Interim reclamation: what is it and why we should be doing this more often

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Outline

1. Context for today's discussion
2. What is interim reclamation: directive SD 2010-02
3. Example: new Interim reclamation case study
4. Cost analysis of case study

Context for discussion

Consistently (+ cost effectively?) re-establish functional and resilient forest plant communities.

- Plants grow in the soil – what we do to the soil will have direct and long-lasting consequences on how that future forest will develop and persist.

Progressive reclamation and interim clean-up

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Progressive reclamation and interim clean-up ensures that reclamation material (soil, woody debris and the vegetative propagule bank) is best managed to ensure final reclamation objectives can be attained as efficiently as possible. Minimum Disturbance is the best case scenario, but in its absence, progressively returning the disturbance to a state of equivalent capability is expected.

Research has shown that stockpiling of topsoil for periods greater than eight months leads to dramatic reductions in seed and root viability. It also negatively affects the chemical, physical and biological properties of the soil. It is therefore considered a best management practice to minimize stockpiling of topsoil by redistributing salvaged topsoil within the lease.

tive Number: SD 2010-02
May 13, 2010
Reference:

nterim Clean-up

des all disturbances associated with
log decks, campsites, borrow areas,
umps, access roads, etc). This also
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requirements of the lease.

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Interim reclamation

Where progressive reclamation, as outlined above is not practical, interim clean-up, i.e. stockpiling of reclamation materials while ensuring other aspects of the progressive reclamation conditions are met, will be acceptable due to the following:

- further activities on the site (multi-well pads) if documented at planning stage
- large cut/fills that will require significant

While these activities are all positive- can we take this a step further?

wetland status

For these types of situations, topsoil spreading will not be required but operators are to construct stable, non-erosive stockpiles with the maximum surface area possible to reduce soil and vegetative propagule degradation, and to control weeds and invasive species on these stockpiles.

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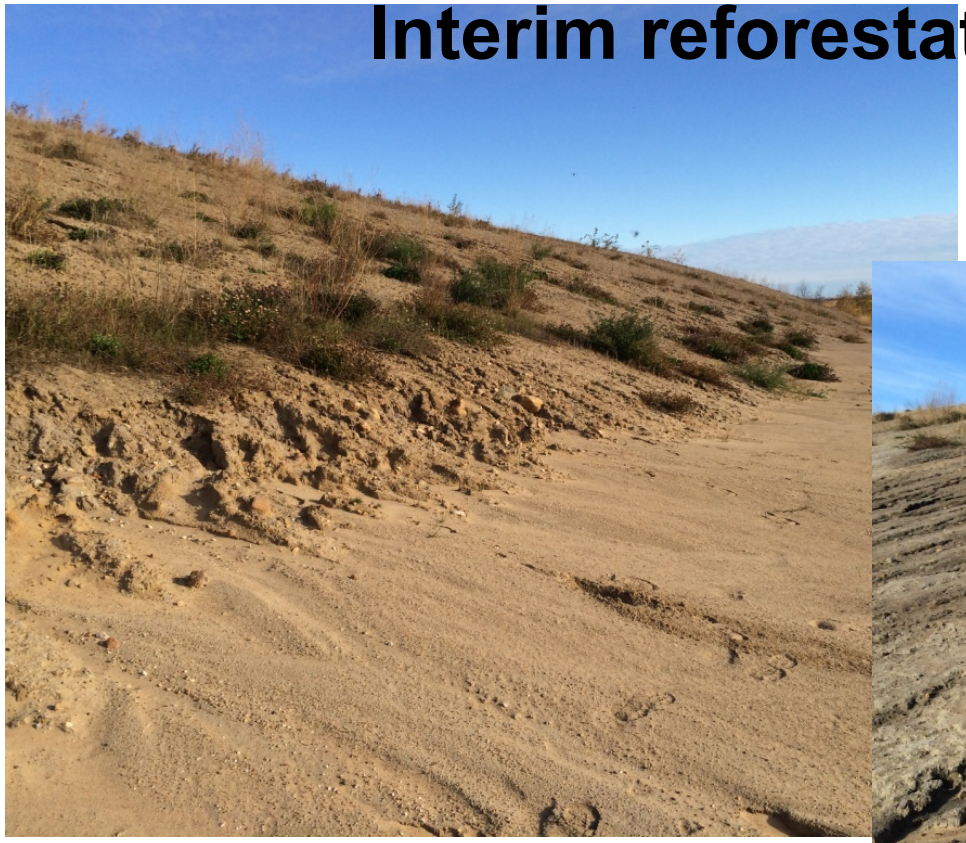
Yes we can-

