

BYRON BAY HISTORICAL SOCIETY

Sand Mining in Byron Bay Area

May 2015

Sand Mining

- Zircon Rutile Limited (ZRL) formed in Byron Bay in June 1934
- Built 7600t/y treatment plant in Jonson Street (now Woolworths site)
- Sand mining started in January 1935 at Seven Mile Beach
- “Black-sanders” contracted to collect black sand from strand lines and old leads (grade > 75% heavy minerals); separated gold by amalgam, sluicing, tables; “tailings” trucked to Jonson Street plant
- “Black-sanders” kept gold, platinum and tin, were paid \$4.80 for 44 hour week, lived on beach, (ate a lot of fish??)
- Replaced later with draglines, dozers, scrapers
- In 1943 ZRL became first company in world to produce clean, separate, high-grade zircon, rutile and ilmenite products
- Bagged and exported around world from Byron Bay port/rail
- By end of WW2 ZRL one of largest producers of zircon and rutile

Sand Mining



Black sand slicks on beach (50% heavy minerals) – Tallow Beach. (Photo - Main)

Sand Mining



Thick black sand “lead” (90% heavy minerals) – Seven Mile Beach. (Photo – Main)

Sand Mining

- So why mine sand from beaches and dunes
- To recover four “heavy minerals”

<i>Rutile</i>	<i>(TiO₂)</i>	<i>density 4.5</i>
<i>Zircon</i>	<i>(Zr,SiO₄)</i>	<i>density 4.6</i>
<i>Ilmenite</i>	<i>(Fe,TiO₃)</i>	<i>density 4.7</i>
<i>Monazite</i>	<i>(Ce,La,Th,PO₄)</i>	<i>density 5.1</i>
<i>(Minor gold, platinum, tin)</i>		

- Rutile and ilmenite used in welding rods also source of TiO₂ and titanium metal
- TiO₂ used as whitener/opacifer in paints plastics and paper
- Titanium metal used in aircraft/spacecraft, corrosive chemical environments and prosthetics
- Zircon used for foundry sand, ceramic glazes, enamel
- Monazite a source of cerium (glass colouring and sensitizing, lapidary polishing) and thorium (potential nuclear fuel)

Sand Mining



Zircon, ilmenite, rutile concentrates.

(Photo - Main)

Sand Mining

- In 1947 ZRL expanded mining to Tallow Beach (south end)
- Introduced floating suction dredges in 1948
- Banks of spiral cyclones on concentrators separated heavy minerals easily, effectively, cheaply (could mine 4% heavy mins)
- Clean sand pumped back and shaped into required landforms
- Concentrates (30% rutile, 30% zircon, 40% other) pumped or trucked to plant for separation into individual mineral products
- In 1951 ZRL first company to rehabilitate mined areas, reformed and replanted dunes (not always original or native species!)
- Between 1950 and 1961 ZRL largest and most profitable producer of zircon and rutile in the world centred on Byron Bay
- Mining gradually moved north along Tallow Beach to Cosy Corner and ceased on Seven Mile Beach
- In November 1961 ZRL taken over by AMC

Sand Mining



Primitive dragline mining sand - Seven Mile Beach mid 1940's. (Photo - Morley)

Sand Mining

- AMC and others continued mining Tallow Beach and inland areas
- Main and Belongil Beach dunes and beach mined mid 1960's
- Mining ceased 1968 (34 years), processing 1972 (38 years)
- Processing plant pulled down and site rehabilitated – disposal of monazite concentrate an issue, (government policy impact)
- Total production of heavy minerals by all operators from Byron unknown - estimate >500,000 tonnes
- Current value >\$500 million (zircon = \$1200/t, rutile = \$1000/t)
- Byron Bay played pioneering, innovating, wealth-creating role in this industry; spawned other industries (HT Reading Pty Ltd)
- Mined areas now incorporated in Arakwal National Park; public places (high school, Red Devil Park, Main Beach Park); sites of private houses, commercial and other buildings, roads/streets (Main Beach area and Lawson Street).

Sand Mining



Mining at future Red Devil's sports ground and high school – 1966. (Photo – NSW Govt)

Sand Mining



Sand mining at Cosy Corner - 1966.

