

Native Prairie Reclamation

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Historical Context

Reclamation is defined as the process of reconvertng disturbed land to its former or other productive uses. This involves the removal of structures, decontamination and land surface reconstruction such as contouring, soil replacement and revegetation.

The process of land reclamation at industrial sites in Alberta has progressed over a period of five decades from a reactive “fix it” approach in the 1960s to a proactive “conservation” approach. This involves setting clear goals and land use planning that consider the valued ecosystem services and sensitivities associated with both the site and the wider landscape.



Photo courtesy of Gerry Haekel, Alberta Sustainable Resource Development.

Prior to 1963, there was no requirement in Alberta to reclaim industrial disturbances, although some seeding of disturbed areas with tame forages did occur. In 1963, the combination of public concern about industrial development and the increased rate of petroleum activity resulted in the enactment of the *Surface Reclamation Act*, the first of its kind in Canada. This Act established an administrative and field enforcement program to set minimum standards (e.g., site hazard reduction, cleanup and recontouring), and also provided for the issuance of reclamation certificates for industrial lands.

In 1973, the *Land Surface Conservation and Reclamation Act* came into effect and provided for planning industrial development to minimize impact. It also designated surface disturbances (e.g., coal mines, large pipelines) as requiring conservation, development and reclamation approvals. In 1978, the Act was amended to identify the types of disturbances for which conservation and reclamation standards were enforceable. Residential development and agricultural operations were exempt. In 1980, minimum reclamation standards were issued. These indicated that topsoil and organic matter should be selectively conserved and in 1983, the Alberta government acted on its authority to enforce topsoil salvage.

In 1993, the *Environmental Protection and Enhancement Act* (EPEA) and the *Conservation and Reclamation Regulation* came into effect. The Regulation requires the conservation and reclamation of specified lands (wells, pipelines, transmission lines, mines, plants etc.) to equivalent capability. This is defined as: “the ability of the land to support various land uses after reclamation is similar to the ability that existed prior to

an activity being conducted on the land, but the individual land uses will not necessarily be identical". This Act also made remediation a requirement of reclamation.

In 1993, Alberta established the first formal reclamation criteria for certification of wellsites (with revisions in 1994, 1995 and 2010). In 2010, the 1995 well-site criteria were updated after extensive review by a multi-stakeholder committee and field testing (Alberta Environment 2010c). There are also draft criteria for reclamation of pipelines (Alberta Environment 2001a).

In 2001, Alberta Environment implemented detailed Phase 1 environmental site assessment requirements for well-sites to determine if contamination may be present at a site. After consultation with stakeholders in 2002 and 2003, the reclamation certificate program changed to a desktop review and audit system. Phase 1 and Phase 2 environmental site assessments and drilling waste disposal area assessments became a requirement to ensure that contamination, if present, was fully remediated.

In 2008, the requirement for professional sign off was implemented. All Phase 1 and Phase 2 environmental site assessments and reclamation assessments must be signed off by a professional who has at least five years experience and is a member of a professional regulatory organization that enables them to do remediation and reclamation work.

As of 2011, industry operators can elect to apply for a remediation certificate, which provides certainty that a spill remediated to meet Alberta Environment's current requirements will not require additional remediation if standards become more stringent in the future. Alberta Environment also administers the *Water Act* (Government of Alberta 2000g) and associated Regulations. This Act is particularly relevant for conservation and reclamation affecting water bodies (e.g., ponds, lakes and streams).

From 1993 to 1996, land management agencies for public land in the White (settled) Area in Alberta started to require native grasses for revegetation of prairie. In 2001, the *Native Plant Revegetation Guidelines for Alberta* were released. The use of native species for reclamation of native landscapes on public land is now mandatory. This coincides with a new emphasis on returning ecosystem functionality of disturbed lands (considering all components, including groundwater, surface water, soils, vegetation, landscapes). There is also more awareness of habitat fragmentation and cumulative impacts and the associated conservation planning needs.

Minimizing the overall industrial footprint has become a greater concern. There is increasing emphasis on the surface water (lakes, ponds, streams) and groundwater aspects of reclamation, particularly for large scale disturbances such as mines.

