

# **Time to Order Seedlings!**

## **Wait...Seed? What?**

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# DNR reforestation history

- **Historic approach – bareroot seedlings, aerial seeding after slash burning; huge seed quantities**
- **Late 1970's – first container seedlings**
- **Continuing expansion of plug and plug transplant demand / high quality seed**



DNR Totem publication Feb 1966

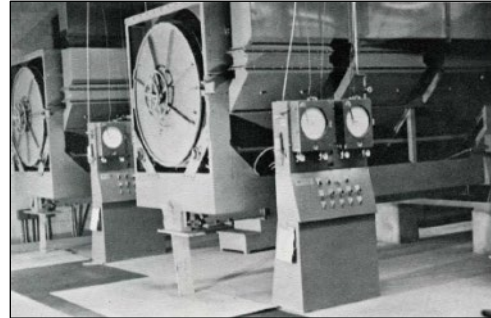


Google Earth



# DNR seed processing history

- **Changes in seed program to accommodate increases in container demand**
- **Prioritization of seed quality with associated costs**



DNR Totem publication Feb 1966

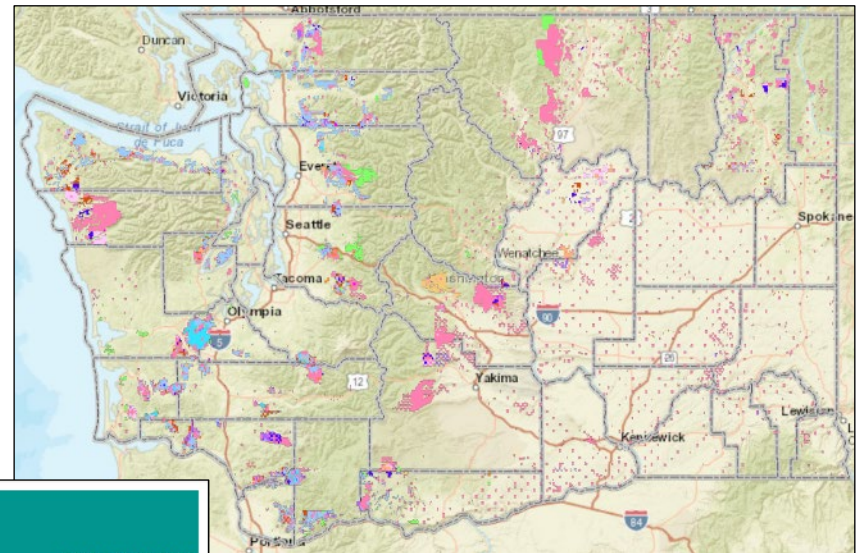


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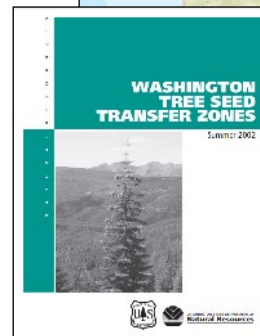


# DNR landbase

- **2.1 million forested acres scattered across the state**
- **14 species planted**
- **2002 WA Tree Seed Zones**
  - **335 species/seed zone/elevation band combinations**



DNR SUVT



# **DNR Seed Program – inventory and approach**

- **Decades to build inventory – spatial complexity, crop cycles, seed shelf life**
- **Limited staff, skilled contractors, budget**
- **5 staff – surveys, monitoring, collection on DNR, USFS, private lands; seed processing**
- **Provide seed for 17,000 – 20,000 DNR acres reforested annually plus NIPF**





# DNR seed storage

- **Owned infrastructure - mostly fixed costs**
- **Lack of pressure to dispose creates revenue opportunities**
- **Inventory - 870 seedlots, 18,000 lbs.**
- **Documentation of all seedlot details**

A photograph of a large, multi-page document, likely a seed lot inventory or management record. The document is filled with columns of text and data, organized into a structured format. It appears to be a detailed record of seed lot details, including lot numbers, quantities, and other relevant information.

