Biodiversity and Conservation Science

Dirk Hartog Island National Park

Return to 1616

Ecological Restoration Project

Stage Two – Year Six

Translocation and Monitoring Report

June 2023 to May 2024

July 2024

GOVERNMENT OF WESTERN AUSTRALIA

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Summary

Year six of the second stage of the Dirk Hartog Island (Wirruwana) National Park Ecological Restoration Project involved the translocation of 100 brush-tailed mulgara (*Dasycercus blythi*) to the island in June 2023 and 66 dibblers (*Parantechinus apicalis*) bred at Perth Zoo. The dibblers were released in two cohorts, one in October 2023 (n = 48 individuals) and the other in November 2023 (n = 18 individuals). The current number of individual animals translocated to the island across eight species is 959.

Ongoing monitoring of translocated fauna continues to rely upon a range of different methods, including cage, Elliott, and camera trapping as well as faecal pellet collections, track searches, and the WildTrack passive RFID detections. Translocations continue to be assessed against success criteria, prescribed in approved Translocation Proposals, with more progress made towards achieving these goals in 2023-24.

Here we present results for:

- the brush-tailed mulgara translocation,
- a final supplementation translocation for dibbler, and
- translocated species monitoring undertaken between July 2023 and May 2024.

1 Background

1. The vision

The vision for the Dirk Hartog Island National Park Ecological Restoration Project (ERP) is to create a special place that is valued by Western Australians (and people from further afield) because of the well managed system processes that support healthy vegetation and fauna, including a suite of re-established (since the time of Dirk Hartog's landing in 1616) and newly established (for conservation outcomes) terrestrial animals. The vision aligns with the goal for Dirk Hartog Island, or Wirruwana, as a National Park, which is to ensure these natural assets are "conserved, protected and valued" by people (https://www.dbca.wa.gov.au/parks-and-wildlife-service). The island will soon be co-managed with the Malgana Aboriginal Corporation with formal ratification of the joint management agreement expected in late 2024.

2. Site description

Wirruwana/Dirk Hartog Island (hereafter WDHI) is located in the Shire of Shark Bay in Western Australia at approximately -26° S and 113° E, and forms part of the Shark Bay UNESCO World Heritage Area. It falls within the Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service's Gascoyne District in the Midwest Region and with final ratification, will be co-managed with the Malgana Aboriginal Corporation. The island is approximately 80 km long and up to 12 km wide with a total area of 63,300 ha, making it the largest island in WA. The island contains multiple terrestrial vegetation elements, including *Acacia*-dominated shrubland communities, *Triodia*-dominated grasslands, *Thryptomene dampieri* heath, large areas of *Spinifex longifolius* (typically associated with consolidated and mobile dune-systems) and chenopod communities associated with the many 'birrida' clay-pans (Beard 1976).

The project has achieved eradication of sheep (*Ovis aries*), goats (*Capra hircus*) and feral cats (*Felis catus*) (Algar et al., 2020) — ameliorating issues relating to unsustainable predation and over grazing — followed by the reestablishment / establishment of seven mammal and one bird species (Department of Biodiversity, Conservation and Attractions, 2023). A strategic framework for the program, prepared by Morris *et al.* (2017), outlined a further five species to be translocated to the island: heath mouse (*Pseudomys shortridgei*), desert mouse (*P. desertor*), woylie (*Bettongia penicillata*), boodie (*Bettongia lesueur*), and chuditch (*Dasyurus geoffroii*). Because of issues around identifying source populations with trappable numbers, heath mice and desert mice are currently on hold.

3. Rainfall

WDHI has a semi-arid climate, typically receiving most rain over the winter months but with occasional heavy falls in summer and autumn due to cyclonic events. Annual rainfall for the reporting period (1 July 2023 to 30 May 2024) was 57.4 mm, with the largest falls between January and June 2024. This is almost 200 mm short of the annual average, due to the current drought cycle the region is in where record low rainfall occurred in 2023, and record high temperatures were experienced across much of the region in February 2024, including a maximum of 48.9 ºC on WDHI on February 19th.

4. Past results

After the removal of key introduced species (*F. catus, O. aries, C. hircus*), phase two of the program was fully initiated in 2018. Main annual outcomes of that work are:

2017 to 2018

- After a trial translocation of banded hare-wallabies (*Lagostrophus fasciatus*; BHW) and rufous hare-wallabies (*Lagorchestes hirsutus*; RHW) in 2017, full-scale translocations of both species began in 2018.
- First trials of DNA analysis from faecal pellets to monitor population size and genetic diversity.
- Monitoring of extant reptiles and small mammals.

2018 to 2020

- Additional RHWs translocated.
- First cohort of Shark Bay bandicoots (*Perameles bougainville*; SBB) translocated.
- First cohort of dibblers (*Parantechinus apicalis*) translocated from a captive-breeding program at Perth Zoo.
- Continued monitoring of extant reptiles and small mammals.

2020 to 2021

- Additional releases of SBBs and dibblers.
- First translocations of Shark Bay mice (*Pseudomys fieldi*; SBM) and greater stick-nest rats (*Leporillus conditor*; GSNR).
- Continued monitoring of previously translocated species.
- Continued monitoring of extant reptiles and small mammals.

2021 to 2022

- Supplementation translocations for dibbler, SBM, and GSNR.
- Continued monitoring of translocated species.
- Continued monitoring of extant reptiles and small mammals.

2022 to 2023

- Translocation of the western grasswren (*Amytornis textilis*; WGW).
- Supplementation translocations of dibbler.

- Ongoing monitoring of translocated fauna.

5. Release areas

The translocated species have been released in several different areas since 2017 (Table 1 and Figure 1).

Table 1: General location (refer to Figure 1 for more detail) and timing of releases for each translocated species.

Species	Source and year	Area of release
Brush-tailed mulgara	Matuwa Kurrara Kurrara National Park, 2023	Louisa Bay area
Western grasswren	Hamelin Station Reserve and Peron Peninsula, 2022	Around the under-construction airstrip and associated drainage lines in the greater Herald Bay area
Greater stick-nest rats	Salutation Island, 2021 and East and West Franklin Islands, 2022	Between Garys Beach and Quoin Bluff
Shark Bay mice	Northwest Island, 2021 and Bernier Island, 2022	*Spinifex longifolius*-dominated dune systems between Tetradon Loop and Herald Heights
Dibbler	Jurien Bay Islands via Perth Zoo Native Species Breeding Program, 2019, 2020, 2021, 2022, and 2023	Between the weather station and the Herald Bay barge landing
Shark Bay bandicoots	Bernier and Dorre Islands, 2019 and 2020	Between Herald Bay and Ten Mile well
Rufous hare-wallabies	Bernier and Dorre Islands, 2017, 2018 and 2019	Between Notch Point and Cape Ransonnet and Herald Bay
Banded hare-wallabies	Bernier and Dorre Islands, 2017 and 2018	Between Notch Point and Cape Ransonnet

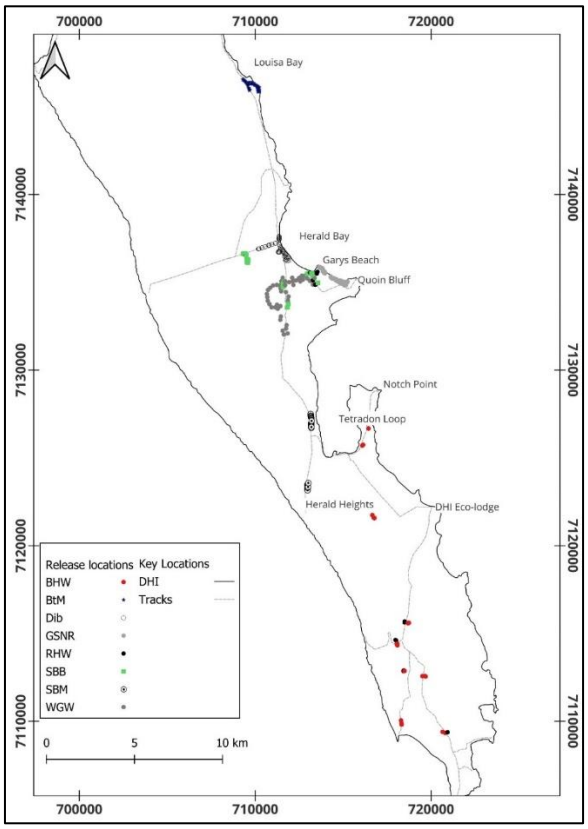

Figure 1: Release locations for each translocated species. BHW = Lagostrophus fasciatus, BtM = Dasycercus blythi, Dib = Parantechinus apicalis, GSNR = Leporillus conditor, RHW = Lagorchestes hirsutus, SBB = Perameles bougainville, SBM = Pseudomys gouldii, WGW = Amytornis textilis.

