

Rehabilitation of abandoned mining lands trust fund

Summary of activity 2022-23



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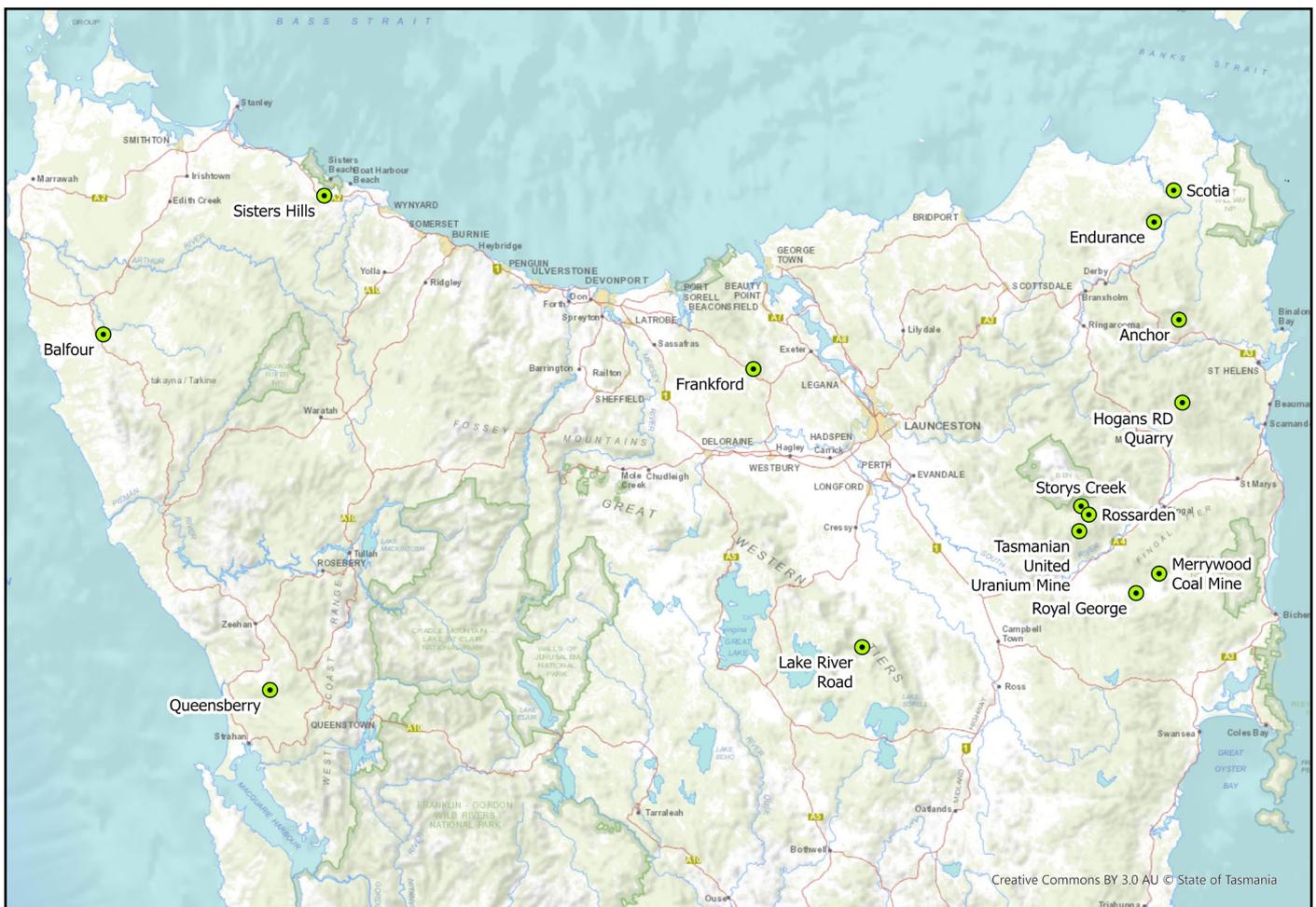


Background

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 2022 – 2023 abandoned mines rehabilitation program was spread across eight sites (three on the works plan are forfeited bonds sites). Major projects included commencement of the Balfour environmental risk reduction works and groundwater bore installation at Storeys Creek. Water quality monitoring was carried out at Aberfoyle Creek, Merrywood, and Balfour by Mineral Resources Tasmania (MRT) staff. Weed control programs were continued at Royal George, Frankford, Queensberry, Sisters Hills, and Balfour.



Rehabilitation project site locations 2022-23 program (source: C. Steyn, 2023).

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 coarse 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 October 2022, March 2023, and May 2023, MRT completed visual inspections of the coarse tailings dump as well as the recently constructed diversion drains and subsidence repairs (completed May - June 2020) at the Aberfoyle mine site. The coarse tailings dump has experienced significant erosion over the year. The diversion drains are performing as expected, preventing water from creating various flow pathways over the coarse tailings.

