

Super trees studied in Grays Harbor

Longterm UW silviculture research project is in early stages

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Grays Harbor is on the forefront of timber science. A long-term study is looking at the effects modern silviculture techniques and tree selection have on growth and future timber harvests.

Early results from a decades-long timber study in Grays Harbor and Pacific counties seem to show that genetic elite trees hand-selected for rapid growth are outperforming their wild kin. At stake are the costs involved with seedling cultivation and the future market value of Douglas-fir timber in the region.

In 2003, the Northwest Tree Improvement Cooperative, the Stand Management Cooperative, and the U.S. Forest Service Pacific Northwest Research station pooled their expertise to begin the Genetic Gain/Type IV study. The study is located in the Grays Harbor breeding zone, which covers an area from the Quinault Indian Reservation to Pacific county and is defined by having similar soil types, frost-free days and temperatures.

Of the research undertaken by either cooperative, this experiment was "one of the (studies) thought about the longest," said Eric Turnblom, associate professor at the University Washington's School of Environmental and Forest Science and one of the researchers who designed the study.

With advances in nursery technology and improvements in Douglas-fir genetic quality, silviculturists were interested to see which plays a more significant role in a tree's development: genetics, site, seedling cultivation or spacing. Though other studies have tested genetics and spacing individually, this study combines them in addition to testing their interaction. For the next 30-40 years, researchers will observe the growth of wild, intermediate-gain and elite trees in three spacings: 7-foot-square, 10-foot-square and 15-foot-square.

The intermediate-gain and elite trees aren't genetically modified; they are the offspring of



Researchers and students check out the growth of one-year-old plantings at the LeftCourt site, part of a multi-decade Douglas fir silviculture experiment in the Grays Harbor area.

trees that outgrew their competitors in growth experiments conducted by tree geneticists. If the parents were the best trees found in the wild, their children are the best trees cultivated in nurseries and during the growth experiments. Both elite and intermediate-gain trees are from natural stock, said Candace Cahill, research and development coordinator of the Northwest Region for Rayonier.

The goal is to have "increased productivity without depleting diversity," Turnblom said. Twenty different families plus a wild tree seedlot are represented in the study.

The six research sites are located on the Quinault Indian Reservation, Rayonier, Weyerhaeuser Company, Washington State Department of Natural Resource, Port Blakely Tree Farms and Green Diamond Resource Company timberlands. Though these sites are scattered throughout the Grays Harbor breeding zone, each site is relatively uniform to ensure the trees

grow under similar environmental conditions. Given the work involved in preparing the sites and planting the seedlings, work was distributed over two years; three sites were established in 2005 and the other sites placed in 2006.

At each site is an installation covering 20-30 acres. An installation comprises 22 plots of one-third acre to one-half acre in size. The multiple plots and installations are needed to test the factors of genetics, spacing and vegetation control, study organizers said.

When it comes to designing a Silviculture study, "it's not as easy as it looks," Turnblom said. "You have to look into the future to set the study up now ... The planning horizon is much longer than you think."

The study cost \$60,000 for the site installation, but that only covered labor and 36,690 seedlings, Turnblom said. The numbers don't include the cost the companies bear to remove land from production or the ongoing costs of data collection. Data is collected every other year for the first nine

Partnership mission

The mission of NWTIC is to assist and coordinate members in developing and managing their forest gene resources in the Pacific Northwest. <http://www.fsl.orst.edu/nwtic/>

The Stand Management Cooperative provides a continuing source of high quality information on the long-term effects of silvicultural treatments and treatment regimes on stand and tree growth and development and on wood and product quality. <http://www.cfr.washington.edu/research.smc/pages/mission.html>

years of the study, then will be collected every four years for the study's remaining duration. In 2009, field crews measured 6,314 trees as part of the data collection process.

But the costs associated with this study are worthwhile costs for the landowners and the cooperatives, researchers say.

"We see doing research as a positive," Cahill said. At Rayonier, research is "taken seriously and (we) want to be doing the right thing" in managing our timberlands.

Results from this year's measurements show the trees — 8- and 9-years old — aren't surprising, Turnblom said.

The height and diameter at breast height (4.5 feet from the ground) of the elite and intermediate-gain trees is substantially greater than the wild trees, but longterm experiments can counter preconceived notions, he said, saying it was too early in the study to draw any conclusions.

Though this study started with the intent of studying Douglas-fir genetics, weed control and spacing, the trees' future lumber value is also being studied. Silviculturists want to know how the wood characteristics are affected by the treatments. Producing the trees that satisfy consumer demand for high-quality lumber is another important goal for the cooperative members.

While a frustrating part of Silviculture research is "having to wait so long" to yield results, Cahill said, the questions it answers enables Rayonier and timberland owners to continue using science to grow "good healthy forests for the future. To me that's pretty exciting."