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Surrender Report

EL12/2013

Ringarooma Bay Project

**For the period 30 June 2014 to May
2015**

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BIBLIOGRAPHIC DATA SHEET

Project Name: Ringarooma Bay
Tenement Number: EL12/2013
Tenement Holder: Kenex Pty Ltd
Tenement Operator: Kenex Pty Ltd
Report Type: Final, Surrender
Report Title: Surrender Report EL12/2013 Ringarooma Bay Project.
Report Period: 30th June 2014 to 21st May 2015
Date of report: May 2015

Abstract: EL12/2013 was surrendered in May 2015 after a comprehensive data compilation and a target resource model.

Location: NE coast of Tasmania

Geology: Tertiary and Quaternary offshore sediments and alluvial deposits containing sands, clays and local boulder horizons.

Work done: Data compilation, 3D geological modelling, Target definition study

Datum: GDA94

Results: Increased knowledge of structure and geology, prioritised target areas

Conclusion: Insufficient data to support suggested resource

Target commodities: Tin

Keywords: Review, Surrender

Contents

1	LOCATION	4
2	PREVIOUS EXPLORATION	4
3	GEOLOGY AND MINERALISATION	7
	LOCAL GEOLOGY	8
	SEABED COMPOSITION.....	9
	TIN MINERALISATION	10
4	DETAILS OF EXPLORATION ACTIVITIES	12
4.1	DATA COMPILATION	12
4.2	3D GEOLOGICAL MODELLING.....	12
4.3	TARGET DEFINITION STUDY	13
5	RECOMMENDATIONS	14
6	CONCLUSIONS	14

Figures

Figure 1.	Location of EL12/2013.....	4
Figure 2.	Offshore and near coastal tin resource outlines from Mineral Resources Tasmania reports.	6
Figure 3.	Geological map of the Ringarooma Valley with the Ringarooma and Boobyalla Rivers.....	7
Figure 4.	Seamap series showing habitats for Ringarooma Bay (Lucieer et al, 2009).	9
Figure 5:	Schematic model of Ringarooma Bay with TNT (2013) tenements highlighted.....	10
Figure 6.	Six channels identified from bathymetry and bedrock surfaces in leapfrog Geo.	12

Tables

Table 1.	Major geological units found around Ringarooma Bay, in chronological order.....	8
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1 LOCATION

EL12/2013 is located in Ringarooma Bay at the north eastern tip of Tasmania (Figure 1). The bay is 30 km northeast of the town of Bridport and forms a broad semi-circular bay that faces north towards the Bass Strait. EL12/2013 was granted on 30/6/2014 and covers 54.84 km² of offshore seabed. EL12/2013 was surrendered in May 2015.

