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**MORE THAN MEETS THE EYE:
THE NEW SEED ORCHARD AT PRT ARMSTRONG**



The average person looking at this lovely photograph might recognize its subject as a Douglas-fir tree. At PRT, we see much more than that. Mike Brown, Operations Superintendent at PRT Armstrong, notices the finer details such as the healthy flowers and the pollen on its branches. Brown could also tell you where this Douglas-fir grows, who its parents were and what its offspring will be like - their growth rate, disease resistance and wood quality. He looks at this tree and he sees the future. The future - it's growing in the seed orchards at PRT Armstrong.

"We've been focused on the future more than ever this year," says Brown. "Our newest seed orchard is the reason." Although the orchard was only planted in Fall 2014, its story actually begins more than three years ago.

At that time, the BC Forest Genetics Council (FGC) identified a gap in the



The removal of Orchard 308



The new ramets head to the field



A good drink

reforestation plans for Douglas-fir in the Thompson Okanagan (TO) seed planning zone. As Dan Livingston, Customer Support Representative for Southern BC, further explains: "PRT was approached by SelectSeed to co-partner a new TO Douglas-fir orchard at our PRT Armstrong nursery. The FGC business plan indicated an annual average seedling need for the TO high elevation Douglas-fir zone of 1.8 million seedlings. Consequently, we made a proposal to the FGC and Ministry of Forests, got the green light, and then set to work with our partners at SelectSeed to fill the gap."

The new PRT orchard is for the 1100 to 1600 meter (3,600 to 5,200 feet) range of the TO seed planning zone. The Ministry is in the process of establishing a TO low elevation Douglas-fir orchard (600 to 1100 meters which is 2,000 to 3,600 feet) at their Kalamalka Seed Orchard site. As part of the plan, approximately 2,200 new cone-producing trees, called ramets, will be planted at PRT Armstrong over the next few years. Harvesting of these Douglas-fir cones could start as early as 2019 and both orchards should be in full production in about 10 years.

But before we get ahead of our story, let's go back to its roots. To graft and grow the ramets to plantable size, our partners at SelectSeed enlisted the help of Skimikin Nursery in Tappen, BC. The first group of Douglas-firs was grafted at Skimikin in Spring 2012 followed by a second lot in 2013 and a third in 2014. After three seasons in an outdoor compound, the first 400 grafts were delivered to PRT Armstrong for planting this fall.

To make room for them, PRT had applied to the Ministry of Forests and the Chief Forester for permission to remove Orchard 308, a 25-year-old site that had reached the end of its productive life. Approval was received. Every tree in Orchard 308 - top, stump and roots - was removed, piled and then fed through a chipper. The entire process took five days. The wood chips were then spread on the ground and the new five-hectare (12.4-acre) orchard readied for planting.

Nine employees hand dug the 400 holes and planted the young trees over two backbreaking days. Each tree had to be carefully extracted from its felt bag prior to planting, a job made easier by the bag's copper treatment. (Copper helps to repel roots so they don't grow through the felt and get damaged during removal.) After tamping down the soil, irrigation was set up at each tree and they were watered well at the end of the day.

Another 1,000 grafts from Skimikin will be planted this coming spring. Planting will be an ongoing project over the next few years until the orchard reaches its final size. Everything is meticulously planned. "Maps are drawn up in advance," says Brown. "As the orchard comprises 45 different parents, every clone has a specific planting position to make sure they will be evenly spread throughout the orchard when the planting is done."

This new Douglas-fir orchard joins our five established orchards at PRT Armstrong. Two grow TO low elevation Lodgepole pine; another two grow Nelson low elevation Lodgepole pine; and the fifth, planted 12 years ago, grows Nelson low elevation Douglas-fir. At present we have roughly 10,000 ramets in these five orchards. The new fir orchard once

established will bring the total to more than 12,000 trees and significantly increase our production.

The PRT orchards in Armstrong had a good crop this year and the seed collected is now available for 2015 sowing via the BC Forest Ministry's SPAR database or directly through PRT. For more information, contact Customer Support Representative Dan Livingston at dan.livingston@prt.com or 877-600-8733.

_____ BIONERA UPDATE: WOODY WILLOW CROPS TRANSFORM WASTE TREATMENT

What do willow trees have to do with waste treatment, you might ask? Irrigating willow plantations with treated municipal wastewater has proven to be an economically and environmentally sound solution for several western Canadian communities. Using biosolids - nutrient-rich organic material reclaimed from the treatment process - to fertilize and enhance marginal agricultural land is another way municipalities are turning an environmental "problem" into a valuable resource.

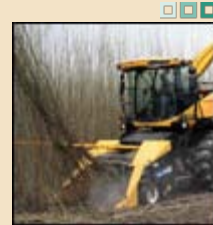
At PRT, we are excited to be part of this revolution in residuals management. This past summer, **Bionera Resources**, our wholly owned subsidiary specializing in woody crops, installed its first commercial-scale biosolid residuals willow crop on a farm outside of Calgary, Alberta. The venture is in partnership with SYLVIS Environmental Services Inc., one of Canada's leading innovators in residuals management and sustainability.