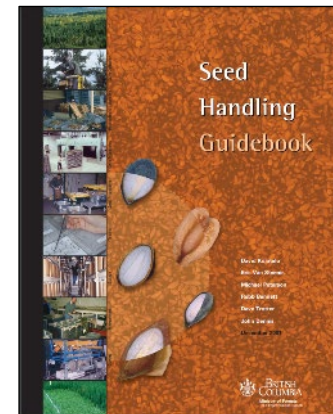
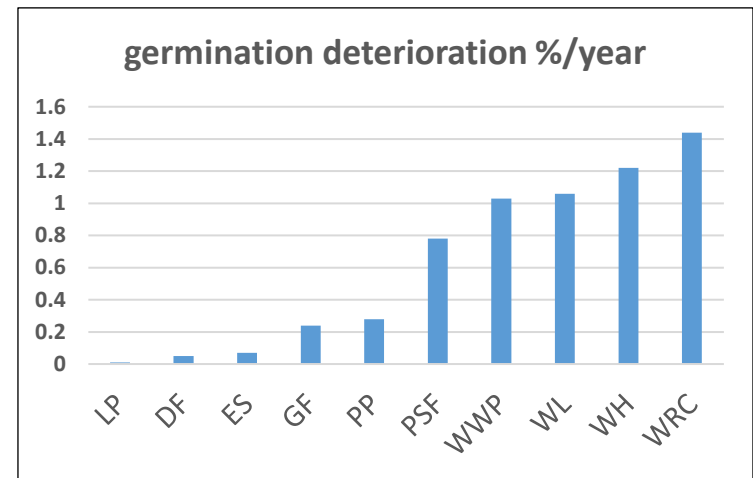
# Seed storage – security considerations

- **Storage temperature and longevity**
- **Freezer infrastructure age and condition**
- **Remote monitoring / power backup**
- **Storage agreements**
- **Insurance options / “replacement” value?**



# Seed storage – germination deterioration

- **Vigor reduction over time – slower germination, more abnormal germinants, greater sensitivity to growing conditions**
- **Good vs. poor storing species**
- **Informs how often to retest to track decline, when to toss, upgrading opportunities**

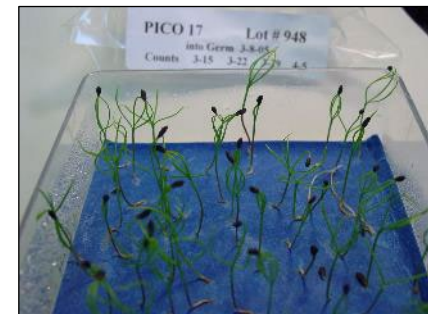




# Seed testing / re-testing

- **Retest germination capacity only – other metrics stay the same**
- **Low moisture content important for extended storage**
- **Frequency - tests for DF, LP, ES remain useful for a long time**
- **Standard certified germ tests often don't match grower operational protocols – can result in seed waste**

<u>Species</u>	<u>DNR retest frequency</u>
Douglas-fir	10
Lodgepole pine	10
Engelmann spruce	10
Sitka spruce	10
Ponderosa pine	7
Grand fir	7
Noble fir	7
Mountain hemlock	7
Western white pine	6
Pacific silver fir	6
Western larch	5
Western redcedar	4
Western hemlock	4



S. Pickens



# Consolidation for retesting

- **Seedlots near depletion are not worth retesting**
- **Combine two or more seedlots of similar age, provenance, and germination to create a balance worth retesting**
- **Document individual original seedlot information and proportions**
- **2-3 years supply can justify retesting depending on value and scarcity**



# Compromised and older seedlots

- **Factors impacting vigor – seedlot history prior to sowing, age deterioration**
- **Age-defying persistent good performers**
- **Plan for species shelf-life averages, aim for near-perfect collections**