2 Individual species updates

6. Brush-tailed mulgara

2.1.1 Background information

Activity	Key points
Translocations	
	• 100 (40M:60F) brush-tailed mulgara (BTM) sourced from Matuwa Kurrara Kurrara National Park were released in the Louisa Bay area in June 2023 (Figure 1; refer to Appendix 1 for more detailed information on this translocation).
Monitoring	
Radio tracking	• 12 individuals (6F:6M) were radio-tracked.
Physical trapping	• Elliott trapping as per Figure 2, Figure 6 and Appendix 1.
Camera trapping	• 23 camera traps have been deployed in the Louisa Bay area since the first release (Figure 2). • 40 cameras are rotated around the island (Figure 3) as an 'island-wide' monitoring program.
WildTrack Scanners	• 13 WildTrack scanning units were deployed at Louisa Bay in 2023 (Figure 2) to test their effectiveness for BTM. The units were removed in March 2024.

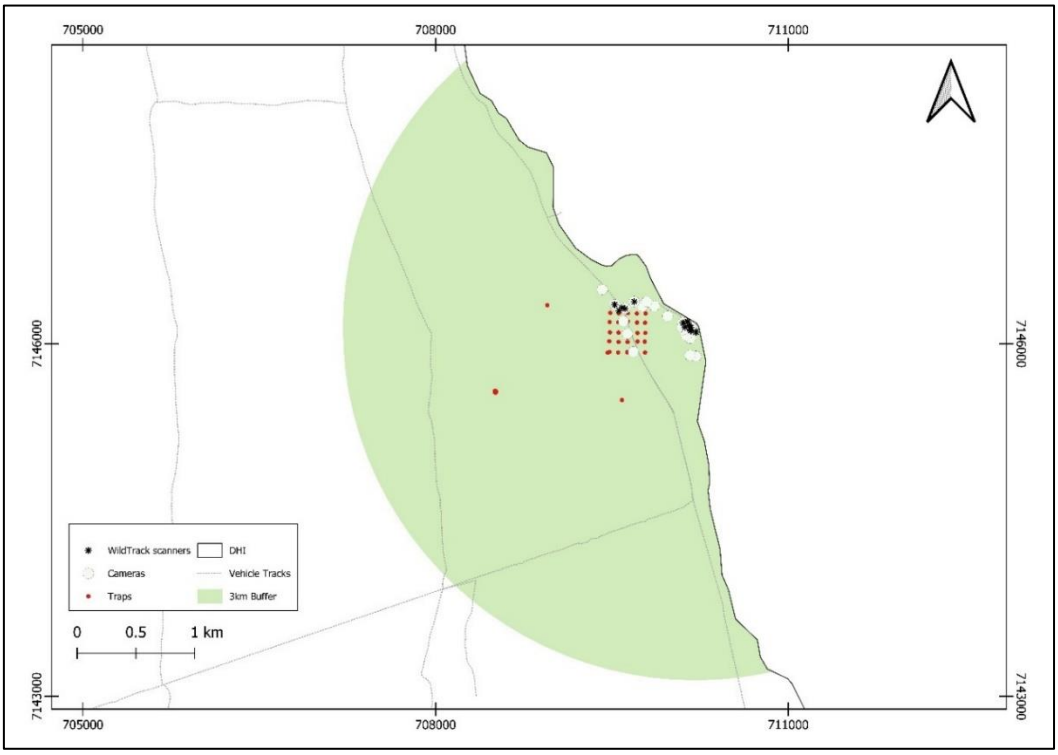

Figure 2: Location of brush-tailed mulgara traps, cameras, and WildTrack scanning units in the Louisa Bay release area. For location of Louisa Bay, refer to Figure 1. Green area indicates a 3 km buffer around the release area referred to in the Translocation Proposal's success criteria.

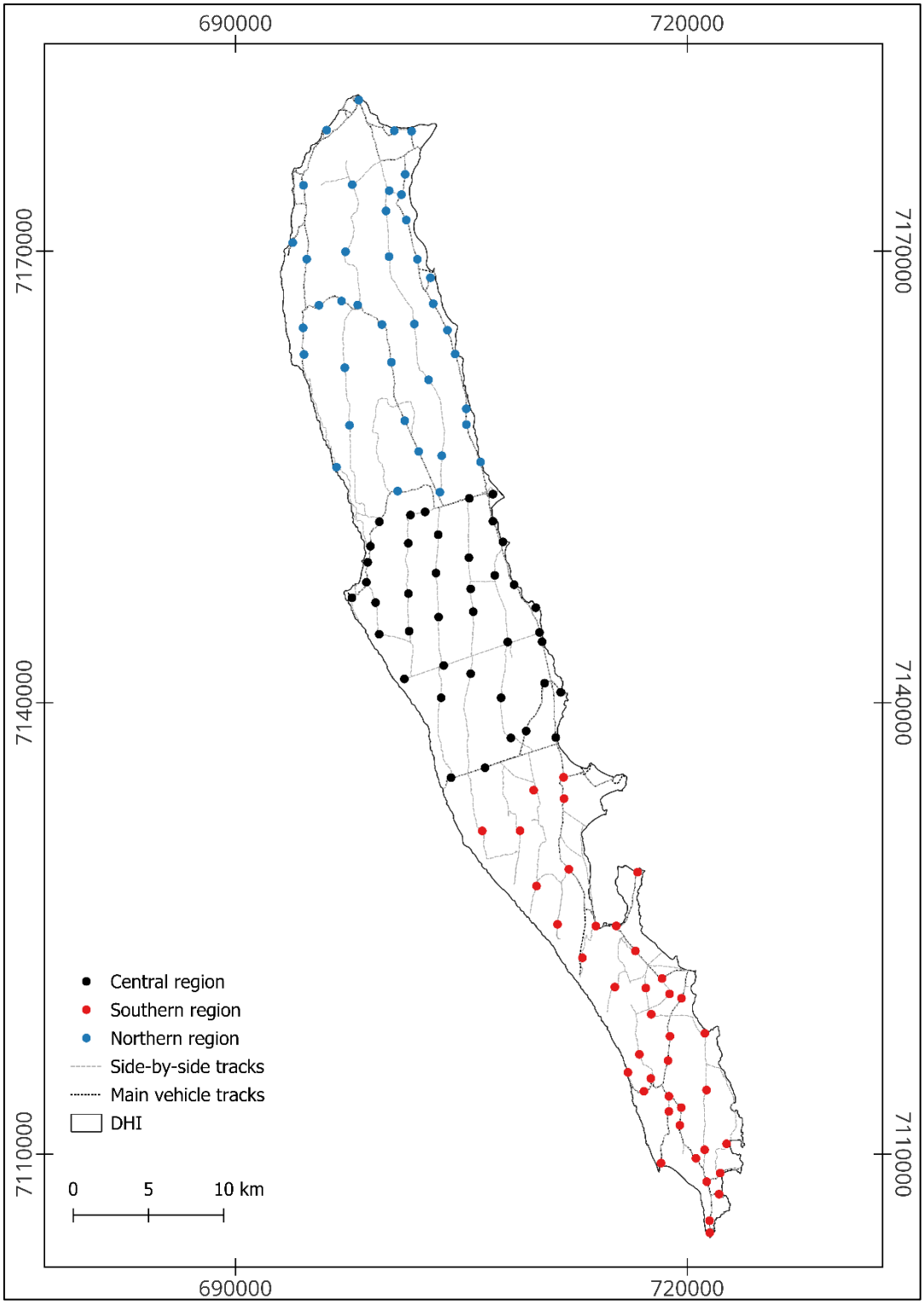

Figure 3: Island-wide camera survey points. Symbol colour indicates the region (northern, central, southern) within which 40 cameras are deployed at any given time. In any region, the 40 cameras are deployed for approximately 4 months after which they are moved to another region and so on. The first round of cameras was deployed in the central region in the latter third of 2023. Cameras are currently deployed in the southern region and will be deployed in the northern region in July 2024.

