

Case Study

September 2021

Macraes mine at sunrise.

Deepdell North pit development: Macraes gold mine

OceanaGold has been mining at Macraes flat in East Otago since 1990. Along the journey the company has gone to extra lengths to manage environmental effects and to work with the local community. The Deepdell North pit development is the latest in a string of nature conservation successes.

Introduction

OceanaGold's opencast Macraes mine in East Otago is New Zealand's largest gold mine which has been in operation since 1990. It covers more than 1000 hectares and has produced more than 5 million ounces, providing employment for around 600 full time staff.

The company's approach to environmental management at all of its sites is to follow the "effects management hierarchy" – a stepwise process of avoiding, remedying (repairing) and then mitigating (making less severe) environmental effects; and, for residual effects, offsets and compensation to enhance biodiversity and wetlands at other sites.

Research is a key component of OceanaGold's work at Macraes. Toxicology studies on elevated sulphate levels in mine drainages confirmed the instream fauna tolerance to consented discharges of SO_4 , an important finding to ensure continued operations. For this work, OceanaGold won a Minerals Sector Award for environmental management in 2019.

This case study focuses on the reopening of the Deepdell pit, which provides a two-year bridge between operations drawing to a close at parts of Macraes, and new operations starting, eg the Golden Point underground mine.

Deepdell presents a challenge in managing surplus rock, as well as for wetland, shrubland and lizard conservation.



Macraes open pit – the Deepdell project.

New rock stack

The largest waste stream at a mine is usually the non-ore bearing rock that the operator must remove to access mineable gold resources. This is surplus rock and it has to be put somewhere.

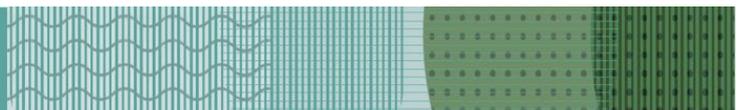
The Deepdell North Stage Three Project entails extending the existing backfilled open pit and creating a new rock stack, one of three new projects consented in late 2020 that will extend the mine life of Macraes to at least 2028.

Finding a suitable place for the 53.5 million tonnes rock stack from the Deepdell North pit entailed extensive consultation with the local community and iwi, farmers, landowners, councils and the Department of Conservation to bring them deeply and early into project design.

This engagement started as far back as 2017 to discuss three options for the rock stack, with an eye to both safeguarding unusual plant and animal species in this part of the Otago high country, and to determine an optimum design, to balance out the effects on the values of each stakeholder group. This occurred two years before OceanaGold lodged resource consent applications, and informed and contributed to obtaining consent.

Following the stakeholder engagement and extensive studies, OceanaGold found that all three options were likely to have difficulty in obtaining consent. A fourth option – identified during early design brainstorming and stakeholder engagement, and initially discarded because of perceived landscape effects – was brought back to the table.

This change from the original design eliminates the need for freshwater management at the site, now placed on a high point in the terrain/watershed, reduces noise impacts, avoids impacts on heritage, and



avoids impacts on Taieri flathead galaxiid habitat, and on an individual 200-year-old tree daisy (*Olearia fimbriata*), classified as Nationally Vulnerable.

Net positive wetlands

Despite the efforts to avoid significant biodiversity values, the Deepdell development affects six ephemeral wetlands on grazing land within its footprint. While classified as Critically Endangered and Naturally Uncommon ecosystems, OceanaGold demonstrated these ecosystems occur extensively across the Macraes Ecological District, and are highly degraded. DOC concurred with this finding.

To mitigate the loss of 0.3 ha of wetlands, OceanaGold is offsetting the disturbance by enhancing a nearby 5.4ha wetland on a nearby farm (the largest of its kind in Otago). The goal of the offset is to improve the wetland’s indigenous biodiversity within the next 10 years to achieve 50% cover in 15 indigenous plant species, including at least 10 species characteristic of Macraes ephemeral wetlands, as well as five ephemeral wetland species of national conservation concern.

A second aspect of the offset package is the enhancement of terrestrial habitat over 50ha of covenanted land, which includes stock exclusion, conversion of tussockland to native shrubland, and a 50-year commitment to manage the site, via a community trust supported with funding.

Ecologist Mike Thorsen (Ahika Ltd) is in the second year of leading this project, which comprises:

- Shrubland: offset effects on 3.75ha (15 plant species) over 4.23ha (22 species). The 10-year goal is to expand shrubland to 10ha with 18 species and 75% canopy cover.
- Seepage wetland: offset effects on 0.07ha (700m²) over 0.82ha. The 10-year goal is a 20% increase in indigenous species dominance, and inclusion of a Naturally Uncommon reed species, *Juncus distegus*.



Ephemeral wetland.



Wetland offset – October 2019.



Tree planting at Cranky Jims.

Lizard conservation

Also associated with Deepdell is disturbance of lizard (ngarara) populations and habitat, a special feature of indigenous biodiversity in the Otago region, and classified as threatened species. The first step was to find and translocate lizards, working with DOC and local iwi. Completed in early March 2021, the results were:



Kōrero gecko

- 1500 kōrero geckos (found in the crevices of rocky tors);
- 350 southern grass skinks (which prefer moist, grassy areas).

The company placed the kōrero geckos into an existing covenant of 100ha (land already set aside for conservation) and mimicked the rocky tors the geckos prefer with replacement rocky outcrops built to resemble landforms typical of the Otago high country. As well, OceanaGold has salvaged rocky tors from the impact site and are placing these on the rehabilitated waste rock stack.

In light of insufficient knowledge of the life cycle of lizards in Macraes, OceanaGold's herpetologist, Dr Mandy Tocher, advised that she did not deem offsetting to the standard required to be possible. As a result, the company developed an extensive compensation package, which includes four streams of research investigating lizard conservation issues, and lasting 7-10-years, to which DOC agreed.

The first research stream investigates the impact on four lizard species of removing grazing. This research has a 7-year duration, and OceanaGold is establishing this in and outside the Redbank offset site.

Southern grass skinks salvaged from the mining area are the subject of the second research stream, which examines the skink's preference for constructed habitat types. A trial site of rocky habitat with different grades of rock will determine the optimal spacing between stones that best suit the skinks to live in.

The third research streams includes studying the effect on lizard populations of a 6-year mammalian pest control programme over a 100ha covenant, to be followed by monitoring the population for a further four years after ceasing the pest control. In the first six months of this project, OceanaGold caught 150 pest animals, including 70 hedgehogs, 48 mustelids (ferrets, stoats and weasels), and 29 feral cats.

The final research stream seeks to determine the most optimal method for determining kōrero gecko populations. This research will run concurrently with the removal of pest control research.

Case study source: OceanaGold Corporation