

**Amrun Project - RTA Weipa Pty Ltd**

## Amrun Project (EPBC 2010/5642) – Annual Environmental Monitoring Report 2022

12 August 2022

A report prepared in accordance with EPBC Approval 2010/5642



Flatback turtle hatchling recorded during the 2021 surveys

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# Amrun Project - Annual Environmental Monitoring Report 2021

## 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) requires 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 2021 and 12 May 2022 associated with:

- Water quality monitoring associated with dredging activities
- 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<sup>1</sup>. The project has a current estimated production rate of approximately 22.8 million dry product tonnes per annum (Mdtpa). 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.

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<sup>1</sup> Preliminary works commenced October 2015 and significant construction commenced in May 2016.

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
- 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.

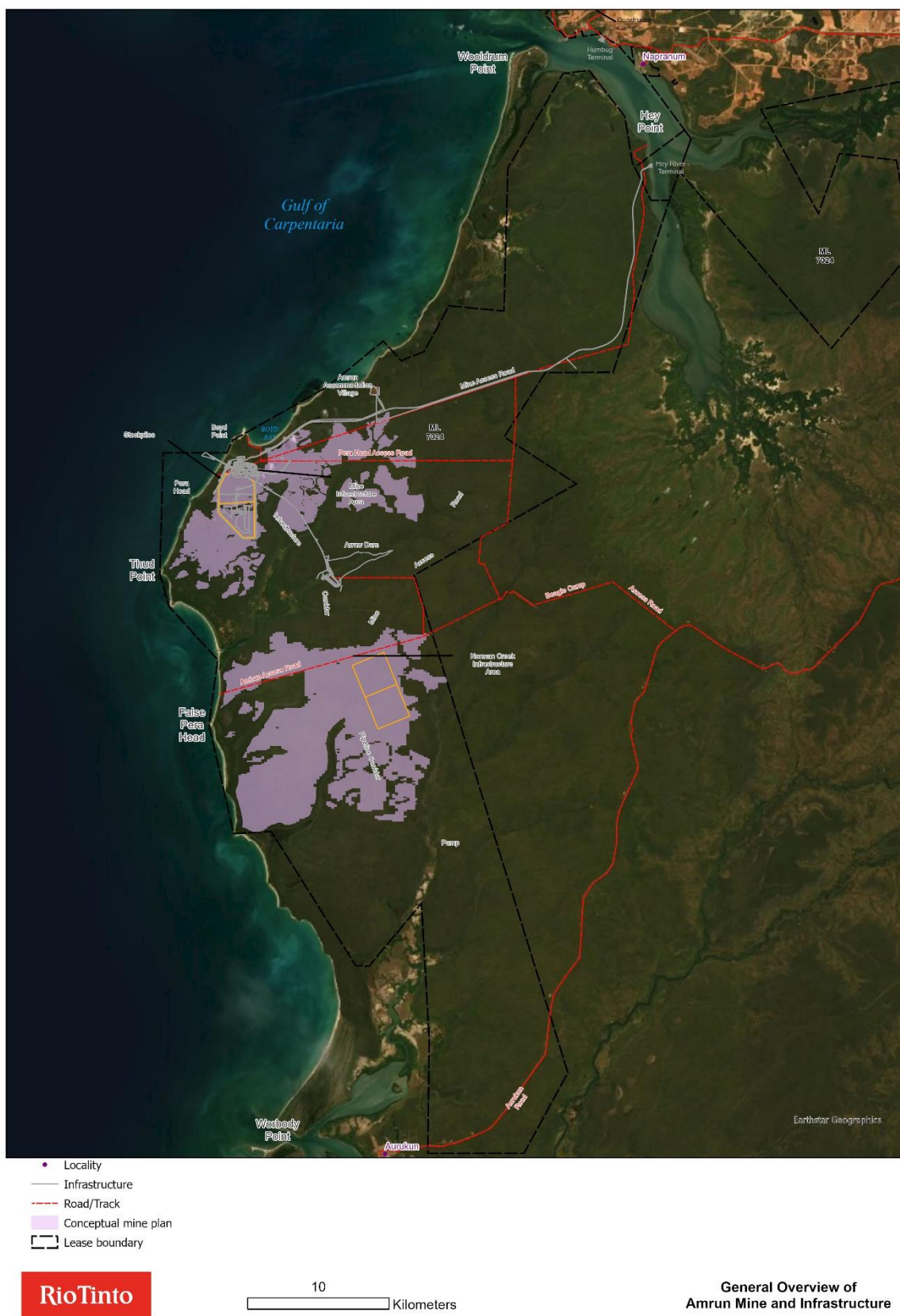


Figure 1: Components of the Amrun Project

## **2. Water Quality Monitoring**

No dredging occurred during the 2021 reporting period and accordingly no water quality monitoring for dredging activities was completed

## **3. 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.

### **3.1 Methods**

#### **3.1.1 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; and,
  - 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.

In addition to the Pre-Disturbance Program under Condition 22, pre-disturbance surveys for Eastern Osprey, White-bellied Sea-eagle and Rainbow Bee-eater 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 (see Tables 17 and 18). The protocol for surveys conducted under the Pre-Disturbance Program shall be prepared by an experienced environmental professional with knowledge of the identification of the Red Goshawk, Masked Owl, Eastern Osprey, White-bellied Sea-eagle and Rainbow Bee-eater and their nests.