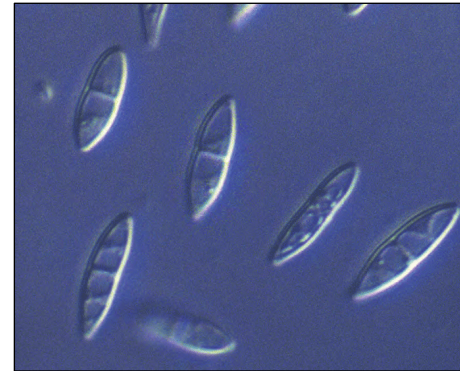


N Khadduri



# Seedborne pathogens

- ***Fusarium* and *Sirococcus* reduce expected yield**
- **Feedback from grower – type and severity**
- **Independent fungal assay with representative sampling**
- **Initial negative result – quarantine and re-assay**
- **Document, communicate, and plan for seedlot replacement**



G Stanosz



N Khadduri



# Seed upgrading

- Reclean low purity seedlots of long shelf-life species
- Water separation early in processing of new TF lots
- Imbibition, partial drying, and air separation of inventory TF lots pre-stratification



K Blair



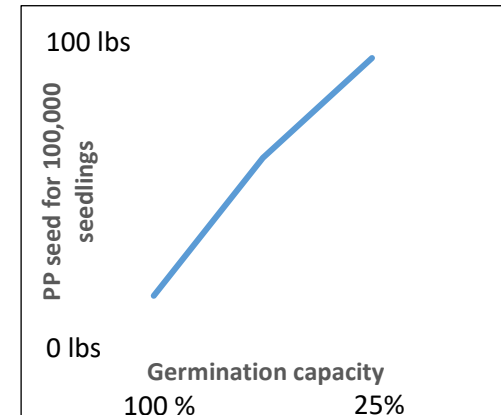
N Khadduri





# Impacts of quality on inventory management

- **Growers seek >95% cell fill**
- **Poor quality seed requires higher sowing rates - associated higher seed and thinning costs**
- **Low quality seed will disappear much more quickly than high quality seed**



# Efficient inventory management

- **Know seedlot history - collection, handling, processing, and growing**
- **Know long-term organizational reforestation plans**
- **Plans for excess seed – produce revenue or use as trade bait**
- **When to toss – consider purpose, size and age, shelf-life, replacement options, grower perspective**



MT State Univ

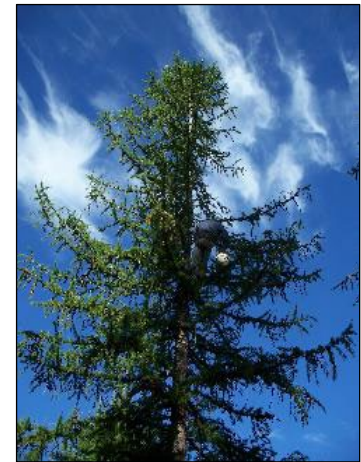


# Collection planning

- **Keep smaller inventories of short shelf-life species than long shelf-life ones**
- **Species or areas with less frequent cone crops complicate things**
- **Consider age and past performance of existing inventory – stay ahead**
- **Address uncertainty surrounding existing seedlots / sub-optimal collections**
- **Too much seed is better than not enough if you can afford it**



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# Sharing and cooperation

- **Look for opportunities to develop networks and cooperate / pool resources with other landowners**
- **Share info on seed needs and available excess inventory with others**
- **Opportunity to produce revenue and optimize a scarce resource, or trade for something of value**
- **Appropriate valuation for situation**



# Deployment

- **Woods-run – first in first out (assuming quality/germ class constant)**
- **Orchard – “newest” (best performing improvement cycle) out first**
- **Stress seed use efficiency where advanced seed is scarce**





# Utilization - sowing

- **Grower relationship – realistic expectations; feedback to clients on problem seedlots**
- **Track average seedlings/lb produced for each seedlot over time**
- **Explore options for stretching seed**



# Utilization - sowing

- **Low quality seedlots should be sown promptly following stratification**
- **Returned stratified seed should be properly dried down and stored as a separate seedlot**



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# Summary / Review

- **Inventory building can be a long process**
- **Be aware of your seed storage circumstances**
- **Prioritize, plan, and stay on top of seed retesting**
- **Plan for seedlot replacement well in advance, and think about your inventory during collection planning**
- **Document everything you can about your seedlots**
- **Use scarce and improved seed efficiently and effectively**
- **Communicate / share seed needs and surpluses with others, and cooperate whenever possible**



# Acknowledgments

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