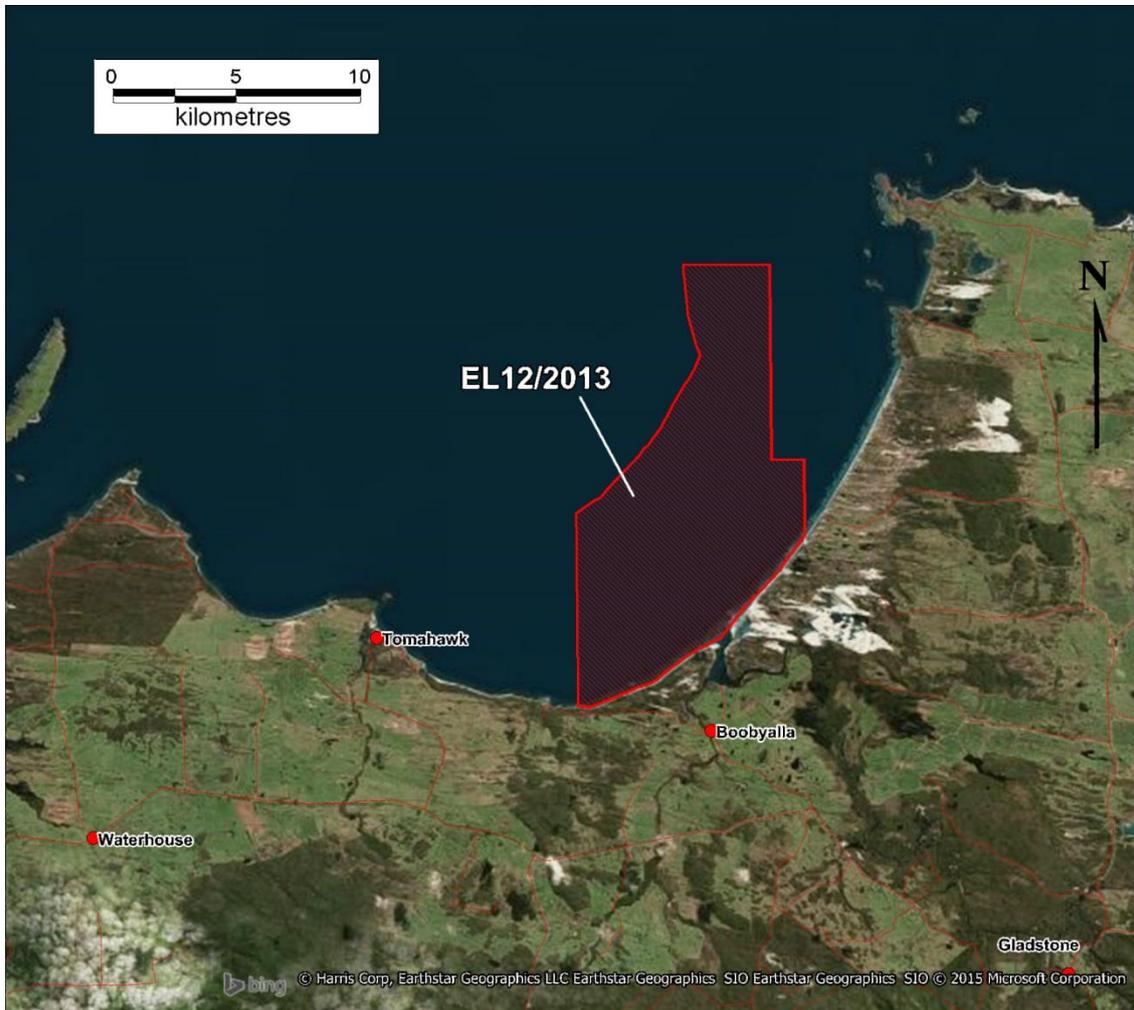


Figure 1. Location of EL12/2013.

2 PREVIOUS EXPLORATION

The inland area south of Ringarooma Bay is a well-known alluvial tin province that has produced in excess of 40,000t of tin since discovery in the 1870's, from mines such as the Briseis, Arba, Pioneer, Endurance and others.

Cassiterite has also been transported by the Ringarooma river over millions of years from the tin bearing rocks surrounding Ringarooma Bay and upstream of the Ringarooma River. Tin-rich sediments transported by the Ringarooma River, which is now partly submerged beneath Ringarooma Bay, settled within the Pleistocene course of the river and were reworked and concentrated by wave action since that time. Tin mineralisation also occurs along submerged strandlines within the bay, parallel to the current coastline.

A number of exploration companies have carried out mineral exploration activities in Ringarooma Bay since 1966. A summary of this work is provided below:

- Between 1966-1968, Tasmanian Offshore Exploration Company (TOEC) conducted a regional bathymetric, seismic and sampling programme, followed by a 138-hole drilling programme in the areas of interest. Of these holes, TOEC considered that 27 holes yielded encouraging mineralised intervals. Sixteen of the holes had “*grades over their total depths*” above a cut-off grade of 75 g/m³ Sn. The grades of the 192 analysed samples ranged from 37 to 815 g/m³ Sn;
- In 1968, Utah Development Corporation together with BHP drilled 15 holes to 18 m water depth up to 4.3 km offshore. The best intervals included 2 holes that were drilled within 600m of shore and contained averaged grades of 50 to 85 g/m³ Sn;
- In 1981-1982, Hellyer Mining and Exploration Pty Ltd (Hellyer) completed a programme of bathymetric, seismic and magnetic surveys and a review of works completed by TOEC;
- In 1983, Conzinc Rio Tinto of Australia Exploration Pty Ltd (CRAE) undertook a review of the works completed by the previous owners and concluded that the quantum of mineralisation in the area ranged from 14-21 Mm³ @ 175 – 200 g/m³;
- In 1995, Mineral Holdings Australia Pty Ltd completed a “pre-feasibility review” of the historic work and in 2000 the review was updated. Based on the historic drilling data by TOEC, and geophysical surveys undertaken by Hellyer, the quantum of mineralisation in the project area was re-estimated and it was concluded that the major palaeo-channel and four other prospects together host up to 199 Mm³ @150-250g/m³ Sn of “*inferred materials*”, which included 16 Mm³ @ 227g/m³ Sn of “*indicated Resource*” (Figure 2).
- In addition to the potential tin mineralisation, Mineral Holdings considered the Project area might have potential of containing gemstone quality sapphire, and economic concentrations of rutile, gold, zircon and ilmenite. It was concluded that the area is prospective for a large scale dredging operation.

