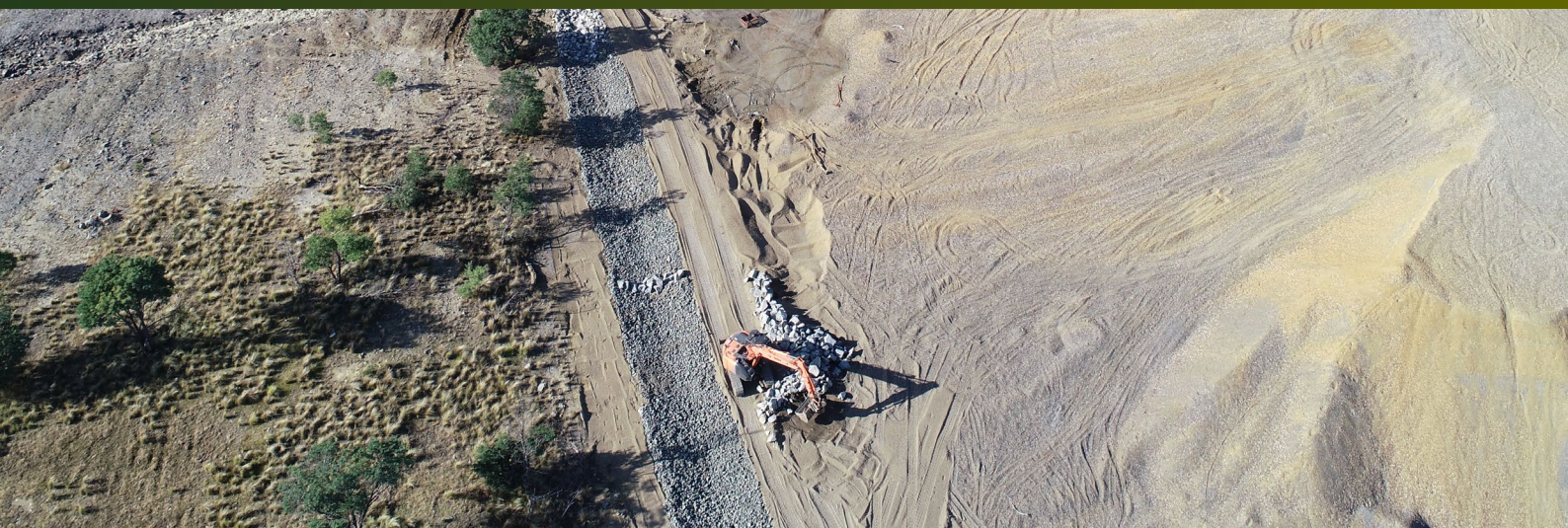
Rehabilitation of Mines 2021 - 2022
Annual Review

