

Coal Mine Rehabilitation

2021 Update

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Planning for rehabilitation starts as early in the mine life as possible; with our contemporary mines this takes place before first coal is mined.

*Nigel Charnock
Land & Property
Manager*

In 2020, our Australian coal operations:

Completed

1,382ha
of rehabilitation

Invested more than

\$43 million
in rehabilitation work

Used more than

2 million of topsoil
cubic metres

Planted
almost

**78,000 tubestock
& seedlings**

Sowed more than

33 tonnes
of seed

Achieved Government

sign-off on rehabilitation at

4 mine sites

In total:

We have now

rehabilitated almost

20,000ha of mined land

7

Successful applications
for Government sign-off
on almost

800ha of mined
land

Our rehabilitation planning ensures programs are **resourced, budgeted and delivered.**

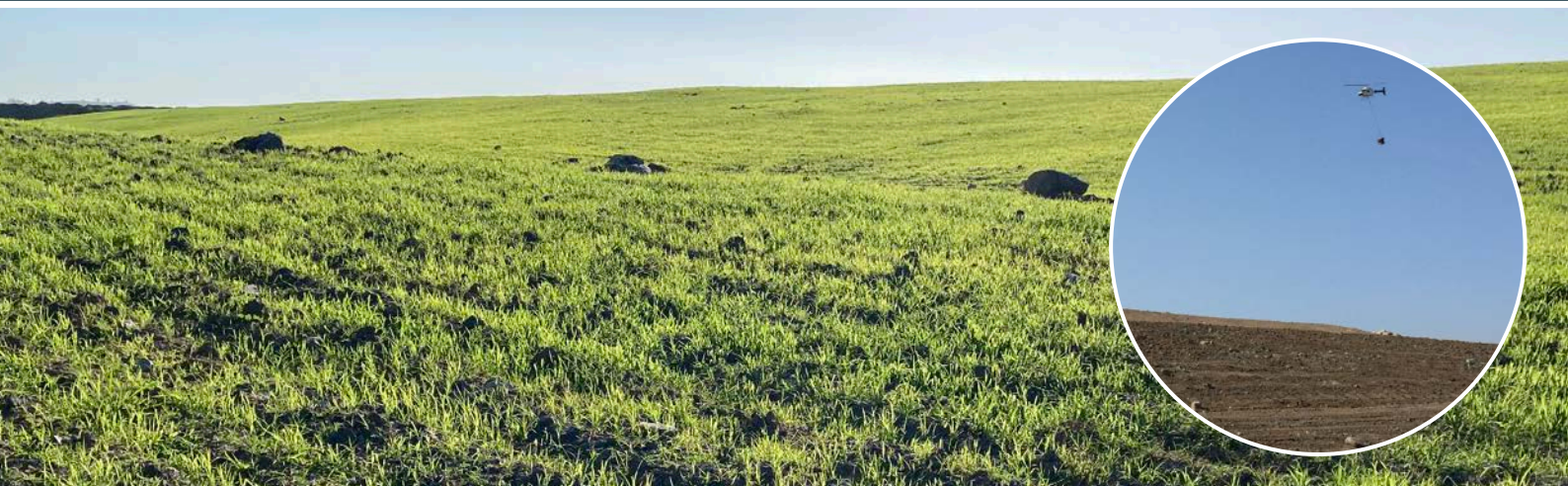
Progressive rehabilitation at Clermont Open Cut.



