RioTinto

Amrun Project- RTA Weipa Pty Ltd

Amrun Project (EPBC 2010/5642)- Annual Environmental Monitoring Report 2025

August 2025

Flatback turtle hatchling recorded during the 2024 surveys

Contents

1 Purpose 3
1.1 Project Overview 3
2 Pre-Disturbance Monitoring 6
2.1 Methods 6
2.1.1 Pre-disturbance program 6
2.2 Target fauna survey methods 7
2.3 Results 8
3 Weed Management 11
4 Fire Management 12
5 Feral Animal Management 14
5.1 Feral Pigs 14
5.2 Feral Cat and Dogs 17
6 Marine Turtle Monitoring 19
6.1 Methods 19
6.1.1 Schedule 21
6.1.2 Nest census surveys 21
6.1.3 Predation monitoring 21
6.1.4 Ongoing nest monitoring 21
6.1.5 Nest excavation 21
6.2 Results 22
7 Marine Pest Monitoring 25

1 Purpose

The Amrun Project (formerly South of Embley Project) involves the construction and operation of a bauxite mine and associated processing and port facilities to be located near Boyd Point on the western side of Cape York Peninsula. A detailed description of the Project is provided in the Queensland EIS (RTA 2011), the Queensland SEIS (RTA 2012), and the Commonwealth Environmental Impact Statement (RTA 2013). The marine works associated with the new port facility included the construction of jetty, wharf and ship loaders and dredging of berth pockets and departure channel.

Amrun Project Commonwealth approvals (EPBC/5642 Condition 57) require environmental survey methodology and results associated with activities to be reported and published on the Rio Tinto Website. This annual report presents the monitoring and methodologies implemented between 12 May 2024 and 11 May 2025 associated with:

- Pre-disturbance reporting.
- Weed management.
- Fire management.
- Feral animal monitoring and control.
- Marine turtle monitoring.
- Marine pests monitoring.

In previous years these reports have been published individually but have been combined based on the interactive nature of the activities.

1.1 Project Overview

The Amrun (formerly Boyd components of the South of Embley) Project involves the construction and operation of a bauxite mine and associated processing and port facilities for shipping of bauxite to either Gladstone or international markets. The Amrun Project is located near Boyd Point on the western side of Cape York Peninsula approximately 40km south of Weipa (Figure 1).

The project is currently in the Operations phase with commencement of bauxite shipping on 02 December 2018[1] . The project has a current estimated production rate of approximately 22.8 million dry product tonnes per annum (Mdptpa). Actual production rates, timing and extent of future capacity expansions that are consistent with this approval will depend on market conditions. The anticipated mine life is approximately 40 years, depending on production rates.

The main Amrun Project activities that have been completed to date are listed below. Detailed information on the full Project is presented in the South of Embley Project Commonwealth EIS (RTA 2013).

- Commencement of shipping and production.
- Bauxite processing infrastructure –construction and operation of the Amrun (Boyd) beneficiation plant.
- Product bauxite stockpiles –construction and operation of beneficiated product stockpiles adjacent to Amrun (Boyd) Port.
- Ancillary infrastructure –construction of a diesel-fuelled power station, workshops, warehouse, administration facilities, package sewage treatment plant, temporary waste storage prior to disposal off-site and diesel storage facilities.

[1] Preliminary works commenced October 2015 and significant construction commenced in May 2016.

- Barge, ferry and tug facilities – construction and operation of a new a roll on/roll off barge and ferry facility at Humbug Wharf, and a new barge and ferry terminal on the western bank of the Hey River.
- On-site camp – the construction and operation of camp facility (also referred to as the Amrun Accommodation Village).
- Water infrastructure –construction and operation of a water supply dam on a freshwater tributary of Norman Creek (Arraw Dam (formerly Dam C), plus pipelines, water treatment plants (for potable water) and artesian bores.
- Port and ship-loading facilities –construction and operation of the Port of Amrun, including ship-loading and tug mooring facilities between Boyd Point and Pera Head. The Port of Weipa continues to receive deliveries of fuel, cargo, and equipment for the Amrun Project from domestic (mostly the Port of Cairns) and international ports.

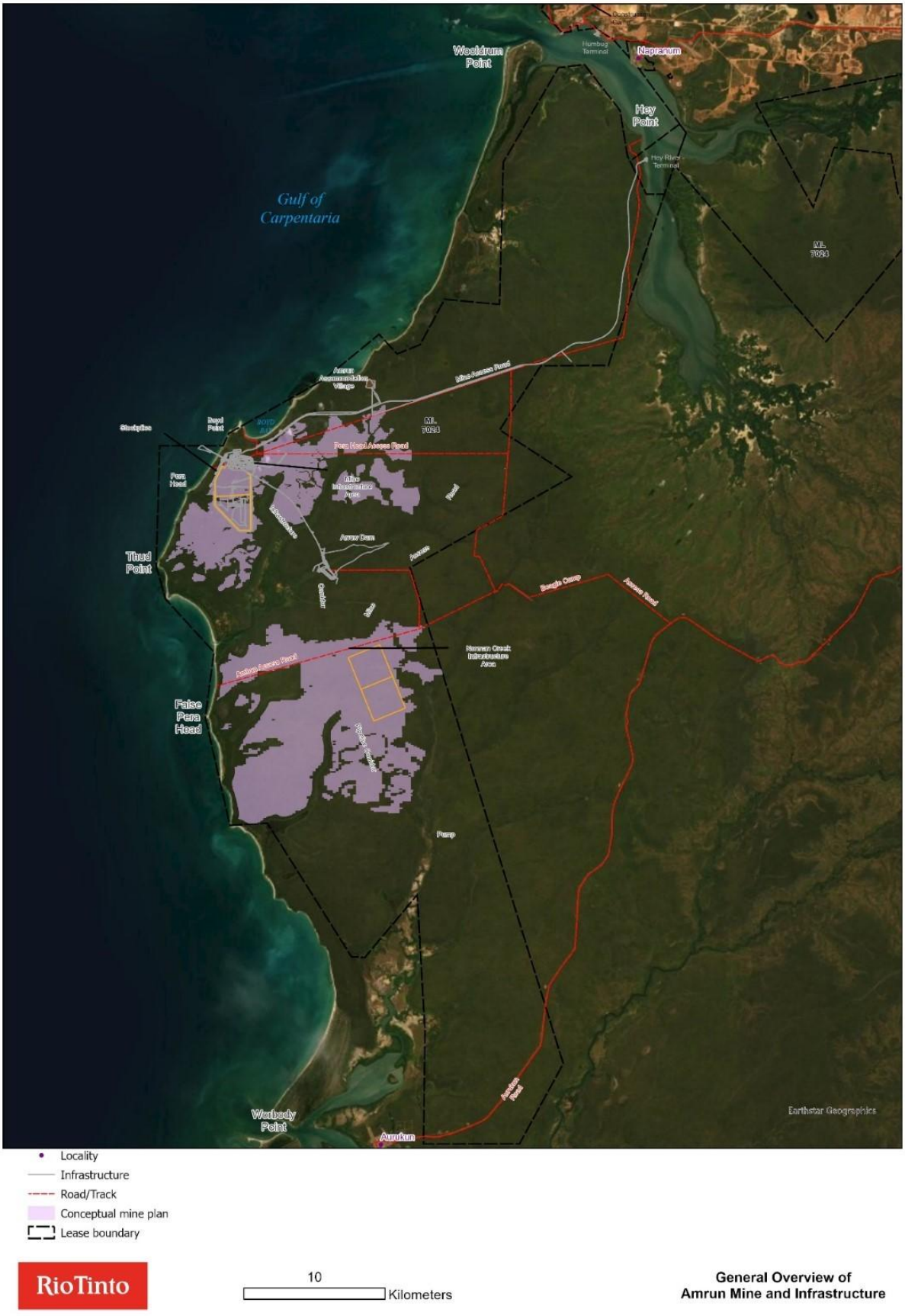

Figure 1: Components of the Amrun Project

2 Pre-Disturbance Monitoring

The requirements for the Pre-disturbance Program are specified by Condition 22 to 24 of the South of Embley Bauxite Mine and Port Development approval (EPBC2010/5642), issued under the *Environmental Protection and Biodiversity Conservation Act 1999*. The Pre-disturbance Program is presented in Section 5.3 of the Terrestrial Management Plan – South of Embley Project. The Pre-disturbance Program has been implemented in accordance with approval conditions and the Terrestrial Management Plan.