Department of State Growth
Mineral Resources Tasmania

Tasmanian Government

Contents



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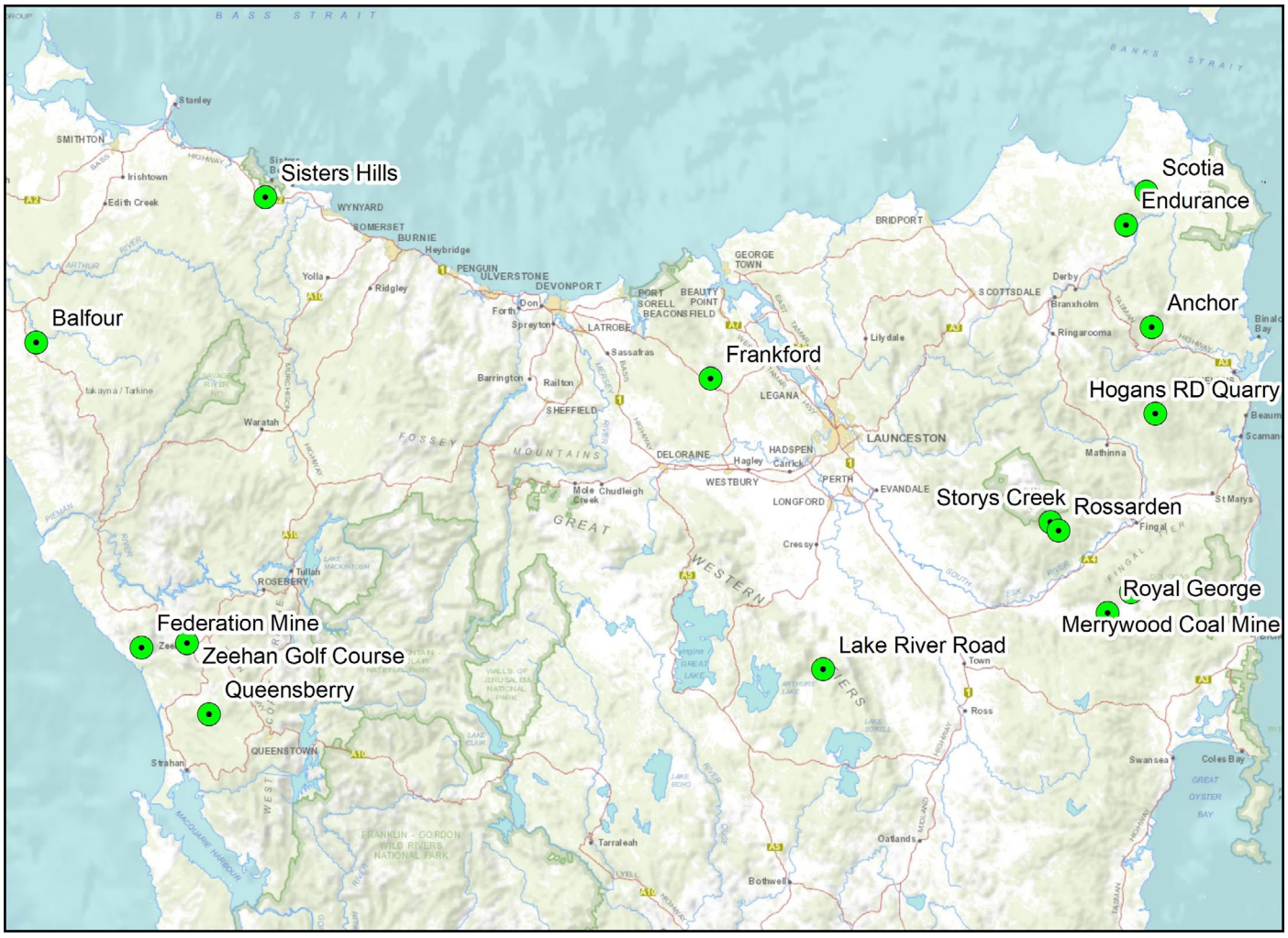
Background

The Mineral Resources Development Act 1995 (MRDA) makes provision for the Minister to undertake rehabilitation of abandoned mines. Section 181 of the MRDA allows the Minister to establish a Rehabilitation of Mining Lands Trust Fund (RTF) which is administered by a committee, including members from regulatory bodies, Crown land managers, and industry organisations. The RTF receives an annual grant from the Government to undertake rehabilitation activities.

The RTF committee has recently moved to review the RTF Strategy and the methods by which sites are selected for remediation. As part of this review, the RTF committee has initiated a data collection and risk rating process for abandoned mining features in Tasmania, with data housed in the newly developed Legacy Mine Database. The Legacy Mine Database will bring Tasmania's data collection and risk management into alignment with the National Strategic Framework for Managing Abandoned Mines in the Minerals Industry, allowing the RTF committee to better prioritise sites for remediation based on risks to both public safety and the environment.

Overview

Activity in the 2021 – 2022 abandoned mines rehabilitation program was spread across twelve sites. Major projects included subsidence repairs at Zeehan and Federation Mine and investigative works at Side Creek (part of the Storeys Creek Mine). Water quality monitoring was carried out at Anchor, Endurance, Royal George, Merrywood, and Balfour by Mineral Resources Tasmania (MRT) staff. Weed control programs were continued at Royal George, Sisters Hills, Frankford, Queensberry, and Balfour.