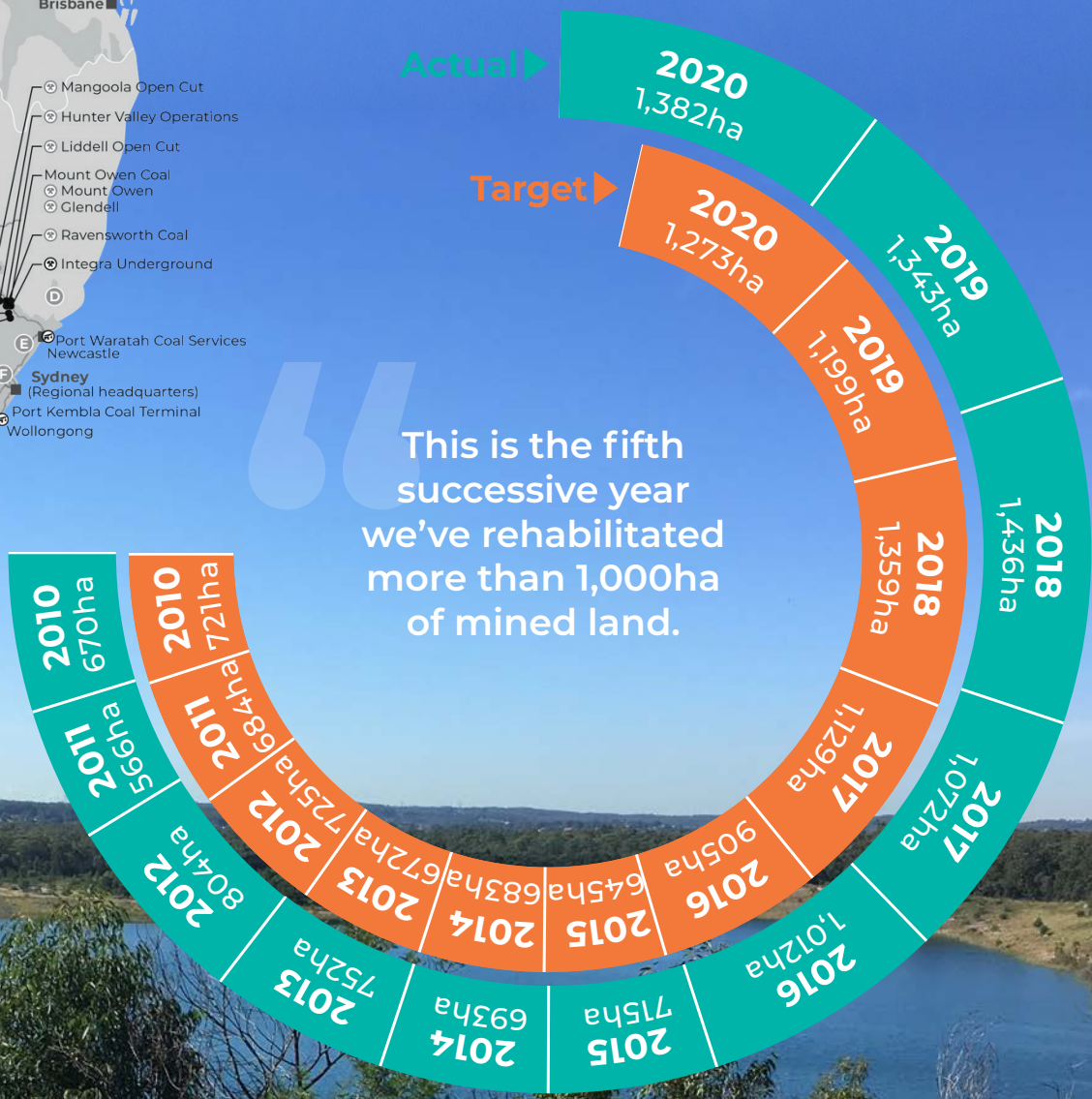
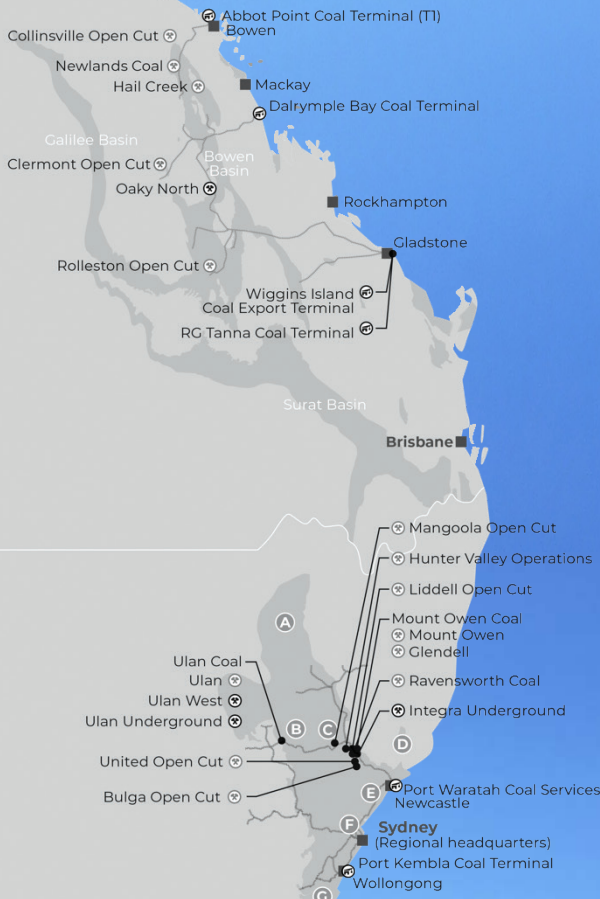
No longer needed for coal production, one of Hail Creek mine's draglines has been re-purposed to shape final landforms.



