

LAND RECLAMATION

Performance Overview

- Surpassed reclamation target for 2011
- Planted over 600,000 shrub and tree seedlings
- Topsoil material placed in fen wetland research area as part of reclamation of former East Mine

Our Policy

Syncrude will ensure the land disturbed by our operation is returned to a stable, safe condition that is capable of supporting biologically self-sustaining communities of plants and animals. Our long-term vision is to create a landscape that sustains an integrated mosaic of land uses that meet stakeholder expectations.

Our policy adheres to the [Alberta Environmental Protection and Enhancement Act](#) which requires Syncrude to return the land we use to a productive capability equivalent to that of the pre-disturbance landscape.

Reclamation Plan Provides Outlook to 2080

Syncrude is required by Alberta legislation to submit a reclamation and closure plan every 10 years, with a mid-term update provided five years after the submission. We provided our update to regulators in 2011. This plan is separate from, but consistent, with our [ERCB Directive 074](#) submission which outlines our [tailings management plan](#).

The reclamation plan outlines in detail the various elements involved in closure of our operation up to end-of-mine life for our Mildred Lake site and Aurora North site, around 2080 and 2050 respectively. It includes information on our regulatory framework, regional planning, consultation, landform design, water management, soil conservation and management, materials balance, forest resources and timber salvage, upland vegetation, wetland reclamation, biodiversity establishment and monitoring, and reclamation monitoring and research.

The closure plan also provides an overview and update on modelling and activities to improve and develop reclamation science, addressing key issues such as landform evolution, water management, salts and their effects on soils, vegetation and surface water, and ecosystem design for establishing natural plant and animal communities.

Reclamation Progression, 2011–2070



* Approximate end-of-mine life.

Creating a Self-Sustaining Landscape

Our reclamation goals are to ensure the final reclaimed landscape:

- has capability equivalent to that existing prior to development;
- is integrated with the surrounding area;
- establishes boreal forest upland and lowland communities;
- yields water suitable for return to the natural environment; and
- is planned in direct consultation with local, directly affected stakeholders, such as neighbouring Aboriginal communities and the Regional Municipality of Wood Buffalo.

Performance objectives include that the land will be suitable for commercial timber production, extensive areas are returned to a natural state and suitable for traditional land uses (hunting, trapping, fishing and harvesting of traditional plants), and wildlife habitat is deemed to be within the natural variability in the region.

To ensure a regional approach to reclamation, and to foster the use of reclamation best practices, Syncrude regularly consults with other operators and openly shares the results of our environmental research.

Ongoing Reclamation Activities

Reclamation of our former East Mine area is ongoing. This area is approximately 11.5 square kilometers in size and is bordered by Highway 63 south of our main plant site and upgrader. It was part of our original operation when Syncrude began production in 1978. Reclamation began in 2000 using composite tails technology.

In our former West Mine area, also part of our original operation, reclamation will begin in late 2012 using the method of capping fluid fine tails with water.

Further discussion on reclamation of these areas can be found in the [Tailings chapter](#).



A reclaimed area once part of our former West Mine.

Mine Financial Security Program

Alberta's new [Mine Financial Security Program](#) for oil sands mines and coal mines was introduced in 2011 through amendments to the Environmental Protection & Enhancement Act. The two primary purposes of the program are to incent ongoing reclamation as soon as practical and to ensure adequate security in the event of premature mine closure or abandonment. It accomplishes those objectives through a series of measures, including:

- The retention of financial security posted by all oil sands and coal operators prior to 2011 under the old Reclamation and Remediation Regulation, totalling approximately \$1 billion, to provide care and custody security.
- The requirement to prepare and file three-year reclamation plans once lands are available to be reclaimed, and to impose financial penalties if reclamation is not performed in accordance with those plans.
- The requirement for each project to generate at least \$3.00 in net revenue for every \$1.00 of reclamation liability and to post security in the event project revenues fall below that ratio.
- At 15 years from end-of-mine life, the requirement for each project to determine the remaining reclamation costs (including post-closure reclamation and monitoring expenses). The project must also post financial security equal to 10 percent of that amount in each of the first 10 years, so that closure liabilities will be fully secured five years prior to end-of-mine life.

If a project operator defaults in any of the security requirements, the government will have the ability to implement appropriate enforcement measures, including the seizure of mine site assets. This program was developed over several years through an extensive consultation process with input from various financial experts and industry associations, including the [Alberta Chamber of Resources](#) (of which Syncrude is a member), with a view to ensuring the development of the province's mine resources without exposing Albertans to undue risk.