2.1 Methods

2.1.1 Pre-disturbance program

Condition 22 of the EPBC 2010/5642 approval sets out a Pre-Disturbance Program to be implemented prior to the clearing of any vegetation. Pre-disturbance surveys will be conducted to:

- Determine the presence of any active or potentially active Red Goshawk and/or Masked Owl nests prior to clearing any vegetation. Surveying will be undertaken:
  - Red Goshawk – in areas located within one (1) kilometre of permanent water supporting riparian gallery forest or Paperback wetland; seasonally inundated coastal wetlands and seasonal water courses supporting riparian gallery forest, or an estuary.
  - Masked Owl – in areas within 200 metres of permanent water supporting riparian gallery forest of paperbark wetland, seasonally inundated Paperbark wetlands, seasonal watercourses supporting riparian gallery forest or an estuary.
- Surveys will involve walkthroughs of those areas to be cleared, prior to clearing.
- Any observations of nests that may be used by Red Goshawks and/or Masked Owls will be recorded and further assessment undertaken to determine whether the nest is being actively used.
- If an active nest is identified, avoidance, mitigation or management measures will be implemented and a 200m buffer will be established around the nest trees. The nest tree and buffer zone will not be cleared or disturbed until the end of the breeding season (being until fledglings no longer use the nest). Nesting periods are as follows:
  - Red Goshawk - courtship starts as early as April and young do not leave their natal territories until as late as the end of December. Breeding occurs generally in the spring with eggs laid between May and October.
  - Masked Owl - probably breeds between March and October but may breed when conditions are favourable, which can be any time of the year. It is thought that the female occupies the nest for up to 10 weeks before laying. The incubation period is generally 33–35 days but could be as much as 42 days. The fledging period is 10–12 weeks.
- If a potential Red Goshawk and/or Masked Owl nest is located but is not actively being utilised, the tree may be felled immediately to encourage any future nesting pairs to establish a nest outside of the disturbance area[2].

In addition to the Pre-Disturbance Program under Condition 22, pre-disturbance surveys for Eastern Osprey and White-bellied Sea-eagle will be undertaken within potential nesting riparian forest habitat within Arraw Dam (previously named Dam C) and at infrastructure crossings of riparian forest. Any active nests identified will be buffered until the end of the breeding season for the species in question. The protocol for surveys conducted under the Pre-Disturbance Program shall be prepared by an experienced environmental

[2] Under the Nature Conservation (Wildlife Management) Regulation 2006 an active breeding place is defined as (Department of Environment and Science 2016); A bower, burrow, cave, hollow, nest or other thing that is commonly used by the animal to incubate or rear the animal's offspring; or the animal is preparing, or has prepared, the place for incubating or rearing the offspring; or the animal is breeding, or is about to breed, and is physically occupying the place; or
the animal and the animal's offspring are physically occupying the place, even if the occupation is only periodical; or the animal has used the place to incubate or rear the animal's offspring and is of a species generally known to return to the same place to incubate or rear offspring in each breeding season for the animal.

professional with knowledge of the identification of the Red Goshawk, Masked Owl, Eastern Osprey, White-bellied Sea-eagle and their nests.

2.2 Target fauna survey methods

The survey methodology implemented during the reporting period for each of the target fauna species are presented in (Table 1) below. The survey methods were implemented within areas to be cleared, prior to clearing. The following parameters are to be recorded for each observation where relevant and possible, however in many instances some of this data (e.g. age class, habitat type) are indeterminable or not applicable for bird observations:

- Species name (common and scientific).
- Time and day of survey.
- GPS location.
- Number of individuals located.
- Age class (if known).
- Habitat type.
- EPBC Act listing status.

Table 1: Pre-disturbance Program target fauna species survey methods.

Species	Red Goshawk (Erythrotriorchis radiatus) Eastern Osprey (Pandion cristatus) White-Bellied Sea-eagle (Haliaeetus leucogaster)	Masked Owl (Tyto novaehollandiae kimberli)
Method	Systematic traverses, no more than 100m apart, to detect nests within 1km of permanent water supporting the following: • Riparian gallery forest or paperbark wetland; • Seasonally inundated coastal wetlands; • Seasonal watercourses supporting riparian gallery forest; or • estuary. 15-minute bird observation points (preferably in the morning or if not then late afternoon) at a density of 1 per 25ha with focus on detecting active or calling individuals Undertake targeted follow up observations at identified potential nests if needed to confirm ownership or occurrence of breeding activity.	Systematic traverses, no more than 100m apart, to detect nests within 1km of permanent water supporting the following: • Riparian gallery forest or paperbark wetland; • Seasonally inundated coastal wetlands; • Seasonal watercourses supporting riparian gallery forest; or • estuary. Call playback surveys at a density of 1 per 25ha within waterway habitats and the adjacent 200m area. Undertake targeted follow up observations at identified potential nests if needed to confirm ownership or occurrence of breeding activity.

2.3 Results

Surveys were conducted across approximately 681 ha during the Amrun clearing plan for mining and approximately 7,419 ha during Amrun geological drilling exploration activities during the reporting period which includes all the vegetation specified within the survey methodology (Table 1). The results of all surveys were communicated to the Superintendent Land & Rehabilitation.

All other observations of target fauna species recorded during the Pre-disturbance Program surveys in the reporting period are presented below in (Table 2) in accordance with Condition 25.

Table 2: Pre-disturbance Program- target fauna species observations.

Common Name	Full Latin Name	Date	Easting (m)	Northing (m)	Habitat	EPBC Act Status	Active Nest	Buffer Established	Notes / Comments
Red Goshawk[1]	*Erythrotriorchis radiatus*	24/06/2021	572725	8566700	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Endangered	Yes	Yes	Active Nest
Red Goshawk[1]	*Erythrotriorchis radiatus*	7/09/2021	567499	8562997	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Endangered	Yes	Yes	Active Nest
Red Goshawk[2]	*Erythrotriorchis radiatus*	29/07/2024	590618	8586974	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Endangered	Yes	Yes	Active Nest
Red Goshawk[2]	*Erythrotriorchis radiatus*	5/08/2024	588631	8582193	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Endangered	No	Yes	Inactive Nest
Eastern Osprey	*Pandion cristatus*	22/04/2025	595350	8593583	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	Yes	Yes	Active nest
Eastern Osprey	*Pandion cristatus*	27/05/2024	592676	8581303	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	No	No	Incidental Fauna Observations
Eastern Osprey	*Pandion cristatus*	11/07/2024	569174	8545736	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	No	No	Incidental Fauna Observations
Eastern Osprey	*Pandion cristatus*	07/04/2025	595289	8593455	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	No	No	Incidental Fauna Observations
White-bellied Sea-eagle	*Haliaeetus leucogaster*	2024-07-10	574643	8552656	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	No	No	Incidental Fauna Observations
White-bellied Sea-eagle	*Haliaeetus leucogaster*	18/07/2024	573927	8564238	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	No	No	Incidental Fauna Observations

