Sustainable Forest Management

2015 Facts & Statistics

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Agriculture and Forestry

Site Preparation

Ensuring prompt and successful reforestation after harvesting is key to sustaining Alberta's forests for the future. Alberta law requires reforestation of harvested areas to be started within two years of harvest completion. The department has mandatory reforestation standards and survey procedures to help ensure the success of regenerating forested lands. The department also reviews and approves all reforestation plans before they are implemented.

Forest managers use a variety of methods, collectively referred to as "site preparation" to prepare harvested areas for reforestation. These methods increase the success of establishing young, healthy and vigorous trees. In Alberta, forest managers use site preparation (Figure 1) before seeding or planting nursery-raised seedlings on more than half of all harvested areas. Sites with very few soil limitations (*i.e.*, not excessively wet) or with certain vegetation types (*i.e.*, few competitors) can be successfully reforested without any site preparation.

In Alberta, common site preparation methods can be classed into three general types: mechanical, herbicide and prescribed fire.

Mechanical site preparation uses many construction and agriculture-inspired tools, such as the bulldozer and plough, to prepare the site to enhance the early growing conditions for the establishing trees. Just as farmers and gardeners know the value of good soil management in promoting good crop growth, forest managers must assess and understand each site's limitations and, where feasible, improve them.

Creating raised micro-sites (small areas for planting) is a common mechanical site preparation method. This method raises the planting spot for the seedling above cold and water-laden soils and allows the soil to drain and warm, thus promoting good root growth. In addition, planting trees on these small mounds can reduce the competition from fast-growing grasses and other ground vegetation to increase tree survival. In areas of drought, this method

Figure 1. Example of site preparation

can also increase the available soil moisture for the developing trees by capturing limited moisture next to the planted tree.

Forest managers can also use a variety of mechanical tools to expose mineral soil or mix (Figure 2) thick layers of organic matter with mineral soil leading to enhanced root development and seedling growth. This mechanical site preparation method can help warm the soil to support better root growth.

Registered herbicides are used for site preparation to reduce competition from grasses and shrubs. This technique is effective in controlling, for one or two years, vegetation that would otherwise reduce tree survival and early growth. Heavy grass cover can develop within one or two years of harvesting activity and creates dense mats that prevent young seedlings from establishing.

Other site preparation methods, such as prescribed fire, can also be successfully used to manage the thickness of the organic matter on the forest floor, as well as to reduce the amount of woody material (branches and shrub stems) on a site. Prescribed fire requires specific weather and site moisture conditions, and highly trained personnel to ensure the burn meets the management objectives.

Alberta Government

Though site preparation techniques are often used to enhance reforestation success, "Leave-for-Natural" is also commonly prescribed. Where a site has minimal limiting conditions or where vegetative reproduction will be used (*e.g.*, trembling aspen), site preparation methods are often unnecessary to re-establish the forest. In these situations, the Leave-for-Natural option is selected.

"Direct planting", the practice of artificially reforesting harvested areas without any site preparation is also occasionally used by forest managers. However, for such a practice to successfully establish a new crop of regenerating trees, the site must be free of soil conditions that might prevent seedling establishment and growth (very wet or cold soils) as well as have only small amounts of competing vegetation like grasses.

Statistics

Table 1 shows reforestation activities conducted in harvested areas on Alberta public land from May 1, 2014 to April 30, 2015. The total area of site preparation and Leave-for-Natural was about 32,988 hectares. As shown in Figure 3, leave for natural covered the largest area (62.73%), followed by mechanical site preparation (34.76%).

In 2014/2015, approximately 11,468 hectares, mostly in the Upper Athabasca, Lower Peace and North Saskatchewan regions (83.29%), were subject to mechanical site preparation (Figure 4).

In the same time period, the majority (84.81%) of area where herbicide and other site-preparation methods were prescribed in the Upper Athabasca and Upper Peace regions (Figure 5).