## 3.2 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 ( <i>Erythrorhynchus radiatus</i> ) Eastern Osprey ( <i>Pandion cristatus</i> ) White-Bellied Sea-eagle ( <i>Haliaeetus leucogaster</i> )	Masked Owl ( <i>Tyto novaehollandiae kimberli</i> )
Method	<p>Systematic traverses, no more than 100m apart, to detect nests within 1km of permanent water supporting the following:</p> <ul style="list-style-type: none"> <li>• riparian gallery forest or paperbark wetland;</li> <li>• seasonally inundated coastal wetlands;</li> <li>• seasonal watercourses supporting riparian gallery forest; or</li> <li>• estuary.</li> </ul> <p>15-minute bird observation points (preferably in the morning or if not then late afternoon) at a density of 1 per 25ha within waterway habitats and the adjacent 200m area.</p> <p>detecting active or calling individuals</p> <p>Undertake targeted follow up observations at identified potential nests if needed to confirm ownership or occurrence of breeding activity.</p>	<p>Systematic traverses, no more than 100m apart, to detect nests within 1km of permanent water supporting the following:</p> <ul style="list-style-type: none"> <li>• riparian gallery forest or paperbark wetland;</li> <li>• seasonally inundated coastal wetlands;</li> <li>• seasonal watercourses supporting riparian gallery forest; or</li> <li>• estuary.</li> </ul> <p>Call playback surveys at a density of 1 per 25ha within waterway habitats and the adjacent 200m area.</p> <p>Undertake targeted follow up observations at identified potential nests if needed to confirm ownership or occurrence of breeding activity.</p>

### 3.3

#### Results

Surveys were conducted across approximately 1569 ha during the Amrun clearing plan for mining and 3744.6 ha during Amrun Geotech 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 observations of target fauna species recorded during the Pre-disturbance Program surveys 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	<i>Erythrotriorchis radiatus</i>	24/06/2021	572725	8566700	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Vulnerable	Yes	Yes	Pair, Confirmed active nest ,
Osprey	<i>Pandion haliaetus</i>	9/08/2021	565040	8566389	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory		Yes	Confirmed
Osprey	<i>Pandion haliaetus</i>	11/08/2021	564065	8563152	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory		Yes	Confirmed
Osprey	<i>Pandion haliaetus</i>	16/08/2021	563803	8563083	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory		Yes	Confirmed
Osprey	<i>Pandion haliaetus</i>	1/09/2021	567134	8561633	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory		Yes	Confirmed
Red Goshawk	<i>Erythrotriorchis radiatus</i>	7/09/2021	567499	8562997	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Vulnerable	Yes	Yes	Pair, Confirmed active nest.
Osprey	<i>Pandion haliaetus</i>	15/09/2021	590690	8593231	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory		Yes	Suspected Osprey occupant due to nest characteristics
Osprey	<i>Pandion haliaetus</i>	16/09/2021	591336	8595604	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory		Yes	Suspected Osprey occupant due to nest characteristics
Osprey	<i>Pandion haliaetus</i>	15/03/2022	578148	8573547	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory	No	NA Nest)	(Not Heard during bird survey
Osprey	<i>Pandion haliaetus</i>	22/03/2022	579168	8572285	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory	No	Yes	Suspected Osprey nest with no recent activity/ evidence to confirm, buffer implemented due to unconfirmed activity status.
Osprey	<i>Pandion haliaetus</i>	3/05/2022	565151	8566698	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory	No	NA Nest)	(Not Seen & heard during bird survey
Osprey	<i>Pandion haliaetus</i>	3/05/2022	565187	8566659	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland open forest	Listed Marine/Migratory	Yes	Yes	Confirmed active nest

#### 4.

### Weed management

During the reporting period, the Weed Management Program was implemented by the Amrun Project construction, Amrun operations and 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 Project security 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 and dedicated weed survey was conducted by Rio Tinto Weed quality control specialist within the LSMP team. 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 into field sheets 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 2021 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, and the area is signed, barricaded, and regularly checked and rechecked for additional growth. Most specimens were found roadside on light vehicle tracks. No broadscale infections have been recorded.
- Overall distribution and abundance of weeds across the mining lease is reduced by proactive weed control implemented by the LSMP Team.
- The LSMP Team members are exceptionally knowledgeable about the distribution of weeds on site.
- The use of targeted herbicides in 2021 for weed spraying has been helpful to kill isolated plants without killing the native grasses alongside.

## 5. 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 late May to 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 to seasonal fuel loads are adaptively managed.

The Amrun fire management plan for 2021 aimed to:

- Build on and compliment the 2020 fire program to achieve a fine mosaic of burnt / unburnt country throughout the lease area inclusive of the offset area.
- 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 later June.

Figure 2 displays the fire scar mapping obtained from 2018 to 2021 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 the ongoing ignitions programs. This burn pattern has changed significantly from 2016 which had previously large-scale late season (Oct – Dec) fires.

