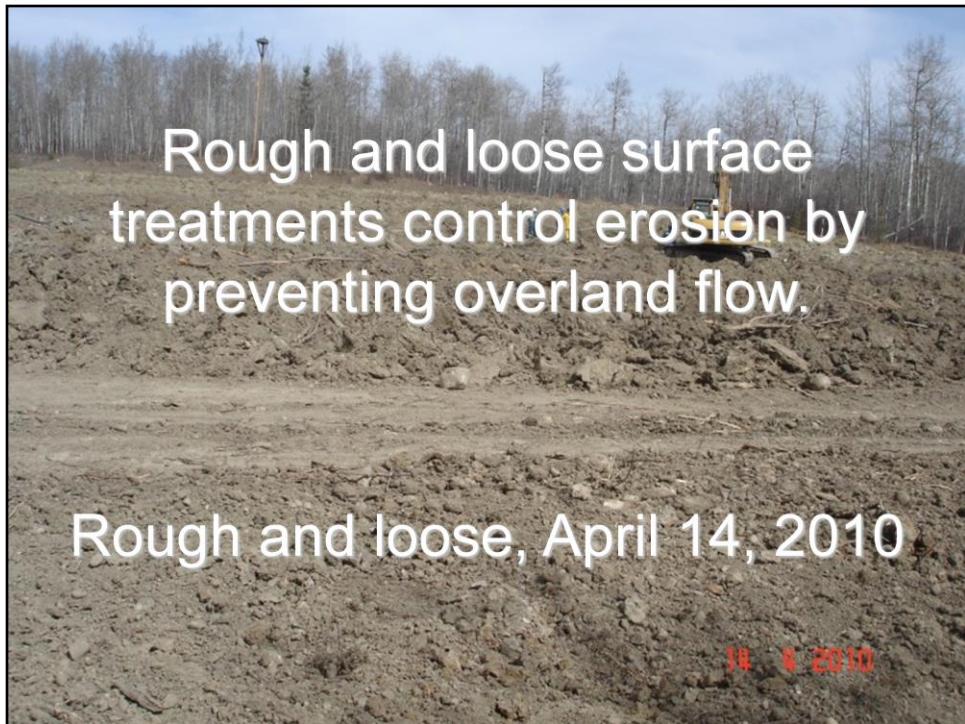




Gas plant site to be restored, March
11, 2010

This is the site of a former gas processing plant just south of Edmonton AB. Contaminated soils have been cleaned up and the site is now ready for restoration. Traditionally sites such as this would be seeded with an agronomic mix of grasses and legumes and the site would remain with this cover, often augmented by weeds as the agronomic grass cover is an unhealthy ecosystem. This weakness is exploited by weeds. In this case, however, we chose to move along the natural successional trajectory directly into a woody pioneering stage of succession.



Erosion is often cited as the reason for using a grass and legume seeding. However, making the ground rough and loose prevents water from running across the surface of the land and encourages infiltration, moving water into the groundwater system. Rough and loose treatments were used on this site. Rough and loose surface configurations can be achieved by using a large excavator to open holes on the slope, dumping the material that is generated from the holes in mounds between the holes. The excavator, using a digging bucket (not clean-up), takes a large bucket full of soil and places it to the left of the hole that was just opened, half a bucket width from the hole so it is half in and half out of the hole. A second hole is then excavated half a bucket width to the right of the first hole. Material from this hole is then placed between the first and second holes. A third hole is now opened half a bucket width to the right of the second hole, with the excavated soil placed between the second and third holes. Care should be taken when excavating the holes to shatter the material between the holes as the hole is dug. The process of making holes and dumping soil is continued until the reasonable operating swing of the excavator is reached. The excavator then backs up the width of a hole and repeats this process, being sure to line up the holes in the new row with the space between the holes (mounds) on the previous row.



In addition to preventing erosion, the rough and loose treatment traps snow, adding to the soil moisture that will help plants grow in the spring.



Planting pioneering vegetation, April 14, 2010

Pioneering woody species were established from 2 m long dormant stem cuttings with 1 m in the ground and 1 m above the ground. A large poker was fitted to an excavator to open holes for the cuttings. Willows, balsam poplar and red-osier dogwood were used.



Planting pioneering vegetation, April
14, 2010, note fence.

14 4 2010

Cuttings were planted at about 1 m spacing to provide a dense cover early in the recovery processes. Note the fence which was established to keep deer and moose from eating the new sprouts on the cuttings.



Watering in the cuttings, April 14, 2010

A high pressure hose was used to wash the soil into the hole around the cutting so that there were no air pockets and the cuttings had good contact with moist soil. This also provided water so that the cuttings would not dry out during the first few weeks after planting.

Cuttings growing, June 24, 2010



Growth of almost all of the cuttings had started by June 24th.

Cuttings growing, July 15, 2010



As the summer progressed, in addition to the cuttings, seeds of a wide variety of plants that had been in the soil seed bank started to sprout and grow.

Cuttings growing, July 15, 2010



Active growth of the cuttings benefits from the moisture trapped by the rough and loose ground.

August 17, 2010



By August the site was covered with the various species from the soil seed bank as well as the woody trees and shrubs growing from the cuttings.



Balsam poplar is doing very well.



The growth at the site continued into the fall...



...with some very impressive growth from the woody species – balsam poplar shown here...



...and red-osier dogwood shown here...



October 2, 2010

...indicating the end of growth for the 2010 season.



October 2, 2010

By moving directly to a woody species cover, issues such as invasive species will be minimized. Continued monitoring of this site will be undertaken in the years ahead as opportunities arise. This will provide insights into the application of these restoration treatments for the long term recovery of disturbed sites.

April 10, 2011



A winter inspection illustrates the differential melting of the snow so the mounds melt first with the hollows remaining snow covered longer.

June 20, 2011



The second growing season shows the rough and loose texture moderated by weathering as well as the continued growth of the woody species.

Cover provided by woody species starting to dominate, June 20, 2011



Growth the second year was even more impressive than the first year.

August 2, 2011



...with some shoots more than 2 m long.

August 2, 2011



Sweet Clover that came in with the soil provided aggressive competition for the woody species...

August 19, 2011



But some of the Balsam Poplar cuttings were well above the Sweet Clover by the end of the growing season.

Two growing seasons...



The arrows show two growing seasons of growth at this site just south of Edmonton, AB.



This is what the site looked at in the early spring of 2012.

July 9, 2012



In 2012 growth continued on the site.

March 1, 2013



Woody species now dominate the site with some of the Balsam Poplar over 3 m high.



August 17, 2013

The use of natural processes can provide cost-effective solutions for the restoration of drastically disturbed sites.

The forest continues to grow.



The woody vegetation shows up well against the snow.