



# UI Extension Forestry Information Series

Fire No. 19

## Postfire Management: Reforestation

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One of the first things many people do after a wildfire, especially if they have lost a lot of trees, is to start planning a reforestation project. All states in the Inland Northwest have a defined set of legal forest practices which are set to guide landowners and managers on minimum best management practices for that state. It is important to be familiar with your state's forestry laws. They can be unclear and misinterpretation is not an excuse for noncompliance. To be sure, contact your local state land's office for a copy of your state rules and for clarification you may need on any particular laws.

Forestry laws usually include reforestation standards. *Reforestation* is the process of establishing a new stand of trees on a previously forested site following a disturbance, such as a harvest or wildfire. The

method of reforestation you choose, as well as the species of trees, will depend on the site, established management plans and objectives, and financial resources.

*Natural regeneration* is when you let nature handle the job or establishing trees on a site following a disturbance. Natural regeneration success will depend on the abundance of seed available at the site in surviving species and in soil seedbanks. Though natural regeneration will likely be the most cost-effective means of reforesting your property, species selection is often not a choice, nor are stocking levels and spacing.

When a wildfire removes some, most, or all of the vegetation from a site, a natural regeneration strategy may not be feasible. *Artificial regeneration* is when you seed or plant the site yourself. In general, direct seeding is not recommended for artificial regeneration. Seed eaten by rodents, birds, and insects can drastically affect success and incur additional follow up costs for fill-in planting, brush control, and thinning. By planting seedlings you can select favored species and get a one- to five-year head start on other plants that will sprout from local seed.

A successful reforestation project will require a considerable amount of planning and preparation, but will dramatically increase your level of success.

To begin, review your management objectives. By reviewing your forest management plan you can see how a reforestation project can help you get closer to your planned goals. Areas designated primarily for timber production will have a different selection of tree species than others areas such as those designated as riparian areas, and/or wildlife habitat. Now is the time to also consider non-tangible needs such as recreation, aesthetics, and view sheds.



A naturally regenerating whitebark pine seedling after a wildfire.

Photo by USDA Forest Service - Region 2 - Rocky Mountain Region, USDA Forest Service, Bugwood.org

Match plant species to the site. Consider soil type, amount of precipitation, slope aspects, and frost pockets. Look at past management records to see which species did well and which did not. Consider a mix of conifers, and some shrubs, forbs, and grasses for the understory.

Match the seed source to the site. Trees that are grown from seed gather at sites with similar conditions to yours will do better. The most commonly used criteria for matching seed zones in the Inland Northwest is elevation, and reputable nurseries should be able to tell you what elevation their seed was collected for each species.

### Planting stock

Once you have reviewed your management objectives and selected suitable tree and understory plant species, you will need to decide on the type of planting stock you want to purchase. The most important characteristic of your planting stock will be the caliper (diameter) of the stem. The larger the caliper, the stronger and more resilient the seedling.

Attention should also be paid to the shoot to root ratio. You need a sufficient amount of top to support the root system with 'food' from photosynthesis and a sufficient amount of root system to support the top with moisture and nutrients. 'Good' shoot to root ratios for different types of planting stock are listed below.

Planting stock comes in two basic forms:

- *Bareroot stock* is grown in nursery seedbeds, lifted, and transplanted to field sites. As the name implies, this type of stock has no rootball of soil around the roots. Bareroot stock is the most commonly found stock and is usually available in larger sizes at a lower cost. Some species of trees, such as hemlock, do not grow well as bareroot stock and will not be readily available. Bareroot stock is also more susceptible to stress from heating and drying during storage and shipping. Good shoot to root ratios for bareroot stock are 2½ - 3 (shoot) to 1 (root).
- *Plug, or container grown, stock* is grown in containers and removed from the container before planting. This type of seedling retains the plug of soil it is grown in and usually experiences less transplant shock. Usually costing more than bareroot stock, containerized seedlings are becoming more readily available and some nurseries offer a variety of sizes. Frost heaving



By planting seedlings behind rocks or downed logs you provide a pocket of cooler and wetter conditions for young trees.

Photo courtesy of Idaho Department of Lands.

is more of a problem with containerized stock than bareroot trees. Good shoot to root ratios for containerized stock are 1-1½ (shoot) to 1 (root).

### Determine the number of trees you will need

How many trees do I need? The answer to this question is "it depends". It depends on the burn severity, number of trees and species present before the burn, management objectives, site characteristics, and the carrying capacity of the site.