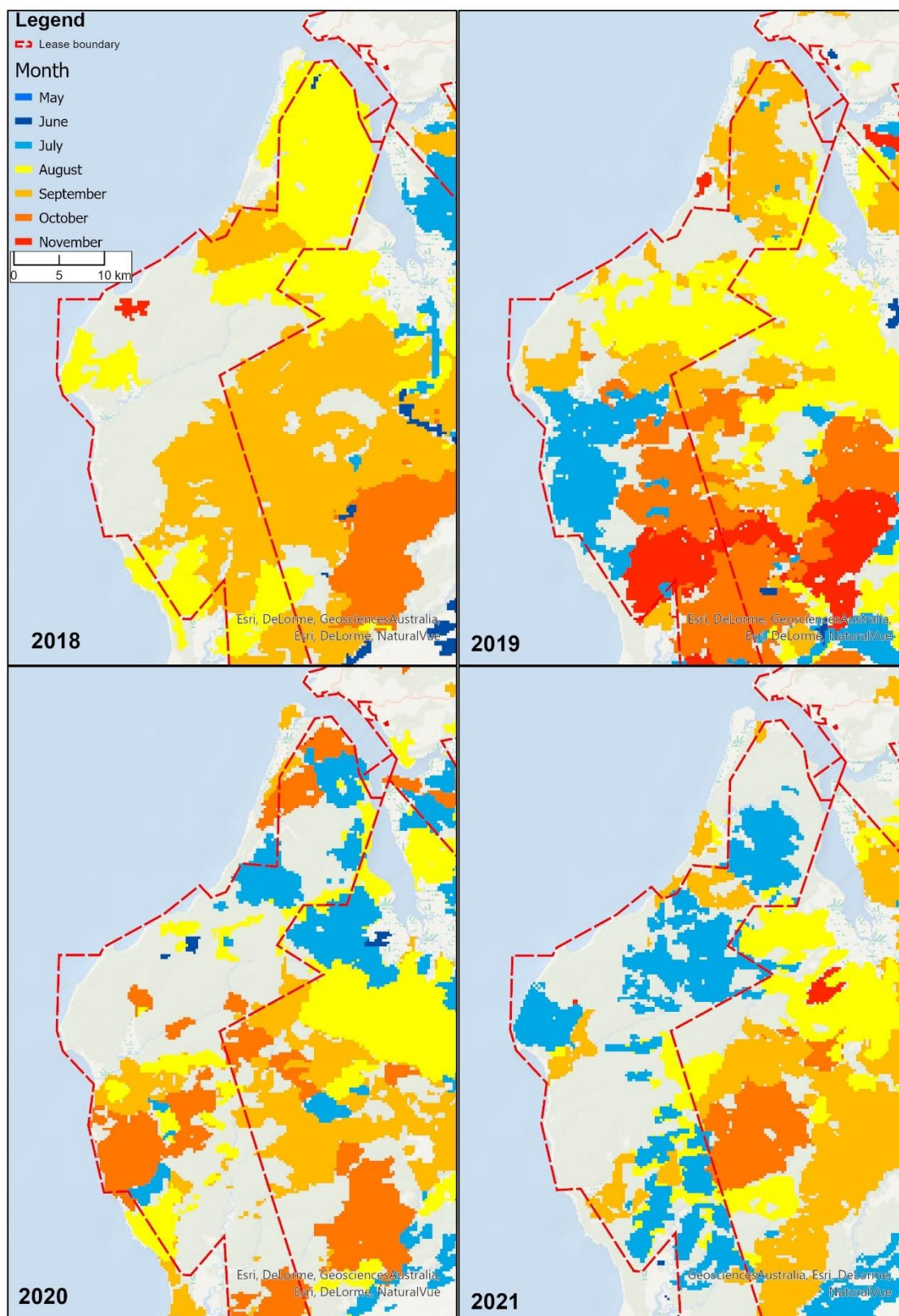


Figure 2: 2018 – 2021 fire scar comparison of the Amrun site using NAFI mapping data

## **6. Feral Animal Management**

### **6.1 Feral Pigs**

Feral pig eradication is completed via aerial and ground based shooting and pig baiting. 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.

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 2021 feral pig management activities complied with the requirements outlined in the Feral Pig Offset Strategy. The 2021 campaign consisted of the following:

- 34 nights of scheduled ground-based shooting using a mobile team on foot and in All Terrain Vehicles (ATV). Spread across May to November to eliminate habitual pigs along beach.
- One four day (22 hours) aerial shooting campaign.
- The use of bait stations and trapping was discontinued due to its demonstrated ineffectiveness<sup>2</sup>.
- Feral cats whenever sighted.
- Carcasses from ground-based operations were burnt to prevent decay, as per Traditional Owner's.

During the program, 709 pigs were humanely destroyed. Aerial shooting accounted for 653 pigs whilst ground-based shooting accounted for 56 pigs. This demonstrated an approximate 50% increase in number of individual pigs humanely destroyed in both shooting methods compared to the previous year. As expected, high levels of pig activity were concentrated around Winda Winda Creek, Norman Creek and Ward Creek. All 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 all the Amrun coastline.

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

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<sup>2</sup> For further information, please see Amrun Project (EPBC 2010/5642) – Annual Environmental Monitoring Report 2020.

Table 3: Summary of aerial and ground based shooting results for pigs for 2021.