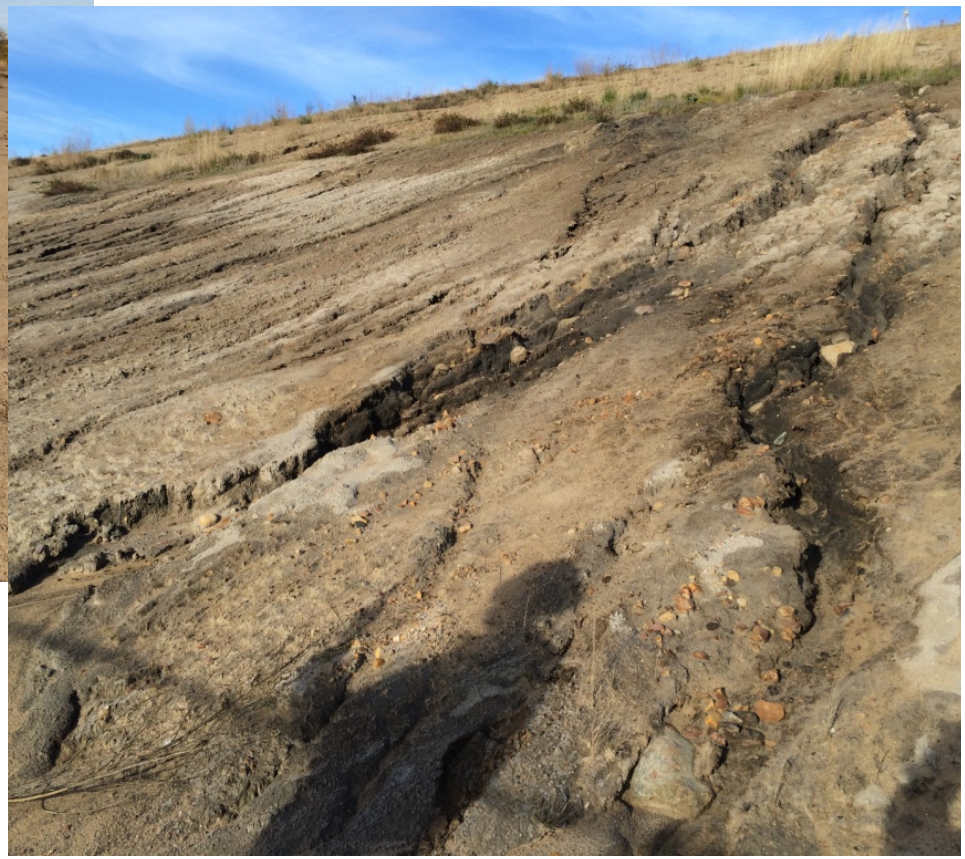
Interim (temporary) reforestation of soil stockpiles

Potential benefits:

- Provide a bank of root and seed propagules for final reclamation.
- Provide coarse woody material for final reclamation.
- Maintain the ‘health’ of stored soil
- Long-term control of erosion on stockpiled soil
- Reduce the invasion/influx of undesirable or weedy vegetation.
- Increase biodiversity and habitat