2.1.2 Monitoring results 2023 to 2024

Because BTM were translocated in 2023, we provide information for the short- and medium-term success criteria. Additional information about the translocation and post-release monitoring can be found in Appendix 1.

The **short-term success criteria** (0 to 6 months post last translocation) are:

>67% survival of individuals fitted with VHF transmitters with known outcomes at one month after release (or when the transmitter is removed).

- This criterion was met as more than 67% of collared animals (with a known outcome) one month after release had survived (Table 2).
    - Signals from 11 of the 12 collared animals were detected (without a mortality signal) up to 1 month post release (Table 2).
    - Of the six animals with transmitters still attached (or locatable) at ~4 weeks (1 month), five (83%) were still alive.
    - Of the other six collared individuals, three could not be located at 1 month after release. The other three individuals could be located from the air, but not on the ground. The transmitters were not 'mortality signalling'.
        - Of note, the collars generally had around 300 m range making it difficult to track individuals, which were typically below ground during the day (further reducing detection range) and moving large distances in the evenings (up to 4 km overnight). Aeroplane flights were used on several occasions to locate 'missing' individuals, but follow-up ground tracking was met with limited success as the detections from the aeroplane had limited accuracy.
        - The self-releasing mechanism on the collars worked as intended based on individuals captured at the end of the tracking period; it is likely that collared animals not re-trapped will have shed their collars.

Likely causes of mortality have been identified and/or ameliorated during the first two months of monitoring.

- This success criterion has been met. There was only one confirmed mortality of a collared individual – possibly predation by a reptile, but the direct cause of such mortalities can rarely be confirmed as animals may have scavenged an already dead animal.

Monitoring methods provide evidence of continued persistence of populations up to 6 months post-release. At least 25% of cameras show continued presence within 3km of the release site (or other nearby suitable habitat) and/or trapping of at least 20% of founders.

- There is evidence of continued persistence indicating that the first part of this criterion is being met. However, despite over 90% of deployed cameras detecting BTM at some point over the first 6 months and detections occurring at most camera sites over the first two months post release (Figure 4), the proportion of

cameras with BTM detections dropped significantly in August 2023 with between 13% and 17% of cameras continuing to record BTM up to November 2023 — the 6-month cutoff for the second part of the criterion.

- Although the percentage of cameras detecting BTM dropped to below 25% after two months, the data still demonstrate that the species remained in the release area over the first 6 months, providing evidence of continued persistence.
- One BTM founder was detected on a WildTrack scanner in the release area (wildtrack-rfid-module-070) on 5 November 2023.

Table 2: Results for radio tracked brush-tailed mulgara (BTM).

Individual	Collaring date	Date of collar removal	Result
1	28-Jun-23	18-Jul-23	Mortality
2	28-Jun-23		Not removed
3	28-Jun-23	20-Jul-23	Self-removal
4	26-Jun-23		Not removed
5	26-Jun-23		Not removed
6	26-Jun-23	22-Jul-23	Self-removal
7	26-Jun-23	22-Jul-23	Removed
8	24-Jun-23	21-Jul-23	Removed
9	24-Jun-23	22-Jul-23	Removed
10	24-Jun-23		Not removed
11	22-Jun-23		Not removed
12	22-Jun-23		Not removed

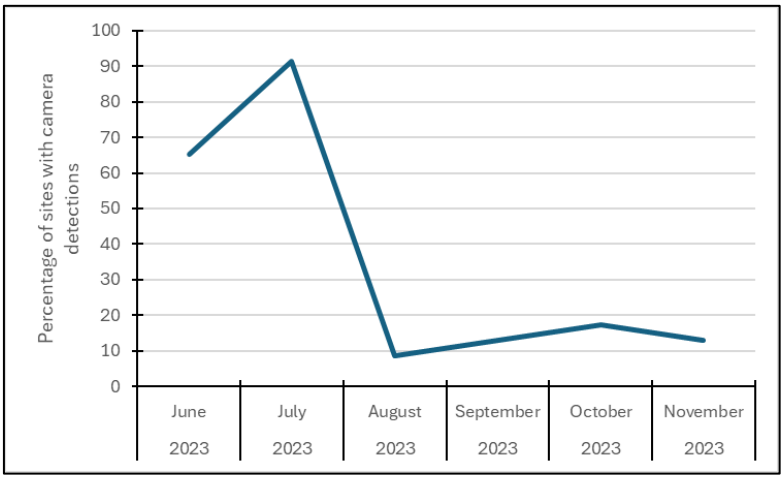

Figure 4: Monthly percentage of camera sites with brush-tailed mulgara (BTM) detections post release in the release area.

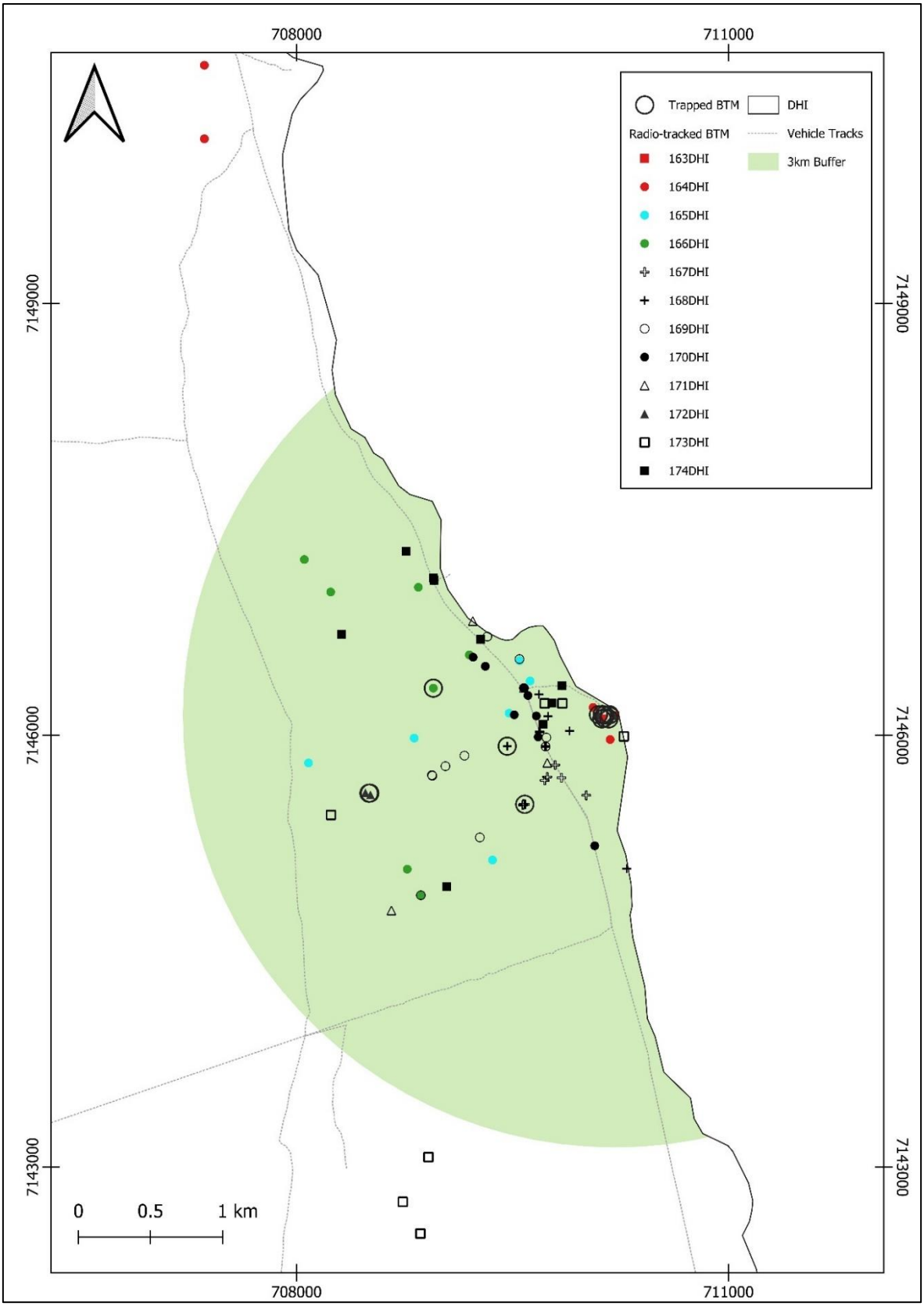

Figure 5: Trapping and radio-tracking data for brush-tailed mulgara (BTM). All data was collected in June and July 2023.