<b>Event</b>	<b>Dates</b>	<b>Animals culled</b>
Ground Shooting Campaign	17 – 26 May	41
Ground Shooting Campaign	21 – 30 July	9
Aerial Shoot	2 - 4 August	653
Ground Shooting Campaign	12 – 15 September	5
Ground Shooting Campaign	19 – 24 October	1
Ground Shooting Campaign	17 – 22 November	Nil
<b>Total</b>		<b>Aerial – 653 pigs Ground – 56 pigs</b>

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

<b>Year</b>	<b>Total Aerial</b>	<b>Pig baiting and ground based shooting<sup>3</sup></b>
2016	121	1
2017	268	6
2018	300	11
2019 <sup>4</sup>	824	31
2020	429	37
2021	653	56
<b>Total</b>	<b>2595</b>	<b>142</b>

<sup>3</sup> Pig baiting was discontinued in 2021 as it was deemed ineffective.

<sup>4</sup> The 2019 program included 2 aerial culling campaigns for a total of six days.



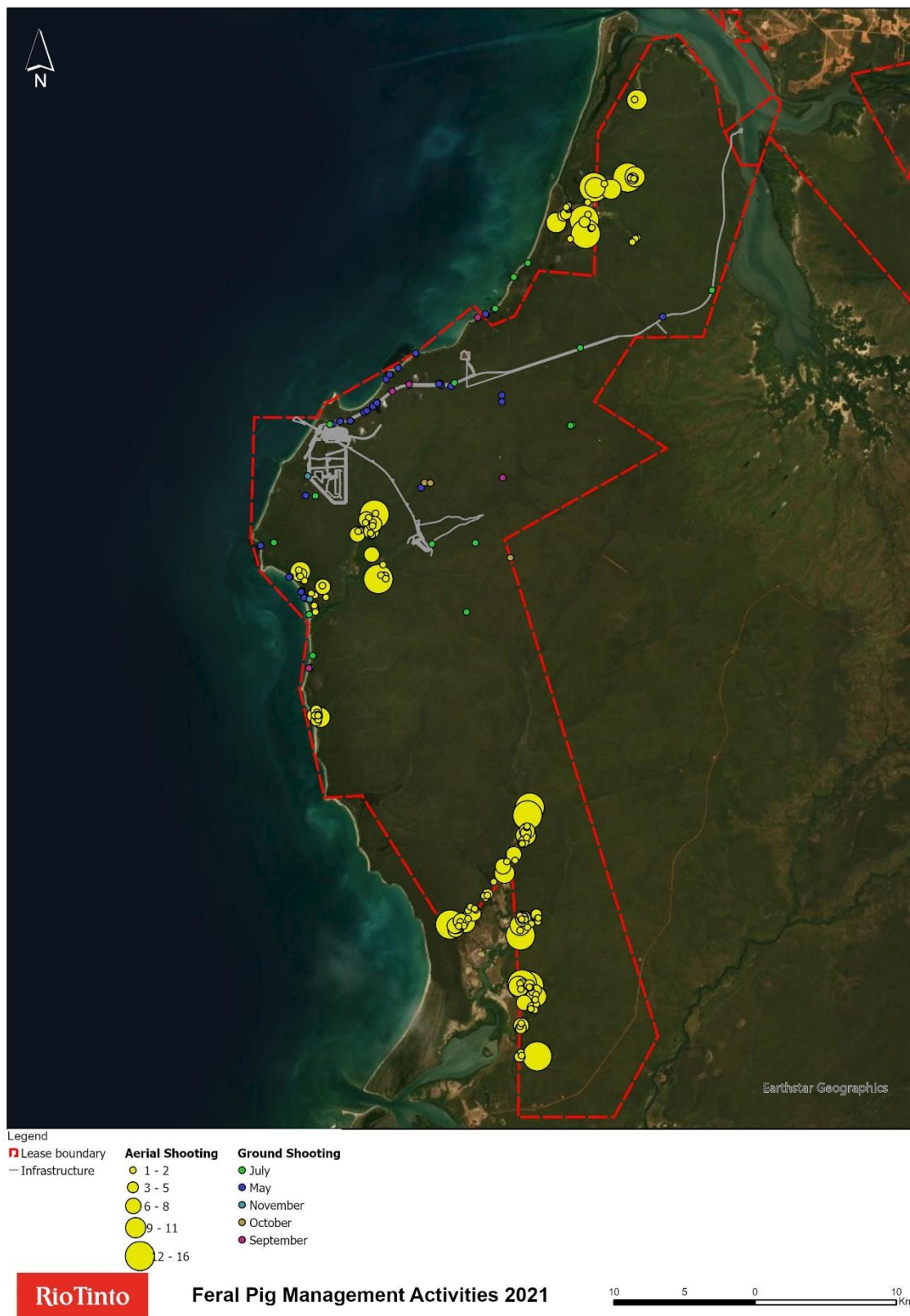


Figure 3: Feral pig engagement locations and timing during 2021 control activities