Interim reforestation case study

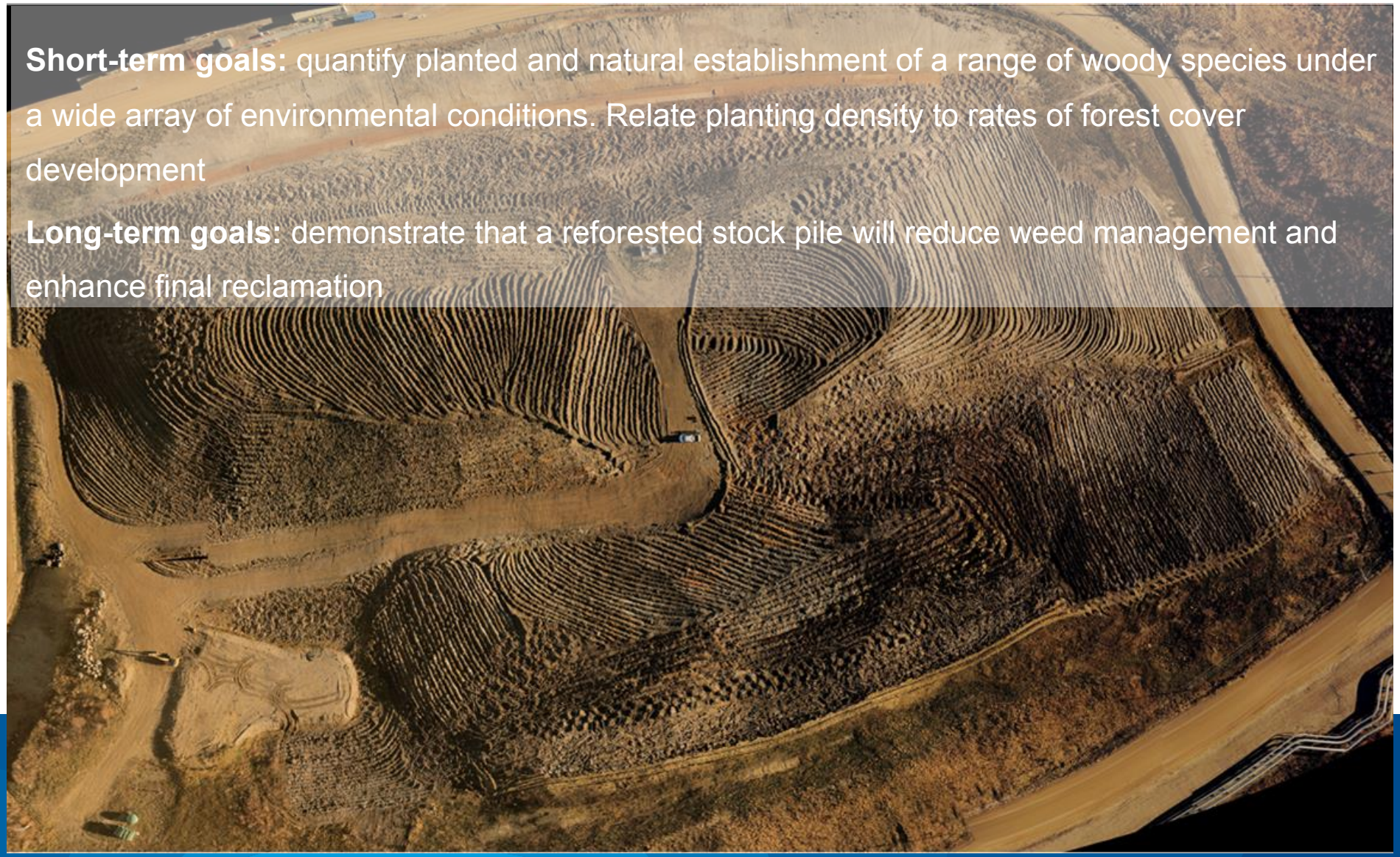




Interim reforestation case study

- This vegetation community will be all sorts of problematic when it comes time for final reclamation and this stock pile is placed.
- We need this stockpiled soil to help us regrow a forest – not hinder it.

Interim reforestation case study



Short-term goals: quantify planted and natural establishment of a range of woody species under a wide array of environmental conditions. Relate planting density to rates of forest cover development

Long-term goals: demonstrate that a reforested stock pile will reduce weed management and enhance final reclamation

Coarse woody materials

Soil surface heterogeneity

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Why soil surface heterogeneity??

Vegetation benefits of a heterogeneous ‘messy’ soil surface:

- Plant require warm soils, water and light to grow.
- If we increase permeability and surface area for water absorption- we increase plant available water.
- At the same time- the increase in surface area will act to warm soil more effectively and increase permeability which allows for better conductance of heat.
- Variability in soil surface will better act to capture seeds and create nice microsites for variable regeneration of wider range of species.
- Rough surface better captures snow- this goes back to the principle of increasing water supply and also reducing winter dessication as young seedlings will be more protected (eg. conifers).
- Intensive site preparation is also utilized as a short-term vegetation control measure for grasses (common practice in forest industry).

Site preparation before in 2014 (left) and after (right) in 2015.

Interim reclamation: hypothetical cost analysis

Example: existing facility stockpile (time to final reclamation 40 years)

	$ per ha	# ha	# entries required	Total ($)
Conventional approach				
Hydroseeding (0.50 m^2)	5000	13	2	$130,000.00
Herbicide (weed management)	500	13	17	$108,333.33
Earthworks maintenance/re-entry	500	5	3	$7,500.00
			Total cost:	$245,833.33
Interim reforestation approach				
Site preparation (assume 10 hr/ha with hoe)	2500	13	1	$32,500.00
Woody species planting (5000 stems/ha)	10000	13	1	$130,000.00
Herbicide (weed management)	500	13	9	$55,250.00
			Total cost:	$217,750.00

Notes:

1. Herbicide: both cases, assume every year for first 5 years. Every 3 years thereafter in conventional, 10 year interval for interim approach
2. Site preparation - additional efficiencies/cost savings if this was completed during stockpiling

Interim reclamation: hypothetical cost analysis

Example: well site stockpile (time to final reclamation 20 years)

	$ per ha	# ha	# entries required	Total ($)
Conventional approach				
Hydroseeding (0.50 m^2)	5000	0.2	1	$1,000.00
Herbicide (weed management, cost $/entry)	500		10	$5,000.00
			Total cost:	$6,000.00
Interim reforestation approach				
Site preparation (assume 10 hr/ha with hoe)	2500	0.2	1	$500.00
Woody species planting (5000 stems/ha)	10000	0.2	1	$2,000.00
Herbicide (weed management, cost $/entry)	500		7	$3,250.00
			Total cost:	$5,750.00

Notes:

1. Herbicide: both cases, assume every year for first 5 years. Every 3 years thereafter in conventional, 10 year interval for interim approach
2. Site preparation - additional efficiencies/cost savings if this was completed during stockpiling

Final notes on cost examples

- Both cases result in moderate cost savings or equivocal cost depending on realized costs for herbicide, seeding, planting etc.
  - Take home message = temporary reforestation does not have to be a more expensive option!
- It can be reasonably assumed that utilizing a temporary reforestation approach should also result in a number of supplementary and key benefits (some which might actually save $ at final reclamation):
  - Reduced weed seed bank
  - Fewer agronomic species present hindering woody species establishment
  - Propagule bank (roots + seeds) for final reforestation
  - Faster time to reclamation certification??

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