The **medium-term success criteria** (6 to 24 months post last translocation) are:

Population settled in an area of suitable habitat as evidenced by monitoring methods (e.g., cameras, traps, or tracks) within 24 months post-release.

- This criterion could not be fully measured in this reporting period.
    - An Elliott trapping survey was conducted from 20-24 May 2024 in the Louisa Bay area (Figure 6). Although a 90-trap site configuration (3 clusters of 30 sites) was originally designed, only two of the site clusters were established (i.e. 60 trap sites in the most northern clusters 'H' and 'LoB'; Figure 6) due to logistical reasons. The configuration was developed following the optimisation approach of Dupont et al. (2021), with the location of each grid determined by known areas of activity at the end of the radio-tracking period.
        - Two Elliott traps were deployed for 4 nights at each site within each grid, each with a universal lure.
        - No BTM were captured however fresh diggings were observed across the 'H' grid suggesting the ongoing presence of the species in that area.
        - Given that only one breeding season has occurred since last year's release, we expect detections of BTM to be low at this point in time (9 months post-release).

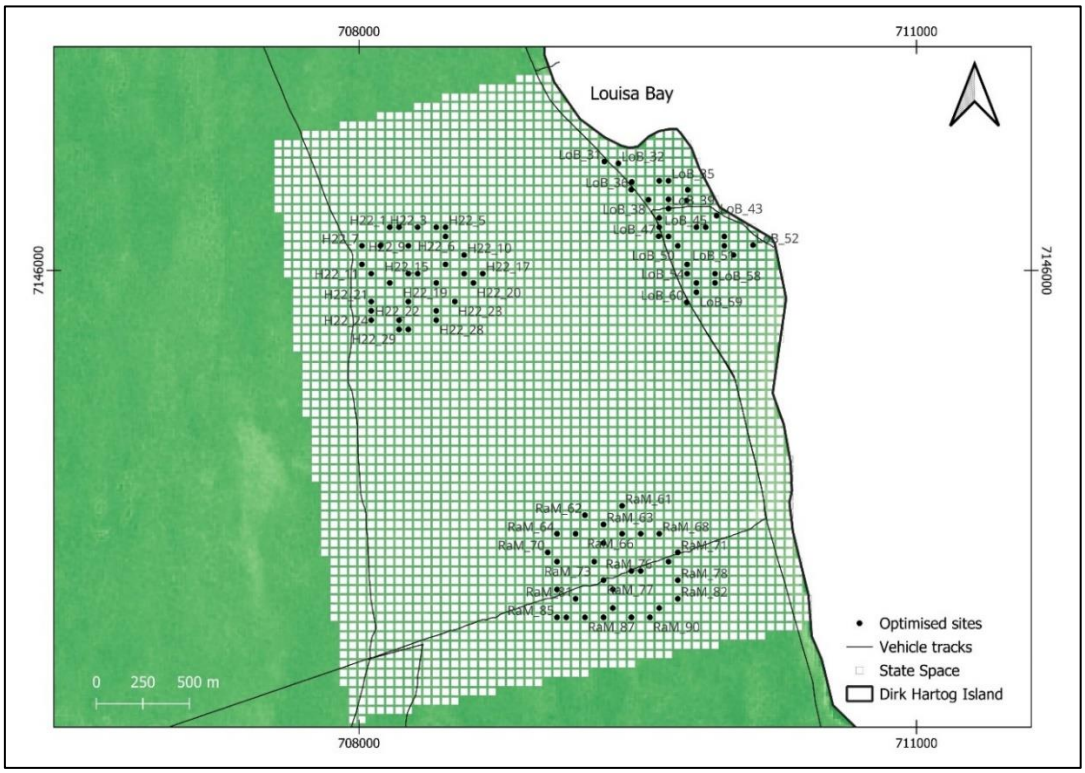

Figure 6: Initial location of optimised Elliott trap configuration for brush-tailed mulgara (BTM) monitoring in the Louisa Bay area. Only the 'H' and 'LoB' sites were opened for trapping in 2024.

Evidence of reproduction and successful recruitment of F1 and possibly F2 individuals into the populations within 24 months post-release.

- This criterion is being met.
    - Preliminary classification of the IWS camera images indicate BTM were present at a site away from the release area (Figure 8) with images captured in December 2023 and again in February 2024. Several images captured a small individual likely to be a new recruit (Figure 7).

Figure 7: Image of new brush-tailed mulgara (BTM) recruit captured on an IWS camera in 2024.

Average body weight and condition of captured individuals is maintained within range (within +/- 5%) of that observed in founder group at release (dependent on comparable rainfall and breeding season) within 24 months.

- Could not be measured in this reporting period.

Evidence of dispersal of new recruits beyond initial release area by two years post-translocation.

- This criterion is being met
    - The individuals (e.g., Figure 7) captured approximately 6 km to the southwest of the release area (Figure 8).