(Photo – NSW Govt)

Sand Mining



Main Beach - rehabilitated sand mining area - 1971.

(Photo – NSW Govt)

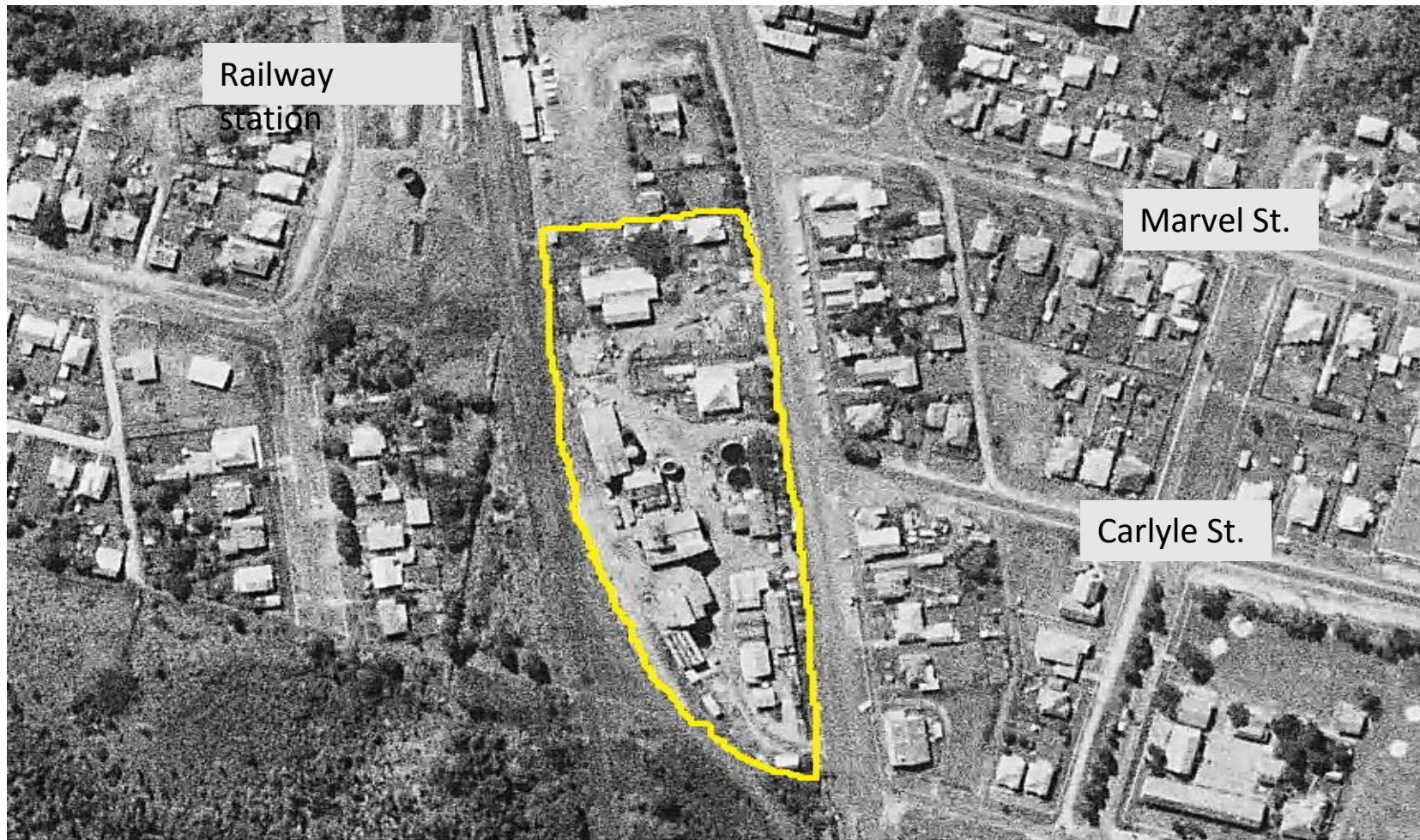
Sand Mining



Post Mining Erosion "Management" - Belongil Beach 1972

(Photo EJW)