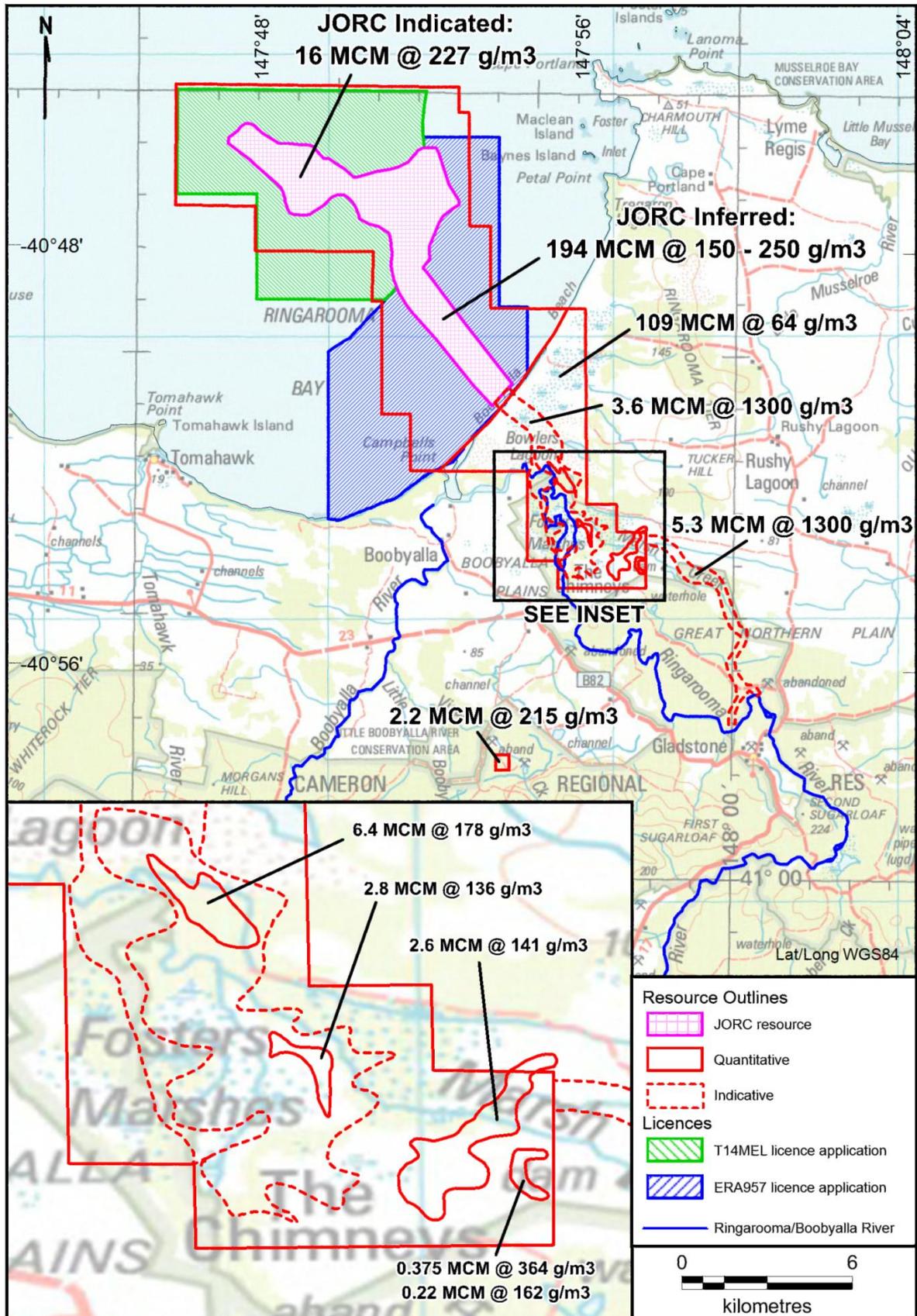


Figure 2. Offshore and near coastal tin resource outlines from Mineral Resources Tasmania reports.

3 GEOLOGY AND MINERALISATION

The regional geological setting is dominated by three acid igneous intrusives of Devonian age, the Eddystone, Blue Tier and Scottsdale Batholiths, which intrude the older Ordovician to Devonian Mathinna Supergroup turbidite sediments. The region was subjected to a period of alkali volcanism during the early Tertiary, which was followed by rapid uplift and prolonged erosion. Subsequent sedimentation resulted in the development of thick, extensive alluvial sequences in the northern drainages of the Blue Tier Batholith. These alluvial deposits, most tin bearing, were subsequently covered by valley fill basaltic flows, a Quaternary marine transgression and continued terrestrial and marine deposition. Figure 3 illustrates the relationship between the lithological units described here.

