

Why mine?

Mining provides us with minerals, metals and other materials we use every day and the fuel used to generate electricity. These minerals have economic value and can benefit mankind.

Although in Australia, less than 1% of the land is mined, depending on the size of the mine, method of mining and location, mining can have a significant impact on the environment. To minimise the effects of this impact, careful planning, management and supervision are required.

What environmental regulations are in place?

In Australia, mining operators must follow strict environmental regulations that are put in place by all levels of government: local, state and federal. These laws not only regulate land use, but also include coverage of clean air, noise abatement, management of waterways and fauna and flora conservation issues.

Before permission to mine is granted, mining operators conduct an Environmental Impact Assessment (EIA) of the area to be mined. The EIA also looks at other areas that may be affected by the mining operation such as roads and the social impact on local towns in terms of employment, education and housing. Details of land restoration and the final use for the mine site must also be included in the mining plans.

Pre-mining studies are conducted into the area's climate, soil, topography and community views are sought on the best use of the land post mining.

How is mined land rehabilitated?

Factors such as rainfall, winds, temperature range, pre-existing vegetation, ground water quality, soil conditions, topography, native flora and fauna are all taken into consideration when rehabilitation plans and activities are developed and implemented.

At the exploration stage, core samples are taken to not only determine the level of mineralisation but to also assess the value of soil to support vegetation. Computer models are used to simulate mining and any necessary backfilling that may need to occur during the life of the mine.

In open-cut mining operations, rehabilitation occurs along with the mine's development. Top soil is stripped and stockpiled prior to mining for later use over rehabilitated areas. As mining ceases in one area bulldozers and scrapers are used to reshape the disturbed area. Water drainage is designed to make the new land surface as stable as possible. Dams can be built to protect the area further from erosion and act as a permanent water storage area. The final contours of the land forms are smoothed and planted with vegetation.



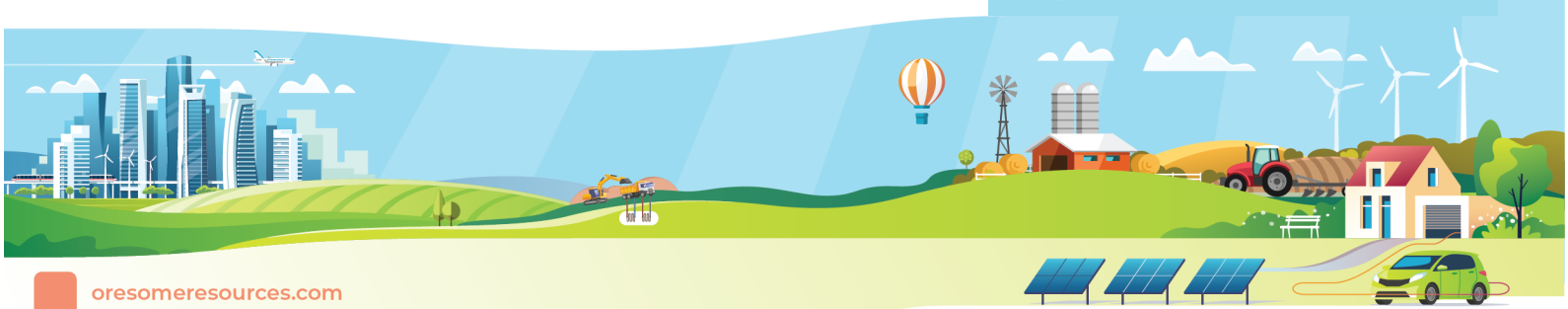
Water testing is conducted on site

Image courtesy of Queensland Resources Council



Rehabilitated waste rock stockpile

Image courtesy of Xstrata copper



The progress of the rehabilitation is monitored with miners usually prohibiting further land use until the vegetation is well established.

In underground coal mining, surface land subsidence can occur. A range of improved engineering techniques is used to design the layout and dimensions of underground mine workings to minimise and control subsidence.

How are the environmental impacts of mining managed?

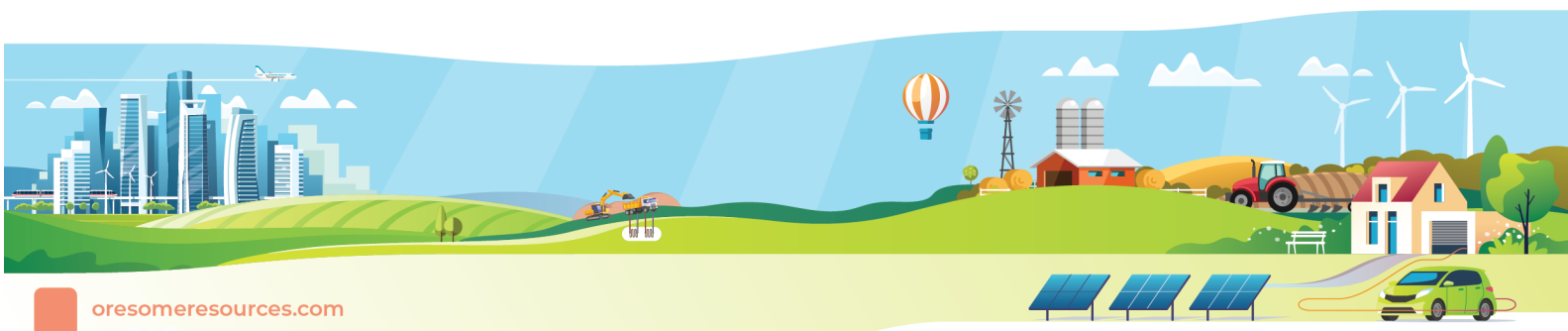
The operating of a mine can have challenges in relation to land disturbance, impact on biodiversity (plants and animals), waste and recycling, use of water and energy use and emissions.

This table sets out some of these impacts and methods used to minimise them.

Impact	Steps taken to reduce impacts
Animal and plant habitats are destroyed	Disturbed areas are rehabilitated or new habitats developed in line with the needs of local animal and plant species
The land is changed significantly as a result of open-cut mining.	Top soil is removed and reused later in rehabilitation. Land forms are re-contoured to resemble the natural landscape or shaped for other purposes determined by the local community e.g. grazing land or aquaculture.
Large pits are created from open-cut mining.	Pits can be backfilled or used as storage areas for water.
Underground mining can cause land subsidence.	In hard rock mining underground areas are backfilled with waste from the mining operations. Miners submit a plan to the government before mining that details how subsidence will be managed by underground engineering techniques and the re-contouring of disturbed areas.
Waste from minerals processing is collected in tailings dams.	Tailings dams can eventually be covered with clay and topsoil and then revegetated. Monitoring of the tailings occurs post mining.
Dust is emitted from tailings dams, open-cut mine stockpiles and trucks carrying ore.	Water trucks use recycled water whenever possible on mine sites to suppress the dust.
Water is used in the processing of minerals, washing of vehicles to prevent the spread of weeds and for dust suppression.	Water is recycled wherever possible with excess water contained in dams.
Vehicles on mine sites emit greenhouse gas emissions	The use of fuel efficient vehicles reduces the level of emissions.

What Happens After Mining?

The type of rehabilitation of the mine site is determined in consultation with local community groups and takes into consideration the location and prior use of the land. This could vary from recreational use, pastures, the development of nature reserves to a new industry use such as aquaculture.



Links

For careers related to mining and environmental management visit www.peopleforthefuture.com.au or www.miningcareers.com

For more on mine site rehabilitation visit University of Queensland Centre for Mined Land Rehabilitation