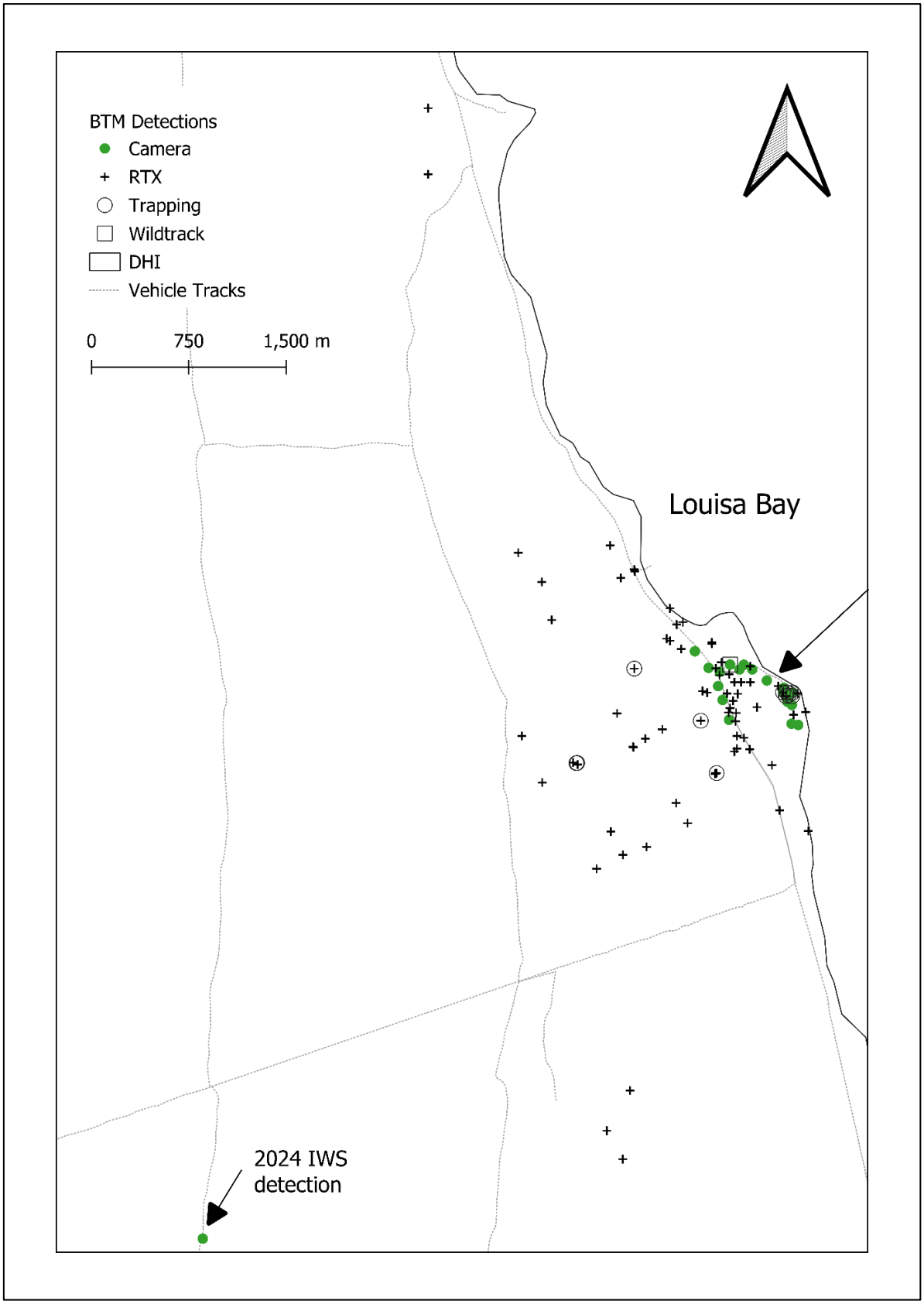

Figure 8: Annual brush-tailed mulgara (BTM) detections (n = 182). Top upper indicates general release area and lower arrow the location of 2024 IWS camera detection.

2.1.3 Discussion

BTM appear to be persisting on the island and dispersing away from the release area. The mortality rates appear to have been low and there were still sufficient camera detections to be satisfied with the progress of the translocations at the six-month mark. No BTM were trapped in May 2024 in and around the release area, however observations of diggings near to the release area suggest animals are still in the general vicinity. Images captured on remote camera through the IWS confirm that animals have successfully bred and have dispersed beyond the release area.

7. Greater stick-nest rat

2.1.4 Background information

Activity	Key points
Translocations	
	• Greater stick-nest rats (GSNR) were translocated to the island from Salutation Island for the first time in May 2021, when 62 individuals were released with a sex ratio of approximately 2M:3F (Cowen et al., 2021). Of note, four of the released individuals were captive adults originally from Salutation being held at purpose-built facility at Peron Homestead. • A supplementation translocation of GSNRs occurred in May 2022, with a total of 30 individuals translocated from each of East and West Franklin Islands (Cowen et al., 2022). The sex ratio was 3M:2F. These animals were released in an area adjacent to the 2021 release area (Figure 1).
Monitoring	
Physical trapping	• Trapping grids were used in the general release area up until May 2023, but with limited success (Department of Biodiversity, Conservation and Attractions, 2023).
Camera trapping	• Camera traps have been used extensively to monitor GSNRs in the Herald Bay area from 2021 to 2023, often in association with GSNR protonests (Department of Biodiversity, Conservation and Attractions, 2023). • 22 cameras were deployed at the northern airstrip site (Figure 9 and Figure 10) from 17-22 March 2024 (Department of Biodiversity, Conservation and Attractions, 2024). • 40 cameras are rotating around the island as an ‘island-wide’ monitoring survey (Figure 3).
WildTrack Scanners	• 40 scanning units were deployed near to 2021 GSNR release sites (Cowen et al., 2023) in the Herald Bay area from 2022 to 2023. All units have been taken in for servicing and in March 2024, 16 units were deployed in the Hearld Bay area (Figure 16). Refer to dibbler section for more information.
Scat surveys	• An extensive survey was conducted at the northern airstrip site (Figure 9) in March 2024 for GSNR faecal pellets and to identify sinkholes being used (Department of Biodiversity, Conservation and Attractions, 2024). • 204 fresh scat samples were collected in May 2024 in ‘high activity’ areas identified in March. Scats were collected for the purpose of field trialling faecal pellet DNA (eDNA) methods that are currently in use for other trap-shy species. • 39 wetland/birridas were identified across the island (Figure 10) from satellite imagery (Department of Biodiversity, Conservation and Attractions, 2024). Each wetland/birrida is being surveyed for sign of GSNRs. At the time if writing, 20 wetlands had been surveyed.

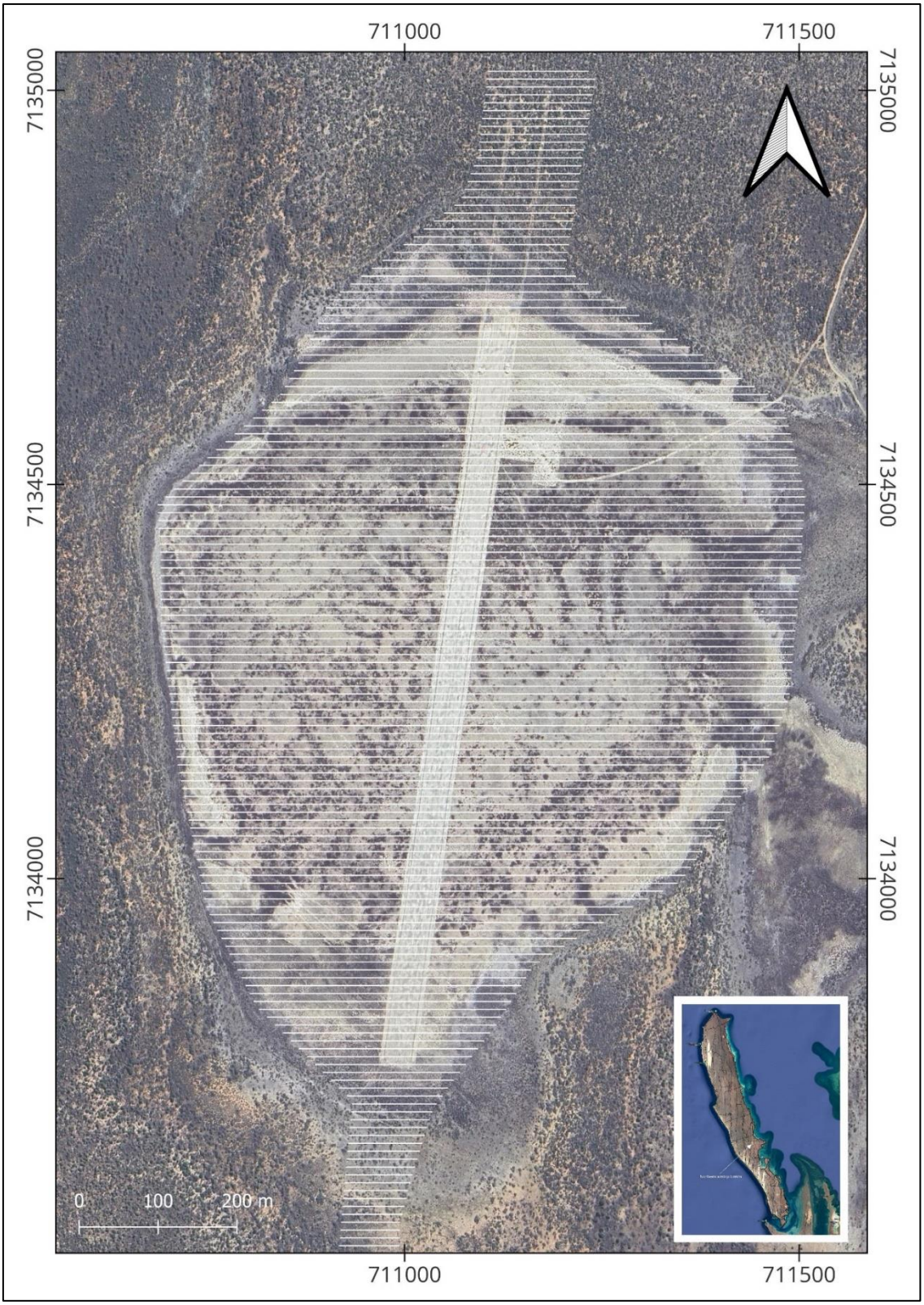

Figure 9: Transects surveyed in March 2024 for greater stick-nest rat (GSNR) faecal pellets and location of sinkholes at the northern airstrip site – located on a birrida.