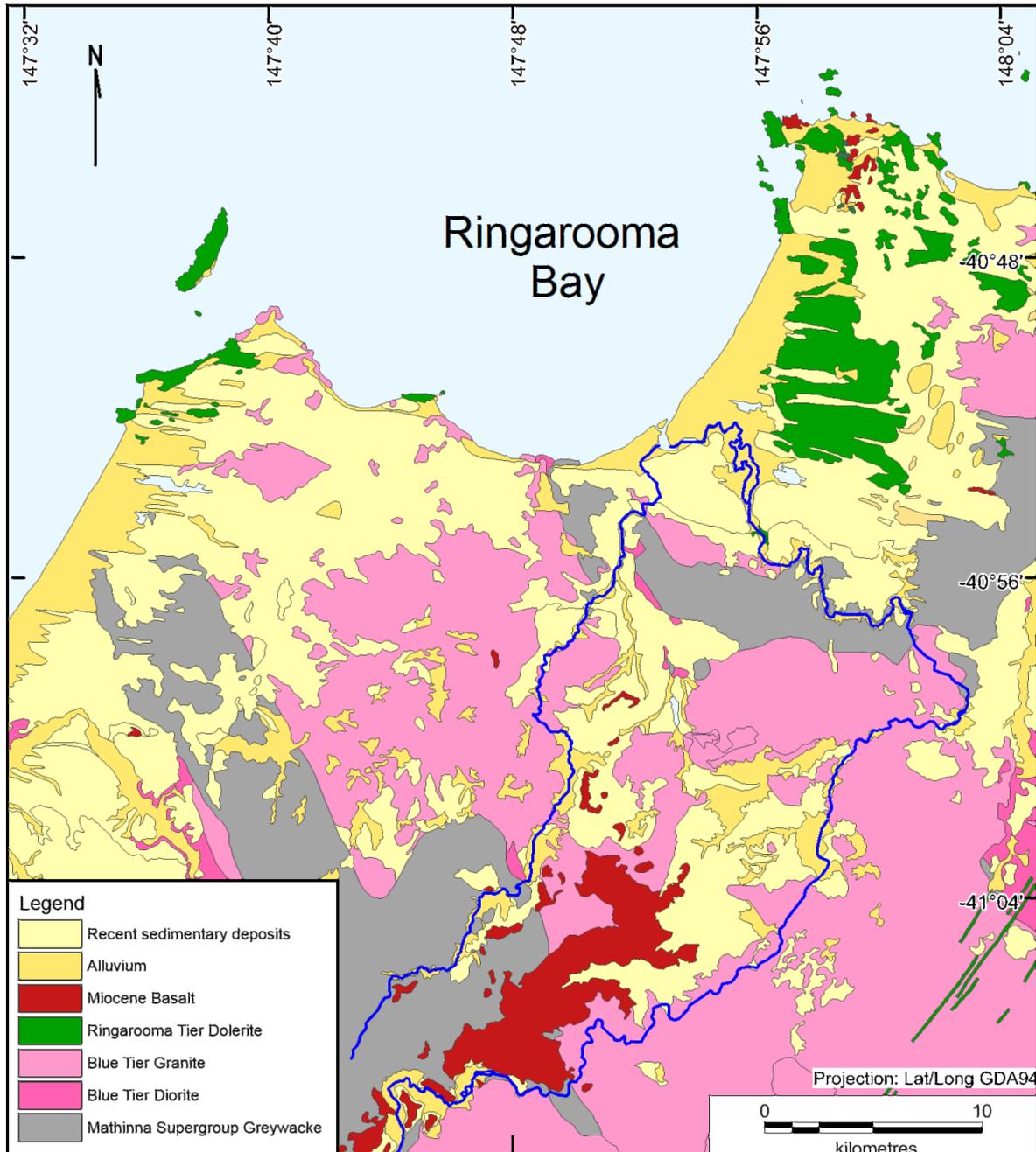


Figure 3. Geological map of the Ringarooma Valley with the Ringarooma and Boobyalla Rivers.

Local Geology

The major geological units that outcrop around Ringarooma Bay are summarised in Table 1:

Age	Unit	Description	Significance
Ordovician – Devonian	Mathinna Supergroup	Micaceous greywacke turbidite sequence, locally hornfelsed.	Low weathering resistance may lead to the development of tin-rich Tertiary channels cut into this unit.
Late Devonian	Blue Tier Batholith	Porphyritic fine to coarse grained granite/adamellite and biotite-hornblende granodiorite.	Forms the tin-rich Mt Cameron Massif to the south of Ringarooma and basement around the southern edge of the Tertiary marine embayment.
Jurassic	Ringarooma Tier	Dolerite with locally developed granophyre.	A resistant basement outcrop and is the bounding feature of the eastern edge of the marine embayment.
Tertiary	Sedimentary	Sands, clays, locally boulders. Some lignite zones and silcrete/ferricrete development.	Basal layers are enriched in cassiterite of economic significance. Also contains gold, sapphire, rutile, zircon and ilmenite.
Tertiary	Younger Basalt	Basalt with associated pyroclastic flows.	Partially covers deep leads in the Ringarooma valley.
Quaternary	Sedimentary	Sands, clays, peats, aeolian dunes, swamp and marsh.	Represents overburden over Tertiary tin-bearing alluvial deposits.