Rehabilitation project site locations 2021-22 program (image source – C. Steyn, 2022).

Rehabilitation Trust Fund Projects

Rossarden

Several mines operated immediately north of Rossarden during the 1900s, the major operation being the Aberfoyle Mine (1931 until 1982). The Aberfoyle Mine produced approximately 11,000 tonnes of tin and 3,500 tonnes of wolfram during its operating life.

Tailings were disposed of around the mill and later into conventional tailings dams north of the mine. The mine water discharged from an adit, draining directly into Aberfoyle Creek, downstream of the site.

During 2018, it was noted that the course rejects dump (CRD) was unstable and material from the dump was failing into the Aberfoyle Creek valley. In May to June 2020, drainage realignment was completed by MRT to minimise future erosion. During these works, two areas of ground subsidence corresponding with the historic Northern Prospecting Shaft and Searles Shaft, were repaired to reduce risks to public safety.

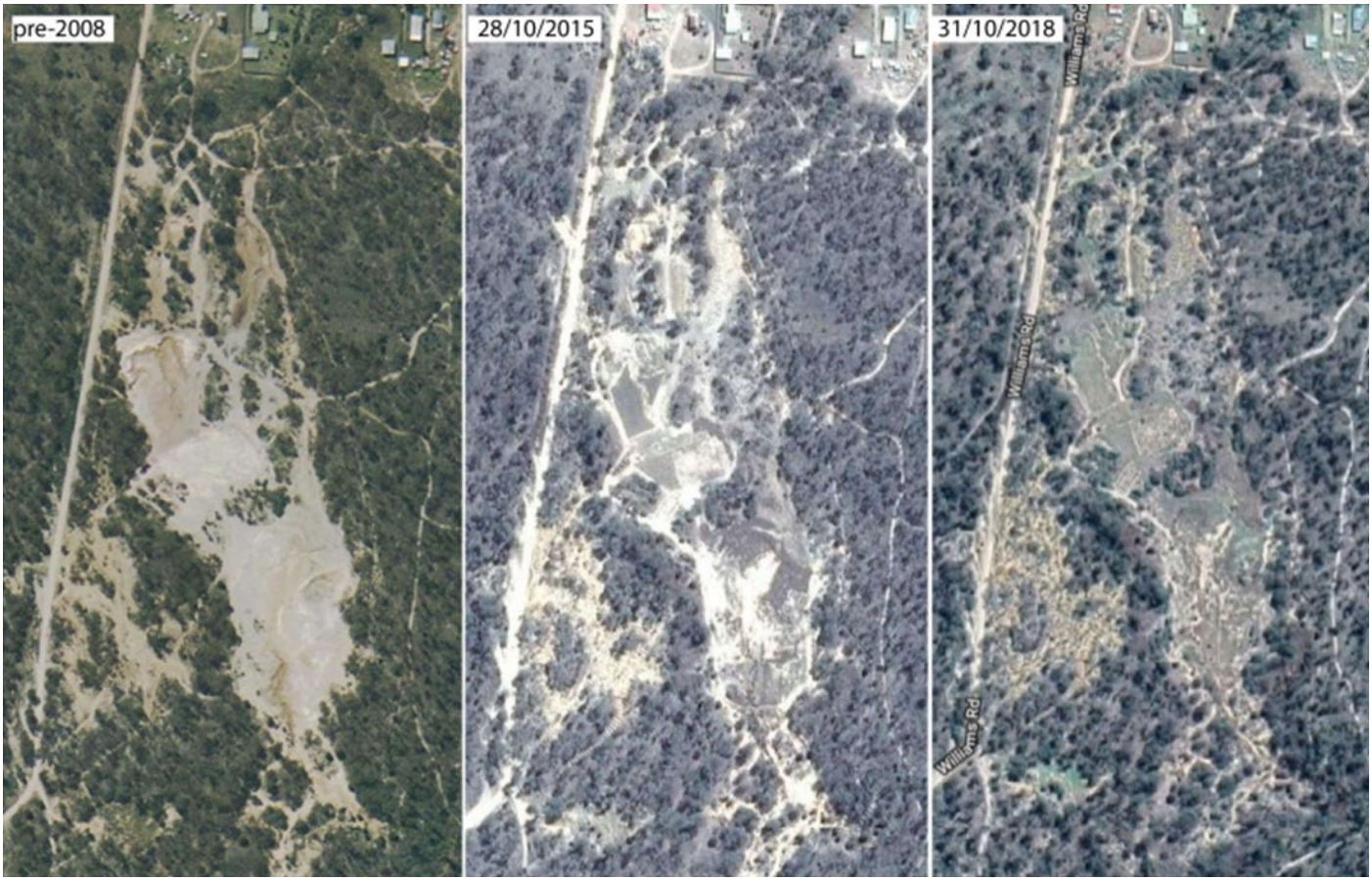
In September 2021 and February 2022, MRT completed visual inspections of the recently constructed diversion drains and subsidence repairs (completed May - June 2020) at the Aberfoyle mine site. The diversion drains were in good condition and appeared effective at diverting surface water flows on site.