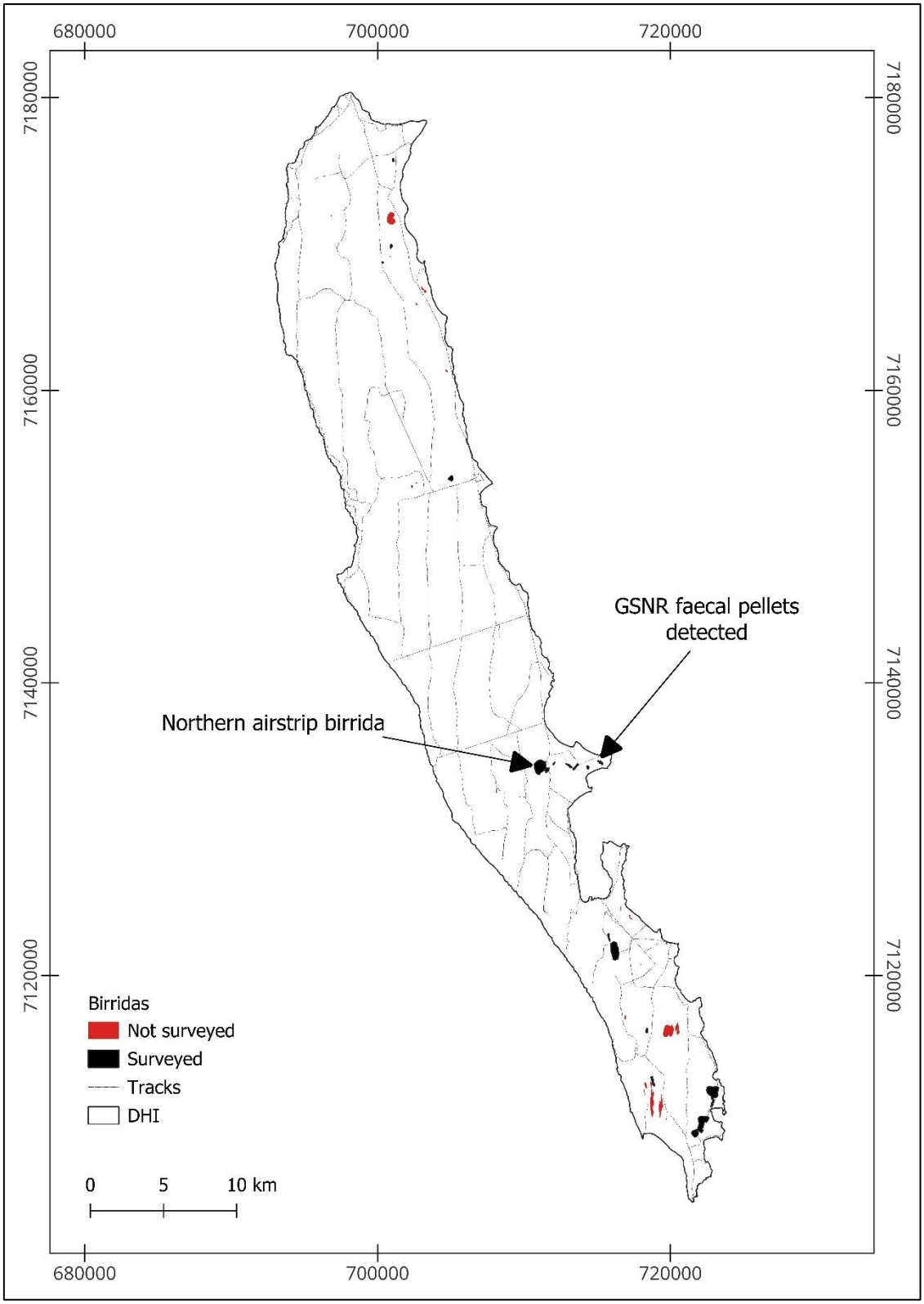

Figure 10: Wetland/birridas of interest on the island with regards to being potentially used by greater stick-nest rats (GSNR). Map also shows where the northern airstrip site is located and indicates (with arrows) the other wetland where greater stick-nest rat faecal pellets and tracks continue to be detected. Map modified from Department of Biodiversity, and Conservation and Attractions (2024).

2.1.5 Monitoring results 2023 to 2024

As GSNR were last translocated in 2022, we provide an assessment of progress towards the medium- to long-term success criteria – noting the short-term success criteria were all met (Appendix 2).

The **medium-term success criteria** (6 to 24 months post last translocation) are:

Continued survivorship of founders (and progeny) over the first summer (≥50% of those KTBA at 6 months still KTBA at 12 months).

- This success criterion has not been met in a technical sense as:
    - No translocated individuals have been recaptured beyond 4 months post release.
        - Animals from the 2022 release were most recently detected in October 2022 (around four months post release).
        - One 2021 release animal was detected up to July 2022 on the WildTrack system (14 months post release).
- However, given the continued persistence of the species, founders must have survived for long enough and bred such that the species has now been detected at multiple places across the island including the northern airstrip site (Figure 11).

Population has established and maintained or expanded habitat used, including construction of stick nests.

- This success criterion has been met:
    - Animals have been detected across the island, including the detection of footprints near to Surf Point (Figure 12).
    - As described by Department of Biodiversity, Conservation and Attractions (2024), in 2023, GSNRs were discovered occupying sinkholes in and around the construction site for the northern airstrip (Figure 9; Figure 11), suggesting expansion of habitat. In this area, the species appears to have constructed stick-nests in the sinkholes.
    - Of the 20 wetland areas across the island surveyed for evidence of GSNR faecal pellets, two have had pellets detected (Figure 10). Of note, five of the surveyed wetlands have some level of sinkhole formation.