In addition to on-site inspections, drone-acquired survey-grade photogrammetry and LiDAR data has been collected by MRT to monitor erosion. These tools can assist in better understanding the dynamics of land movements, analysing 3D displacements, and calculating the rate and magnitude of erosion over time.



Inspection of installed drainage, north of the tailings (May 2023).

Water quality monitoring was completed in April 2023 as a follow-up to the 2018, and 2020 sampling rounds and aims to establish the impact of waters flowing through the tailings area on Aberfoyle Creek and the South Esk River further downstream.

Storey's Creek

Storeys Creek Mine Tin and wolfram were first mined in 1895, originally via blind adits driven into outcrops in Side Creek, which drains into Storeys 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. 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.

Tailings were originally discharged directly into Storeys 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 Storeys Creek. Follow-up water quality sampling occurred in April 2023.

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. 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.

In 2023, a drilling program and initial hydrological assessment of the Storey's Creek area was completed to evaluate the potential success of this option by examining water sources, pathways, and water table depths throughout the mine workings. Findings from the program suggest that the bedrock permeability is very low, and shallow groundwater movement primarily occurs in stopes, adits, development drives, and fractures, ultimately disconnected from deeper groundwater in the area (Hydro Earth, 2023). A further hydrological assessment was recommended to obtain a more holistic understanding of groundwater movements and hydrogeological flow models.

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.

Water sampling at Royal George is primarily concerned with ensuring that water running off the site is not contaminating the St Paul's River, which will enable decommissioning of the community water tank managed by MRT. During 2021-2022, the Environment Protection Agency (EPA) completed a review of the water quality data, suggesting that the works completed over MRT's management of the site, including reshaping, revegetation, and fertiliser application have improved the overall site biodiversity and water quality.

Water quality monitoring of tailings inflow and outflow on the site was not completed during the 2022-23 reporting period due to dry conditions. Water sampling was conducted at St. Paul's River, upstream of the tailings outflow, in August 2022, November 2022, January 2023 and March 2023 to maintain an ongoing record of background water quality.

Microbiological sampling of the community water tank at Royal George continues to be conducted quarterly, showing no issues with drinking water quality.

Ongoing weed management was conducted in December 2022 to control slender thistles, Californian thistles and gorse plants.

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.

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. Water quality monitoring aims to quantify impacts on the downstream environment, including an in-stream farm dam on the Merrywood River. MRT conducted a drone mounted water sampling program to sample the Merrywood farm dam at various depths. Follow-up drone sampling is planned for the 2023-24 financial year.

Additionally, MRT continues to work with the University of Tasmania (UTAS) to identify the source (and drivers) of the contamination in Merrywood Creek, with reporting will be finalised in the 2023-24 financial year.



University of Tasmania staff sampling Merrywood Creek (source: C. Steyn, March 2023).

Ongoing landslide monitoring has been initiated at the former Merrywood Coal Mine following the discovery of substantial ground displacement after a large rainfall event in October 2022. In addition to traditional monitoring techniques, MRT is using drone-acquired data to better understand and track the movement of the Merrywood landslide. The use of drones to collect high quality local survey-grade photogrammetry and LiDAR data provides the ability to scan the entire area to detect surface changes quickly and accurately. Drone-acquired data, in conjunction with geological, meteorological, and site-specific information, provides us with the tools to best manage risk and predict future landslide activity.

MRT will continue to monitor the landslide as part of ongoing rehabilitation management of the Merrywood Coal Mine.



Comparison of photogrammetry from November 2022 (left) to March 2023 (right).

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.

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.

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.

In 2021-2022, the RTF engaged a consultant to review the data collected during the water quality monitoring program. The consultant suggested that the copper is likely being sequestered by organic matter in the Frankland River, therefore not causing environmental harm.

As a follow-up to the water quality review, an AUSRIVAS (Australian River Assessment System) assessment and toxicology testing of the Frankland River was completed as to identify any potential impacts to the receiving environment.

Sampling was conducted at three sites along the Frankland River. The Frankland River downstream of the Balfour site was shown to have similar or above levels of biodiversity to reference sites. Samples collected in the Frankland River, downstream of the central Balfour shaft, did not exhibit any toxicity.

The Balfour repository dam retains a significant volume of metalliferous sludge. The condition of this dam is very important as failure of the dam could result in the release of metalliferous sludge from storage, negatively impacting the downstream environment. A dam inspection in 2022 showed that the dam was in poor repair and did not meet the current standards of dam construction.

MRT engaged a contractor to undertake a preliminary options analysis of risk reduction works at the Balfour site. The scope was to complete high-level identification of options to identify a preferred remediation option to “take forward” based on the available information.

