Wisconsin DNR Tree Improvement Program

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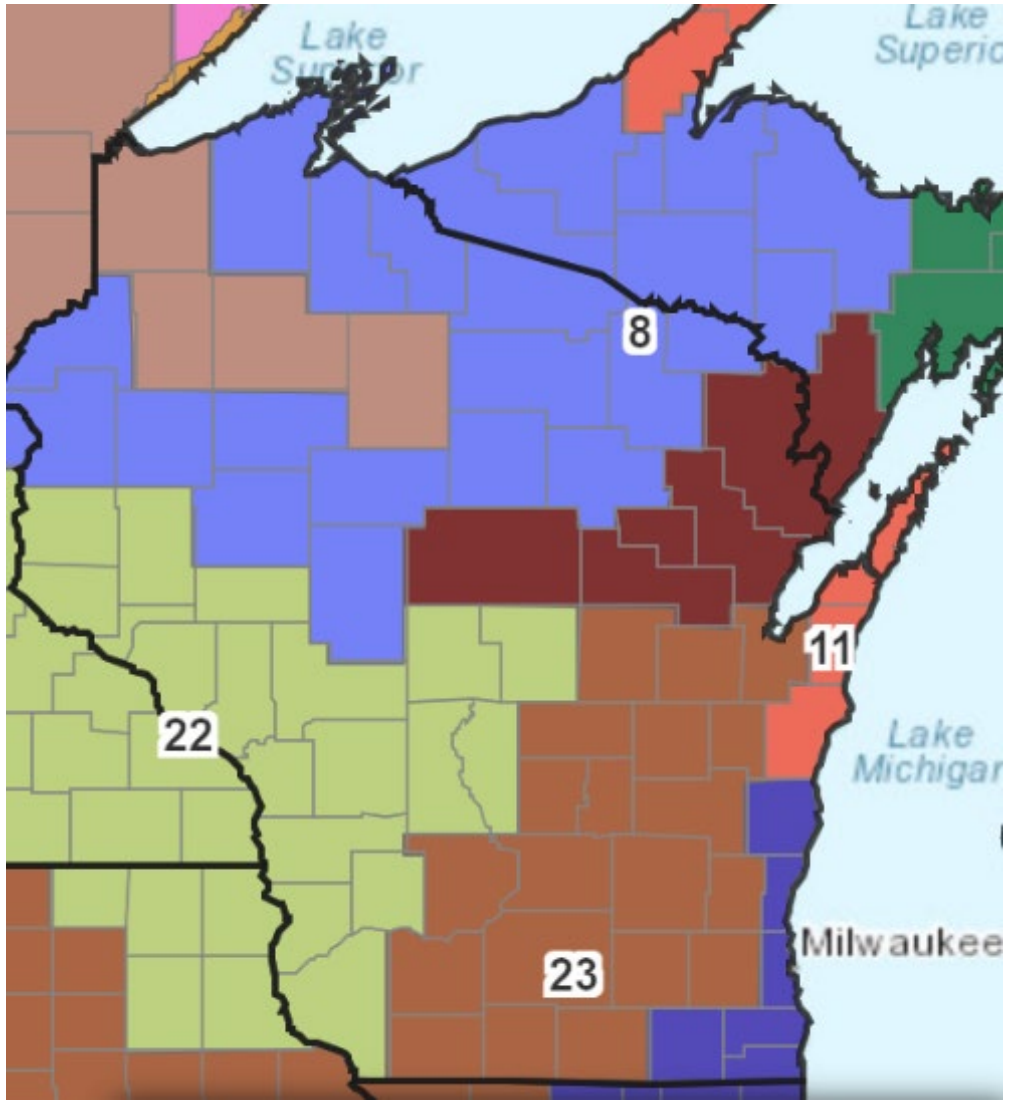
COF Meeting
5/20/2025

Tree Improvement Program

- Passive vs. active tree improvement
  - Passive tree improvement through orchard development and seed sourcing
  - Active tree improvement through progeny tests
- The Tree Improvement Program and species under threat
- What is next?

Passive Tree Improvement: Seed Sourcing

- Tree improvement takes several generations of crosses and may not be able to keep up with rate of climate change
- Complexity and uncertainty of future stressors makes targeted tree improvement difficult
- What can be done in the near term to address these issues?
  - **Increase genetic diversity!**



Seed Zones of WI (Pike et al. 2021)

