SCARIFICATION FOR NATURAL REGENERATION

Scarification for natural regeneration is any technique that prepares a site to improve receptive seedbed and promotes satisfactory growth of naturally disseminated seed. Scarification conducted by the province is achieved through contractual agreements or rental agreements.

The majority of scarification in Manitoba is implemented through contractual agreements with equipment operators administered and supervised by Regional Operations staff.

Site inspections and specific evaluations are done either prior to harvest or shortly following harvest to assess: Physical attributes - soil type, rockiness, slash volume, size and frequency of stumps, slope, duff layer, and ground vegetation, and, Biological attributes - seed supply, residuals, advance regeneration, organic material, weed species, and disease or insects.

Scarification options are administered by working groups within forest management plans, thus the treatment options presented below are by working groups (ie. jack pine, black spruce, and white spruce).

Jack Pine

Treatment options associated with scarification for natural regeneration in Manitoba centre around jack pine covertypes. Jack pine silvics make this species favourable for the promotion of natural regeneration through some form of site disturbance. Successful treatments of these covertypes in Manitoba have occurred in most forest sections (Lower English River, Manitoba Lowlands, Mixedwood, Northern Coniferous), of the Boreal Forest Region.

Most cone opening and seed dispersal for jack pine occurs from those cones resting immediately or adjacent to the ground surface, where the extreme heat opens serotinous cones. Good seedling establishment normally occurs during the first and second years following scarification. Seed shortage can be the result of waiting too long before scarification or from full tree logging where most cone bearing slash has been removed. Scarification is more effective in the mid-summer immediately following harvest when slash and debris is brittle and breaks up easily.

Favourable seedbed for jack pine germination are: mineral soil, lower raw-humus strata, and lower peat strata which has been burned. When exposed, the mineral soil is universally recognized as the best medium for jack pine regeneration. Duff over top of mineral soil should be less than one centimetre thick and allow jack pine seedling roots to easily penetrate to the mineral soil.

Spiked-anchor chains dragged behind an articulated skidder (90+ HP) have produced adequate receptive seedbed. These areas must have abundant jack pine seed sources available naturally (cone bearing slash) to ensure minimum restocking following scarification. In Manitoba, one pass with drags on an eight foot drawbar is usually sufficient to prepare the sites, however, some sites (heavier slash loads) may require two passes with anchor chains to effectively prepare the site for natural regeneration.

Spiked anchor chains can be used in conjunction with other supplemental equipment, such as; shark-finned barrels, flange barrels, tractor pads, and various hook-up components (drawbars, junction loops, swivels, etc.). Skidders are the normal prime movers however, tracked bulldozers are also used where increased flotation is desirable.

In the event of a suspect seed supply (insufficient number of cones/ha), it may be beneficial to add heavy drags (i.e. barrels) thus allowing the manager to plant the area if natural seeding fails. Regeneration establishment should be monitored closely following treatment. Plantable microsites should not be allowed to diminish beyond the point where further site preparation is required.

Black Spruce

Scarification to promote black spruce natural regeneration is more difficult than jack pine. Black spruce usually occupies lowland or wetter sites where organic peat layers are greater than thirty centimetres in depth. Receptive seedbed for black spruce lowland sites is difficult to achieve. Receptive seedbed for black spruce are; mineral soil, slow-growing sphagnum moss, mineral soil with light cover of polytrichum, lower peat strata, moist rotten wood, and compacted peat or moss. Scarification methods which have proved to be effective are; winter shear blading, ripper tooth, and disc trenching. Compaction and rutting from site preparation should be avoided by using a prime mover with wide pads or large floatation tires.

Black spruce seed sources for natural regeneration are predominately from standing trees. Maintaining a seed source for natural regeneration of black spruce is best achieved through modified harvest cuts, carried out during heavy cone crop year (strip clear cutting). Clear cut strips should be orientated perpendicular to the prevailing winds to more effectively distribute seed. Optimum strip widths are from 40 to 80 metres. Lowland black spruce sites, which have abundant sphagnum moss (slow growing), should not be site prepared, as sphagnum moss is considered receptive seedbed. Sphagnum sites may regenerate naturally over a long

period of time (10 years) providing that there is a standing seed source in close proximity. Removal of large amounts of slash may be required, as slash inhibits black spruce regeneration.

If acceptable regeneration has not occurred by the fifth year after scarification or cutting, further regeneration measures should be taken. Black spruce germinants suffer a high mortality rate due to frost heaving, desiccation and fall frosts. Therefore, it is crucial that natural regeneration not be judged as to its success until the seedlings are established for at least three years.

White Spruce

Scarification for white spruce natural regeneration has been conducted in conjunction with the seed tree silviculture system. However, due to problems associated with cone crop periodicity, rabbit damage and competing vegetation, this treatment has had limited success and is only recommended if planting is not considered an option. The four main regeneration requirements for white spruce are: a mineral soil seedbed; reduction of competing lesser vegetation; shade, especially during the first growing season; and an adequate seed supply. Weather, seedbed, litter, crown cover, site, lesser vegetation, and animals also play important roles in the germination, early survival and growth of white spruce.

Shelterwood cutting in accompaniment with the scarification of mineral soil seedbed on fresh to moist sites using a bulldozer and straight blade created conditions suitable for the establishment of natural white spruce regeneration (Riding Mountain).

According to the Manitoba forest regeneration survey database, white spruce predominantly found on mixedwood covertypes will regenerate successfully to the mixedwood stocking standard however, some subsequent treatment may be required.