Common Name	Full Latin Name	Date	Easting (m)	Northing (m)	Habitat	EPBC Act Status	Active Nest	Buffer Established	Notes / Comments
White-bellied Sea-eagle	*Haliaeetus leucogaster*	11/10/2024	573804	8565620	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	No	No	Incidental Fauna Observations
White-bellied Sea-eagle	*Haliaeetus leucogaster*	21/10/2024	575703	8562694	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	No	No	Incidental Fauna Observations
White-bellied Sea-eagle	*Haliaeetus leucogaster*	02/05/2025	595623	8592066	*Eucalyptus tetrodonta* and *Corymbia nesophila* woodland open forest	Listed Marine/Migratory	No	No	Incidental Fauna Observations

[1] Previously reported nest records
[2] Nest identified through dedicated research projects via tracking. Nests not located during preclearance activities

3 Weed Management

During the reporting period, the Weed Management Program was implemented by the Amrun operations environmental teams and Traditional Owners through the Land and Sea Management Program (LSMP).

Weed management activities included:

- Washdown and inspection of all vehicles travelling into the Amrun Project area, and verification by wharf security and environmental quality control officers through collection of weed hygiene certificates and cleanliness checks before permitting vehicles to access the project site.
- All wash-down facilities are self-contained, zero discharge facilities.
- Ongoing weed survey by LSMP. The results of the surveys are detailed below.
- Routine inspections are conducted in and around construction areas and access roads in the Amrun Project area including identification and reporting of weed occurrences.
- Routine ongoing weed control was completed by suitably qualified personnel throughout the reporting period using both manual and chemical treatments depending on the locations.
- The weed identification and reporting procedure has been implemented for site and part of employee inductions and is updated through e-days. Ongoing weed management training is completed with our weed management specialist throughout the year.

Weed surveys are completed by both foot and vehicles. The method chosen is dependent on vision and extent of weed infestation in an area. In either event, the vehicle is driven slowly (approx. 10km/h along the access track and team members checking to identify weeds across all access tracks on site and within the mine. When sighted the car is safely stopped and the location is recorded and if available, manual or chemical (herbicide) treatment (pickers or glyphosate) will be applied immediately, or the area will be recorded to be revisited for treatment shortly thereafter. Information is recorded using the ArcGIS application “collector” and then updated into the weed management database by the LSMP team members. In the event a plant is unknown a specimen will be collected and sent to a competent person for further identification.

The main outcomes of the 2024 survey were as follows:

- Previous isolated Class 2 or 3 weed species have been effectively controlled and were not present during the survey indicating the team is on track for successful eradication of the species.
- Isolated occurrences of Gamba grass (*Andropogon gayanus*) were identified as individual plants. These plants were immediately treated, recorded into field data collection system and regularly checked and rechecked for additional growth. Most specimens were found roadside on light vehicle tracks. No broadscale infestations have been recorded.
- The last periodic weed survey was completed at Amrun by Ecotone Flora and Fauna Consultants in October 2022. The next periodic survey will be completed in June 2025 and reported on in the 2026 EPBC annual environment monitoring report.

The main summary of the 2024 weed management program and three-yearly periodic survey are as follows:

- Previous isolated Class 2 or 3 weed species have been effectively controlled and were not present during the periodic weed survey.
- Isolated individual gamba grass (*Andropogon gayanus)* plants identified and destroyed along high traffic areas within operational areas, data was recorded and will be monitored in the 2025 reporting period.
- Increase in density of Hyptis (*Mesosphaerum suaveolens*) and Common Stylo (*Stylosanthes scabra)* around Hey River Terminal laydown area and main access road from HRT to Camp facility. Area is recognised as highlighted target area in 2025 weed management program.

4 Fire Management

The fire management program for Amrun (and the greater lease area) aims to reduce the incidence of damaging late dry season fires through ‘low intensity’ controlled burns. The control program aims to create a mosaic across the site to protect sensitive vegetation types and reduce fuel load. Burns are commenced in early June (early dry season) based on the vegetation condition.

The Amrun fire program has been underway since 2017 supporting construction of the Amrun mining infrastructure. In 2018, it was officially integrated into the Rio Tinto Weipa Operations Management Plan. This program is currently adapting to operations and to support progressive rehabilitation commenced in 2021 and has been designed in consultation with fire management experts, Traditional Owners and from previous site experience. The site-based plan is reviewed and amended at the end of each fire season to ensure seasonal fuel loads are adaptively managed.

The Amrun fire management plan for 2024 aimed to:

- Build on and compliment the previous fire programs to achieve a fine mosaic of burnt / unburnt country throughout the lease area inclusive of the offset area.
- Exclude fire from areas that received late season burns in 2023.
- Prevent the east-west movement of late season wildfires through the lease area.
- Build the capacity of the LSMP to implement an on-going fire management program.
- Implement targeted aerial incendiary works across the site.

This was achieved through:

- One aerial incendiary campaign in late July.
- Ground based ignition using a combination of single point ignition (match) and drip torch burns commencing in late June.

Figure 2 shows the fire scar mapping obtained from 2021 to 2024 downloaded from the Northern Australian Fire Information (NAFI) website. The mapping displays a comparison between years to identify how the regime has changed since implementation of the burn program across the Amrun site. Consistent with the fire management program objectives, a mosaic pattern is starting to present through the landscape with reduced late season frequency with the ongoing ignitions programs.