MRT undertook a Multi-Criteria-Analysis (MCA) workshop in April 2023. The MCA uses both qualitative and quantitative information in the option selection process, with different weighting associated with each criterion.

MRT plans to continue the program of risk reduction works in the 2023-24 financial year.

Additionally, MRT capped two adits at the Balfour site due to public safety concerns.



Biological sampling the Frankland River near Blackwater Road.



Newly installed Balfour adit gates (source: Ben Edmunds).

Queensbury

Gorse control was undertaken in November 2022, as a follow-up from previous years.

Frankford

Weed management was conducted at the rehabilitated Frankford quarries in November 2022. The primary weed of concern was Spanish Heath (*Erica lusitanica*). Revegetation within the fenced plots continues to perform well.

Sister Hills

Weed management was conducted at the Sisters Hills site in January 2023. Treatment of Spanish Heath (*Erica lusitanica*), Radiata Pine, Blackberry, Blue Butterfly Bush, Gorse, Pampas Grass and Spear Thistle was completed over the five management areas.

Anchor

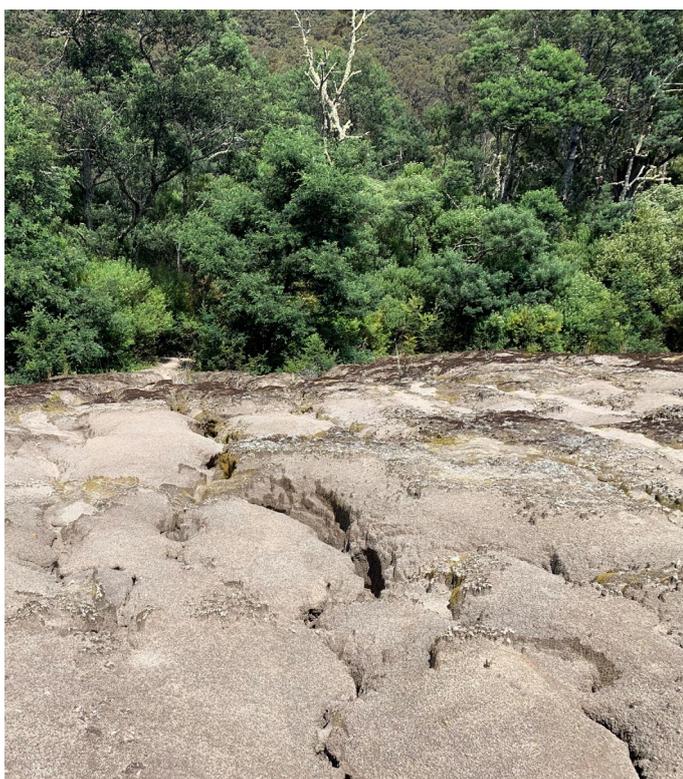
The Anchor mine was first mined during the “tin rush” in the 1870's. The first major developments at the site were the development of an underground mine in the late 1800's, with a move to open cut mining as the ore grades declined. Operations at the Anchor Mine ceased in 1913.

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.

There has been some historical community concern regarding the stability of the gabion dam wall. The tailings are piled on an abutment of gabions, which makes it potentially somewhat unstable and susceptible to erosion.

During a site inspection in October 2022, MRT noted that there was significant erosion on the dam wall, likely due to high rainfalls in October. MRT received advice exploring remediation options to stabilise the tailings, which will be evaluated in the budget for 2023-2024. MRT continue to conduct routine inspections to ensure the erosion is not accelerating.

MRT organised for prisms to be installed in March 2023 to monitor the erosion of the dam wall. A follow-up survey was conducted in May 2023, with negligible difference between the March and May surveys. A further survey is planned for May 2024.



Erosion on the Anchor dam wall (December 2022).

Tasmanian United Uranium Mine

MRT staff completed an inspection of the abandoned Tasmanian United Uranium (TUU) mine due to concerns of public safety following a social media post showing a member of the public uncovering some of the abandoned workings in September 2022. The site can be accessed by a trafficable road until about 1.3km from the site, where a large Eucalypt tree has recently fallen across the road. Using a Mini ConRad radiation survey meter (Geiger counter), it was determined that there were high levels of radiation on a small ore dump, but the remainder of the mine site area was only slightly above background levels. The site was not deemed to be a risk to the public as recent flooding has largely backfilled the opening. Signage was installed on site to warn visiting public of the radiation risk and mine workings.



Use of handheld meter to determine radiation levels.



Signage installed to warn visiting public of the radiation risk and mine workings.



Mineral Resources Tasmania

30 Gordons Hill Rd
Rosny Park TAS 7018

Ph: (03) 6165 4800

Email: info@mrt.tas.gov.au

Web: www.mrt.tas.gov.au