The Grasstree pit at Oaky Creek during mining and after rehabilitation. The green outline shows the area signed-off by Government.



Rehabilitation at Mt Owen mine one month after aerial seeding (inset).



This is the fifth successive year we've rehabilitated more than 1,000ha of mined land.

Rehabilitation

Our Australian coal operations once again rehabilitated more than 1000 hectares of mined land in 2020 and achieved sign-off on rehabilitation of mined land at four mining operations.

This is the fifth successive year we have exceeded a target of 1000ha in a year, while sign-off on areas of rehabilitation at our Ulan, Westside, Collinsville and Oaky Creek sites makes a total of seven successful applications for Government certification in NSW and Queensland in the past four years.

These results are driven by an ongoing focus on returning mined land to either self-sustaining native ecosystems, agricultural use or other suitable purposes that meet requirements set down by Government and the expectations of the communities that host our operations.

And they show the benefits of ensuring that planning for rehabilitation at all Glencore operations starts as early in the mine life as possible; with our contemporary mines, this takes place before first coal is mined.

Rehabilitation is then incorporated into daily and annual plans to ensure the work is adequately resourced, budgeted and delivered.

Our final rehabilitation outcomes must be capable of meeting agreed post-mining land uses and to

ensure this we have developed a Rehabilitation Report Card that is used to assess the status of any rehabilitation area against set success criteria.

The Report Card, now in use across all Glencore mining operations, shows how well rehabilitation areas are performing, removes measurement bias, and includes scientific rigour that stands up to future scrutiny.

It's a systematic approach that has enabled a number of our sites to achieve industry firsts for rehabilitation.

In 2017, our Newlands Open Cut operation in central Queensland became the first in Bowen Basin coal mining history to have mine spoil certified by regulators as being successfully rehabilitated while operations continue.

Our Westside Open Cut site in the NSW Lower Hunter has received Government certification for 38ha of its rehabilitated mined land, a first for the State's coal industry under contemporary mine rehabilitation criteria.

And our Mangoola Open Cut mine in the NSW Upper Hunter has pioneered the incorporation of natural landform into its rehabilitation, work that is widely acknowledged as an industry benchmark.

The total amount of mined land that our operations have rehabilitated up to 1 January 2021 is almost 20,000ha, equivalent to almost the entire city of Sydney.

Government certification

All of our mining operations must meet requirements set down by Government that ensure mined land is returned to either self-sustaining native ecosystems, agricultural use or other suitable purposes.

This is done progressively during the mine life as well as after mining activity has finished.

Our focus on delivering both quality and quantity has resulted in a number of our mining operations achieving certification from Government (effectively, a sign-off) on areas of rehabilitation.

The key completion criteria include performance requirements relating treatment of mining

infrastructure, landform stability, water management and site drainage, vegetation and, in some cases, native fauna.

Since 2017, we have successfully applied to have seven areas of rehabilitation at our sites signed off after inspections by either NSW or Queensland Government regulators determined that these areas had met specific closure criteria.

This represents almost 800ha (equivalent to more than 1,300 football fields) with almost all of this achieved at active mining operations, reflecting our commitment to ensuring that rehabilitation work is incorporated as far as practicable into the day-to-day operation of the mine.



achieved certification in 2020 for **99ha** of rehabilitated mined land

COLLINSVILLE OPEN CUT

Collinsville, Queensland's oldest operating mine, achieved certification in 2020 for 99 hectares of rehabilitation over a previous mining area known as Belmore.