Each Syncrude owner is liable for its share of financial security regarding the operation's closure obligations. Currently the Province holds letters of credit in the amount of \$205 million in respect of the Syncrude Project.

Research on Soil Containing Hydrocarbons

Pre-disturbed soil conditions in the area of our Aurora North Mine have resulted in unique vegetation communities, which Aboriginal stakeholders expect us to return after mining. The soil also contains extensive, naturally occurring petroleum hydrocarbons, such as “tarballs,” which may present unique reclamation challenges. In 2010, construction began on a 40-hectare watershed research project to evaluate these challenges and the most effective salvage and soil cover design strategies for reclamation. The study is a multi-disciplinary, collaborative project involving research scientists from Syncrude, the University of Alberta, University of Saskatchewan, consultants and industry partners through the Canadian Oil Sands Network for Research and Development (CONRAD).

Watershed Research

Research continues on a number of watersheds established on our reclaimed land. Syncrude contributes financial grants to Canadian and U.S. universities to conduct research on these watersheds. This supports the long-term data collection, instrument maintenance and database management of soil, climate and hydrology monitoring of these areas.

Research results are used extensively in closure modelling, landscape and soil cover design, and revegetation practices. For example, the construction experience from the fen pilot project will contribute to the reclamation plans of the remaining East Mine area. Additionally, the results from these watersheds inform updates of all the reclamation guidance documents in the region as well as the knowledge base of reclamation practitioners at Syncrude and other oil sands operators.

Bioengineering Helps Control Erosion

In early 2011, we explored the use of large machinery to assist in our bioengineering activities around erosion control. A wood harvester – one of only six in North America – was sourced and used to harvest willow and poplar while still dormant. These species have the ability to shoot roots and stems from cuttings and were intended to become live stakes and bundles called “live fascines.” The fresh tops of aspen and spruce trees, left after removing the limbs from merchantable timber, were also formed into bundles and placed. By using both the live and dead material, we are able to slow down the flow of water on the reclaimed landscape.

Over 8,000 live stakes of balsam poplar and various species of willows, and over 300 dead bundles, were harvested to create 55 live fascines that will continue to grow. The effectiveness of using the wood harvester is under evaluation.



Wood harvester bundling tops from slash piles (left) and live willows and balsam poplar (right) on Syncrude site.



Fascine placed in west swale perpendicular to the flow of water (left). Fascine being covered with soil with excavator (right). Live stakes were placed alongside the dead fascine.

Rough Mulching Aids Reclamation Efforts

A new salvaging technique developed by Syncrude is helping to avoid soil compaction on reclamation areas and create diverse microsites for plants and animals.

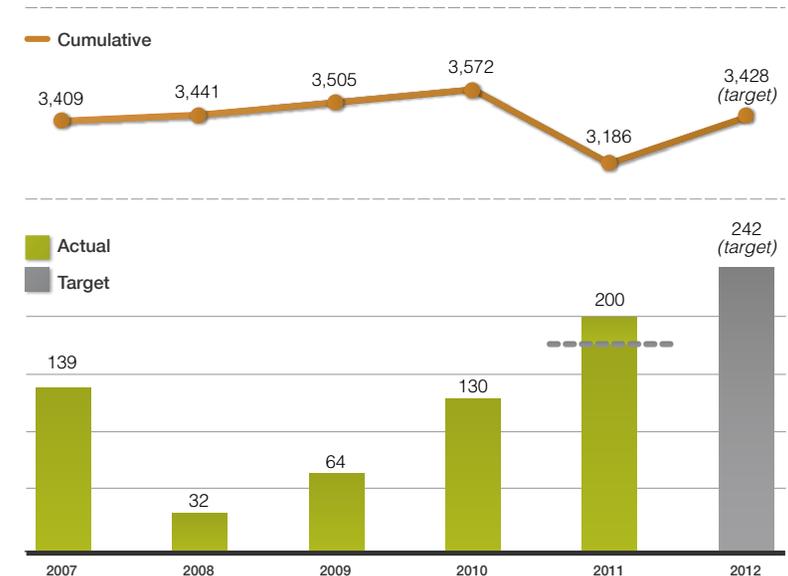
Before soil salvage, the tops and stumps of non-merchantable trees are recovered using a method called “rough mulching.” This adds large pieces of woody debris into the cover soil. When soil is being placed, this coarse material creates surface roughness. This, in turn, creates microsites and moisture traps for vegetation and erosion control. There is also faster self-establishment of native plant species from the seed bank and various propagules present in the soil.