Table 1. Major geological units found around Ringarooma Bay, in chronological order.

There are only minor occurrences of the Ordovician greywacke and the Permo-Triassic glacio-marine sequences in the area. The Tertiary basalt and associated pyroclastic rocks have only been mapped on the eastern portion of Cape Portland. The Devonian adamellite granite forms a significant part of Waterhouse Point and the bedrock in other inland areas around the south of Ringarooma Bay. The Jurassic Dolerite forms the bedrock in eastern areas of Ringarooma Bay, outcropping on the western side of Cape Portland and also Tomahawk headland.

A veneer of Quaternary sand, mud and gravel sediments has covered much of the older rocks, with deposition occurring through lacustrine, fluvial, littoral wave and wind action. Flood plain deposits occur along the drainage lines and in particular the Ringarooma River flood plain. Extensive dune fields have developed. Dune crests are typically oriented along a roughly east-west axis, with the exception of the coastal dune line perpendicular to the shore along the bay.

Seabed Composition

The near-shore bathymetry of Ringarooma Bay has been mapped by Lucieer et al (2009). The project involved mapping bathymetry and the seabed composition, within 1.5 km of the shore, including distribution of cobble, reef, sand and seagrass facies (Figure 4).

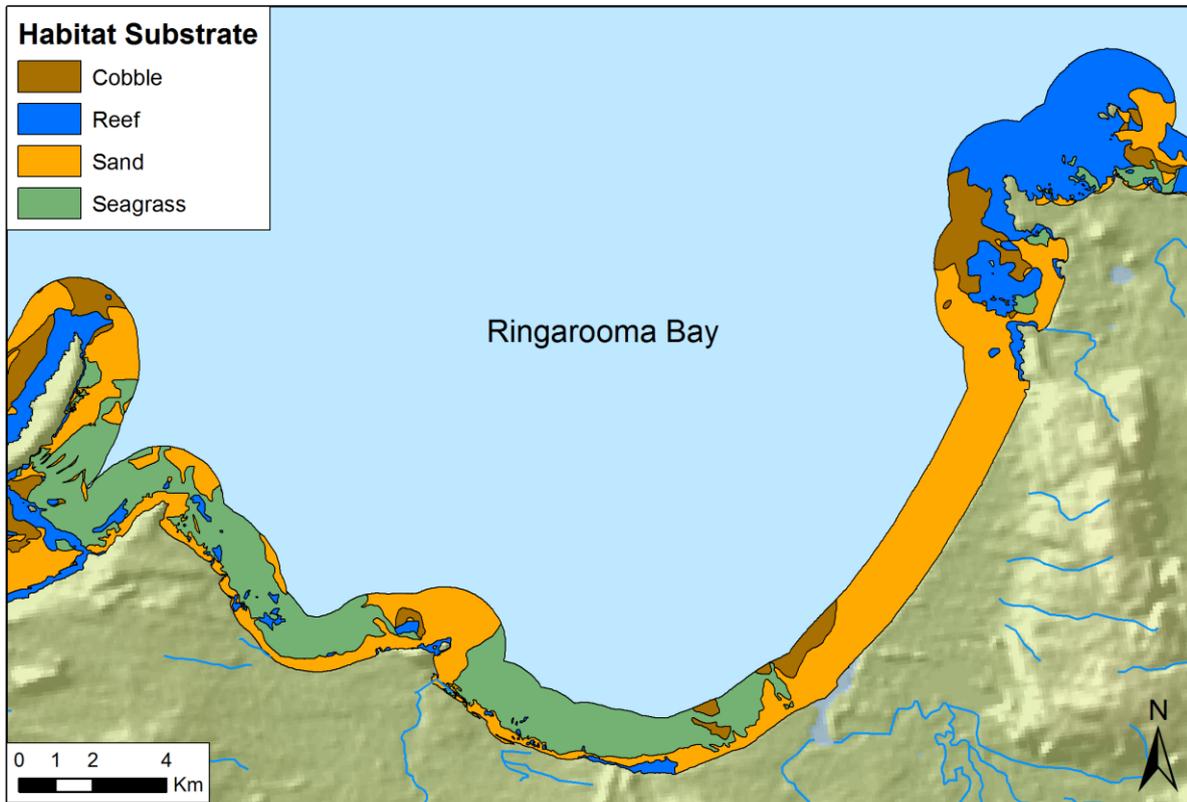


Figure 4. Seamap series showing habitats for Ringarooma Bay.

Tin Mineralisation

Cassiterite is widespread throughout the Tertiary and Quaternary alluvial profiles however as a rule the higher grade (economic) concentrations are restricted to the more coarse basal horizons.

