BLM Genetics Program Prepares for the Future

BY MICHAEL S. CRAWFORD

The Bureau of Land Management (BLM), an agency within the United States Department of the Interior, administers 258 million acres of public lands, mostly in Alaska and eleven western states. Of this land base, 2.2 million acres in western Oregon are managed for forestry. As part of their effort to develop healthy, fast growing sustainable forests, the BLM made a major commitment over 50 years ago to tree improvement and forest genetics, understanding the long-term commitment required to meet their goals.

The BLM instigated tree improvement in 1965, establishing the Horning Seed Orchard on 320 acres south of Portland, Ore. Initially operated as a stand-alone program, it made selections based only on phenotypic characteristics, which did not employ progeny testing to analyze tree qualities. In 1968 the agency changed direction and joined the Cooperative Progressive Tree Improvement Program (which morphed into the Northwest Tree Improvement Cooperative, or NWTIC) to widen the genetic base for testing and help share the cost of progeny evaluations with industrial forest partners. The agency was highly involved in regional breeding programs and by 1987 had installed 209 progeny test sites in western Oregon. The BLM participated in tree improvement programs to enhance growth-and-yield in Douglas-fir, western hemlock, and noble fir, as well as working with the US Forest Service Dorena Genetic Resource Center to promote resistance testing of white pine blister rust in five-needle pines.

By the mid-1980s, the BLM greatly expanded their orchard footprint. Horning was expanded to cover the agency's Douglas-fir, noble fir, western hemlock, western white pine, western redcedar, and sugar pine seed needs of northwest Oregon. Two additional Douglas-fir seed orchards were soon developed: Tyrrell covered the seed needs of west-central Oregon and the southern coast, while Provolt grew seed for southwest Oregon. By the early 1990s, the BLM managed an extraordinary 490 acres of Douglas-fir seed production orchards in western Oregon to cover reforestation needs of 1,300 lb/year.

Just as the BLM orchards were coming into production, a major change in federal forest management occurred, resulting in a dramatic decrease in seed needs for the agency. By the mid-1990s, it became apparent that the first-generation orchards, designed to meet the seed needs for the harvest levels of the 1970s and early 1980s, provided significantly more seed production potential than the BLM needed. As a result, the BLM developed their first seed orchard memorandum of understanding (MOU) at Tyrrell in 1998, providing industrial forestland owners and forest nurseries in western Oregon the opportunity to cooperate with the BLM in improved seed production. Over the next four years, similar MOUs were in place for the other three BLM orchards.

Development of BLM Seed Orchards

By the mid-1980s, the BLM had established three Douglas-fir seed orchard facilities and one sugar pine orchard in western Oregon, managing nearly 450 acres of improved Douglas-fir orchard blocks. These orchards covered a 1,200 lb/year seed need for the Salem, Eugene, Roseburg, Coos Bay, and Medford BLM Districts. Six greenhouses at Horning and Sprague orchards produced about 2.5 million containerized seedlings per year. ◆

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BLM Orchards for the Future

Approximately 83 acres of newly planted advanced generation orchards have been developed since 2010, which will help address the future seed needs of the BLM and its 26 orchard cooperators. Species include Douglas-fir, noble fir, sugar pine, and western hemlock. As new genetic material becomes available following analysis of breeding cooperative progeny testing, the BLM will establish updated orchards. Trees are paper mulched for early vegetation control and tubed to protect grafted seedlings from deer and elk damage. Tree tags include barcodes to assist with efficient inventory. The taller trees in the background are part of a Port-Orford-cedar preservation orchard managed in conjunction with the Dorena Genetic Resource Center, US Forest Service. ◆

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In 2006, decision makers recommended rightsizing the entire orchard program by closing Sprague and Provolt seed orchards in southwest Oregon, downsizing orchard staff, and redesigning the tree improvement program to maintain quality while continuing to look for efficiencies. Horning and Tyrrell were to become the future base of operations for the program, reestablishing new orchard blocks with genetic material from the closed facilities and developing advanced generation orchards as tested material became available. First-generation Douglas-fir breeding units in western Oregon were consolidated into more logical geographic regions based on progeny test analysis by NWTIC. This resulted in a significant reduction in the number of acres required for Douglas-fir seed production, falling from 460 acres in 1990 to 47 acres in 2010. A combination of 14 elite 1.5-generation and 2.0-generation orchards replaced 45 first-generation Douglas-fir orchard blocks planted in the 1980s.

Currently, the BLM has 26 cooperators in its seed production program covering federal, state, industrial, and tribal forestland between northern California and western Washington. Cooperators provide proportionate funding for their level of participation to cover all facets of seed orchard management, resulting in significant yearly support from the private sector to operate the facilities. In return, the cooperators receive their share of improved orchard seed. At Tyrrell alone, cooperators have received over 11,000 pounds of improved Douglas-fir seed over the past 19 years.

With 50 years behind it, the BLM continues to prepare for tree improvement in the next half-century. Major improvements to the orchard infrastructure, including updates of offices, storage buildings, and water systems, were recently completed. A new greenhouse/shade house was constructed for small-lot growouts and as a regional grafting center for cooperators, and a newly completed 50-person conference center will provide space for regional forestry and tree improvement meetings. An agency with a long history in working to improve forest genetics, the BLM continues to stay present and remain an active player in tree improvement in the Pacific Northwest. ◆

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