Mined by open cut methods between 2000 and 2003, rehabilitation of the Belmore area was completed in 2003-04. Since 2007, Belmore has been used for grazing cattle by a private landholder from a neighbouring property while rehabilitation monitoring of the area continued.

"We are achieving some significant outcomes in rehabilitating a mine that has been operating for 100 years and Government sign-off on the Belmore area recognises this."

Dawid Pretorius
Operations Manager

NEWLANDS OPEN CUT

In 2017, our Newlands Open Cut operation in central Queensland became the first in Bowen Basin coal mining history to have mine spoil certified by regulators.

A 73ha area of rehabilitation was signed off after being assessed as providing habitat suitable for flora and fauna within overarching objectives of being safe, stable, non-polluting and sustainable.

"It is the first time in the history of coal mining in the Bowen Basin that rehabilitation of coal mine overburden spoil has ever been certified."

Clayton Stansbie
Operations Manager



In 2017 **73ha** of rehabilitation was signed off.



achieved certification for almost **400ha** of its rehabilitated mined land

ROLLESTON OPEN CUT

Rolleston has twice received Government certification of areas of rehabilitation that will be used in future years for cattle grazing.

Since first coal was mined in 2005, the central Queensland site has received sign-off for 220ha of rehabilitation in 2018 and on another 166 hectares of rehabilitated mined land in 2019.

This means Rolleston now has certification for almost 400ha of its rehabilitation (equivalent to more than 660 football fields), which represents over 30% of the total amount of mined land that has been rehabilitated at the site.

"Our employees take enormous pride in this aspect of mining; many of them are from rural backgrounds and it is important to them and Glencore that we return the land to a productive and sustainable use."

Paul Sear
Operations Manager

OAKY CREEK OPEN CUT

Oaky Creek's 2020 certification covered two areas on the site that now support native vegetation and potential for cattle grazing.

The rehabilitation is across a 60-hectare area known as G5S, which was mined in the 1980s, and a 72ha area called Grasstree, where mining finished in the 1990s.



In 2020 two areas achieved certification for **132ha** of rehabilitated mine land.

"As progressive and responsible miners, we will continue to work on achieving completion criteria for other areas of rehabilitation across our site."

Dave Stone
Operations Manager

ULAN OPEN CUT

Our Ulan Coal operation in the NSW Mid-Western region achieved Government sign-off on 52ha of its rehabilitated mined land in 2020.

More than 130 native wildlife species have been recorded since rehabilitation was completed, including the endangered Painted Honeyeater and several other threatened species.

"It's so rewarding to see the thriving rehabilitated ecosystem providing habitat for native species."

Robyn Stoney
Environment & Community Manager



achieved certification in 2020 for **52ha** of rehabilitated mined land

WESTSIDE OPEN CUT

Our Westside Open Cut site in the NSW Lower Hunter received Government certification for 38ha of its rehabilitated mined land in 2020, a first for the State's coal industry under contemporary mine rehabilitation criteria.

Recent monitoring showed the site's rehabilitation supports 127 fauna species, including 11 threatened species.



In 2020 **38ha** of rehabilitated mine land received Government certification.

"The focus on progressive rehabilitation throughout the operational phase meant final rehabilitation of the mine was completed . . . just two months after mining finished."

Ben Clibborn
Environment & Community Manager

Mine Closure

In addition to rehabilitation planning, all Glencore operations also focus throughout the life of a mine on planning for eventual closure.

A mine's closure outcome is set at the outset by an agreed final landform and land use as part of the EIS approval process. Progressive rehabilitation is designed to achieve the approved final land use outcome.

Each site's closure planning will also be guided by its regulatory approvals, the site's regional context, long-term post-mining land uses and by consultation with all relevant stakeholders.

This forward-thinking delivers many benefits.

- It allows for progressive decommissioning and rehabilitation work while mining is underway;
- It avoids the need for costly or unforeseen remedial work late in a mine's life cycle;
- It minimises the impacts of unexpected or unplanned closures;
- It ensures that the costs of progressive and final closure works are included in site budgeting;
- It delivers sustainable post-mining land uses that enable mining tenements to be relinquished.

To guide our closure planning, we have a Mine Closure Control Group whose charter is to oversee the last few years of detailed closure planning at each operation.

Each site is required to have a closure plan that reflects the site's mining phase.