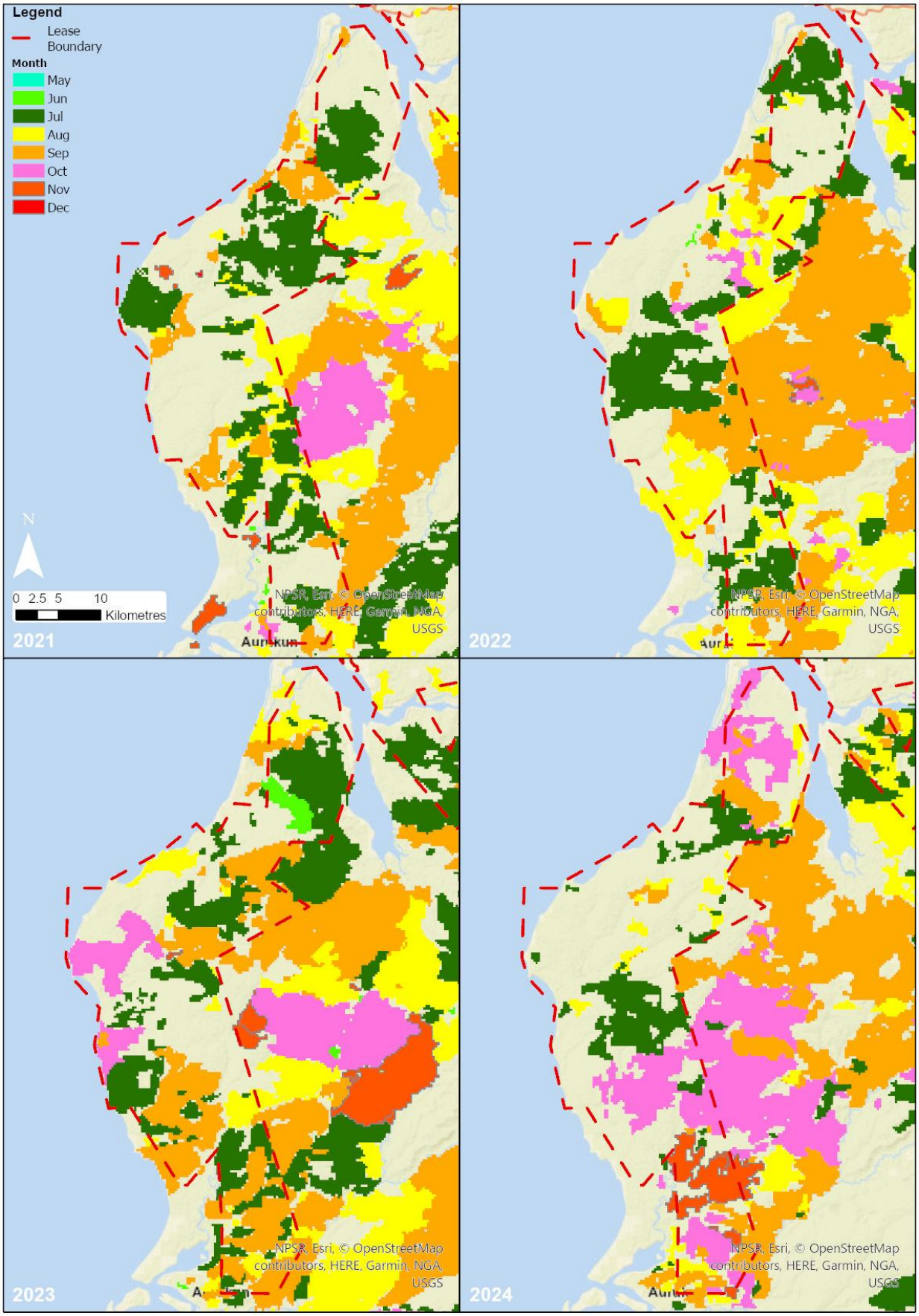

Figure 2: 2021-2024 fire scar comparison of the Amrun site using NAFI mapping data

5 Feral Animal Management

5.1 Feral Pigs

Feral pig eradication is completed via a combined program of aerial shooting and ground-based shooting. Since its inception in 2016, the program has adaptively changed over time to optimise the approach to eradicating feral pigs. This ensures the intended objective of decreasing marine turtle nest predation along the Amrun foreshore. Baiting is no longer used as an eradication method as it proven to be ineffective and labour intensive, low numbers were observed at bait stations and habituated boars that predate on turtle nests avoided bait stations all together.

The initial scope of the program was to focus on boars (male feral pigs) resident along the coastal swamps and beaches. New data from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) demonstrated feral pigs will move much greater distances to forage, especially on protein-rich food sources, including turtle eggs. The program has ultimately been expanded to include most Amrun on-lease areas of ML7024 between the Embley and Ward rivers. The only areas excluded from the program are those in which infrastructure is present. Whilst the program still focuses on the high-biodiversity coastal swamps of the Ward River, Norman Creek, Winda Winda Creek and Triluck Creek, the expanded culling area allows for greater engagement with groups of feral pigs moving outside of these swamp areas.
The 2024 feral pig management activities complied with the requirements outlined in the Feral Pig Offset Strategy. The 2024 campaign consisted of the following:

- 55 nights of scheduled ground-based shooting using a mobile team on foot and in All Terrain Vehicles (ATV). Spread across May to November 2024 and again in February 2025 to eliminate habituated pigs from coastal areas and prevent backfill from the greater lease area.
- One four day (24 hours) aerial shooting campaign.
- The use of bait stations and trapping was discontinued due to its demonstrated ineffectiveness.
- Feral cats were removed whenever sighted.

During the program, 560 pigs were humanely destroyed. Aerial shooting accounted for 451 pigs whilst ground-based shooting accounted for 109 pigs. A summary of the 2024 aerial and ground-based shooting results is presented in Table 3, and a comparative list of total pigs culled between 2016-2024 is presented in Table 4.

Table 3: Summary of aerial and ground-based shooting results for pigs for 2024

Event	Dates	Animals culled
Ground Shooting Campaign	21/05/2024 - 27/05/2024	13 pigs
Ground Shooting Campaign	05/06/2024 - 10/06/2024	3 pigs
Ground Shooting Campaign	15/07/2024 - 20/07/2024	6 pigs
Ground shooting Campaign	14/08/2024 - 16/08/2024	4 pigs
Aerial Shooting Campaign	17/08/2024 - 20/08/2024	451 pigs
Ground Shooting Campaign	15/09/2024 - 21/09/2024	12 pigs
Ground Shooting Campaign	02/10/2024 - 06/09/2024	10 pigs
Ground Shooting Campaign	30/10/2024 - 03/11/2024	18 pigs
Ground Shooting Campaign	14/11/2024 - 19/11/2024	17 pigs
Ground Shooting Campaign	09/02/2025 - 18/02/2025	26 pigs
Total		560 Pigs

Table 4: List of feral pig annual cull totals since 2016

Year	Total Aerial	Pig baiting and ground based shooting[3]
2016	121	1
2017	268	6
2018	300	11
2019[4]	824	31
2020	429	37
2021	653	56
2022	578	60
2023	425	104
2024	451	109
Total	**4049**	**415**

No estimate on pig population has been attempted as this is exceptionally difficult to do with accuracy and changes in the control program do not allow comparisons between years. The effectiveness of the control program is monitored through the turtle predation rates by pigs which is the key threatening process and key objective of the Feral Pig Offset Strategy

As expected, high levels of pig activity were concentrated around Winda Winda Creek, Norman Creek and Ward Creek. A number of pigs destroyed during the ground-based shooting were near the coastline. These individuals were considered important target animals and their removal has directly contributed to reducing the predation of threatened marine turtle species nest across all the Amrun coastline. The distribution of culled pigs across the 2024 ground-based shooting activities is presented in Figure 3.

[3] Pig baiting was discontinued in 2021 as it was deemed ineffective.

[4] The 2019 program included 2 aerial culling campaigns for a total of six days.

