

RECOVERY OF NATIVE PRAIRIE AFTER PIPELINE CONSTRUCTION IN THE GREAT SAND HILLS REGION OF SASKATCHEWAN¹

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ABSTRACT

A large diameter natural gas pipeline was constructed in 1990 through 12 km of the Great Sand Hills region of southwestern Saskatchewan. The harsh environmental conditions necessitated extraordinary construction and environmental mitigation measures to control wind erosion and successfully revegetate the highly erodible dune soils and fragile plant communities.

Mitigation measures included construction procedures that reduced the size of disturbance, public and worker educational extension programs, dormant season construction, topsoil seedbank salvage, placed fertilizer application, crimping weed free flax straw, straw bale wind barriers, brush mulch wind barriers, surface manipulation with the Hodder Gouger, fencing-out cattle, and the application of a seed mixture of agronomic legumes and native grasses. Vegetation and soil erosion was monitored for four years.

On low relief terrain (hills ca. 1 to 3 m high), vascular plant cover on and off the right-of-way (R/W) after 4 years was similar (44% vs 48%). However, on the high relief terrain (hills ca. 10 to 30 m high), the native vascular plant cover was 22% compared to 34% off R/W. Off the R/W, biomass production was consistent at all three sample sites averaging 165, 166, and 172 g/m². Results on the R/W were different, however. At the low relief sites, biomass production was almost twice that of off R/W (165 vs 288). The reason for this was a different species composition.

On the R/W, plant cover was composed mainly of native grasses from the revegetation mix whereas off R/W, a wider range of species was present including shrubs and forbs which do not produce much forage. At the moderate and high relief sites, biomass production was similar to off R/W. Low soil nutrients and dry climatic conditions limited the production of the forage species on the R/W. A major difference observed in the plant cover on and off the R/W was the presence of non-vascular plants (mosses and lichens) off R/W. This part of the prairie vegetative cover develops slowly.

Saskatchewan government reclamation standards were met for plant density, canopy cover, erosion control, and composition of native species (minimum 50%). The most successful sand stabilization treatment was a straw mulch applied at 6 to 9 t/ha and anchored by crimping. A brush mulch wind barrier of dead shrub branches salvaged prior to

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construction from sagebrush stands on the right-of-way was highly effective in controlling wind erosion on exposed sites. After four years, the canopy cover was 88% native species.

On low-lying, protected sites, vegetation was stable enough after 4 years to resume cattle grazing. Exposed sites on high-relief terrain may not be ready for cattle grazing for many more years.



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*Conservation and Reclamation:
An Ecosystem Perspective*

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