As sites move closer to closure, the level of detail required in the plan increases as we seek to better understand, manage and execute the closure process.

These closure plans involve input from all departments of the site as a means of integrating closure planning through the business.

In recent years we've been undertaking closure works at two sites – Macquarie Coal (comprising West Wallsend and Westside) and Baal Bone – where this attention to planning detail is delivering some excellent outcomes.

Four other sites – Liddell and Newlands open cut, Integra and Ravensworth underground mines – are also in various stages of detailed mine closure planning or works.



Rehabilitation of the former Westside open cut mine at the Macquarie Coal complex.

Case study Macquarie Coal

Macquarie Coal is located in the Lake Macquarie region of New South Wales (NSW), near Newcastle. The site encompasses West Wallsend Underground, the former Macquarie Coal Preparation Plant, the former Westside Open Cut mine and the former Teralba Colliery Northgate and Southgate sites.

Over 100 years of mining on the site ended in 2016. Progress on various mine closure works has taken place since this time, including shaft and drift filling, building demolition, subsidence remediation, contaminated land management, various earth works and tailings dam rehabilitation.

The majority of this work will be completed by the end of 2025, although ongoing work will be required to ensure rehabilitation meets agreed closure criteria set out in the approved Mine Closure Plan.

Key elements of the work to date include:

- 38ha of rehabilitation signed off by NSW Government;
- 16 mine shafts and drifts (roadways) sealed to modern standard; and
- All coal handling infrastructure demolished.



Case study Baal Bone

Baal Bone Colliery, located at Lithgow in the NSW Central Tablelands, has operated as an open cut and underground mine since the 1940s.

Detailed planning during the mine's operational phase and while the site was in care and maintenance from 2013 enabled mine closure work to begin within months of the mine's formal closure in 2019.

The majority of this work will be completed by the end of 2021, although ongoing work will be required to ensure rehabilitation meets agreed closure criteria set out in Baal Bone's approved Mine Closure Plan.

Key elements of the work to date include:

- Nearly 1 million cubic metres of material moved by dozers to backfill and shape voids;
- Almost 10,000m³ of coal and chitter from the stockpile area removed and replaced with 14,000m³ of topsoil; and
- Removal of more than 7km of railway line, nearly 11,000 sleepers and 30,000m³ of ballast (stones used as trackbed) to allow for rehabilitation of the rail loop.



Grazing of Rehabilitated Areas

We work collaboratively with our wholly-owned pastoral subsidiary, Colinta Holdings, to demonstrate sustainable grazing on rehabilitated mined land.

It's a practical and successful example of active mining operations working with agricultural interests to improve the quality of our rehabilitation.

At some of our operations, Colinta's insight and input is helping to facilitate the transition of rehabilitation to a grazing post-mining land use.

At our Newlands Coal complex in Queensland's Bowen Basin, mining will end in 2023 after 40 years of operation in both underground and open cut formats.

While over-sized machinery is used to develop final landform across the site, beasts and beetles are also playing key roles in the rehabilitation work.

Cattle grazing on established rehabilitated areas is improving the quality of pasture available by reducing excessive pasture growth and promoting fresh growth, whilst at the same time providing the disturbance needed to stimulate improved species diversity and cover on bare areas.

Dung beetles are also playing an important part, improving soil fertility by breaking down manure and, through their burrowing, helping improve water retention.



Grazing trials at Liddell have provided vital information on the establishment and management of rehabilitation.

Our Rolleston Open Cut mine, another Bowen Basin operation, is introducing Colinta cattle into areas of the site's rehabilitation that have already been signed-off.

This is improving the quality of pasture, something that will leave a positive legacy for future grazing activities after mining.


At our Liddell Coal complex in the NSW Upper Hunter, grazing trials have demonstrated that cattle can be grazed on rehabilitated mined land at stocking rates at least equal to district averages.

Six years of results showed that cattle grazing on rehabilitated land outperformed those grazing on nearby natural pasture.

Equally important, the trials have also provided vital information to inform the establishment and ongoing management of rehabilitation areas.



Grazing on established pasture at Newlands. Insets: fresh growth in hoofprints and dung beetle activity improving soil fertility.



We're always
looking for advances
in science to ultimately
leave the best
rehabilitation outcome
we can.

*Nathan Lane
Environment & Community
Manager*

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