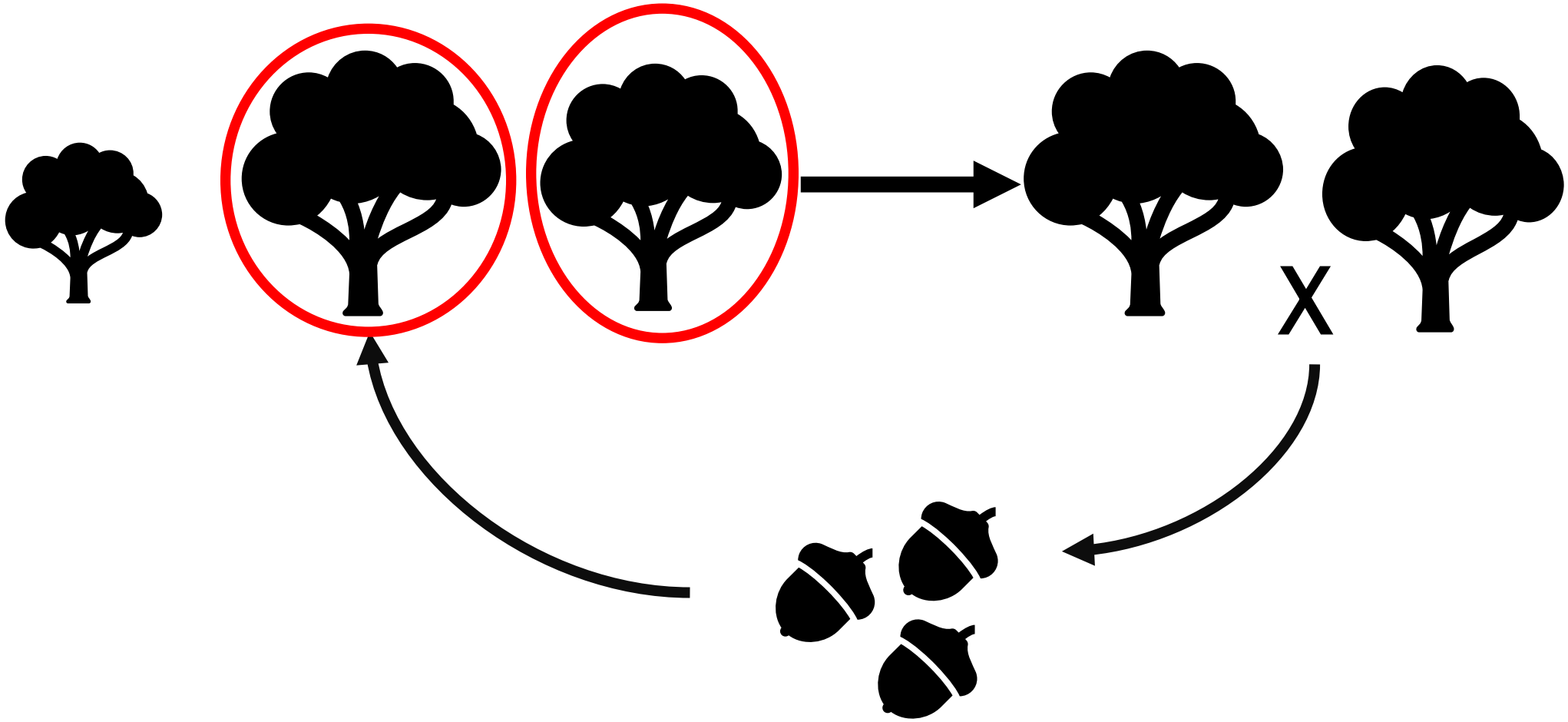
Passive Tree Improvement: Conservation of Genetic Resources

- Maintenance of seed orchards to preserve individuals of known genetic origin
- Consolidation of red pine seed orchards at Hayward and Griffith State Nurseries
- Replication and replacement of aging white spruce orchards
- White pine and jack pine seed production orchards

Jack Pine seed orchards

White Spruce Scion Wood and Orchard Collections

Active Tree Improvement



Active Tree Improvement: 4th Generation Jack Pine Progeny Test

- WDNR currently manages three jack pine plantings that represent three generations of targeted selection of best performing families

- Cones have been collected from the top performing families in preparation for planting 4th generation progeny tests at 3 sites in WI

- Progeny tests will be rogued to include the best performing individuals and converted into production orchards for improved seed