Storeys Creek Mine

Tin and wolfram were first mined in 1895, originally via blind adits driven into outcrops in Side Creek, which drains into Storys Creek below the later established mine site. Storeys Creek Mining Company was established and expanded the Side Creek workings. By the early 1920's the Storeys Creek Tin Mining syndicate was the main wolfram producer in the State and an important producer of tin. By 1960 Thompson & Brett Pty. Ltd. had produced about 800 tonnes of tin and 6300 tonnes of wolfram concentrates. Ore was processed at the Storeys Creek Mine until December 1971 when the processing plant was shut down. Thereafter, ore was transferred to the Rossarden mine for processing.

Smaller drain, north of the tailings, with constant flow (September 2021).

Storeys Creek mine site looking south from the repository dam.



Aerial photography showing the revegetation success at the Royal George Mine.

Tailings were originally discharged directly into Storys Creek, then later dumped along the west slope alongside the creek and in tailings dams east of Storeys Creek. Mine water was pumped directly into the creek until the 1970's when it was pumped to an old tailings dam (now known as the Precipitation Dam) and treated with lime and later with soda ash to raise the pH and enhance the precipitation of metals out of solution.

Water quality monitoring was carried out at Storey's Creek Mine from 2003 to 2006, 2016, and 2021. Side Creek, compared to other upstream sources, was determined to have a significant impact on the water quality within Storys Creek.

In 2021, MRT engaged a consulting company to identify options for the remediation and/or mitigation of impacts from historical mining activity at Side Creek using collected field data, in conjunction with historical information (mine plans, archaeological reports, and water quality data). The report recommended several remediation options to consider, with further studies required to inform the feasibility of these options, and the associated costs.

The remediation option of highest recommendation was the repair/replacement of the existing clean water diversion channel. The potential success of this option can be better understood by conducting a hydrological study to determine water sources, pathways, and water table depths throughout the mine workings.

Royal George

Royal George is a legacy tin mine located in North-East Tasmania, immediately south of the town of Royal George. Mining activity at the site occurred between 1911 and 1928, with around 900 tonnes of tin concentrate produced. The site workings included an open cut mine, an adit, a shaft and a drive.

The processing activities on the site generated tailings which cover an area approximately 600m x 50m, downslope from the mining activities. Over time, during heavy rainfall events, tailings continued to move downslope from the mining activities.

During 2021-2022, the Environment Protection Agency (EPA) was asked to review the water quality data collected during MRT's management of the site. The EPA suggested that the works completed, including reshaping, revegetation, and fertiliser application have improved the overall site biodiversity and water quality. The EPA suggested that the lime addition in particular has assisted with improvements in water quality and dissolution of metal/oids into the environment. The RTF committee elected to continue lime addition on a biannual basis, most recently completed in May 2022.