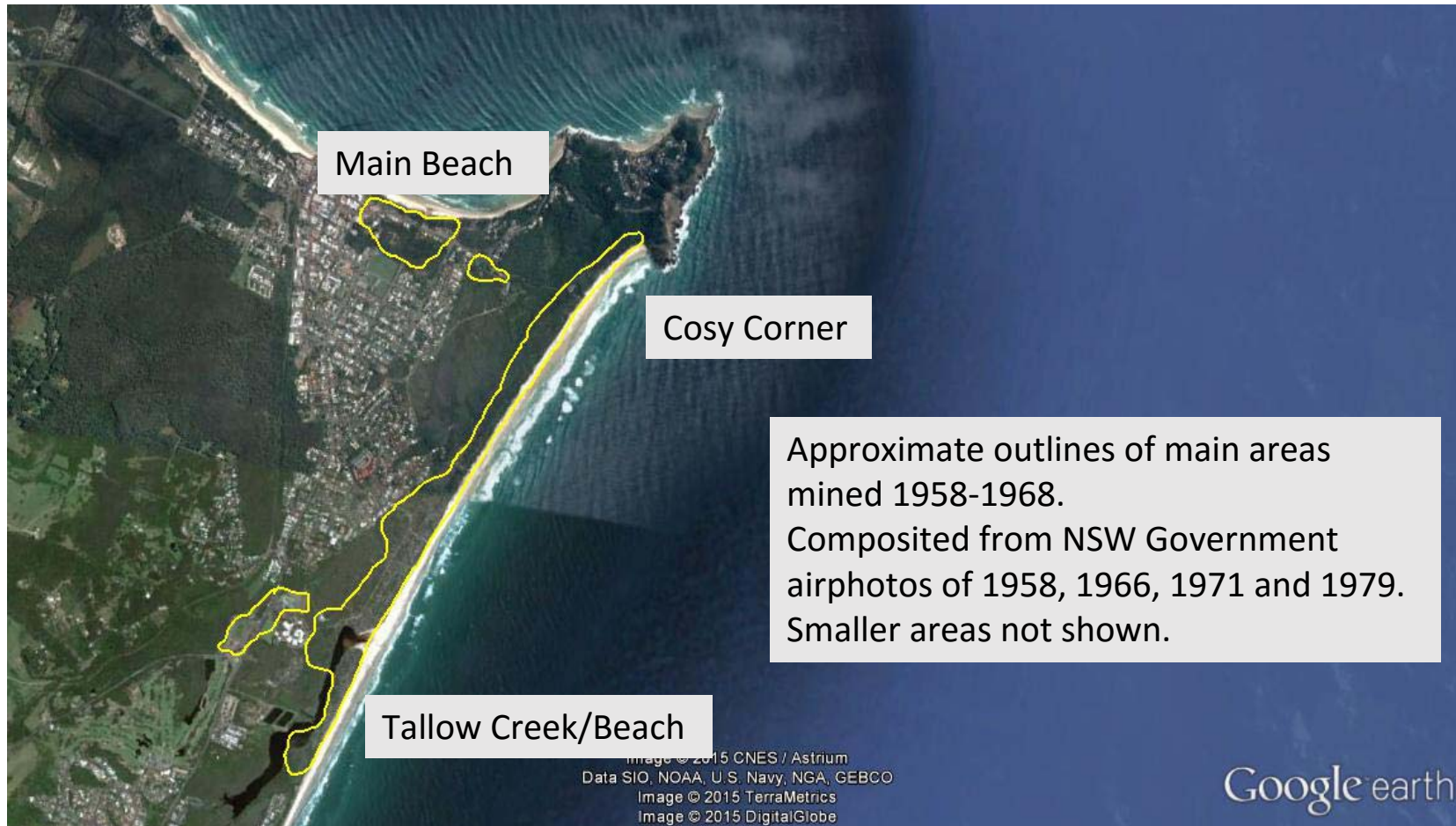
Sand Mining



ZRL's Jonson Street concentrate processing plant – 1971.

(Photo NSW Govt)

Sand Mining



Approximate boundaries of principal areas mined for heavy mineral sand in Byron Bay.