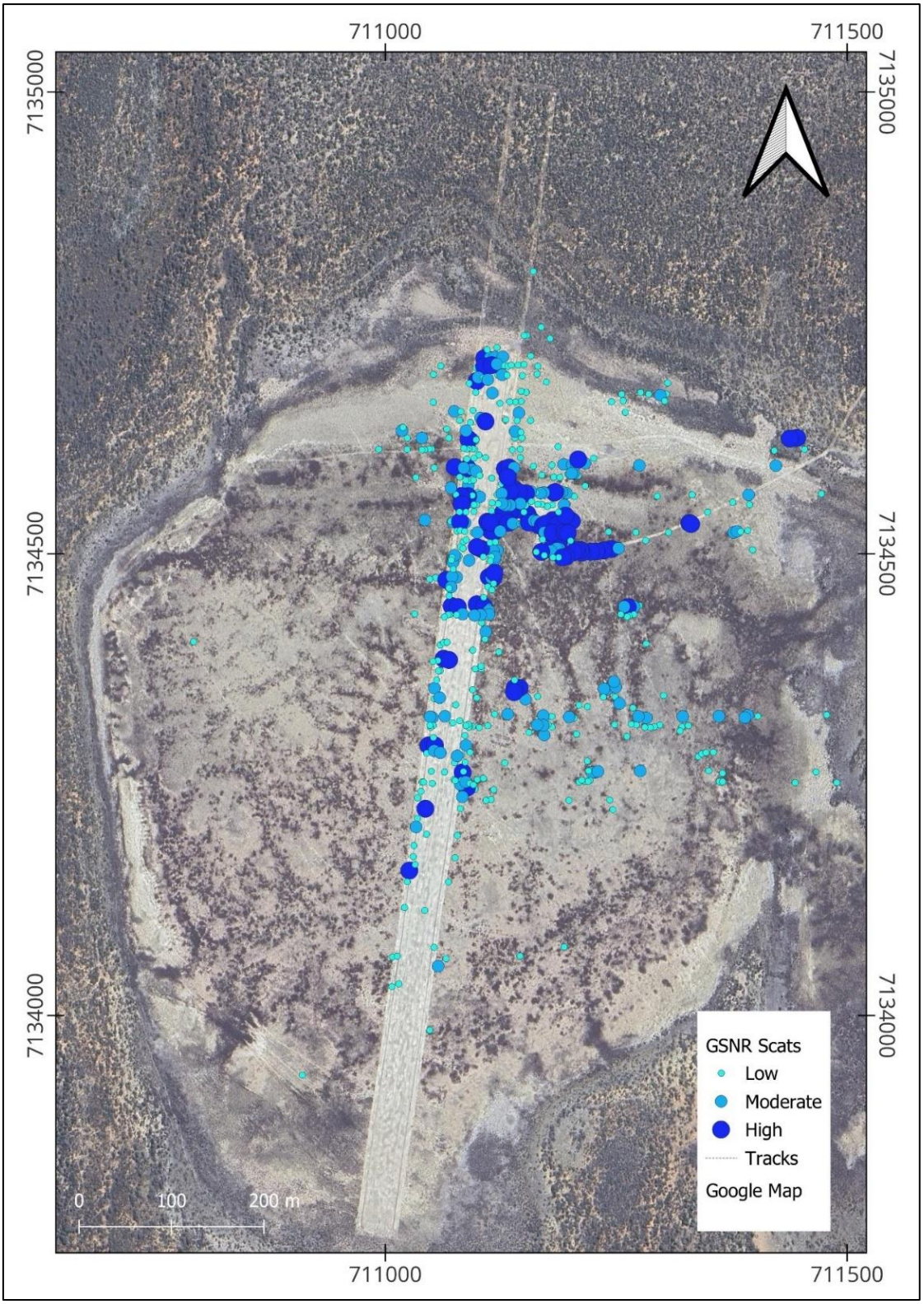

Figure 11: Greater stick-nest rat (GSNR) scat records at the northern airstrip site, sized and coloured by density categories (low, medium, high).

Evidence of reproduction and successful recruitment of new F1 individuals into the population.

- This success criterion has been met:
    - In September 2021, one trapped individual was a new subadult female.
    - In September 2022, three new individuals were trapped.
    - Individuals with attached young, juveniles and subadults have been captured on remote camera within the release area.
    - Multiple images of juveniles and subadults were captured at the northern airstrip site (Department of Biodiversity, Conservation and Attractions, 2024).

Dispersal of new recruits and increasing activity.

- This success criterion has been met:
    - GSNR tracks have been detected at Surf Point; first in October 2021 and most recently in May 2024 (Figure 12), approximately 25 km from the release area. However, it is not known whether these are new recruits.
    - Individuals captured on camera as far north as Louisa Bay (Figure 12).
    - Evidence of individuals occupying sink holes at the northern airstrip site.

Expansion of the area of occupancy of initial founder group.

- Beyond the area of release, GSNRs have been detected at Surf Point, the northern airstrip site, and near to Louisa Bay (Figure 12), indicating this criterion is being met.

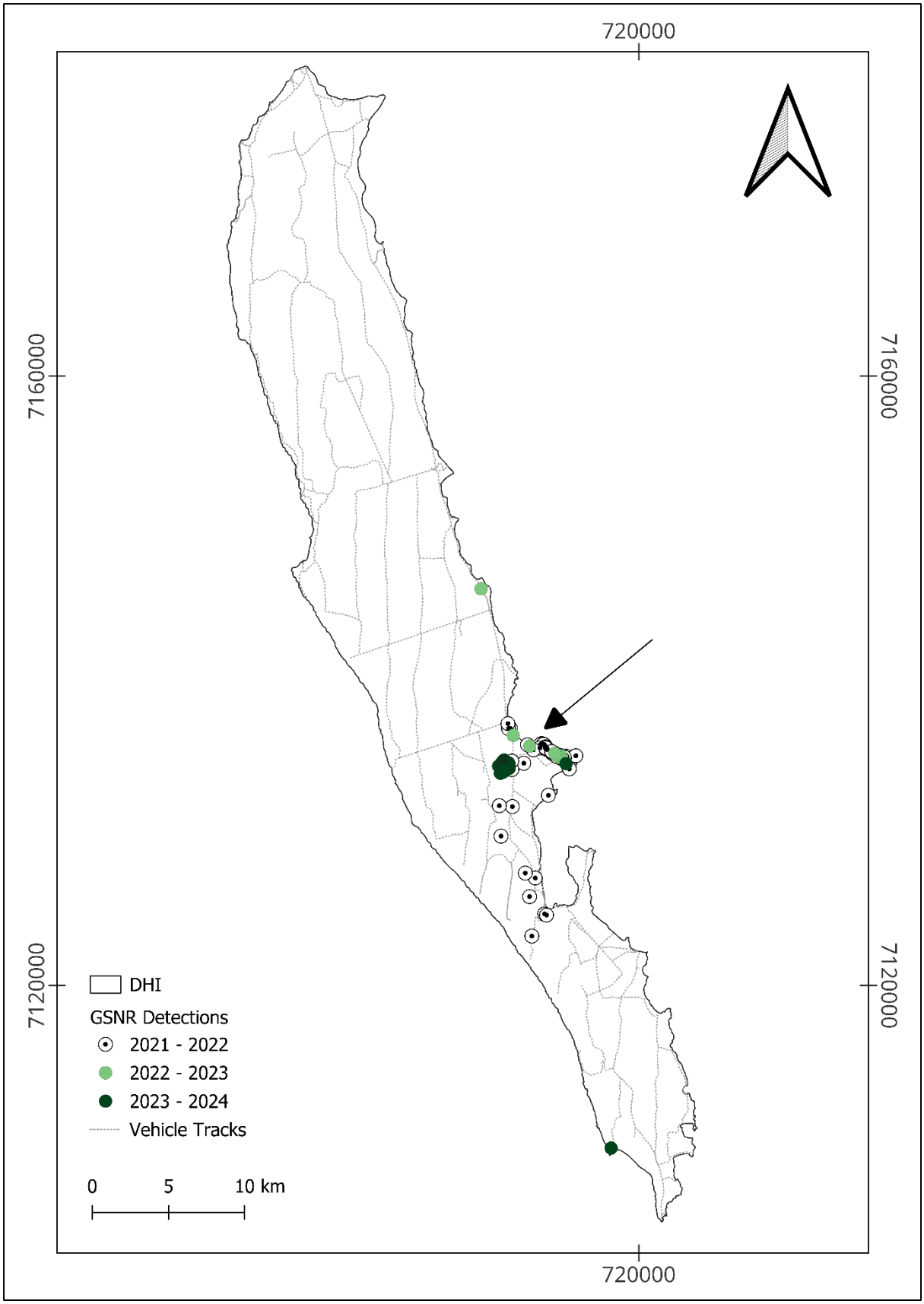

Figure 12: Annual greater stick-nest rat (GSNR) detections (n = 676). The arrow indicates general release area.

The **long-term success criteria** (> 24 months post last translocation) and their status are:

Population has increased and continued to expand area of occupancy to at least twice that initially occupied by the founder group.

- The species has clearly dispersed and appears to be establishing itself in at least one area that is not within the original release area (Figure 1 and Figure 12), indicating this criterion is being met.

F2 (and longer) generation present and reproducing.

- As described above, non-founder GSNRs have been detected, indicating the first part of this criterion has been met. It is also likely that many of the individuals detected on camera and via footprints are new animals.

Body weight and condition is maintained at levels similar to source populations, > 50% females breeding (as appropriate to prevailing seasonality and variable rainfall).

- In terms of body weight, the majority of captured individuals that were born on the island were smaller, but all but one was a subadult or juvenile. The one adult captured was a similar size to the founders (Figure 13). There have been no recent captures, so data to fully assess this criterion is lacking. However, animals observed at night and captured on camera appear to be in a healthy condition. The percentage of females breeding at this time cannot be quantified.

Population persists and recovers their area of occupancy and density after a first drought cycle.

  - Still to be determined.

Genetic variability (allelic richness and heterozygosity) maintained at ≥90% of released individuals at five to 10 years post-release (alternative criteria may be developed based upon deviations of genetic diversity from a mean value)

  - Still to be determined (genetic analysis underway).