No reforestation methods were submitted for the Red Deer Region as it is mainly comprised of non-forested private land.

For any given area, timber harvesting, site preparation, and seeding or planting seedlings are not likely to occur in the same year. However, site preparation, and planting and/or seeding can occur in the same harvested area in the same year. For more detailed planting and seeding information, see the Reforesting Harvested Areas statistic.

Table 1. Area of reforestation activities in harvested areas in Alberta by Land-use Framework Planning Region, 2014/15[1]

Land-use Framework Planning Region (LUF)	Site Preparation Method			Leave-for-Natural (ha)	Planting Seedlings, or Seeding (ha)
	Mechanical (ha)	Herbicide (ha)	Other (ha)		
Lower Athabasca	518	0	0	2,711	1,886
Lower Peace	1,268	0	0	5,779	9,658
North Saskatchewan	3,189	0	0	339	6,037
Red Deer	0	0	0	0	0
South Saskatchewan	130	0	0	0	1,618
Upper Athabasca	4,119	640	0	6,408	20,400
Upper Peace	2,244	187	0	5,456	18,758
Provincial Total	**11,468**	**827**	**0**	**20,693**	**58,357**

[1]The areas are preliminary and have been rounded to the next nearest hectare.

Figure 3. Percentage of site preparation and Leave-for-Natural area by method in Alberta, 2014/15

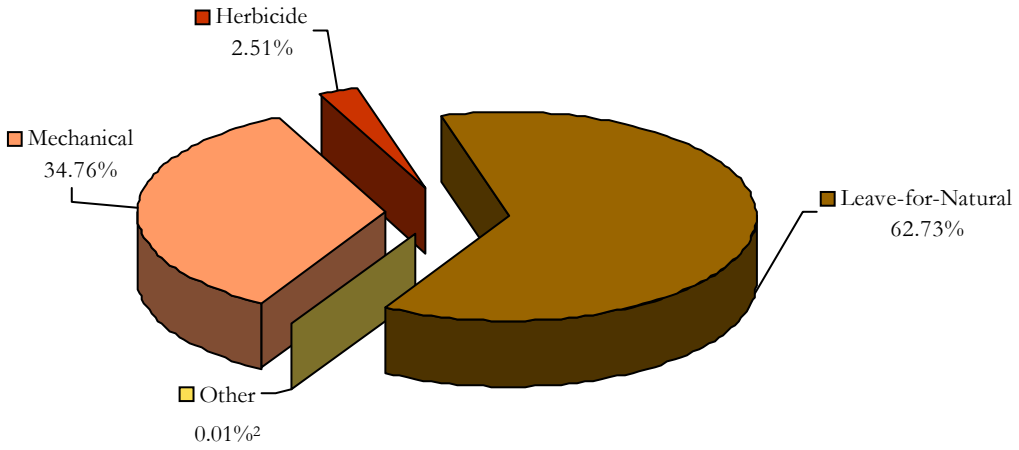


Figure 4. Percentage of mechanical site preparation area by Land-use Framework Region in Alberta, 2014/15

