

Strategies for Reforestation on Lone Rock Timberlands

By Bryan Nelson

Planning for reforestation can be as simple as ordering seedlings after harvest and hoping someone has surplus. or, it can be as complicated as sowing specific seed lots for every individual harvest unit two years prior to harvest and preparing the ground for planting. Many variables must be taken into account to maximize the success of reforestation efforts and investment dollars.

At Lone Rock Timber, we plant in excess of one million seedlings a year on the westside of the Oregon Cascades. Without planning, I could not find enough seedlings on the open market to cover our needs. Even if I could find seedlings, they would be more expensive and most likely be somebody else's rejects.

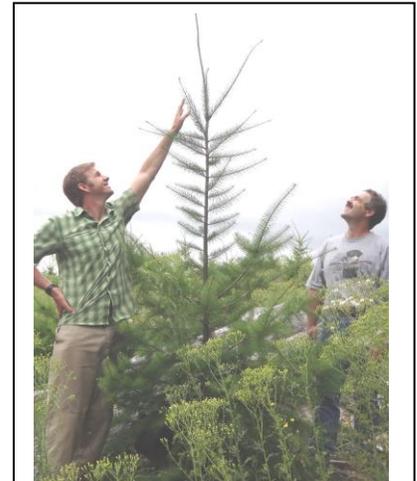


Photo courtesy of Bevin Wigmore, Arbutus Grove Nursery

Bryan Nelson (right) assesses third-year growth in the field with Arbutus Nursery Grove nursery manager Nathaniel Stoffelsma.

Planning starts several years in advance

We choose to plan as thoroughly as possible given the information available. The process starts at least two years prior to harvesting a unit. A harvest schedule and inventory allows me to decide which planting year makes the most sense for each unit. For example, a unit scheduled to be harvested in May 2014 may have enough time over the summer to allow for resprouting of vegetation. We can then plan for effective site prep in September in order to plant in January 2015. On the other hand, a unit planned for harvest in August 2014 may not have enough time for vegetation to resprout and therefore will need to be held over, site prepped in September 2015, and planted in 2016. This scheduling is only as good as the log market allows. Some units will be delayed in poor markets and others will be added during good markets. I usually have 80% of my planting plan set two years in advance.

Seedling specifics

After I have decided which units to plant in what year, I decide on genetics, stock type, growing nursery, and, in some cases, species. Lone Rock Timber has been involved in tree improvement since the 1980s and has received improved seed from cooperative seed orchards since 1997. We are now involved in 2nd and 3rd generation testing programs.

Lone Rock's land base covers 5 seed zones with at least two elevation bands in each. Therefore, I need to decide which seed mixes and species fit the harvest units best based on testing and/or previous plantings. Germination tests, seed weight measurements, and purity tests need to be done on these lots prior to sowing to allow time for the nursery to calculate the amount of seed needed for each lot. I then decide how big of a seedling I want to plant on each site. This will determine which stock type to grow and at what densities. Most of what we have grown is bare root: 1+1s and plug+1s. I also have the option of growing a one year (container) stock type to supplement my plan in case more units are added than planned for.

Root size and architecture is important in getting seedlings planted properly. Root to shoot ratio is important for survival and stress resistance, especially on harsher sites. Root collar diameter and lower lateral branching—rather than height—are better indicators of expected out-plant vigor, browse resistance, and growth. Transplant densities and season of transplanting are crucial prescriptions for achieving these specifications early enough to allow the grower time to shut the crop down in preparation for fall and winter cold hardiness.

The choice of a growing nursery depends on past experience with the grower, price, and soil type. Some nurseries are more experienced with growing 1+1s and others are better suited for fall transplanting plug+1s. Working with a variety of nurseries allows flexibility during packing and provides a margin of safety. These trees are living organisms and anything can and has gone wrong during the growing process. Every nursery has experienced “bad years.”

Site prep decisions

After the sowing is done and the nurseries have the seed they need, my focus turns to keeping up to date with harvest administration and planning for site preparation. Soil types, harvest season, and slash loading are taken into consideration when making a decision to in-unit pile, subsoil compacted areas, and/or prescribe burn. Prescriptions for aerial site preparation or hack

and squirt are made based on the vegetation present or expected. Riparian zones and sensitive areas need to be identified and protected either by spray buffers or hand spraying.

Throughout the next couple of years I will update my plan as harvest schedules change and monitor the progress of the crop.