As regional plans are developed under the *Alberta Land Stewardship Act (2009)*, there will be a need for industry and regulators to pay more attention to assuring desired environmental outcomes through cumulative effects management. The development and implementation of environmental management frameworks for air, land, water and biodiversity will require compliance with limits and triggers for designated environmental indicators. Clear reclamation outcomes establish a common expectation for Alberta industries and set an environmental performance expectation that contributes toward the larger goal of meeting a defined level of regional environmental quality.

Effective Reclamation

Good reclamation starts with effective planning and communication. Companies should be hiring competent, qualified environmental consultants to plan their projects. Planning needs to be “cradle to grave” so that good practices during construction are not undone by the use of poor practices during operations and abandonment. Communication with landowners and land managers should start early, before formal applications are submitted to the government. Landowners should not be shy about specifying their needs.



*Photo courtesy of Patrick Porter,
Alberta Environment*

Industrial land use planning should be designed to conserve the following key valued prairie landscape components:

- Native vegetation
- Sensitive wildlife and their habitat
- Soil structure and function
- Surface and sub-surface hydrology and water quality
- Landscape function (including aesthetics)
- Air quality

Companies need to collaborate with other land users and employ qualified environmental practitioners to plan and oversee all activities to assure that outcomes are achieved throughout the life of the project. Performance management is fundamental to success. Indicators need to be identified and monitored to provide early warning signs of deviation from expected outcome pathways.

An effective industrial development program incorporates the following principles:

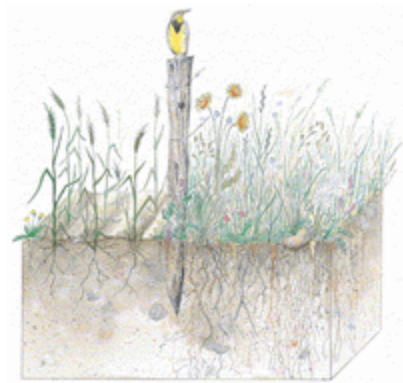
1. Avoid impacting valued prairie ecosystem components
 - Identify valued landscapes, ecosystem services and sensitivities
 - Cooperate with other land users in citing and scheduling the project
 - Locate projects in areas to avoid sensitive landscapes
 - Use existing disturbances where feasible
 - Use alternative technologies and best practices to access the project zone from less sensitive areas where feasible
 - Construct the project during less sensitive times of the year (e.g., dormant or frozen conditions)

2. Minimize impacts to valued prairie ecosystem components
 - Reduce the size of the project footprint
 - Reduce surface loads and traffic to accommodate ecosystem sensitivities and function
 - Alter project timing to accommodate sensitivities of the ecosystem and cooperate with other land users
 - Reduce length of project construction and operation where feasible

3. Beneficial Management Practices
 - Plan the project from cradle to grave using qualified environmental practitioners
 - Ensure that construction, operation and reclamation is supervised by qualified environmental inspectors
 - Offset any habitat loss by developing complementary habitat or similar or greater extent and quality
 - Revegetate using source-identified native species (Native Plant Working Group, 2001)
 - Plan sediment and erosion control practices to meet a soil loss target of no more than four tonnes/hectare for upland areas (equal to the rate of soil formation)
 - Ensure that surface and sub-surface hydrology are restored
 - Blend the site in with adjacent landscapes (e.g., appropriate contouring and selection of native species)

Future Challenges

Alberta has developed a national reputation for its environmental regulatory structure. Site abandonment and reclamation work in Alberta's aging oil and gas fields has resulted in over 62,000 reclamation certificates being issued. However, the pace of reclamation has not kept up with the level of development. At the end of 2010, there were 47,870 abandoned, uncertified wells in Alberta. Between 1963 and 2010, 350,101 wells were drilled in Alberta.



Sketch courtesy of Liz Saunders

Clear goals and performance measures have to be established and new, objective evaluation tools need to be developed. Industry needs to be educated about beneficial management practices for various types of industrial activities.

It is important for industry to take a lead role in educating their staff and their contractors. Industry and government need to ensure that there is good consistent environmental inspection and audits of certified sites conducted by properly trained and experienced personnel. There need to be clear penalties for infractions and a strong enforcement system.

Landowners, land managers, industry representatives and conservationists can make informed decisions on issues regarding reclamation when they have an appreciation for the value of prairie and an understanding of how to reduce the impact of industrial activities. Technology and industrial practices are constantly changing and improving, so it is important to stay informed.

Acknowledgements

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References and Links

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