## 6.2 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.

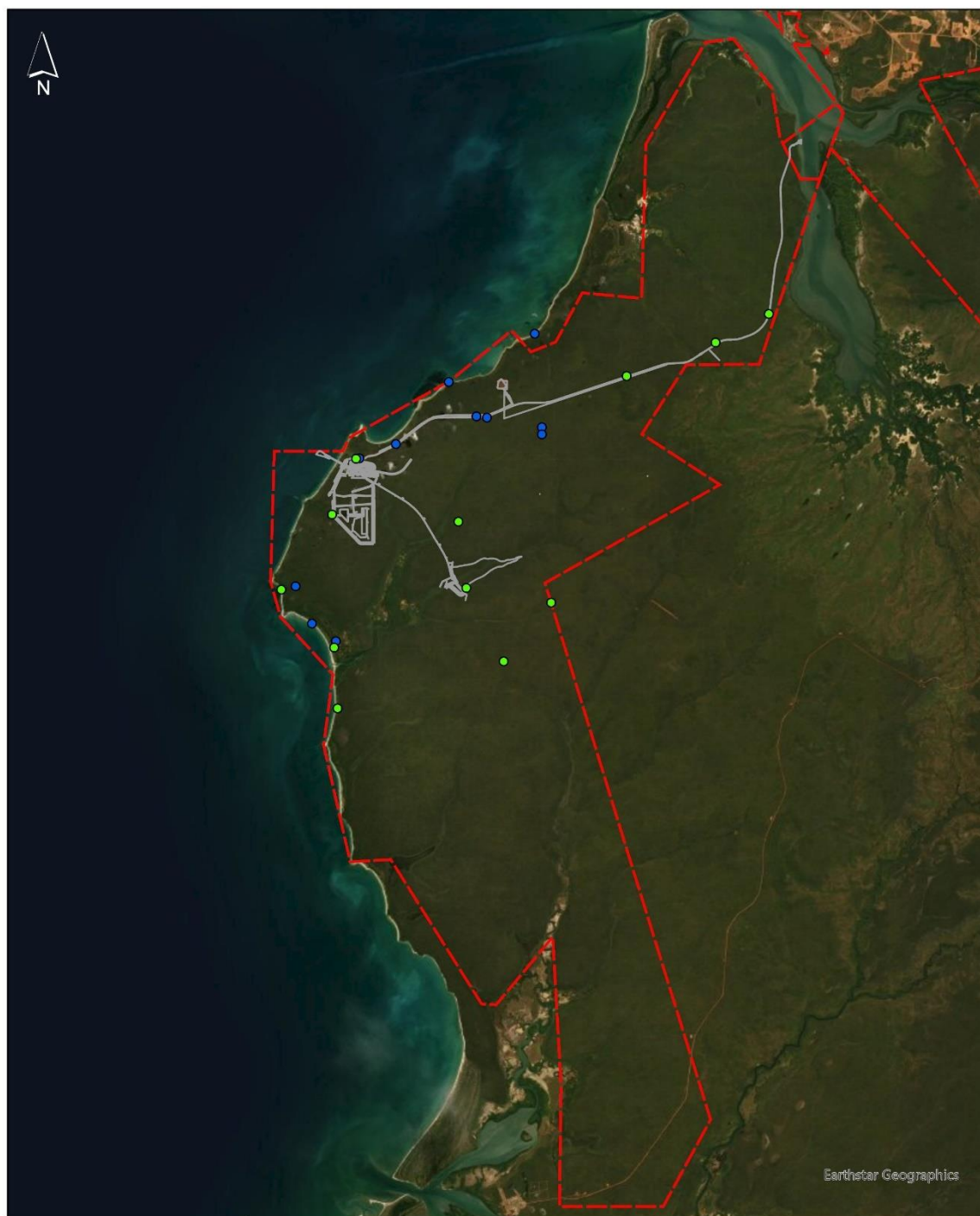
Previously, quarterly visual monitoring (spotlighting) surveys and trapping/baiting events were implemented. As described in the 2019 and 2020 Annual Monitoring report these methods are considered ineffective with the information provided limited data and minimal animal captures. Spotlighting/infra-red 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. Additionally incidental sightings and infra-red cameras around infrastructure were also implemented in 2021. The data collected was used to inform target areas for the ground-based shooting campaign. The use of thermal equipment during ground-based shooting has significantly increased the ability to effectively detect and eliminate feral cats and dogs.

In 2021, 12 feral cats and 11 feral dogs were humanely destroyed. A summary of the feral cat and dog management activities are summarised in

Table 5 and Figure 4

Table 5: Summary of feral cat and dog management activities

Event	Dates		Animals culled				
Ground Shooting Campaign	17 – 26 May		2 x cat 8 x dog				
Ground Shooting Campaign	21 – 30 July		6 x cat 2 x dog				
Aerial Shooting Campaign	2 - 4 August		1 x dog				
Ground Shooting Campaign	12 – 15 September		Nil				
Ground Shooting Campaign	19 – 24 October		2 x cat				
Ground Shooting Campaign	17 – 22 November		2 x cat				
<b>Total</b>			<b>12 cats</b> <b>11 dogs</b>				
Year	2016	2017	2018	2019	2020	2021	Total
Cat	0	0	0	8	9	12	32
Dog	0	0	3	5	10	11	30



Legend

● Cat    — Infrastructure

● Dog    ▬ Lease boundary



#### Feral Cat and Dog Control Activities 2021

10 5 0 10 Km

Figure 4: Feral cat and dog engagement locations during 2021 control activities

## 7. 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<sup>5</sup>.

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;2020 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 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 inconsistent with reality.

In 2019, the program included detailed training for team members and ongoing survey after the completion of activities. In 2020, the LSMP team members were integrated into the operation as full time Rio Tinto employees. This has ensured the longevity of the program as monitoring that would otherwise be outsourced has been brought 'in-house' to be completed by the LSMP Team. The works are completed under appropriate permits from the DES, Permits and Licensing Management and Animal Ethics Committee.