Jack Pine Progeny Test

Active Tree Improvement: White Spruce Progeny Tests

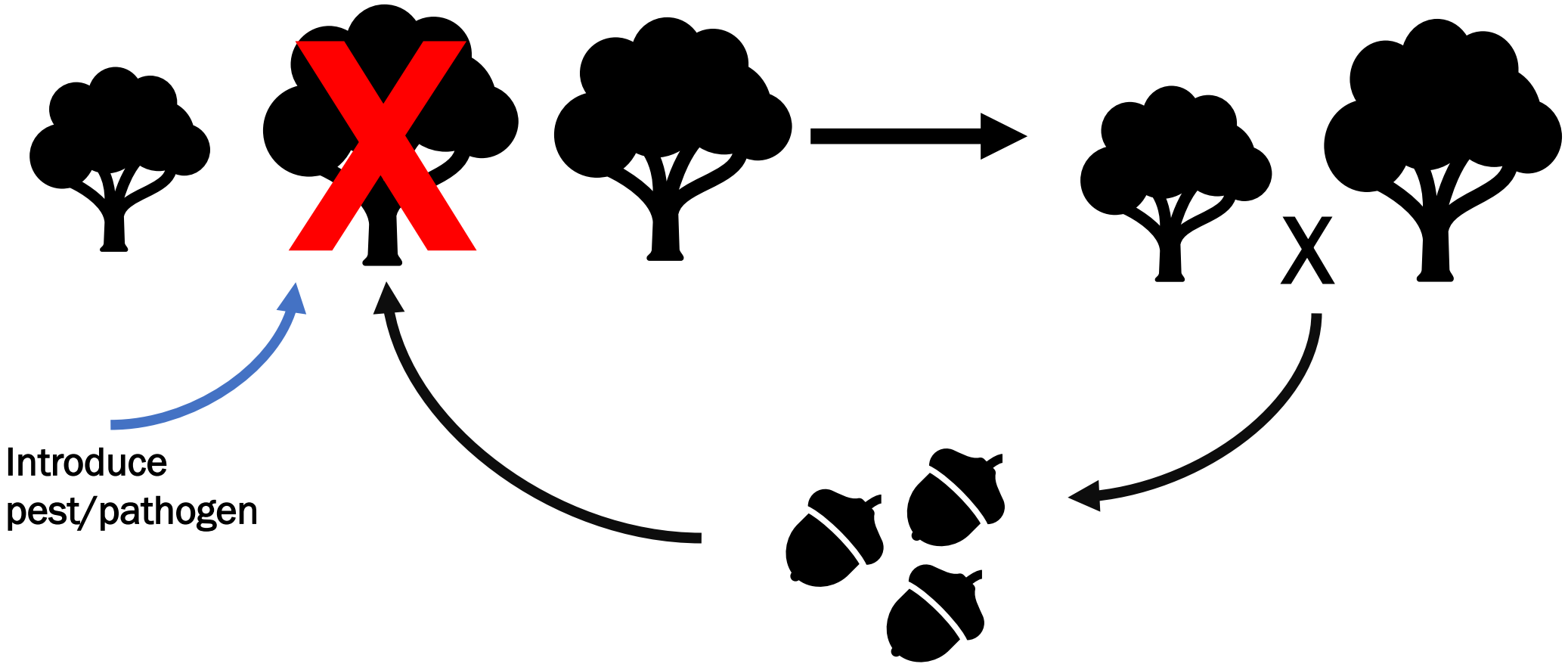
- Currently on the 2nd generation of selections from white spruce progeny tests
- Efforts currently include a grafted white spruce production orchard of the top families
- Replacing and replicating aging orchards
- Scion wood and seed was collected from the top 20 families of white spruce in the WDNR orchard system with significant gains in growth expected

White Spruce Scion Wood and Orchard Collections

Active Tree Improvement: White Oak Initiative Progeny Tests

- Collaboration with the University of Kentucky (WOGTIP) and The White Oak Initiative
- Replicate sites in Grant and Clark Counties in Western WI
- Genetic Material from ~2,900 seedlings representing 72 mothers sampled from entire range of white oak
- Will measure and compare growth traits of local families vs. out of state families and preserve best families as future seed orchards

Tree Improvement in Species Under Threat



Black Ash Screening Trial

- A pilot screening trial to operationalize EAB resistance screening in black ash
- Collaboration with USFS Northern Research Station in Delaware, OH
- Current pilot to include 150 black ash and 50 green ash individuals
- Will be planted at Griffith State Nursery in Spring ‘25

Future Projects: American Elm Screening Trial

- A Dutch elm disease resistance screening trial in collaboration with the U.S. Army Corp of Engineers and the USFS
- Collecting tissue from, and propagating, large (>24” DBH) lingering American elm (*Ulmus americana)*
- Current collections mostly focused on northern populations and the Mississippi River floodplain
- Keep your eyes peeled when you’re out in the field or pass along any reports of large trees!

Butternut Canker Resistance Trial

- Collaboration with USFS and the Hardwood Tree Improvement Center at Purdue University to identify butternut canker resistance in native vs. hybrid genotypes.
- Large planting of native and hybrid butternut individuals in Grant Co.
- Inoculation of the sacrificial trees occurred in Fall 2024

What is Next?

- Greater participation in the Great Lakes Basin Forest Health Collaborative (GLB FHC)

- GLB FHC is a region-wide genetics and forest health collaborative that works to organize conservation efforts between states for threatened tree species

- Current efforts are focused on ash (all native spp.), American elm, beech, and eastern hemlock in the Great Lake States

What Is Next?

- Hiring of Western Great Lakes Basin Forest Health Collaborative Coordinator
  - Wisconsin will serve as a hub for tree improvement work in the four targeted taxa for MN, MI (UP), and WI

- Large-scale, rapid expansion of black ash screening trial
  - Large need for help with seed collection!

- Continuing to collect and document any reports of large, lingering American elm

- Expansion of our participation in GLB FHC activities in beech and eastern hemlock as better science and guidance becomes available

CONNECT WITH US

Questions?

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