Nursery relationships

Communication with the growers is a key function in understanding and having confidence in the process of growing seedlings. It starts with visiting the nursery throughout the year and conveying what the characteristics of my “target” seedling are. I am not a grower, so the last thing I want to do is tell a nursery grower how to grow their crop. They are generally not foresters and rarely get a chance to see the seedlings a year or two after they are out planted, so they value any observations I make while in the field.

I visit the container nurseries that grow my starter plugs prior to transplanting and discuss any issues that might have come up during the growing season. I also get a chance to see any out plant plugs they might be growing. I will try to get to the bare root nurseries in the spring and/or summer during or shortly after transplanting to observe the trees going into the ground. We discuss root growth, stock size, and any crop culturing regime they plan on doing. Visiting the nurseries in the late fall prior to planting is valuable for assessing how the crop is doing going into dormancy and what to expect for size and root structure.

Lifting and timing

Just prior to the planting season, the nurseries will provide an inventory that gives me an expected pack-out and morphology of the crop. With this information I put together a schedule for getting the trees lifted, delivered, and planted. The details of this schedule are usually scrapped the week after I make it due to either weather or logistics, but it gives me, the planting contractors, and the nurseries a framework from which to work through the season. Since my storage capacity is limited I strive to time my lifting and planting as close together as possible. I do not want to have any delays in planting due to insufficient trees, so the details of this plan have to be worked out daily during the season.

It is generally accepted in the PNW that the best time for planting is winter and early spring. However, fall planting is an option in some areas and has the potential to provide the trees with some fall root growth setting them up to grow earlier in the spring.

Winter and spring planting is most reliable for success due to a number of factors that include dormancy, cold hardiness, and stress resistance. Dormancy is defined as the number of days until bud break and is initiated by a combination of moisture stress and day length. Naturally, this begins in September. Release from dormancy occurs as seedlings are exposed to cold temperatures and experience rest. After rest is complete, the seedling breaks bud. Dormancy is important when discussing storability. Cold hardiness and stress resistance are different than dormancy. They are defined as the ability of a seedling to cope with lifting, packing, handling, storage at cold temperatures, and planting. This generally occurs after about 400 hours of temperatures below 6°C (42°F) called “chilling hours.” As chilling hours approach 400 (this can vary from year to year and nursery to nursery) and the day length approaches the shortest day (Dec. 20), I can plan to ask for trees to be lifted. Flexibility and communication are important here. As soon as the trees are lifted, we try to get to the nursery during packing, which gives us an opportunity to fine tune the grading. Grading is the process of selecting the trees that meet caliper and height specifications as well as root volume, root structure, and stem form. This also gives us an opportunity to take measurements and provide the nursery with confidence that they are providing the product we want. I don't like getting surprised when opening a bag of trees in the field. In my experience, most nursery managers are open to and like getting feedback during this visit.

Storage considerations

At some point in this process, seedlings need to be stored. Since dormancy (bud break) is dependent on achieving rest (about 2,000 chilling hours), the earlier the trees are lifted in the year, the longer they can be stored. Cooler storage and freezer storage are used for different purposes. Cooler storage temperatures range from 0°C (32°F) and +2°C (35.6°F). This is used when storing trees less than two months. These temperatures slow respiration and utilization of carbohydrate reserves of the trees but do not stop the release of dormancy. Seedlings will actually break bud in cooler storage. Freezer storage temperatures are around -2°C (28°F). This is used when trees need to be stored up to six months. These temperatures actually stop the



Photo courtesy of Diane L. Haase

Coordinating lifting and storage schedules between the nursery and the field is an important aspect of successful reforestation. This photo shows cooler storage of bare root (bags) and container seedlings (boxes).

release of dormancy. Because of my close scheduling of lifting and planting, I have some storage flexibility when planting delays occur. Freezer storage is seldom used unless we know in advance that planting will not occur before May. Most container nurseries desire to have all their stock packed by early January and therefore freezer storage may need to be considered if planting these seedlings later in the season.

Accessing the results

After planting and spring weed control is completed, planting units are evaluated during their first year. Tree survival and vigor are noted and this information is relayed back to the nursery. Quite often the nursery managers and/or growers will come out into the field to discuss performance and future expectations. Observation, documentation, experimentation, and communication are key factors in managing the many variables encountered when planning and executing a reforestation program.

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