everyone can play a part.

If you have other opportunities you would like to share, you can email treeseedsummit@mastreforest.com, and it will be added to the next newsletter.

Quality

One core insight discussed was the quality of collections, particularly determining and balancing the quality with objectives. 2023 TSS was a largely scientifically minded and academic group, and there were strong arguments in favor of preserving genetic diversity and encouraging resilient forests through biodiversity. Achieving this requires focused efforts – from planning and survey, to developing best practices for collections, all the way through monitoring outplanting successes and failures.

Regarding quality, there were additional discussions around squirrel cache (or ground collections) versus seed collected from climbing versus orchard seed. The quality of a collection should tie to the objective(s) of the collection itself, as well as the overall project, which may include a desire to preserve genetic populations and create cautious acceptance for migrating seed.

Funding

Quality must be balanced, but also, to some degree, competes with funding. Tree seed procurement is expensive, and obtaining funding for a product with unguaranteed financial returns is challenging. Further, a successful collection's operational and financial demands can also compete with best scientific practices. It is an open question of what the industry will value in terms of expertise, and this is likely to shift based on fluctuating needs and demands.

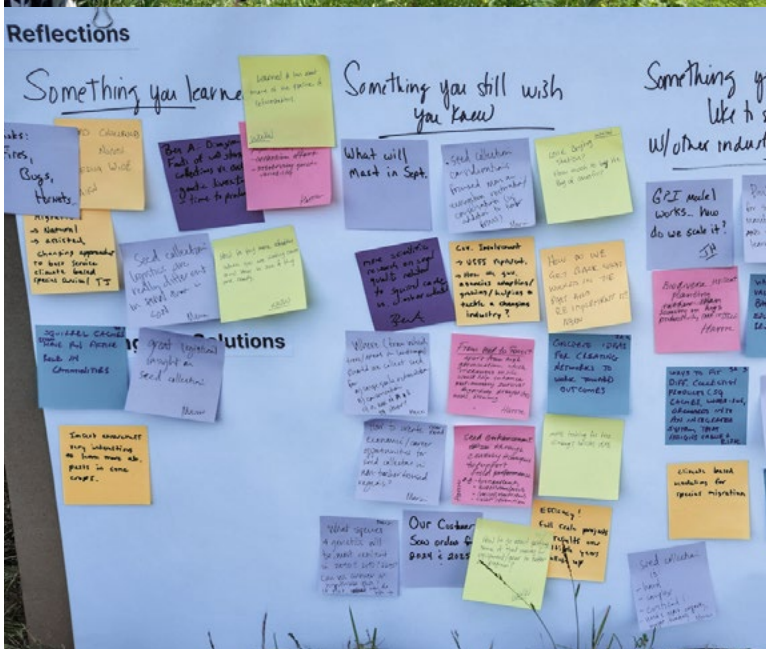
The economics of seed collections are not largely shared or understood. However, this also presents an opportunity to educate stakeholders, calculate the true value of the seed, and ultimately use economic incentives to alleviate constraints with the labor required for procurement. For a deeper dive on this topic, see a recent write-up in the Fall 2023 issue of the Western Forester: The True Cost of Seed: Implications on Workforce Development in the Western US.

Labor

Retaining staff, especially in remote locations, is challenging. At 2023 TSS, Oak Rankin from the Glacier Peak Institute (GPI) gave a presentation about his rural community in Darrington, Washington and their work empowering youth to create resilient and sustainable rural communities and healthy ecosystems. Oak's entire presentation is posted on the "Materials" section at www.treeseedsummit.com. Oak and GPI have worked with Mast Reforestation to set up buying stations for cone collections, bringing not just more cones, but also money to the rural Washington population. There is potential to scale this model to increase capacity for wild collections, and lift up rural communities.

Education

Increasing the workforce will also mean expanding awareness and education about tree seed procurement, both broadly for the industry, as well as detailed, technical specifics for specific critical roles. At 2023 TSS, there were numerous call outs for more education around the topics of seed collection. This includes attracting new, younger generations, and strategies to make seed biology and related topics engaging.



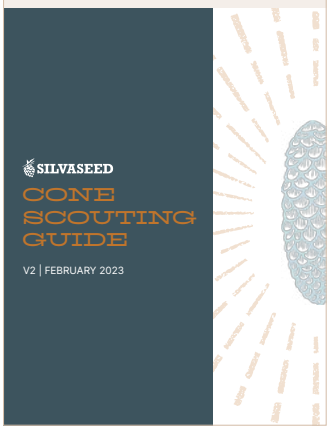
Reading & Resources

For further reading on the topics presented at Tree Seed Summit, check out the links below. Have material that should be shared in the next newsletter?

Send it to treeseedsummit@mastreforest.com.

Seed Needs & Collection

Check it Out:
Silvaseed Cone Scouting Guide



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

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

Tools to aid with seed transfer:

Seedlot Selection Tool

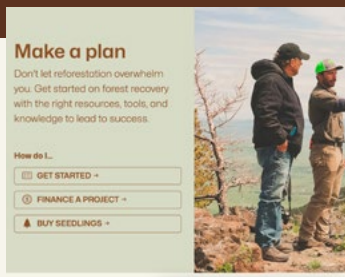
Climate Adapted Seed Tool

Climate Change Informed Species Selection Tool (British Columbia)

Reforestation & Nurseries

Reforestation.fyi

An experimental website 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.



Forest Services Nurseries: 100 Years of Ecosystem Restoration

Challenges to the Reforestation Pipeline in the United States

Additional Resources

Tree Seed Working Group - Biannual bulletin through the Canadian Forest Genetics Association

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

The Woody Plant Seed Manual

Upcoming Events

After the Flames
April 15-17, Estes Park, CO
Website

International Forest Business Conference
May 19th, 2024 in Poland
Website

International Union of Forest Research Organizations (IUFRO)
Jun 23-29, 204 in Stockholm Sweden
Website

2024 National Silviculture Workshop (USFS)
July 16-18, 2024, in Olympia, WA
Website

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

Society of American Foresters - National Conference
September 17 - 20, 2024, in Loveland, CO
Website

SER 2024 North American Conference
October 28 - Nov 1, 2024 in Vancouver, British Columbia, Canada
Website

SER World Conference on Ecological Restoration
September 25 - October 4, 2025 in Denver, CO
More information

Get involved

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treeseedsummit@mastreforest.com