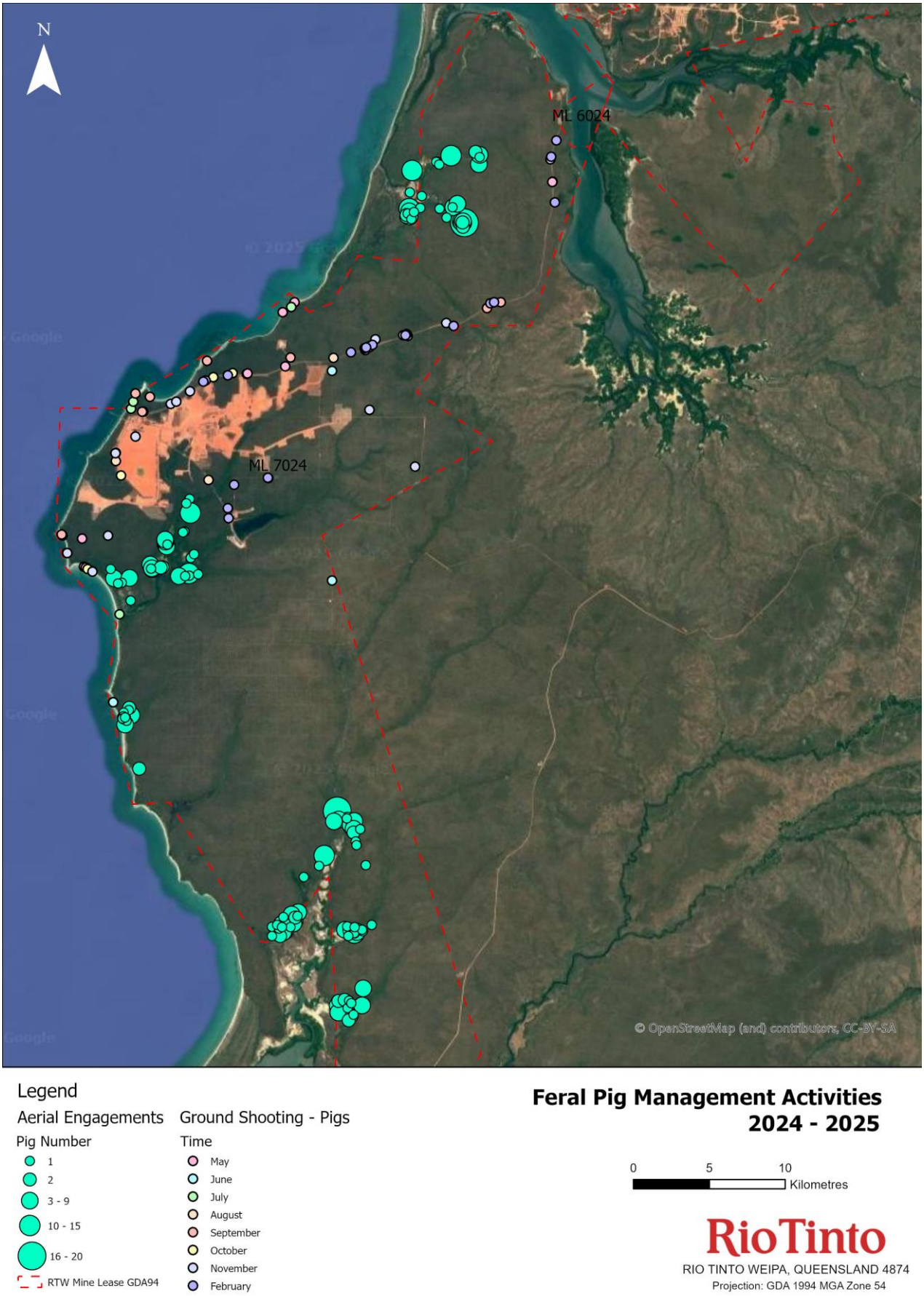

Figure 3: Feral pig engagement locations and timing during 2024 control activities.

5.2 Feral Cat and Dogs

Feral cat and dogs are required to be managed around camp and mine infrastructure areas to supplement environmental goals of the Terrestrial Management Plan and to reduce undesirable human/wildlife conflicts. These activities are conducted in a manner that is consistent with established animal welfare practices.

Previously, quarterly visual monitoring (spotlighting) surveys and trapping/baiting events were implemented. As described in the 2019 and 2020 Annual Monitoring report these methods are considered ineffective with the information providing limited data and minimal animal captures. Spotlighting/infra-red searches are currently completed when completing ground-based shooting campaign. This has been completed since 2019 and significantly increased the success of eliminating feral animals from site.

In 2024, 21 feral cats and 9 feral dogs were humanely destroyed. A summary of the feral cat and dog management activities is summarised in Table 5 and total feral cat and dog culls between 2016-2024 are presented in Table 6. The distribution of culled feral cat and dogs during 2023 and 2024 ground based shooting activities is represented in Figure 4.

Table 5: Summary of feral cat and dog management activities.

Event	Dates	Animals
Ground Shooting Campaign	21/05/2024 - 27/05/2024	1 x Dog
Ground Shooting Campaign	05/06/2024 - 10/06/2024	3 x Cats 3 x Dogs
Ground Shooting Campaign	15/07/2024 - 20/07/2024	0 Animals
Ground Shooting Campaign	14/08/2024 - 16/08/2024	0 Animals
Ground Shooting Campaign	15/09/2024 - 21/09/2024	5 x Cats 1 x Dog
Ground Shooting Campaign	02/10/2024 - 06/09/2024	1 x Cat
Ground Shooting Campaign	30/10/2024 - 03/11/2024	2 x Cats
Ground Shooting Campaign	14/11/2024 - 19/11/2024	3 x Cats 2 x Dogs
Ground Shooting Campaign	09/02/2025 - 18/02/2025	7 x Cats 2 x Dogs

Table 6:List of feral cat and dog cull totals since 2016.

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Cat	0	0	0	8	9	12	12	25	21	87
Dog	0	0	3	5	10	11	10	11	9	59

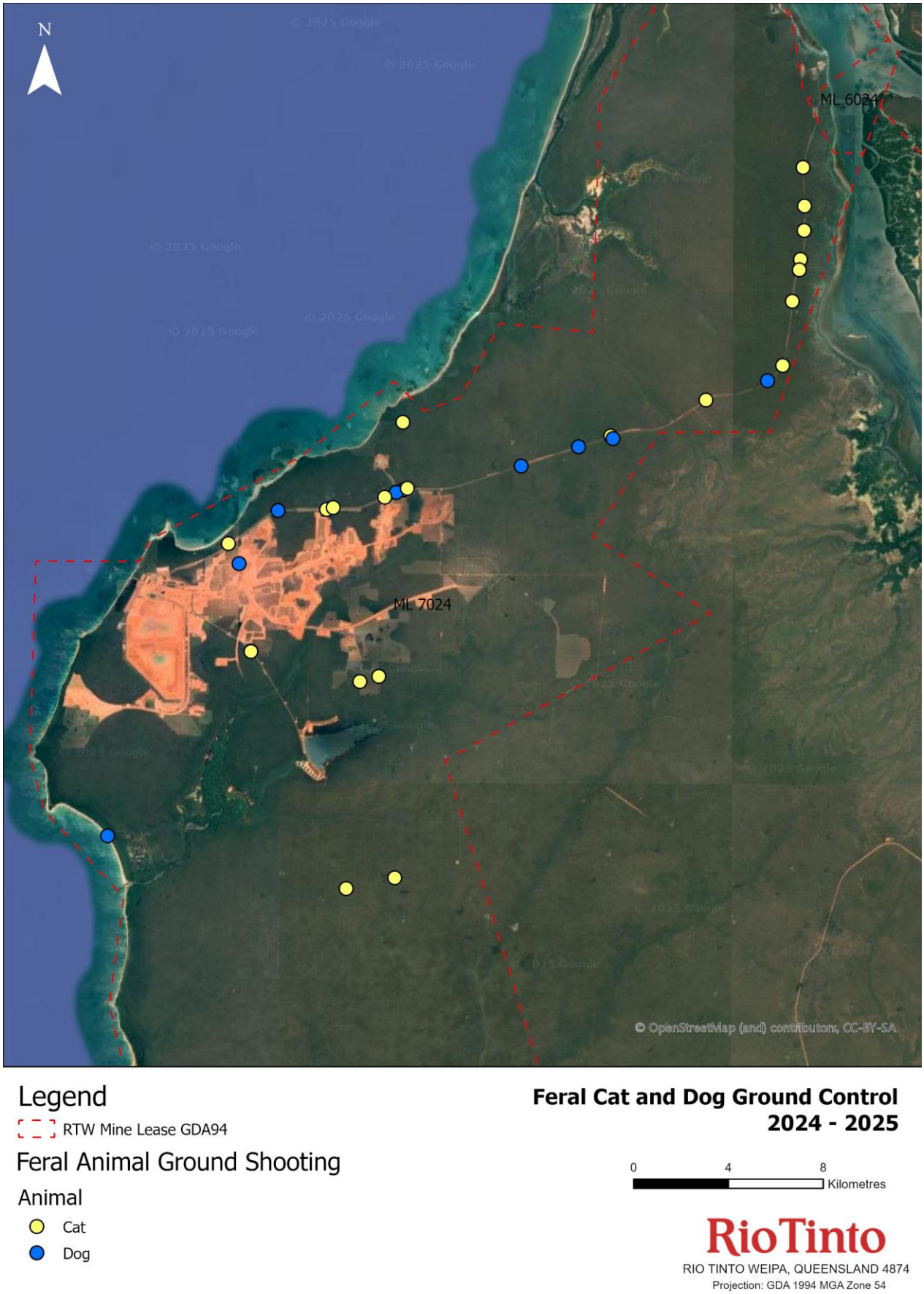

Figure 4: Feral cat and dog engagement locations during 2024 control activities.