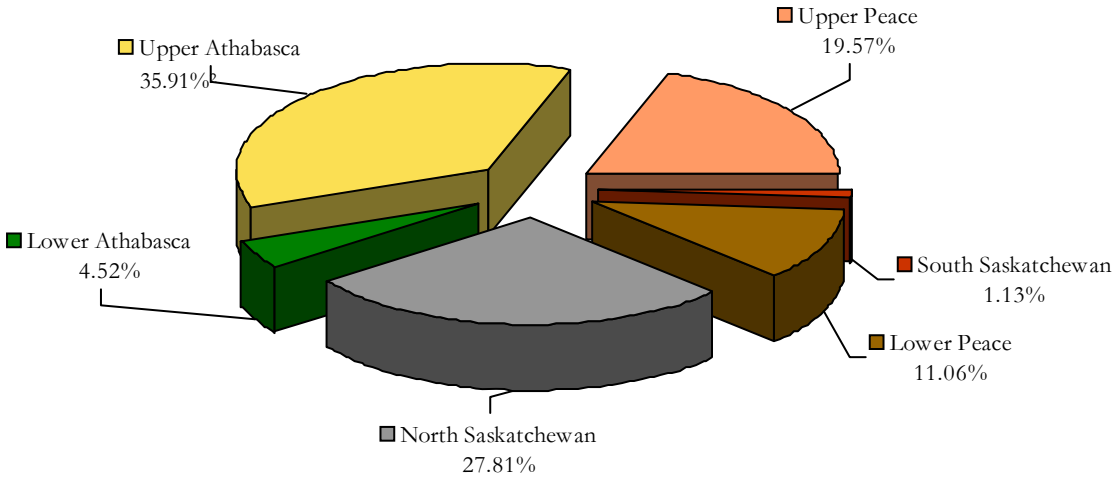
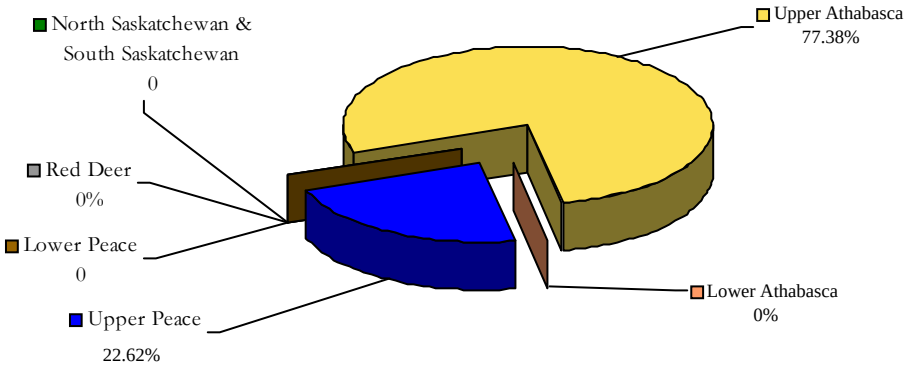


Figure 5. Percentage of area with prescribed herbicide and other site preparation methods by Land-use Framework Region in Alberta, 2014/15[1]



[1] LUF Regions with no prescribed herbicide use are excluded.

Historical Trends

As shown in Table 2 and Figure 6, mechanical site preparation has been the main method used on harvested areas where site preparation was deemed necessary to achieve reforestation objectives. Forest managers also used registered herbicides as a site preparation method on a small amount of harvested area.