The grain size, angularity and colouration are highly variable and dependent to a large extent on source rocks and proximity to source. Colour varies from black to grey, colourless, amber, yellow, brown and red. In the Blue Tier area the cassiterite is predominantly coarse grained and usually angular to sub-rounded being locally derived from quartz, quartz pegmatite veins and greisen deposits. Exceptions do occur, such as at Monarch and Taylors Workings, where fine grained tin is the norm but there are local concentrations of coarse angular cassiterite often occurring as particles locked on quartz. A very local source is indicated.

Grades within the alluvial deposits are highly variable and are again dependent on the proximity to source and the degree of maturity of the deposit. There must be a differentiation between economic and sub-economic grades and such differentiation is usually related to depth of the deposit, depth of barren overburden and mining methodology. Grades vary from 50 – 300 g/m³ in the upper more fine grained alluvials to high grades of up to 40 kg/m³ in the basal zones of the Scotia Lead. In some deposits high grade basal enrichment appears random, in others such as Scotia, Lochaber and Briseis massive basal enrichment is the norm throughout the deposit. As a general rule the sands and clayey-sands that overly the pebble and cobble horizons contain little or no cassiterite.

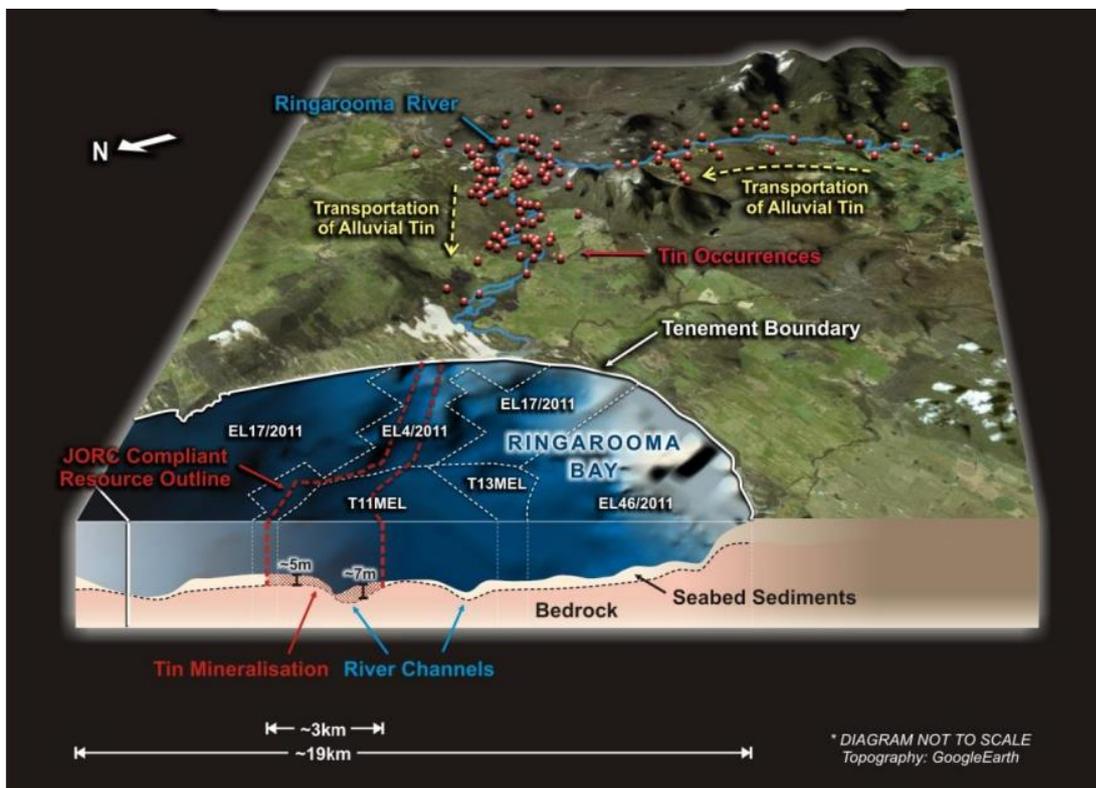


Figure 5: Schematic model of Ringarooma Bay with TNT (2013) tenements highlighted.

Offshore

There is a concentration of alluvial ore centred on the current Ringarooma River waterway. The main river channel continues offshore for at least 13 km, with higher tin concentrations found within the submerged channel, and dispersed across the sea floor as a sheet wash. This drowned portion of the coastal plain contains a continuation of the Boobyalla and Ringarooma leads as low gradient anastomosing channels, and has been delineated by marine seismic and drilling activity.

The average gradient of the offshore river bed is 1.8 m/km, and of the sea bed in the area only 0.95 – 1.33 m/km. A river having a thalweg of this order would be subject to frequent changes in course which in turn would lead to a patchy distribution of any mineralisation. This applies to Ringarooma Bay, where little correlation of sediment type or cassiterite occurrence is possible between drill holes at their current 300 – 800 m spacing. The limited amount of close spaced drilling suggests that

although the deposit is horizontally and vertically patchy, as is common in alluvial deposits, it is likely that mineralisation within the gutter of the old Ringarooma River could be more persistent than that in the upper levels that will have been periodically resorted.