6 Marine Turtle Monitoring

As part of the Amrun project (formerly South of Embley Project) approvals Commonwealth (EPBC 2010/5642 Condition 45) and Queensland (EPML00725113. Condition 42) an annual turtle monitoring program is required. The Queensland Environmental Impact Statement (EIS; RTA 2011)), Queensland Supplementary Report (SEIS RTA 2012) and Commonwealth Environmental impact Statement (2013) identified that lighting at the then proposed Amrun Port could potentially have an adverse impact on marine turtle hatchlings (RTA 2011 and RTA 2012).

While the design of lighting has been developed to minimise adverse impacts on turtle hatchlings, a compensatory measure was proposed in the EIS to enhance overall hatchling survivorship by reducing the predation of turtle nests by feral pigs (RTA 2013). The monitoring associated with this project aims to assess the progress of the feral pig control strategy to enable adaptive management and maximise hatchling success.

Marine turtle nesting habitat in proximity to the Amrun project was assessed, including all accessible nesting beaches on the Amrun Project mining lease north (approximately 27 km of nesting beach) and south (approximately 32 km of nesting beach) of the Port.

Marine turtle monitoring was first conducted along the Amrun project beaches in February 2013. It was identified August/September is the peak nesting period for the region. Since 2016, surveys have been conducted annually[5].

Four nesting turtle species have been identified to date including flatback (*Natator depressus*), hawksbill (*Eretmochelys imbricate*), olive ridley (*Lepidochelys olivacea*) and green (Chelonia mydas) turtles. Surveys to date have confirmed low density turtle nesting occurs on the beaches between Winda Winda Creek and Ina Creek (RTA 2013, Guinea 2014, Pendoley Environmental 2017;2018;2019; and unpublished data).

Since the program's inception in 2016, the program has adaptively changed over time to optimise the approach to monitoring and understanding the impact of feral pigs throughout the duration of nesting season. The Feral Pig Offset Strategy (FPOS) required turtle surveys to be completed over a two -week period which provided only snapshot results. Incidental on-ground results observed nests were being predated by pigs after these surveys were conducted thus inferring results obtained during the two-week survey period were not a sufficient representation.

The program continues to be undertaken in-house by the RTW Land and Sea Team, with works completed under appropriate permits from the DES, Permits and Licensing Management and Animal Ethics Committee. Ongoing training and development of staff is undertaken to continue to ensure successful outcomes.

The 2024 the program followed the survey methods implemented since 2013 to ensure consistency with baseline surveys (Guinea 2014) and project surveys (Pendoley 2016, 2017, 2018, 2019).

In 2024, the Land and Sea team commenced using the Nestor turtle app for survey and monitoring data collection. This transition is part of a broader effort to align Amrun turtle monitoring with other Land and Sea Ranger programs on Western Cape York.

6.1 Methods

The area was divided into seven discrete survey beach sections and included all accessible nesting beaches between Winda Winda Creek (north) and Ina Creek (south) (Figure 5).

[5] Surveys conducted by external contractors to date: February and October 2013 (Guinea, 2014), September 2016, August 2017, September 2017, September 2018 and September 2019 (Pendoley Environmental, 2017).

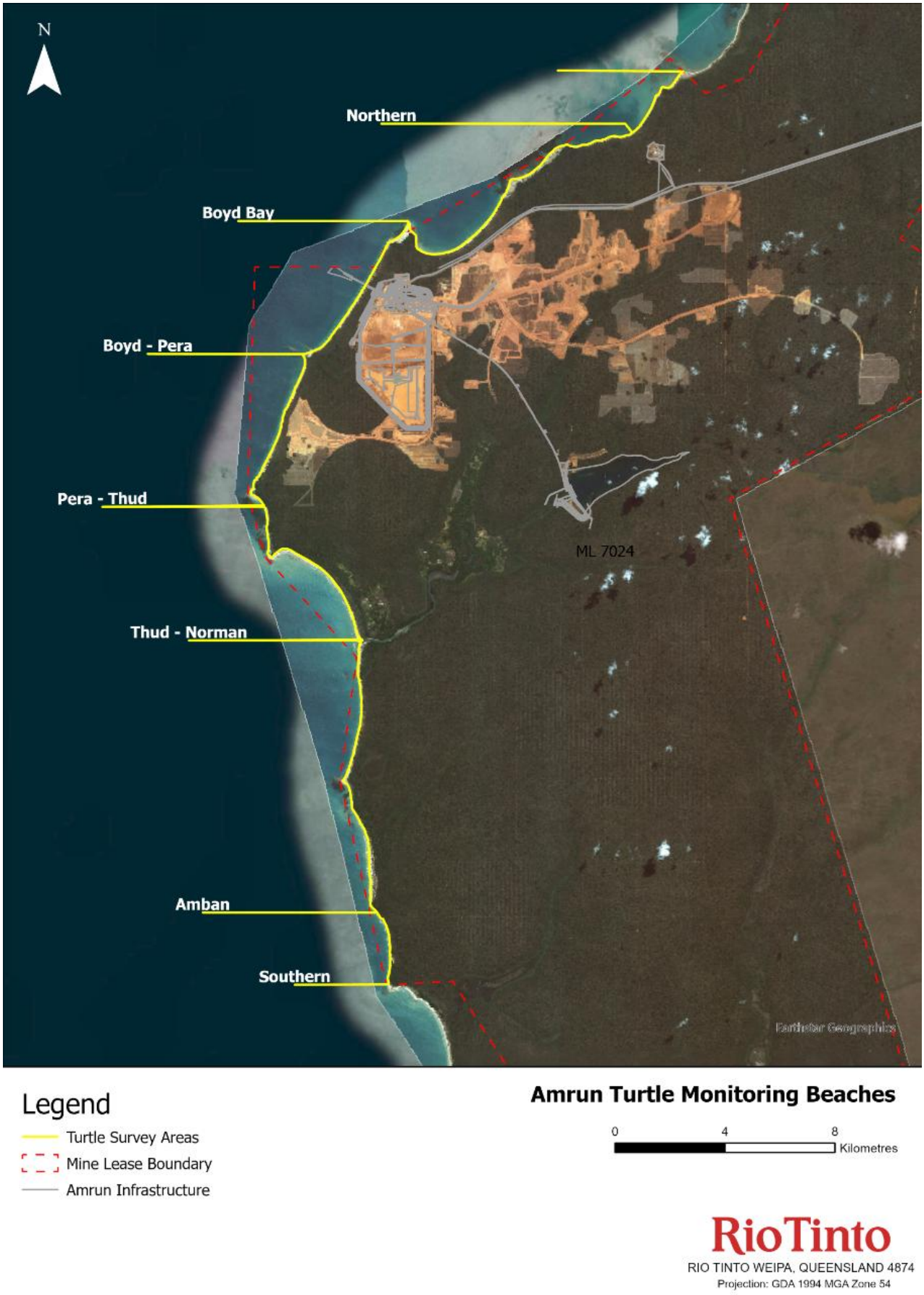

Figure 5: Amrun turtle nest monitoring beaches.

