

Plow-in pipeline construction improves recovery of rough fescue grassland

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The Challenge

Pipeline construction can disturb land through vegetation removal, soil mixing and compaction, and destruction of biological crusts (microorganisms, lichen, moss). Most efforts to restore native rough fescue after pipeline construction through soil replacement and/or rough fescue seeding have been unsuccessful. To overcome this, recent techniques have focused on reducing total grassland disturbance during pipeline construction. This research examines the natural recovery of rough fescue grassland following minimum disturbance pipeline construction techniques.

The Approach

The research was conducted from 2006-2010 in the Central Parkland Natural Region of Alberta. Pipeline right-of-ways (ROWs) built from 1983-2009 and left to recover naturally in undisturbed rough fescue grassland (*Festuca hallii* (Vasey) Piper) were studied. Thirteen natural gas pipeline ROW segments were selected, which were constructed using minimum disturbance techniques such as plow-in, topsoil-strip, or trenching approaches. Each site was paired with an adjacent undisturbed grassland site. Measurements at each ROW/undisturbed pair included foliar cover of all species, the amount of litter, and proportion of bare ground. Statistical analyses of these data were used to identify vegetation differences between ROWs and undisturbed sites.

The Results

The plow-in pipeline approach caused the least grassland disturbance, resulting in a fescue-bluegrass vegetation community that had the fewest non-native species, the best rough fescue recovery, and the greatest similarity to undisturbed natural grassland. The trenching and topsoil-strip sites caused more disturbance, resulting in a wheat grass community that was very different from undisturbed grassland.

Regardless of pipeline construction technique, the undisturbed sites overall had more native grass, less bare ground (more moss/lichen), more litter, and less wheat grass than the ROW sites.



Fig. 1. (A) Plow-in pipeline with topsoil removed, replaced and seeded. Dominated by wheatgrasses. (B) Plow-in pipeline using a bucket plough, left to natural recovery. First year after installation, a south slope with rough fescue, rose, snowberry and other native grasses and forbs.

Management Implications

- Minimum disturbance pipeline construction techniques are critical in grasslands to reduce soil exposure, prevent invasion by non-native species, and allow native species to propagate through seeds or propagules.
- Plow-in construction with narrow trenching is highly recommended for grassland recovery because it retains sod (including propagules and seeds) and minimizes disturbance.

Further Reading

Desserud, P.A.; M.A. Naeth. 2013. Natural recovery of rough fescue (*Festuca hallii* (Vasey) Piper) grassland after disturbance by pipeline construction in central Alberta, Canada. *Natural Areas Journal* **33**(1): 91-98.

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