Recent work by TNT states that the offshore resource lies in average water depths of 5 – 25 m, with a maximum water depth of 40 m towards the Bass Strait. Modern dredging techniques can comfortably operate within these conditions. Mineral Holdings Australia have defined an area of 4 km² containing shallow alluvials with high concentrations up to a maximum of 694 g/t of tin, using a 100 g/t cut off. This area is understood to be reworked placers that have formed a wide blanket perpendicular to the palaeochannel and parallel to the shore, most likely along a palaeo-strandline.

The following summarises conditions under which the highest tin grades have been found during offshore sampling programs. High grade tin wash in Ringarooma Bay:

- Commonly lies directly on the seabed or with less than 2 m of cover;
- Occurs under up to 10 m of overburden deeper in the bay;
- Is in medium to coarse grained quartz sand and fine gravel that often includes well rounded granules and pebbles to three inches diameter;
- Has not been recovered from very fine sediments except where they form the matrix for coarser material as, for example, in a clay-conglomerate;
- Is not a significantly different grade offshore to the onshore sheet wash, which is in contrast with most alluvials where grade decreases away from the source;
- Mostly contains cassiterite grains within the 150 – 250 microns range, there is very little very fine grained cassiterite.

Offshore tin concentrations are found in a notable coarser fraction than the onshore high grade deposits, probably due to reworking. This association of high tin grade with coarse sediments is clearly marked, although exceptions have been noted. It is also evident that many of the richest samples in the upper levels of the sediment body overlie layers of very fine grained sticky silt or semi-compacted white clay and it is probable that these layers have acted as a "false bottom".

There is a second postulated alternative channel of the Boobyalla River, exiting into Ringarooma Bay approximately 3 km to the west of its current estuary. Work has been done onshore to show shallow reworked lenses of tin-rich deposits upslope from this potential channel. Prospective tin-bearing alluvial deposits might be located where this channel spills into the embayment, but no work has been done that proves this to date.

4 DETAILS OF EXPLORATION ACTIVITIES

4.1 Data compilation

A data compilation of the Ringarooma Bay offshore area was undertaken. The area of EL 70/4545 was used to collect a number of data sets:

- Geochemistry: 489 offshore data points with 1630 geochemistry records, 307 oxide records, 1082 minerals records and 531 lithology records.
- Geophysical data: TMI magnetics with a best resolution of 40 m grid cells and coarse gravity data, as well as onshore radiometric data (publicly available, not resubmitted).
- Bathymetry data: grids with resolution of 290 m and of 40 m (publicly available, not resubmitted)

A JORC indicated resource was quoted in 2000, estimating 130 million m³ sand @ 150-250 g/m³ tin largely from a single postulated channel. The estimate is part of a pre-feasibility study, which recommended pattern drilling and geophysical surveying to upgrade the deposit. The JORC report documentation has not been found, and may not exist.

The digital data is attached as:

EL122013_201505_02_collars.txt

EL122013_201505_03_surveys.txt

EL122013_201505_04_lithology.txt

EL122013_201505_05_geochemistry.txt

EL122013_201505_06_filelisting.txt

4.2 3D Geological Modelling

Surfaces for bathymetry and depth to bedrock were created using Leapfrog Geo software (version 2.2.0). When the seabed topography was compared to sediment thickness, it becomes apparent that thickest sediment cover is associated with basement channels, indicating that the later sediments are generally draped over the basement. A number of these channels were delineated and used to create volumes of potential targets for further exploration (Figure 6).