The surveys were completed in 2024 by the LSMP Team which is comprised of Wik-Waya Traditional Owners. The team members have undergone ongoing training since 2016 which included a verification of competencies. The team continue to undergo regular training each season for ongoing improvement.

RTW is currently engaging with other Land and Sea Ranger groups on Western Cape York through the Western Cape Turtle Threat Abatement Alliance (WCTTAA). There may be some future adjustment to the annual turtle monitoring program to better align our data and effort with the work that is undertaken within the broader Western Cape region.

6.1.1 Schedule

In 2024, the sites from Northern to Thud-Norman Creek were regularly accessed throughout the year with incidental observation at least every two weeks. Any occurrences of predation or hatchlings were recorded throughout the year to confirm successful nest or predation. Throughout October to mid-December at least weekly surveys were completed to understand the success of the season's efforts.

Regular access to Amban and Southern beaches remained challenging due to access and logistical challenges.

6.1.2 Nest census surveys

Nest identified – census surveys completed using an All-terrain vehicle (ATV) or on foot to identify nests. Data is collected about the nest and associated crawl. Data includes GPS point, likely species, track widths, hatched nests and any signs of predation. Predated nests are reviewed for the type of predator and whether the nest appeared to be partially or completely impacted.

6.1.3 Predation monitoring

Visual surveys are undertaken regularly along target beaches to identify predation events. Where available an infrared motion detection trail camera is placed on a pole adjacent to the nest with signage (species, estimate hatch date etc). The camera is removed when the nest is predated, or the nest has successfully hatched.

6.1.4 Ongoing nest monitoring

Ongoing nest assessment is completed throughout the survey period. At the end of the season each recorded nest is assigned based on the last recorded nest interaction and includes:

- Predated – where the nest has confirmed sign of predation and (species of predation is identified where possible).
- Partial predation – when an attempt at predation has been made and some eggs may be sighted. The nest is reburied and monitored for the season. It is considered a partial predation event if hatchings are successfully recorded.
- Hatchlings – this is only assigned when confirmed hatchling tracks or a nest excavation has occurred, and the nest has been successful.
- Potential nest – when a potential nest has been identified this is recorded as a potential nest, unless there are confirmed sighting of eggs (e.g. actively recorded laying).
- False crawl – when a track was recorded but no nest signs associated with a nest e.g. mound or covering were recorded.
- Nest washout – when a natural event such as waves or storms wash out the nest. This is recorded but no results are reported. This normally occurs towards the beginning or end of the year.

6.1.5 Nest excavation

Where possible, nest excavation generally occurs 2-3 days after nest emergence. Excavation is completed to confirm species and understand the success of the emergence based on hatched and unhatched eggs.

6.2 Results

A total of 302 turtle nesting related events were recorded during the 2024 monitoring period (Table 7). These included:

- 84 hatched nest events, resulting in the emergence of over 5200 hatchlings
- 77 potential nests, and
- 56 nests predated by feral pigs

Flatback turtles accounted for approximately 36% of total events (Table 7).

In addition to feral pig predation, 40 nests were impacted by other predators, primarily Goanna (37) and Dogs (3). The observed increase in Goanna predation is likely due to improved capacity of the Land and Sea team to identify and document these events more accurately.

Feral Pig predation rates showed a slight increase from 2023, rising to 19%, but remain well below the 30% (or 70% survival) target for Western Cape York. This target is a key benchmark used by the Western Cape Turtle Threat Abatement Alliance (WCTTAA) to assess the effectiveness of feral pig management.

The 2024 data continues to demonstrate the positive impact of the feral pig control program (Figure 6). Initial predation rates, as recorded by Pendoley Environmental in 2016, ranged from 70% to 100% on some beach sections. The sustained reduction in predation highlights the effectiveness of ongoing management efforts.

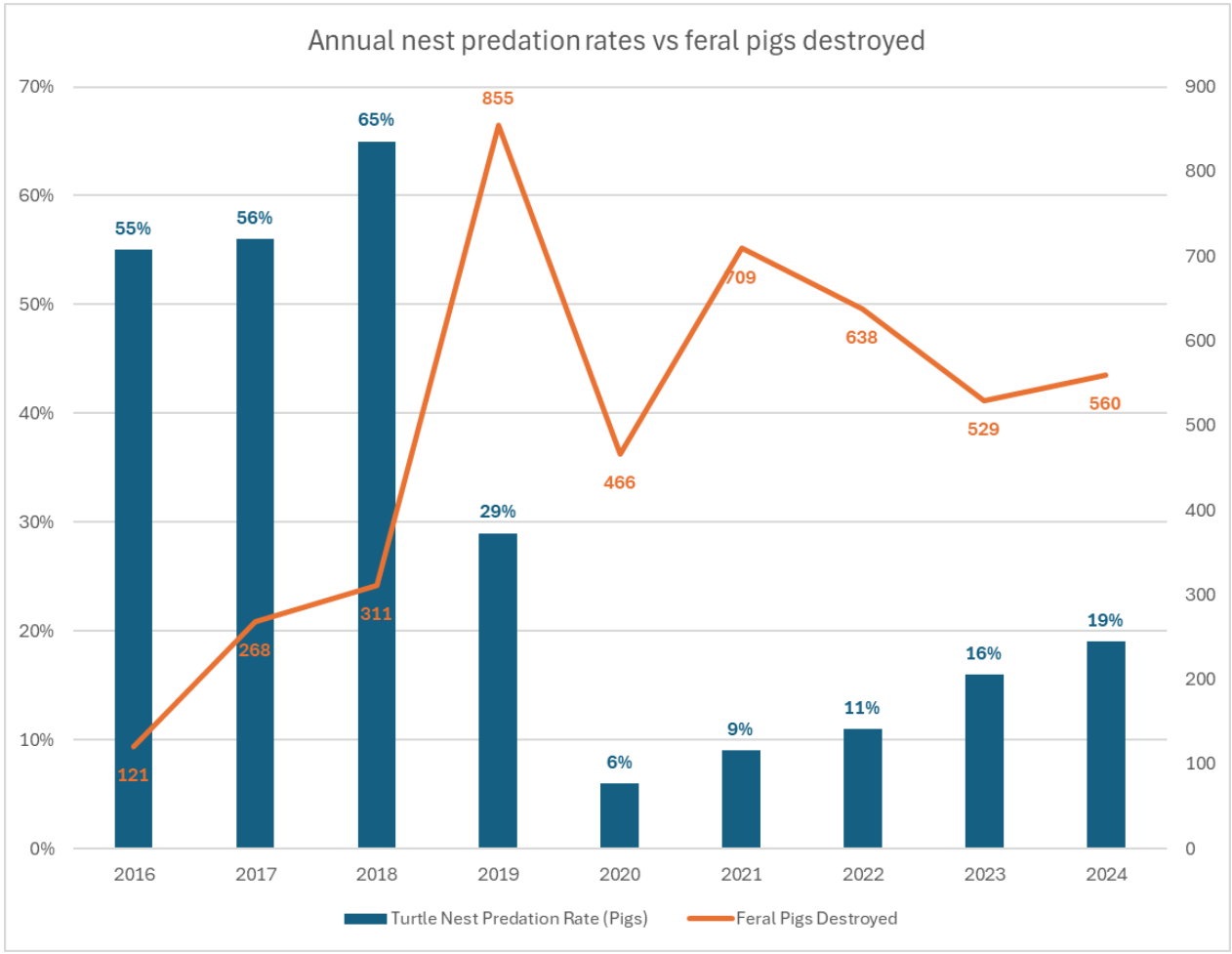

Figure 6: Observed turtle nest predation vs total number of pigs destroyed since 2016

The 2024 Turtle program saw continued improvement in data collection on the 2023 program with the total number of monitoring events increasing from 245 (2023) to 302 (2024).