Lime addition occurring at the Royal George Mine.

Weed management at Royal George was conducted in October 2021 with a follow-up visit in January 2022. Slender thistles and mature gorse plants were treated in October. Young Californian thistles in the historic population, germinating gorse, and any missed slender thistles were treated in January 2021.

Argonaut

Argonaut is a legacy tin mine located in northeast Tasmania, near St Helens. Operations commenced from 1911 to 1913, with pumping and sluicing as the primary mining method. In 1932, Argonaut was purchased by the Siamese syndicate and operations were expanded significantly, including the construction of a water race. Over five years, the company produced 524 tons of tin and employed an average of 60 men. Tailings were stacked on higher ground, well back from the river, and settling dams were provided to settle most of the fines before the water returned to the river. Even with these precautions, heavy rains and floods carried away stored tailings, causing damage as they were deposited on lower areas. Under new ownership, the mine reopened from 1940 to 1962. During this time, the water race was repaired and tailings were progressively discharged into a paddock, resulting in a very small portion of tailings washed downstream.

In 2002, concerns regarding the state of some sites to the west of St Helens resulted in the commencement of investigations into the abandoned tin mining areas off Argonaut Road. Remedial works were designed after taking the recreational use (orienteering) of this area into account.

Rehabilitation activities began in 2003/2004, involving erosion control and revegetation. The RTF committee has committed to ongoing maintenance of the revegetation of the Argonaut site. Fertiliser was applied to the revegetated areas during April 2022.

Merrywood

The Merrywood Coal Mine was first opened in 1947 and operated as both an underground and open cut mine until it closed in 1963 due to a loss of markets. During this time, a crushing plant was installed in 1953 at the Avoca railway siding, and in 1957 a washery was built close to the mine to improve the quality of the marketable coal. Output from the mine was the highest in the State for much of the mine life. In 1989, Merrywood Coal reopened as quite a large operation producing 50,000 to 150,000 tonnes of coal per annum.

Merrywood coal production stopped in 1996/1997. At this time, all plant was disposed of, and the company was expected to go into liquidation. In May 2000, the mining lease (31M/1992) was revoked, and the RTF remediated the site in the following years. The site has been stable and self-sustaining since the remediation.

Remaining structures on the remediated Merrywood Mine Site.

In August 2021, MRT received an inquiry from a member of the public regarding water quality in Merrywood Creek, downstream of the former Merrywood Coal Mine. The RTF supported MRT to conduct surface water quality monitoring on three occasions following the inquiry. The water quality monitoring identified some areas of concern. MRT has since engaged a consultant to assist with better understanding the source of the concern and potential remediation solutions. The RTF supports the consultant's recommendation to continue monitoring downstream of the site to monitor and quantify effects on the downstream environment.

Balfour

The Balfour mining field is a legacy tin and copper mine site in northwest Tasmania. Tin was discovered in about 1884 and productively worked until 1899. Copper replaced tin in 1901, and for the first few years, little mining was carried out. Activity intensified during 1908 and increased to a peak in 1912. Unfortunately, using the mining methods of the day, the mining field rapidly declined and was officially abandoned in 1924, leaving a considerable area in need of rehabilitation.

Water and sediment samples being collected in 2020 at the Frankland River downstream of the site.

Adits and shafts associated with the Central Balfour mine discharge water to Emmetts Creek, which in turn flows to the Frankland River and eventually downstream into the Arthur River.

Water quality monitoring at the Balfour site has been conducted since November 2017 after the Crown land manager Parks and Wildlife Service (PWS) identified a large accumulation of iron oxides near the historic Central Balfour Shaft.

Routine water quality monitoring has been conducted quarterly since 2019 to capture seasonal variations in water quality. The program has shown that the water quality in the Frankland River downstream of the Balfour site is variable over the seasons due to high water flows in the winter, and comparatively lower water flows in the summer months.