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<sup>5</sup> 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).

The 2021 program followed the survey methods implemented since 2013 to ensure consistency with baseline surveys (Guinea 2014) and project surveys (Pendoley 2016, 2017, 2018, 2019).

## 7.1 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).

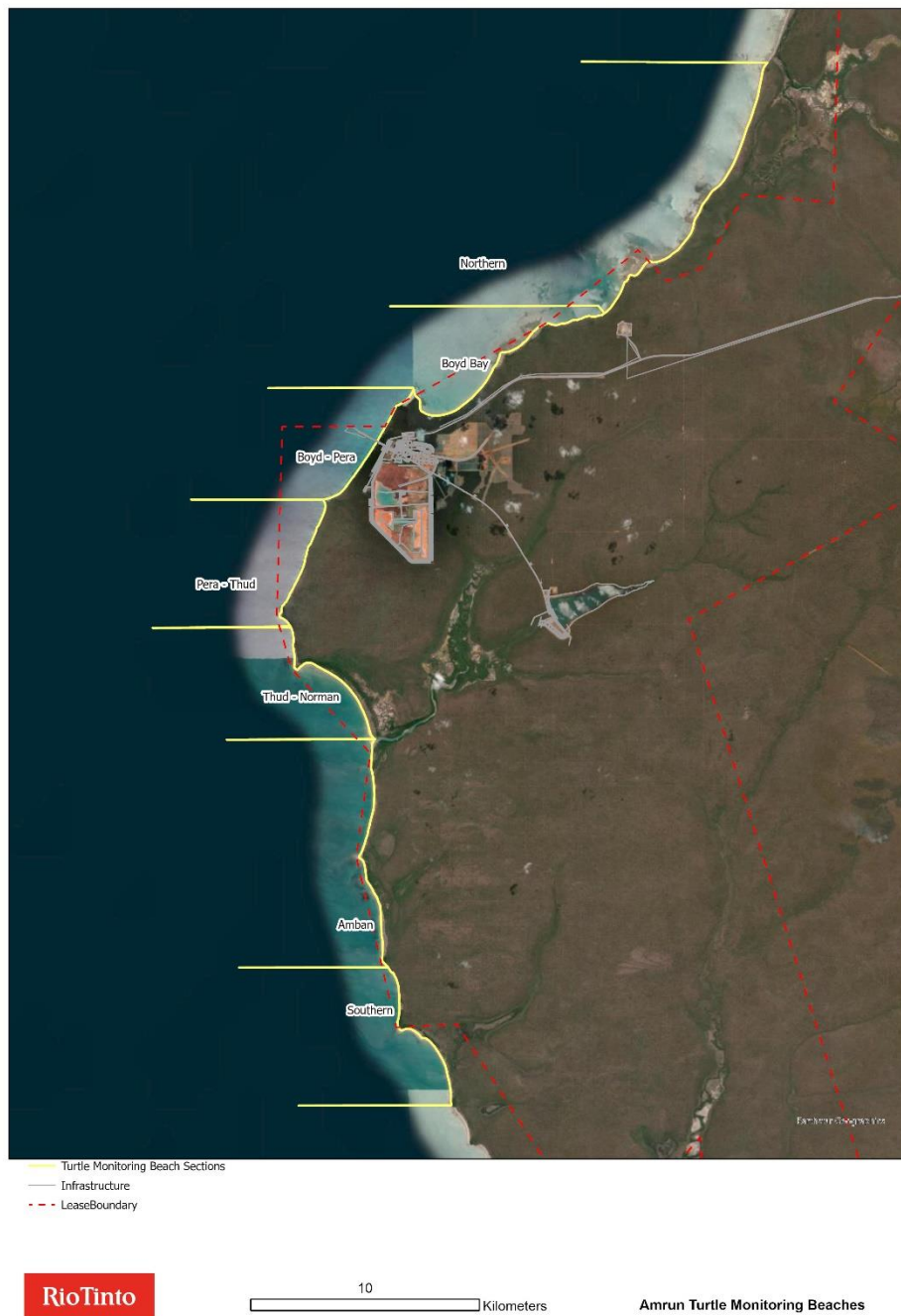


Figure 5: Amrun turtle nest monitoring beaches.

The surveys were completed in 2021 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.

#### **7.1.1 Schedule**

In 2021, the sites from Northern to 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 was restricted due to sorry business, fire activity and ongoing equipment issues. Consequently, only monthly surveys from September through to December were conducted in these areas.

#### **7.1.2 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 including 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.

#### **7.1.3 Predation monitoring**

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.

#### **7.1.4 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 hatchlings 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.

### 7.1.5 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.

## 7.2 Results

A total of 327 events were recorded during the 2021 monitoring period (Figure 6; Figure 7). There were 170 hatchling events, 97 potential nests, 30 predated nests, and 30 false crawls. Flatback turtles accounted for approximately 55% of events). Fourteen events were unable to be identified to turtle species and were recorded as 'unknown'. No partial predation events were observed.