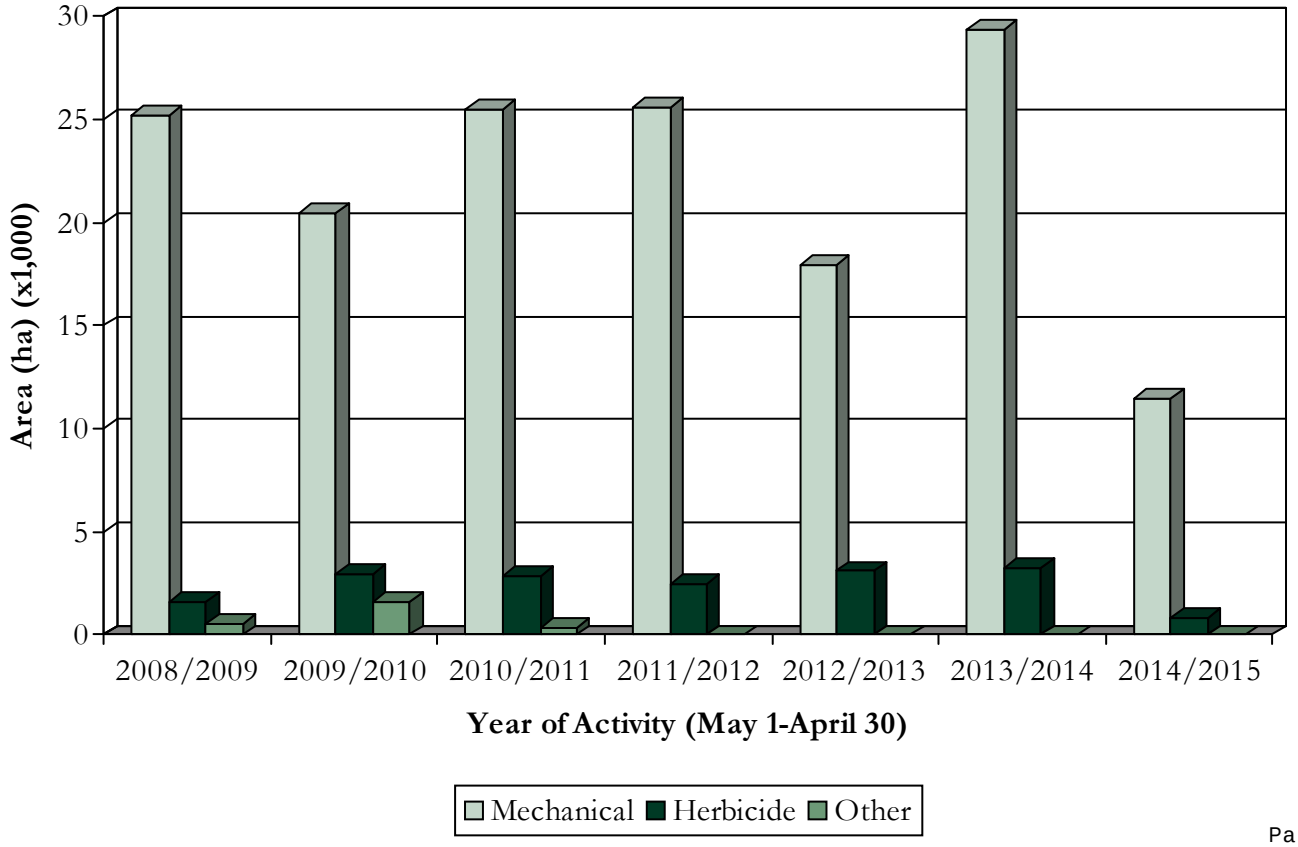
Other methods, such as prescribed fire, have rarely been used in Alberta, as they are usually not cost-effective and demand very specific weather conditions.

Table 2. Area of site preparation method on Alberta public land, 2008-2015[1]

Year (May 1 - April 30)	Site Preparation Method			
	Mechanical (ha)	Herbicide (ha)	Other (ha)	Provincial Total (ha)
2008/2009	25,193	1,571	575	**27,339**
2009/2010	20,479	2,981	1,603	**25,063**
2010/2011	25,525	2,828	341	**28,694**
2011/2012	25,629	2,504	1	**28,134**
2012/2013	17,937[r]	3,095[r]	6[r]	**21,038**
2013/2014	19,771[r]	3,268[r]	0[r]	**23,039**[r]
2014/2015	11,468p	827p	0p	**12,295**

[1]The areas have been rounded to the next nearest hectare: [r]=Revised results; [p]=Preliminary results

Figure 6. Area of site preparation on Alberta public land by method, 2008-2015



Future Outlook

Mechanical site preparation (Figure 7) is an integral and necessary component of the reforestation process. Use of this site preparation technique will continue to dominate, with other techniques being used in unique situations. The proportion of area where site preparation methods are used may drop slightly as increased understanding of early tree growth enables forest managers to use alternative methods. Forest managers are planting nursery-grown seedlings directly into the site after harvesting, to varying degrees in Alberta. This practice may expand as knowledge increases about the type of sites and vegetation that help planted seedlings grow well without any site modifications.

Figure 7. Examples of equipment used for site preparation