This technique was piloted for three years on small-scale projects, and then integrated into all reclamation activities starting in 2011.



Example of rough mulching at fen reclamation project.

Permanent Land - Reclaimed



Land Use

	2007	2008	2009	2010	2011
Total land disturbed – mine and plant site footprint (cumulative hectares)	20,565	21,912	24,289	25,265	25,858
Soils placed – land available for revegetation (hectares) ¹	–	–	1,025	1,216	1,202
Temporary reclamation (hectares) ²	–	–	452	422	690
Permanent land reclaimed (hectares per year) ¹	139	32	64	130	176 (target) 200 (achieved)
Permanent land reclaimed (cumulative hectares) ^{1,3,4}	3,409	3,441	3,505	3,572	3,186
Tree and shrub seedlings planted (annual)	459,075	161,780	142,970	249,821	355,780

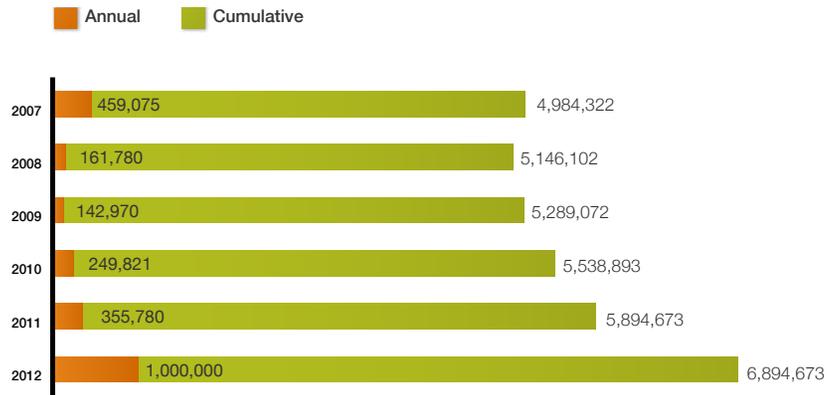
¹ In 2010, the Government of Alberta established a new definition for “permanent reclamation.” For an area to be considered reclaimed, the definition states it must be revegetated in accordance with government-approved plans. Syncrude’s prior definition of a reclaimed area was land that, at a minimum, had been shaped, formed, capped with soil and ready for revegetation. This change resulted in the reclassification of land previously reported by Syncrude in our reclamation numbers. We have amended our reclamation numbers to ensure consistency with government reports.

² In 2011, 338 hectares of bison pasture land formerly considered permanent reclamation were reclassified as temporary reclamation.

³ Includes land certified by the Alberta Government.

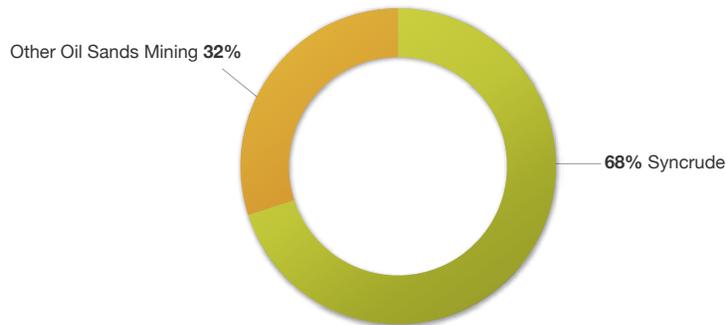
⁴ Numbers include the addition of all newly reclaimed areas as well as any reclamation losses due to redisturbance that may occur. Every effort is made to minimize disturbance of reclaimed areas; however, by progressively reclaiming we may reclaim areas that are later required for operations.

Tree and Shrub Seedlings Planted (cumulative)



Oil Sands Reclamation (permanent and certified)

Permanent and certified



Syncrude has completed over 68 percent of the reclamation in the oil sands mining industry. Data source: Government of Alberta [Regional Reclamation and Disturbance Tracking by Company, to December 31, 2011](#)

Oil Sands Mining Active Footprint (hectares)



Syncrude operations comprise 34 percent of the total active footprint in the oil sands mining industry. Data source: Government of Alberta [Regional Reclamation and Disturbance Tracking by Company, to December 31, 2011](#)

Families Dig Tree Planting Day

Each year, Syncrude hosts a family Tree Planting Day for staff. In 2011, over 150 people participated in planting 600 white spruce and various indigenous shrubs on an area undergoing reclamation.

