Reclamation of a wood chipped winter road: application of the peat inversion technique in a new context

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INTRODUCTION

Sites demonstrating operational reclamation strategies for linear disturbances in peatlands are still lacking in Alberta. These strategies must address the abiotic themes of hydrology and suitable surface substrate in order to support sustainable wetland vegetation communities.

Based on learnings from our first full clay pad restoration, we adapted the peat inversion technique to reclaim a wood chipped winter road back to a peat surface suitable for natural regeneration of fen species from seed sources adjacent to the road. We chose this natural regeneration of bryophyte, herbaceous and shrubby vegetation to demonstrate the applicability of natural regeneration in a highly specific scenario, but supplemented with site planting of Laxia lanicina and Picea mariana with site certification using the peatland criteria in mind.

We discuss site progress, considerations for use of this method and its possible future applications, and alternative strategies for future trials.

PROJECT PLANNING

Three Aspects Of Wetland Reclamation

1. Hydrology – main driver of successful wetland reclamation
2. Suitable surface substrate – can be mineral or peat, must not hinder plant growth (i.e. compaction, salinity, contamination, obstruction)
3. Revegetation – method to establish plants on site in a timely fashion

Our Site Conditions

- 6m wide winter road through circumneutral fen
- Hydrological connection with wetland on both sides intact
- 1.5 meter deep wood chip surface
- Abundant propagule sources available
- Buried pipeline next to road

GOAL: remove obstruction and re-create peat surface suitable for natural regeneration

CHALLENGES

Similar challenges between wood chipped winter road and clay well pad:

1. Need to remove unsuitable surface substrate to restore a peat surface
2. What to do with the material, limiting transportation and disposal costs
3. How to ensure the final peat surface elevation would not be so low as to create an inundated pond, rather than a saturated surface

Prescription – invert wood chips with the buried peat, and adjust the final elevation to be equivalent to that of the hollows in the natural area adjacent to the road (Figure 1).

SITE PROGRESS

Peat Inversion Technique

![Figure 1. Perpendicular cross section of the chip road. Left: Chip road in place, Right: chip layer inverted with buried peat.](image)

![Figure 2. Perpendicular cross section of mineral road. Left) Mineral fill in place, Right) mineral layer & geotextile inverte](image)

![Figure 3. Example of ripping (left) and moundng (right) used on shallow peat upload sites where the chip layer was ~3cm deep.](image)

FURTHER APPLICATIONS

Peat Inversion Technique

- Mineral road with geotextile (Figure 2)
- Natural Regeneration
  - Sites with some desirable vegetation present (i.e. compressed features)
  - Areas with intact seed bank (i.e. scalped sites)
  - Sites with close propagule sources, small enough to allow reasonable ingression (linear features rather than rectangular pad)
- Sites with little worry for weed invasion/competition

NOTE: must have abiotic factors of the site addressed very well to use this revegetation strategy

ALTERNATIVE STRATEGIES

Soil Modification Technique

- Ripping – sites with thin obstruction layer, so peat will be exposed (Figure 3)
- Mounding – sites with compressed surface elevation where risk of mounds drying out is low (Figure 3)

Revegetation Strategy

- Donor mass transfer (ground, field, shrub and tree layer introduction)
- Transplant (field layer)
- Hand collect adjacent seed and spread (field, shrub and tree layer introduction)
- Plant commercial stock (field, shrub and tree layer introduction)

ACKNOWLEDGEMENTS

We acknowledge our summer and permanent research staff for monitoring equipment installation and data collection. We thank our industry partner for kind contributions of civil earthwork and site access.