A total of 30 predated nests were recorded and represent 10% of nesting events. Of these 30 predated nests 13 had pig involvement (9 sole pig predation 4 combined goanna and pig predation). This is an indication of the positive impact of the feral pig control program as initial predation rates were 70% when first calculated by Pendoley Environmental in 2017. This is well above the target of a 70% reduction in nest predation across each beach section, in short, a resounding success. Since 2016 successful hatchling events have increased from 1 to 170 (Figure 8)

Table 6: Summary of nesting events per species

Species	Hatchlings	Predated	Partial Predation	Potential Nest	False Crawl	Total
Flatback	113	11	Nil	40	11	175
Green	12	3	Nil	14	1	30
Hawksbill	23	7	Nil	25	12	67
Olive-ridley	17	6	Nil	12	6	41
Unknown	5	3	Nil	6	Nil	14
<b>Total</b>	<b>170</b>	<b>30</b>	<b>Nil</b>	<b>97</b>	<b>30</b>	<b>327</b>

## 2021 Turtle Monitoring Results - Final Nest Stage

■ Hatchlings ■ Predated ■ Potential Nest ■ False Crawl

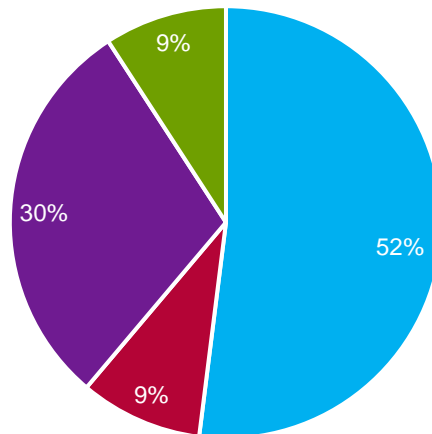


Figure 6: 2021 Turtle monitoring final nest stage results as a percentage



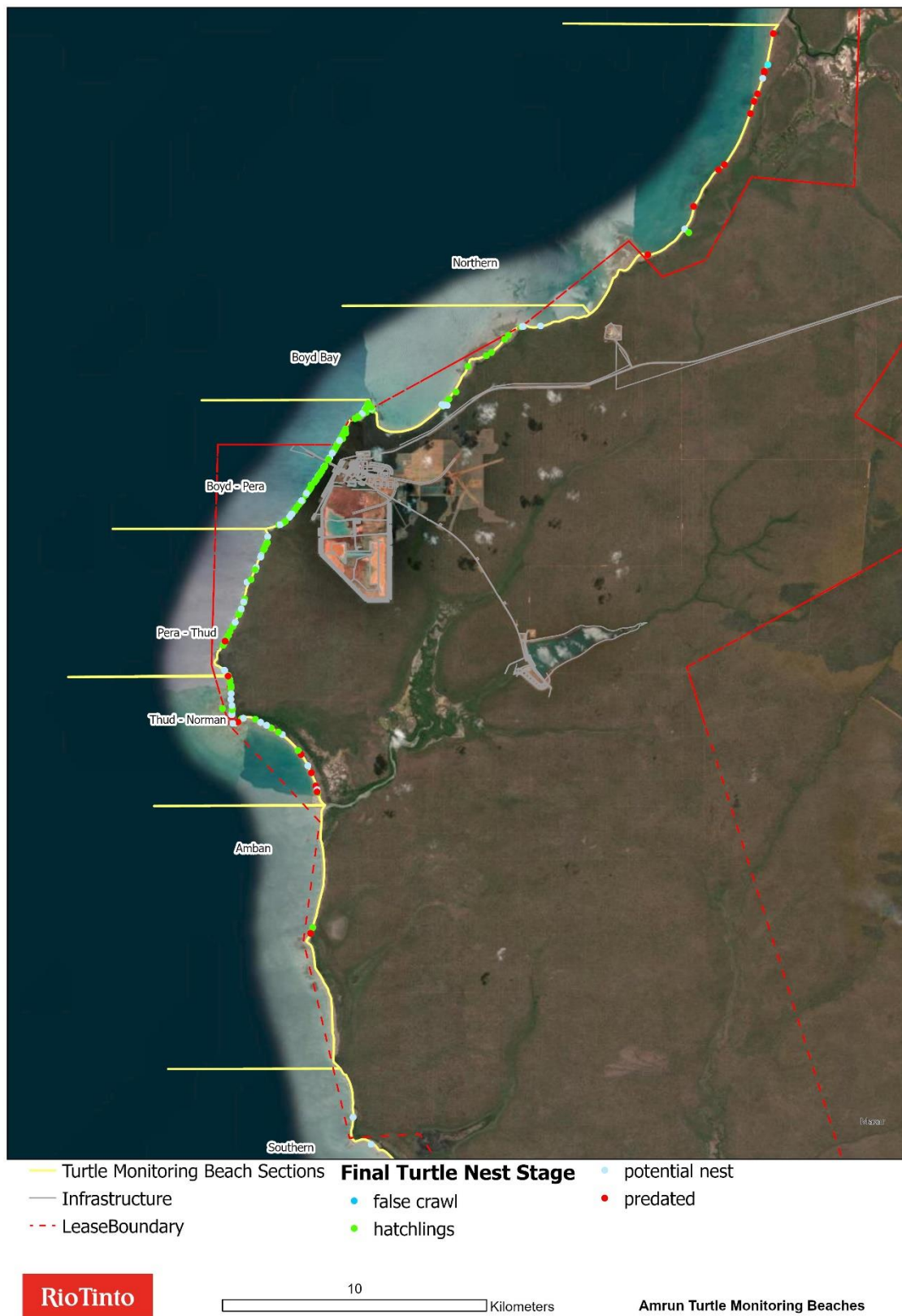


Figure 7: Location of recorded nesting events on Amrun beaches.