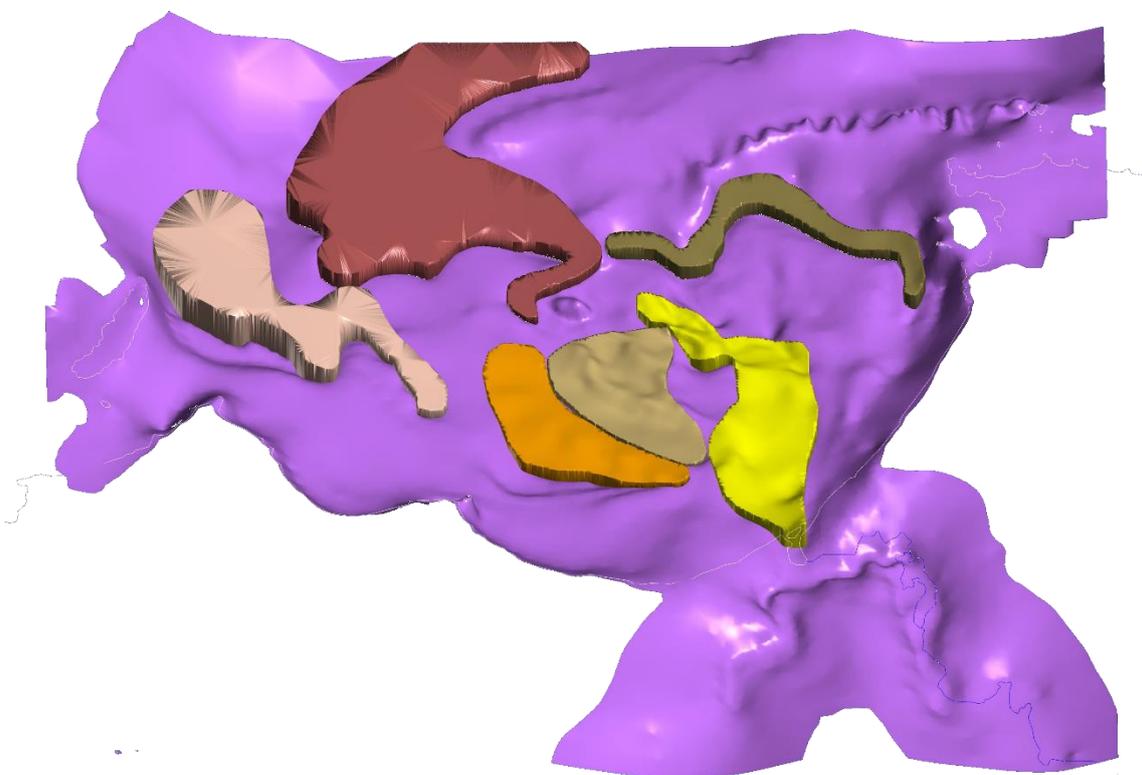


Figure 6. Six channels identified from bathymetry and bedrock surfaces in leapfrog Geo.

The simplified basement and seafloor surfaces are in the digital appendix as:

Basement_simplified.dxf and

Seafloor_simplified.dxf

4.3 Target Definition Study

A target definition exercise conducted for the Ringarooma Bay tin deposit bears little resemblance to previous estimates. Rather than a single channel leading offshore from the Ringarooma/Boobyalla River mouth, the seismics-based bathymetry indicates a potential palaeo-shoreline offset 7 km or so from the present one, followed by a channel-cut fan extending offshore, covered by a sediment drape. The seismic information used for this study was not recent or robust and could lead to unreliable conclusions.

A block model was created that covers the area of most dense drilling, excluding only a few areas to the north. The cell size was 100 m by 100 m by 1 m and three volumes were defined – water, basement and channel sediment.

Estimates of a resource target were conducted using core samples and included grab samples taken by divers. The position of cores are generally unreliable and often the coring type is unknown. While suggested to have 100-200 feet precision, the accuracy for the majority of collars was determined by sextant and, when plotted versus bathymetry, often appears unlikely.

Using the compiled data and modelled surfaces (appended), the resource target size was estimated at less than half of the previously reported resource. The study was not JORC compliant, and as such is not tabulated, but the model blocks are attached in the digital appendix as Ringarooma_Sn_100ppmCutOff.txt.

Indications of elevated grades 7-8 km offshore in a line following the modern coastline may be from a buried strandline, and could be the best target in the area besides the potential elevated grade at the river mouth. To upgrade the resource, a test drilling programme is required to confirm nearshore grades, twin other holes, and define the potential buried offshore strandline. Better bathymetric and geological modelling using multi-beam and sub-bottom profiling methods should also be beneficial.

5 RECOMMENDATIONS

The Ringarooma Bay tin deposit has not been adequately tested to outline a reliable resource. Recommendations for a work programme are outlined below:

- Undertake a multibeam bathymetric survey covering the area of interest. At the very shallow water depth, line spacing will have to be close as the beam width is only about 3-4 times the water depth.
- Undertake a shallow-penetration sub-bottom profiling survey. This should work well in a siliciclastic sedimentation-dominated area and will constrain the mineral sand accommodation space offshore.
- Undertake an in-fill offshore coring programme. Focus should be on testing the holes along the coast drilled by UDC-BHP showing high grades, as well as delineating potential targets at the slope break 7-8 km offshore (300 m hole spacing). Other holes should be twinned at 600-800 m spacing. The nearshore, western region and furthest offshore area also need additional holes cored to improve sample density. Vibrocoring is recommended, as the method accounts for loose sand and gravel.

6 CONCLUSIONS

After compiling and verifying the data and modelling the probable potential resource surfaces, the resulting target estimates did not verify the previous figures. Given the reduced target size and the current tin price, Kenex Pty Ltd surrendered EL12/2013 and withdrew an adjoining application in the deeper federal environs prior to grant.