A total of 166 hectares (410 acres) of the Mountainview Hutterite Colony near Strathmore, Alberta, were planted in hybrid willows. These willows will be fertilized with biosolids from regional waste treatment facilities over the next few years. Once the willows reach harvestable size in two to three years, they will be cut, mulched and used as the carbon component in Calgary's green waste composting program. More biosolids can be added at that point and the crop re-harvested in another three years.

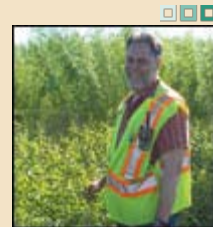
"It's a win-win situation for everyone," says Marc Poirier, General Manager of Bionera. "The municipalities have a market for their biosolids. The environment benefits, the City of Calgary benefits, and so does the landowner. Multiple harvests over a 25-year crop life help offset the cost of operation and ultimately it transforms marginal soil into fully fertile farmland."

We expect crops of similar sizes to be planted in each of the next two years. The elite willow cuttings will come from our own nurseries in Prince George and Campbell River, BC and Hubbard, Oregon as well as our growing partners Double A Willow and Agro Énergie.

These are no ordinary willows. They include varieties developed over two decades at State University of New York College of Environmental Science and Forestry (SUNY-ESF). These genetically advanced hybrids were bred specifically for their frequent harvest cycles, ease of mechanical harvesting, long lifespan, and adaptability to a wide range of conditions including colder climates. They are fast growing, low maintenance, and



*Willow plantation
being harvested*



*Elite willows grown
for Bionera at PRT
Oregon*

disease and pest resistant.

Biosolids contain nitrogen, phosphorous and organic materials in addition to essential micro-nutrients such as copper, iron and zinc. These properties make them unbeatable as a natural fertilizer and soil conditioner for agricultural lands. "Canadian farmers have been successfully using biosolids for over 40 years," says Poirier. "Once the extra water is removed, what remains is a safe, easy-to-manage material that looks like clay and is the perfect food for our specialty willows."

Bionera Resources and PRT Growing Services - Delivering woody crop solutions together. For more information on our purpose-grown woody crops, please visit our website at www.bionera.com.

FROM WAGON TRAINS TO WILLOW TREES: A SALUTE TO PRT OREGON

As well as being home to many award-winning wineries, the Willamette Valley in Northwestern Oregon is world renowned for its greenhouses and nursery stock. Thanks to a series of massive ice-age floods, the valley floor is thick with water-born sediment making the soil of the region extremely fertile. Advertised as a "promised land" to the pioneers of the 1820s, it became a destination of choice for the wagon trains on the Oregon Trail - and in 2003 it became the destination of choice for PRT as well.

Established in the 1960s as an azalea operation, PRT Oregon's site in the valley town of Hubbard, 32 kilometers (25 miles) south east of Portland, had all the natural advantages we were looking for. The zone 8a climate, described by some as "Mediterranean" though somewhat cooler and wetter, was perfect for our needs. And with close to 50% of Oregon covered in forest - up to 80% west of the Cascades - it was an ideal location for a conifer seedling nursery.

Over the past 11 years, PRT has worked diligently and made sizeable investments to bring the facility out of its flowery past into an evergreen future. Many people have contributed to these improvements including numerous staff who remember the azalea days. PRT Oregon has also benefited from Marc Poirier's engineering talents and the seedling culture expertise of Dave Swain and Grant Cummins, PRT employees not stationed here. In every way, the conversion has been a team effort.

Today the 11-hectare (28-acre) site has 20% of its capacity in outdoor compounds and 80% in greenhouse ranges. Recent upgrades include a new irrigation distribution network and the addition of a large reservoir tank. Offices were also built in the main production building to allow the management team to be right in the heart of the action. And speaking of management, Nursery Manager Mark Montville was pleased to have the experienced Briggs Lipsitz join the PRT Oregon team as Production Superintendent a year ago.

PRT Oregon serves customers throughout the northwestern U.S., from northern California to western Montana. Given the diverse landscape on which this customer group operates, PRT Oregon produces a varied



Mark Montville,
Nursery Manager



A sea of Douglas-fir,
the state tree, grows
at PRT Oregon

product mix. Its annual production of approximately 10 million seedlings includes 16 different container sizes ranging from Styro 2As (211A, 240 cavities @ 40 mL) to Styro 27s (815C, 35 cavities @ 440 mL). Within these containers, the nursery grows as many as 30 different species annually. These include coastal species, Rocky Mountain species, and species used by the Christmas tree industry. This level of complexity requires sound planning, keen attention to detail, and solid organization.

Since 2010, PRT Oregon has also been growing 16 different willow varieties for our subsidiary, Bionera Resources. Each January, they harvest the current year's growth, cut them to length and place them into freezer storage where the cuttings are held until spring when they are shipped to Bionera for use in its projects.

This has been part of a continuing series highlighting our nursery operations across North America. For further information on PRT Oregon, please contact Tom Harvie, Customer Support Representative at 250-287-0366.



Merry Christmas and Happy Holidays from all of us to all of you - our customers, partners and friends. May the New Year bring you health, happiness and success.

Contact Us

For more information, please visit our website at www.prt.com.

To contact our editor, to comment on a story or to report any concerns, [please click here](#).