The Thud to Norman and Amban sections had the most predation events during 2024. (Figure 6). These areas are a focus during aerial shooting campaigns due to the difficulty in ground-based access (Figure 3). Ground based control efforts were focussed on areas that experienced high predation during the 2023 monitoring season, targeting habituated animals (Figure 3).

While the Northen Beaches received good post survey monitoring, access and logistical constraints meant there was limited post survey monitoring carried out on the remote Southern beach sections. This resulted in a lower number of successful hatching events being recorded in these sections (Figure 6). It is important to note that new or hatched nests are hard to identify less than a week after an event while predated nests can be identified up to six months after the event and are easily identified during initial surveys.

Table 7: Summary of nesting events per species.

Species	Hatched Nest	Pig predation	Other predation	Potential Nest	False Crawl	Total
Flatback	46	14	7	33	10	**110**
Green	5	1	0	8	1	**15**
Hawksbill	12	2	2	15	7	**38**
Olive-ridley	19	5	2	19	23	**68**
Unknown	2	34	29	2	4	**71**
Total	**84**	**56**	**40**	**77**	**45**	**302**

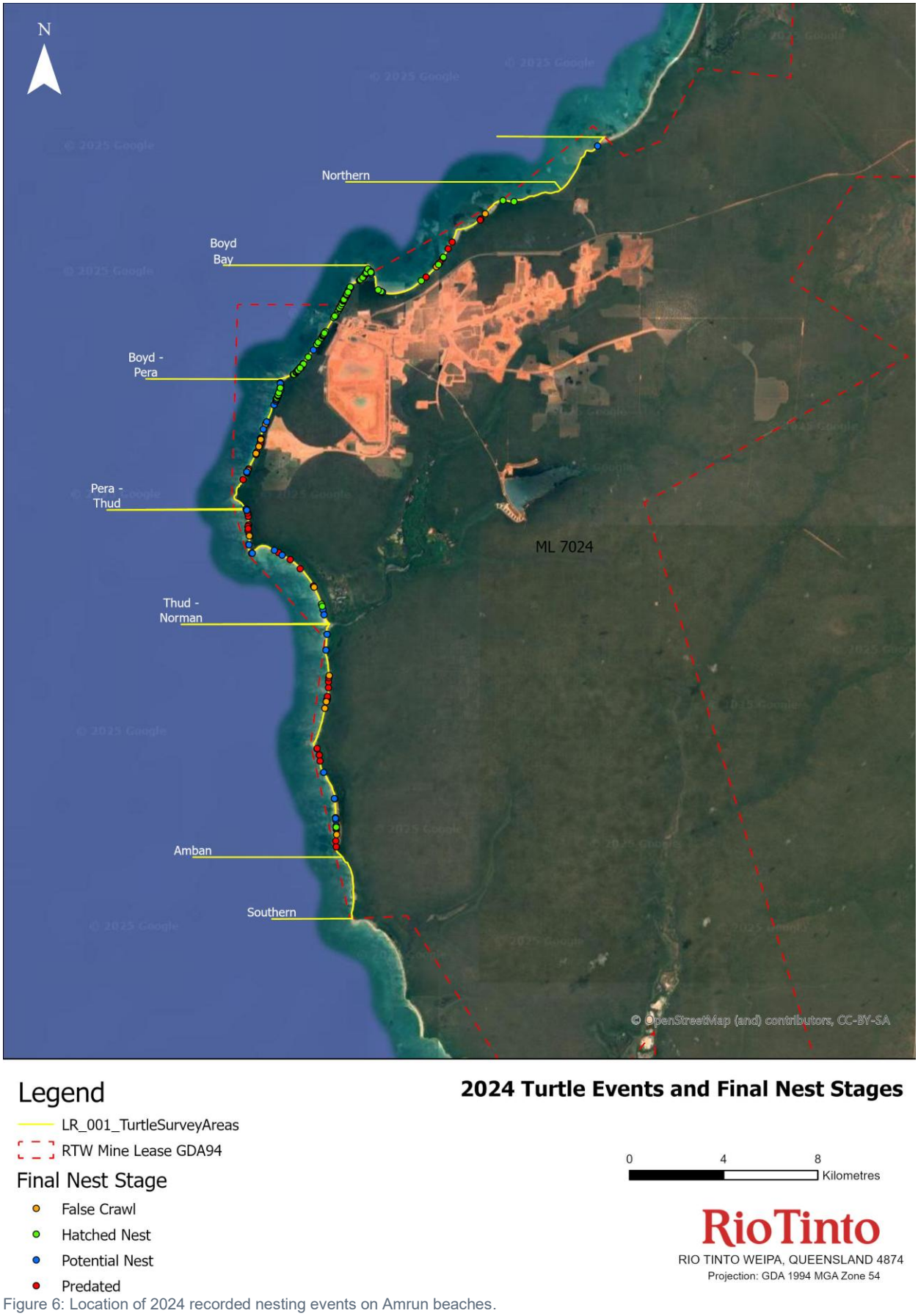

Figure 6: Location of 2024 recorded nesting events on Amrun beaches.

7 Marine Pest Monitoring

The Amrun Project (formerly South of Embley Project) involves the construction and operation of a new Port facility (Port of Amrun) located between Boyd Point and Pera Head. The marine works include construction of a jetty, wharf and ship loaders. Construction of the marine aspects of the Port commenced in May 2017.

It has been identified that vessels that may have visited ports of concern[6] have the potential to translocate marine pests. Should a marine pest be introduced to local marine waters, an increase in artificial structure at the Port has the potential to provide suitable habitat for marine pests to become established. The current risk of translocation to Amrun is low due to the nature of the vessels operating. Vessels (with exception of bauxite carriers which are low risk) have been risk assessed prior to mobilisation to site further reducing the risk of translocation.

Marine pests are marine biota that are translocated into waters outside their natural geographic range and subsequently settle, survive and spread. Translocation and survival of these species in new areas can cause irreversible impacts to the local ecosystem by competing with and/or predating on native species, as well as introducing disease. The consequences can include a combination of environmental, social and economic impacts.

Review of the installation of a marine pest settlement plate program to meet the utilise the Queensland's Seaports eDNA Surveillance (Q-SEAS) Program is underway. Previous installation attempts have identified several safety and operational issues associated with installation. The currents are also identified as impacting the success of the arrays to remain upright. This process is being worked through.

Visual surveys for Asian green mussel (*Perna viridis*; AGM) were made along beach shores and accessible intertidal rocky reef areas. Suspected shells were collected and provided to a marine biologist for identification. Areas explored were limited to between Boyd Bay and Pera Head which is near the export facility. Beach wrack surveys are ongoing through the year while completing turtle surveys and no marine pests were identified on the beach throughout the year.

[6] Those ports that are recognised as harbouring invasive marine species with risk of translocation to other port areas.