Tree planting recommendations are offered as number of trees per acre or as a specified spacing. But these recommendations are not very useful to landowners who are faced with planting areas that have experienced a mosaic of burn severities. Restocking your land to mimic preburn densities is not a good guideline either. Chances are good that you had too many trees per acre before the burn – most people do.

Reforestation companies commonly plant 435 trees per acre at 10' x 10' spacing on clearcut sites that will experience high mortality from harsh conditions such as dry sites, sites with south- or west-facing aspects, or high animal depredation. Numbers decrease with better conditions and will decrease again when you have residual trees. A distance of 16-feet between trees will give you approximately 170 seedlings per acre; 20 foot spacing will result in 110 seedlings per acre.

Using your management objectives, the characteristics of each area you want to plant, and your state's reforestation requirements, determine the number of trees you want to have per acre when they reach

maturity, subtract the number of surviving trees per acre and add 10 % to compensate for mortality. If your site is particularly harsh or you expect a lot of animal depredation, add 25% for mortality.

Once you have come up with a number it is a good idea to check with your local state forestry office to see if your plans will meet the minimum reforestation requirements set for your area.

### **Order your trees**

Finding and selecting a nursery is the same process as finding and selecting a contractor. Locate several nurseries and visit them, if possible, to see the quality of their stock. Compare availability of species and types of stock and compare costs. Order early - supplies can be limited, especially in years when there is wide-spread damage from wildfires.

### **Site preparation**

Site preparation is done to ready the soil to receive seed or seedlings, reduce fire hazard, and/or control pest and diseases. Fortunately, even low intensity burns will leave you with partially prepared seedbeds by decreasing or removing duff layers and competing vegetation and exposing mineral soil.

Treat weeds and remaining undesirable vegetation the fall before planting. This gives you time to see if your preparation was effective and to do any follow up treatments as needed.

### **Planting**

Spring planting conditions are optimal when soil temperatures are 40°F at a depth of four- to six-inches. Many reforestation projects are started as soon as the snow is off the ground and the site is accessible in order to take advantage of spring moisture before the usual summer drought experienced in most areas of the Inland Northwest.

When your order arrives from the nursery, handle the boxes gently to prevent damaging seedlings. If you cannot plant immediately, ensure seedlings are stored properly. Keep seedlings as cool as possible in the packaging material they arrive in, even if it is only for a day or two. Open the boxes and make sure the roots are moist. If not, add some water, rewrap, and close the box. If you need to store your seedlings for a week or more, put them in refrigerated storage at temperatures as close to 35°F as possible.

Only take as many boxes out to the site as you can plant in one day. If your storage area is close to your planting site, remove boxes in batches throughout

the day. Keep boxes and bundles of seedlings out of direct sunlight and be careful how you shade them. Seedlings in a tarp-covered box will be hotter than if placed directly in the sun. The best place for your seedlings at the planting site is in heavy shade under existing trees. If you have no shade at the site, you can create some by suspending a tarp at least three-feet above boxes, which will allow air to circulate freely between tarp and boxes.

While planting, move seedlings around the site in a planting bag or five-gallon bucket. This not only gives you an easy way to transport them, but also protects them from wind, sun, and heat. When possible, plant seedlings on the north- or east-sides of stumps and logs, which will provide some protection from direct sun.

Dig a good hole. Planting holes should be twice as wide and as deep as the root system or plug. Spades, shovels, and hoedads are the tree planters' choice of tools - dibbles are not recommended as they do not create a large enough hole and often contribute to soil compaction. Place the seedling in the hole, making sure you spread roots out if you are using bareroot stock. Backfill, keeping sticks and rocks out of the hole, and firm the soil around the seedling with your hand. DO NOT firm the soil around your seedlings by stepping around them - this over compacts the soil and is commonly referred to as "the death stomp".

### **Maintenance**

Expect weeds. They will be most abundant in areas that were severely burned, adjacent to established weed populations, and/or in poor condition before the burn. Pay special attention to riparian areas, as they typically have richer and moister soils and are able to support a greater diversity of plant species.

Weed control methods include hand treatments, herbicide applications, biological controls, and changes in grazing prescriptions, with the most commonly used being chemical control. You can call your Extension office or agricultural and forestry chemical supply company for information and recommendations.

As a rule, the more severe the burn, the more likely the need for reforestation. One thing you can count on - empty space will quickly be occupied by vegetation. Your goal is to ensure that the vegetation that occupies the space is the vegetation you want and planned for.