The RTF engaged a consultant to review the data collected during the water quality monitoring program. The consultant believes that the copper is being sequestered by organic matter in the Frankland River, therefore not causing environmental harm. The consultant suggested that the RTF conduct an AUSRIVAS survey and toxicology testing to identify any potential impacts to the receiving environment.

The AUSRIVAS survey was planned for 5th May 2022, however, could not be completed due to the Frankland River being in flood. The survey has been rescheduled for spring 2022 and autumn 2023.

The samples for the toxicology testing were collected on the 13th April 2022. Water samples were also collected to be analysed for physical properties, metals, and bulk properties. The samples collected in the Frankland River, downstream of the central Balfour shaft, did not exhibit any toxicity.

Endurance

The legacy Endurance mine site is a historical alluvial tin, gem, and kaolinite mine located in northeast Tasmania, directly south of Mount Cameron. Mining occurred intermittently between 1874 and 1982, leaving a series of open pits which have subsequently formed several lakes, a 'lagoon', and over 70 hectares of quartz-rich, coarse grained mine waste. MRT revegetated the site in the late 1990s, however revegetation success has been limited.

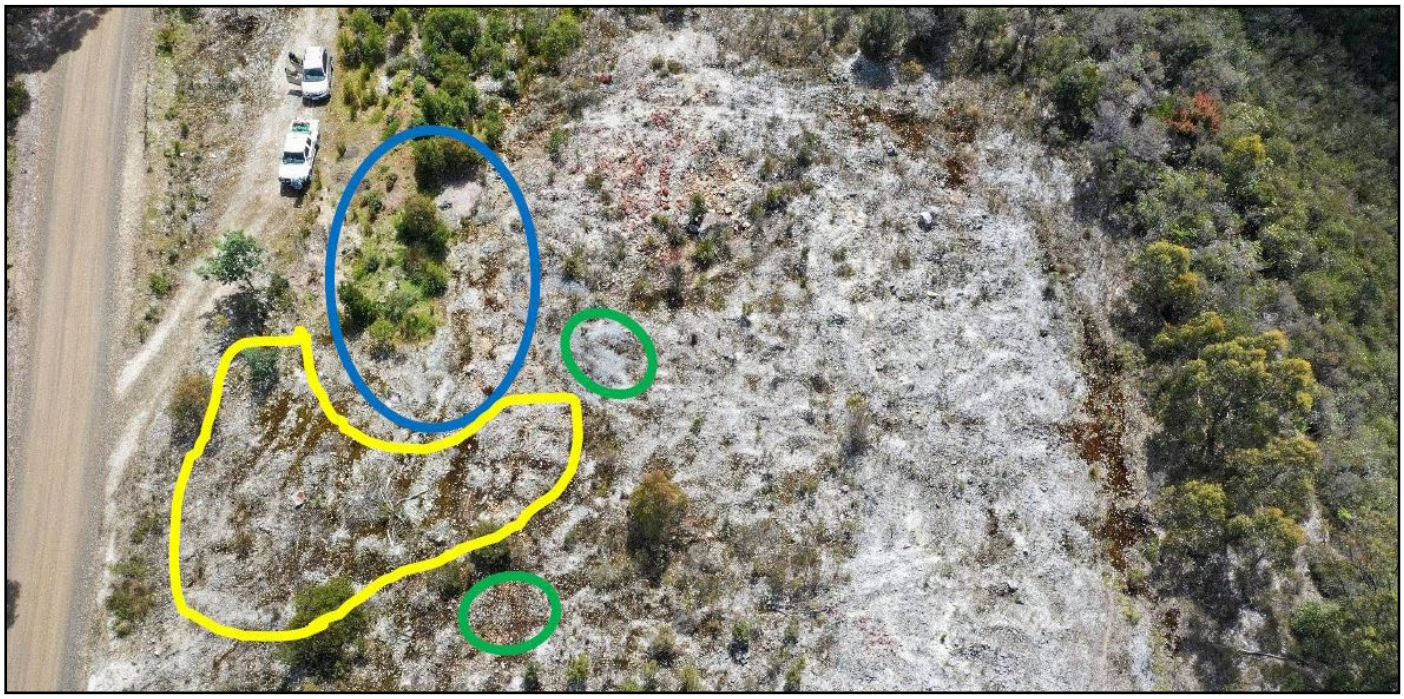
Water quality monitoring at Endurance was conducted in April 2022, as a follow-up on a consultant's 2017 work, MRT sampling in 2019 and 2021, and UTAS honours research projects in 2020.