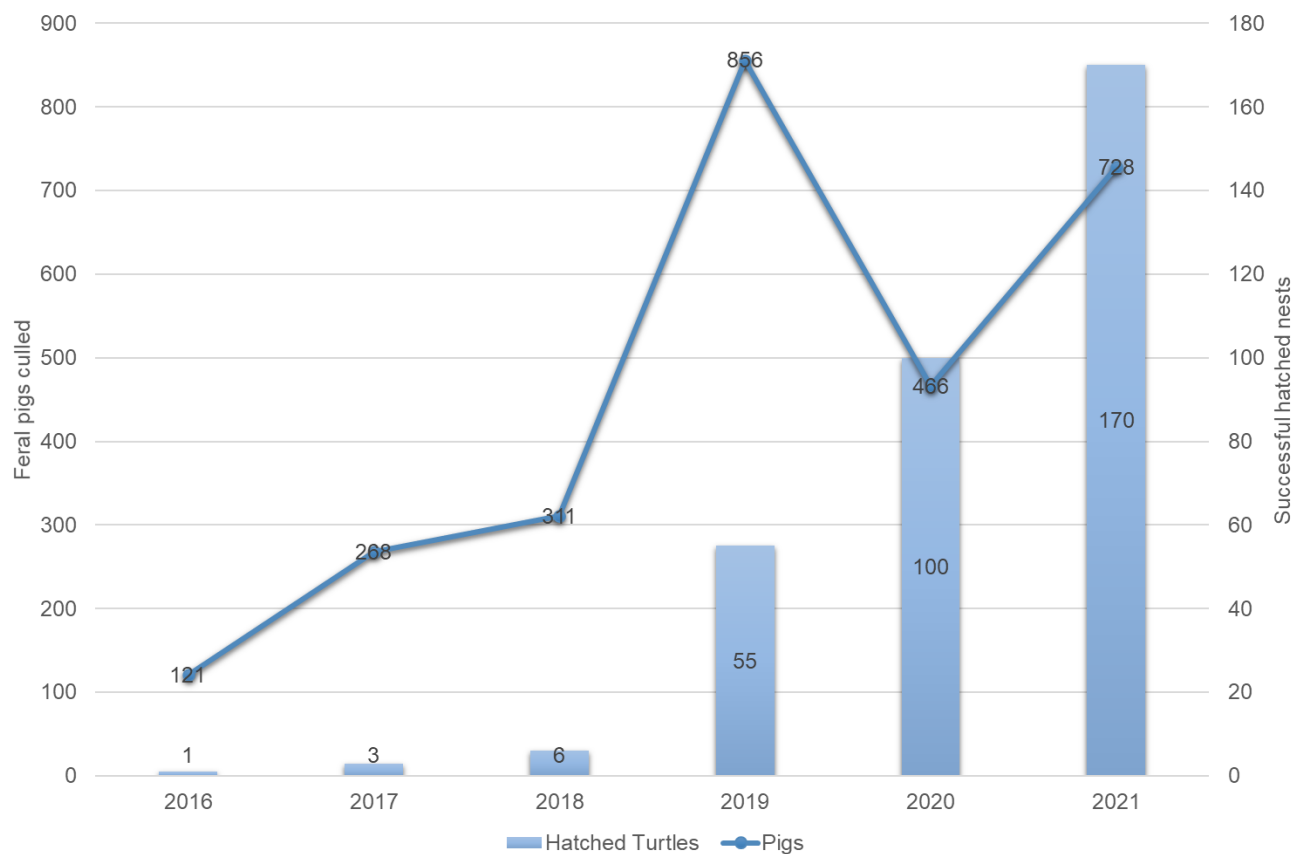


Figure 8: Comparison of hatched turtles and pig control activities from 2016 - 2021

## 8. 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<sup>6</sup> 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.

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

<sup>6</sup> Those ports that are recognised as harbouring invasive marine species with risk of translocation to other port areas.

native species, as well as introducing disease. The consequences can include a combination of environmental, social and economic impacts.

The marine pest settlement plate monitoring program has been amended to utilise the Queensland's Seaports eDNA Surveillance (Q-SEAS) Program and will be installed to meet some of these requirements. This approach in no way compromises the effectiveness of the marine pest surveillance program as the previous arrangement was established to service the construction phase of the program prior to structure being available. Now the export facility is established it provides an appropriate alternative as a platform to conduct marine pest surveillance monitoring. The appropriateness of which has been consulted on with Biosecurity Queensland who concur.

The ongoing Covid pandemic restricted the ability to implement the settlement plate monitoring. Impacts included:

- Equipment parts unavailable due to global slow down
- Issues with access to vessels with biosecurity restrictions associated with remote communities
- Operations near international ship terminal restricting movements and ability
- Dynamic nature of pandemic introducing late changes to the works.

Throughout the installation process, several safety issues have been identified and the intended locations have needed to be amended for:

- Ship safety
- Personnel safety (Snap back zones)
- Regular ongoing access

This process is being worked through for maximum benefit along with extending the program.

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.