Natural Resources Canada
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A Guide to Soil Salvage

Pre-disturbance steps to improve reclamation outcomes

Soil salvage is a pre-disturbance technique to conserve a site's topsoil, which is critical for maintaining nutrient cycling, organic matter, soil biota and plant propagules (Fig. 1). In some cases, subsoil (the second layer of soil material below topsoil) may also be salvaged in a second lift. Healthy soil is essential to the health and productivity of forests. Salvaged and stockpiled properly, replaced topsoil reduces the time and cost to meet reclamation objectives, particularly when natural regeneration is planned. This factsheet focuses on topsoil and is intended only for upland sites.

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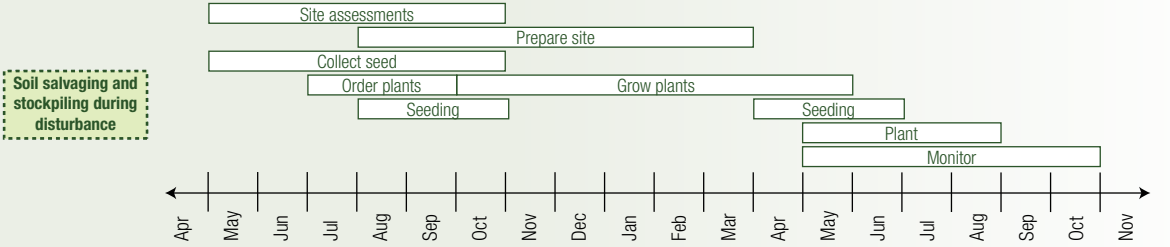
Figure 1. Generalized timeline of activities related to site preparation.



*Note: Not all sites require salvaging (e.g., exploration sites). Where soil has been salvaged, it is assumed to have been replaced prior to site preparation activities.

Regulatory requirements

Soil salvage is a regulatory requirement for many reclamation projects. In Alberta, managers are responsible for complying with the *Environmental Protection and Enhancement Act*, *Conservation and Reclamation Regulation*, *Code of Practice for Exploration Operations*, *Integrated Standards and Guidelines of the Enhanced Approval Process* and any other regulations that may apply. Other jurisdictions may have different relevant regulations that must be followed. These regulatory requirements supersede any recommendations made within this factsheet.

When should soils be salvaged?

Salvaging is legally required during many industrial disturbances. Where not required, soils should be salvaged if the activities (e.g., compaction, rutting) will degrade the soil. Salvaging, however, may damage the soil's properties (see Fig. 2) and should be avoided if soil degradation is not otherwise expected on sites with high-quality (e.g., nutrient-rich) pre-disturbance surface soils.

When salvage is deemed necessary, winter salvage can reduce damage to many propagules, which are dormant, and reduces soil compaction; the risk of soil mixing, however, is increased. Note that some kinds of planned soil disturbance, such as site preparation for reforestation, can be beneficial. In other cases, where activities have the potential to degrade soils, salvage and conservation should be undertaken.

Soil salvage MUST NOT take place under the following conditions:

- Large sites and windy conditions: risk of wind erosion
- Wet conditions: high risk of compaction, soil layer mixing, water erosion and soil structure degradation
- Other weather conditions that increase the risk of soil loss, soil layer mixing or structural degradation

How should soils be salvaged and stockpiled?

A site assessment is necessary to determine the type, extent, depth, location and quality of soils on the site. Salvage depth, timing and equipment must be determined based on the type of surface soil. The planned regeneration method is also a consideration, as natural regeneration will benefit from salvaging that protects roots and concentrates viable propagules (Table 1).

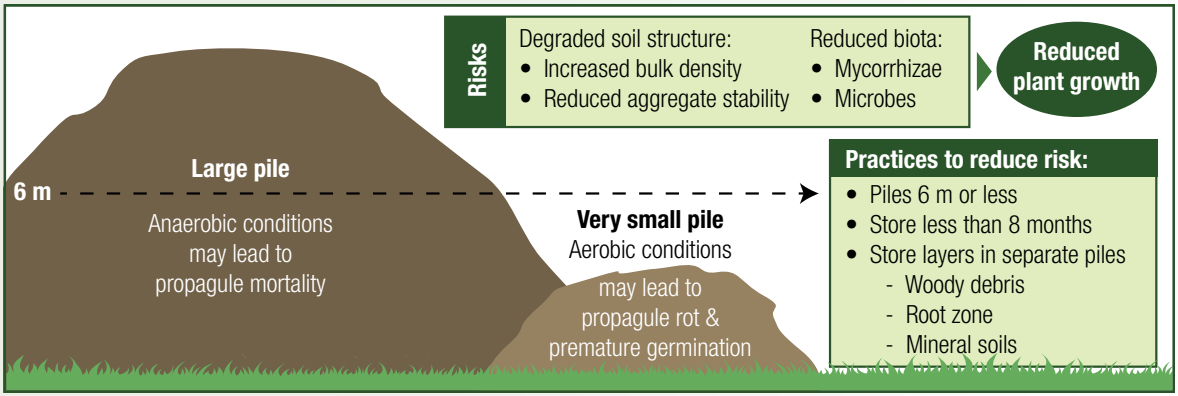
Table 1. Benefits and drawbacks of soil salvage options.

Component	Consideration	Option 1	Option 2
Equipment	Site type (size, shape, slope), regeneration method/target.	Crawler tractor/dozer: covers a large area quickly but damages roots and often strips unevenly and mixes soil layers.	Excavator: strips more slowly but reduces damage to roots and provides greater operator control.
Salvage depth	Soil characteristics, regeneration method/target.	Shallow (10–15 cm): concentrates viable propagules and organic matter.	Deep (20–30 cm): more material available for reclamation and increased root-to-soil contact.

Stockpiling: managing risk

Salvaged soil must be stockpiled until the site has been decommissioned and contoured, at which point the topsoil is spread back over the site. Stockpiling may degrade soil structure and decrease the viability of seeds and other propagules, but these risks can be managed using stockpiling best practices (Fig. 2). Stockpiled soil often contains propagules of competing vegetation. After stockpiled soil has been replaced on the site, it will require careful monitoring and also vegetation management if competing vegetation is limiting the growth of target species and/or trees.

Figure 2. Practices to reduce the risks of stockpiling.



Conclusion

Healthy topsoil is an important and limited resource that can greatly improve reclamation success and timelines. Soil salvage and stockpiling may damage the soil if best practices are not followed, but careful planning can help ensure that this technique is an advantage to reclamation rather than a liability. Approaches using excavators, winter salvage, site-appropriate salvage depths and careful stockpiling can reduce the risk of damage and improve the quality of topsoil and propagules when they are reapplied to reclaimed sites.

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For more information, please contact: nrcan.silviculturetoolkit-outilssylviculture.rncan@canada.ca

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