In addition to surface water samples, groundwater samples were collected from 10 bores, 9 installed for one of the UTAS research honours project (Wilson, 2020) and 1 installed during an earlier honours project (De Jong, 1999).

Sisters Hills

Follow-up weed management was conducted in line with the weed management plan prepared for MRT in 2018.

Revegetation trials in June 2021 explored three different revegetation techniques: Hand seeding, translocation of Poa labillardierei (Silver Tussock Grass), and brush matting. A November 2021 inspection of the recent revegetation work determined that the hand seeding has germinated well in most of the pre-scraped areas and amongst some of the brush matting. Additionally, the planted Poa labillardierei appears to be growing well.



Locations of revegetation trials (Yellow - Hand Seeding, Blue - Translocation of Poa Grass, Green - Brush Matting).

Germination evident in hand seeded areas.

Some germination evident near brush matting.

Poa labillardierei.

Queensbury

Gorse control was undertaken in November 2021, as a follow-up from previous years. Track repairs were also completed at this time, including clearing the batter failure, repairing drainage, and the removal of fallen trees and other debris.

Frankford

Weed management was conducted at the rehabilitated Frankford quarries. The primary weeds of concern were Spanish Heath (Erica lusitanica) and radiata pine.

Anchor

The Anchor mine was first mined during the "tin rush" in the 1870's. The first major developments at the site were the development of an underground mine in the late 1800's, with a move to open cut mining as the ore grades declined. Operations at the Anchor Mine ceased in 1913.

The Anchor site was redeveloped in the late 1980's and tailings from the underground mine were impounded in the valley below the processing area. The mine closed in 2000, with some unsuccessful rehabilitation works completed thereafter.

Water quality monitoring at Anchor was conducted in February 2022 as a follow-up to initial MRT sampling in 2011 and further sampling in 2016 and 2019.

Surface water sampling was conducted at six sites. The sampling showed that the Anchor Mine is not adversely affecting the water quality in the Groom River downstream of the site.

Anchor stampers.

Zeehan Subsidence

Zeehan Golf Club

MRT identified that the areas of subsidence mapped at the Zeehan Golf Course correlated to old mine workings at the former Argent Mine. The areas of subsidence prioritised for repairs, as part of the 'shafts and adits' program, were determined to be a risk to public safety.

In March 2022, five sites were repaired at the Zeehan golf club, with each area excavated until hard material was encountered. The holes were backfilled, compacted, and levelled out. MRT staff were on-site, supervising, for the duration of the works.

Trenching and repair of subsidence in the vicinity of the Zeehan Golf Course.

Zeehan Fire Break

Parks and Wildlife Service (PWS) reported an area of subsidence on the Zeehan Fire trail, which is an important part of fire mitigation activities around the Zeehan township. A site visit, conducted by MRT, indicated that the subsidence was likely a result of historic mining activities. The area of subsidence was repaired in March 2022 and the fire trail was widened to ensure that any further subsidence does not impact future fire management activities.

All works will be inspected regularly as part of ongoing rehabilitation management.

Widening of the Zeehan Fire Trail and backfilling the area subsidence.

Federation Mine

The Federation Mine was identified as risk to public safety after reports by PWS that a fatality occurred in the 1970's, with a member of the public falling into a concealed shaft inside the mine. Recreation four-wheel drive vehicles are regularly accessing the area in recent times; therefore, the public risk has increased.

The project has been contracted, with materials air lifted into the site and ropes laid for safety while installation of the shaft and air rise cover is installed, however, poor weather has delayed the completion of the project. The project will likely be completed in late 2022.

Air lifting equipment and materials to be stored on site.

Tasmanian Government

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