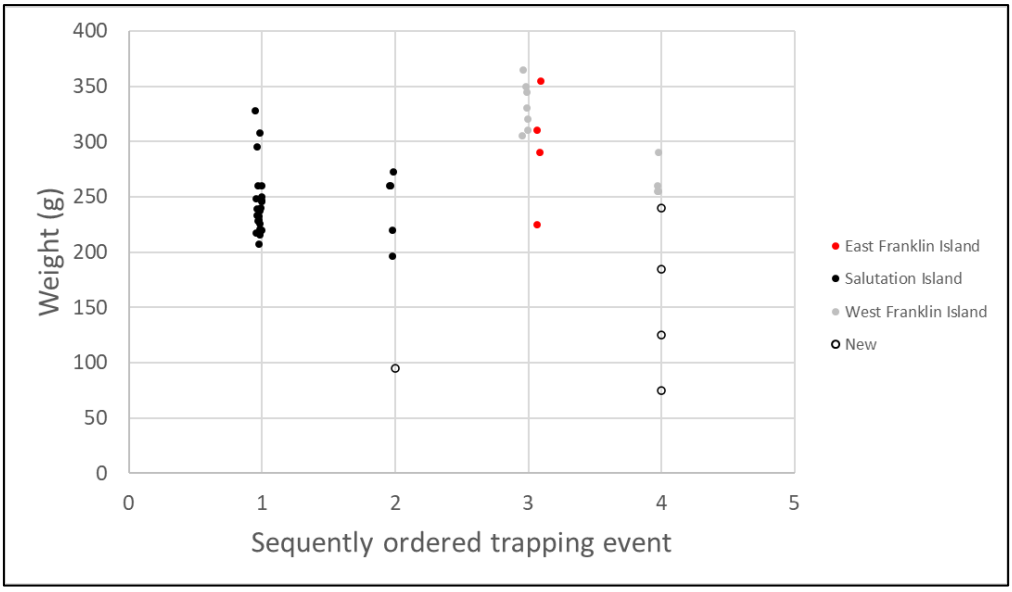

Figure 13: Weights (g) of individual greater stick-nest rats (GSNR) caught since the original translocation during all major trapping events from 2021 to 2023. Symbol colours indicate source populations and individuals born on the island (New). Points are slightly jittered to facilitate interpretation. 1 = June 2021, 2 = September/October 2021, 3 = July 2022, 4 = September 2022.

2.1.6 Discussion

Monitoring suggests that all the short term and the majority of the medium-term success criteria for GSNRs have been met. The species is clearly dispersing away from the release area and there is ongoing evidence of reproduction. Some criteria were not able to be fully assessed due to the lack of data.

8. Shark Bay mouse

2.1.7 Background information

Activity	Key points
Translocations	• Shark Bay mice (SBM) were translocated to the island for the first time in April 2021 (Table 1), with a total of 80 individuals released and a female-biased sex ratio (Cowen et al., 2021, 2022). • A second release of SBM in 2022 totalled 50 individuals with a male biased sex ratio (Cowen et al., 2022).
Monitoring	
Physical trapping	• After the second release, a trapping grid (120 Elliott traps spread across 60 sites) was created to monitor the SBM at Herald Heights (Cowen et al., 2022; Department of Biodiversity, Conservation and Attractions, 2023) which incorporated the later release sites (Figure 14). • The location of the trap sites was designed to cover habitat comprised of *Spinifex longifolia* in the dunes and low heath scrub to the west (Figure 14). • SBM are now regularly trapped in the Herald Bay area in programs targeting other species.
Camera trapping	• Camera traps were deployed at the two release areas, and removed in 2023, but SBM are now being picked up by cameras deployed in other areas. • It is also hoped that the camera IWS (Figure 3) will detect SBM.

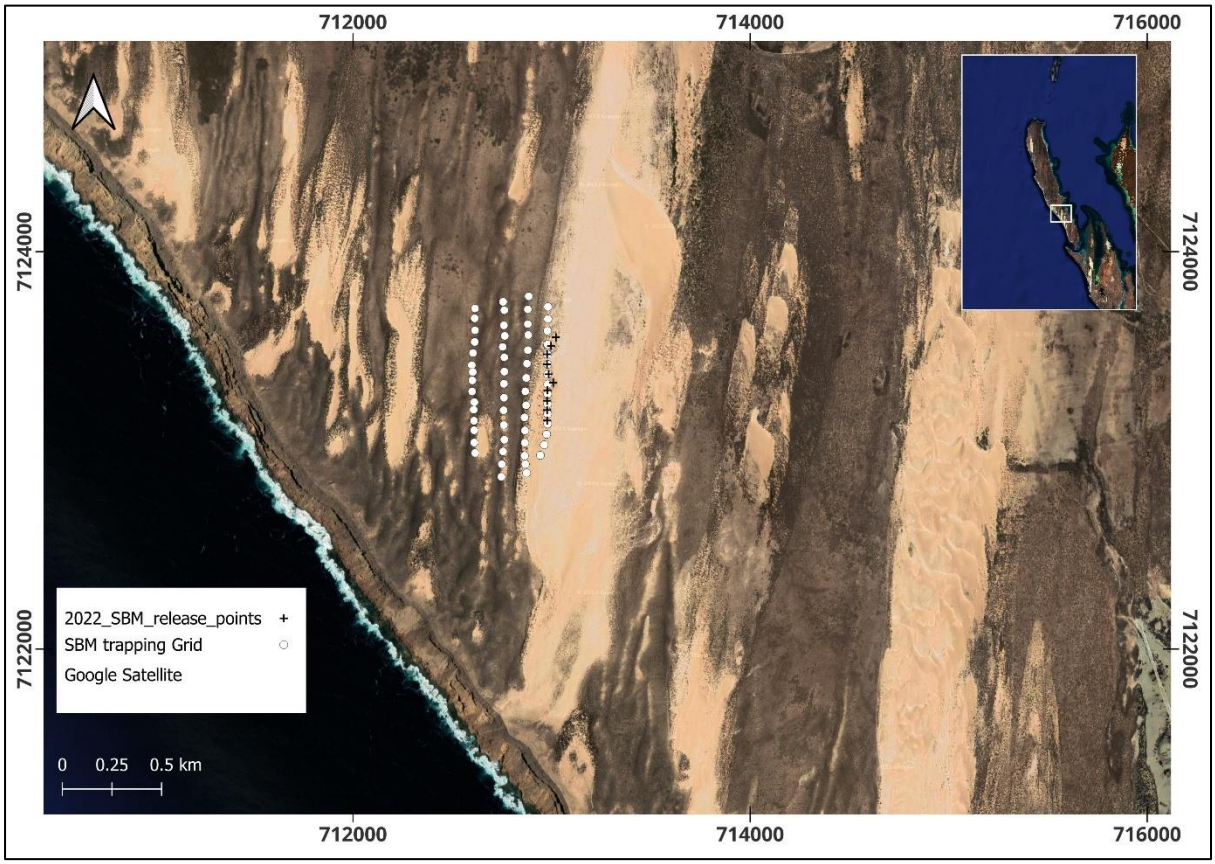

Figure 14: Location of 2022 trapping sites used to monitor Shark Bay mice (SBM) density since 2022. Map also shows 2022 release points.

2.1.8 Monitoring results 2023 to 2024

As Shark Bay mice (SBM) were last translocated in 2022, we provide an assessment of progress towards the medium- to long-term success criteria – noting the short-term success criteria were all met (Appendix 2).

The **medium-term success criteria** (6 to 24 months post last translocation) and their status are:

Evidence of establishment in release area.

- This success criterion has been met.
    - As seen in Figure 15 and described in more detail in Department of Biodiversity, Conservation and Attractions (2023), SBM have been consistently detected in high densities in the release area since their translocation, thus indicating successful establishment.

Evidence of reproduction and successful recruitment of new F1 individuals into population.

- This success criterion has been met.
    - Unmarked 'new' individuals have been captured regularly in the release areas (e.g., Figure 16) and in general trapping around the Herald Bay area, clearly demonstrating the successful recruitment of new individuals. Given it has now been around 2 years since the last translocation, many detections will not be founders (e.g., Figure 16).

Dispersal of new recruits and increasing activity.

- This success criterion has been met.
    - New individuals are regularly detected in areas away from the release points (Figure 15) indicating dispersal of new recruits.
    - In September 2023, 5 SBM were trapped in the Herald Bay area (Figure 15) during the SBB translocation (see SBB section).
    - In the May 2024 SBB trapping (see SBB section), 6 new SBM (from 11 overall captures) were trapped in the Herald Bay area (Figure 15).

Mean weight over time comparable to source populations.

- This success criterion has been met.
    - There is no evidence to indicate that the weights of new individuals are any different from the founders (Figure 16).

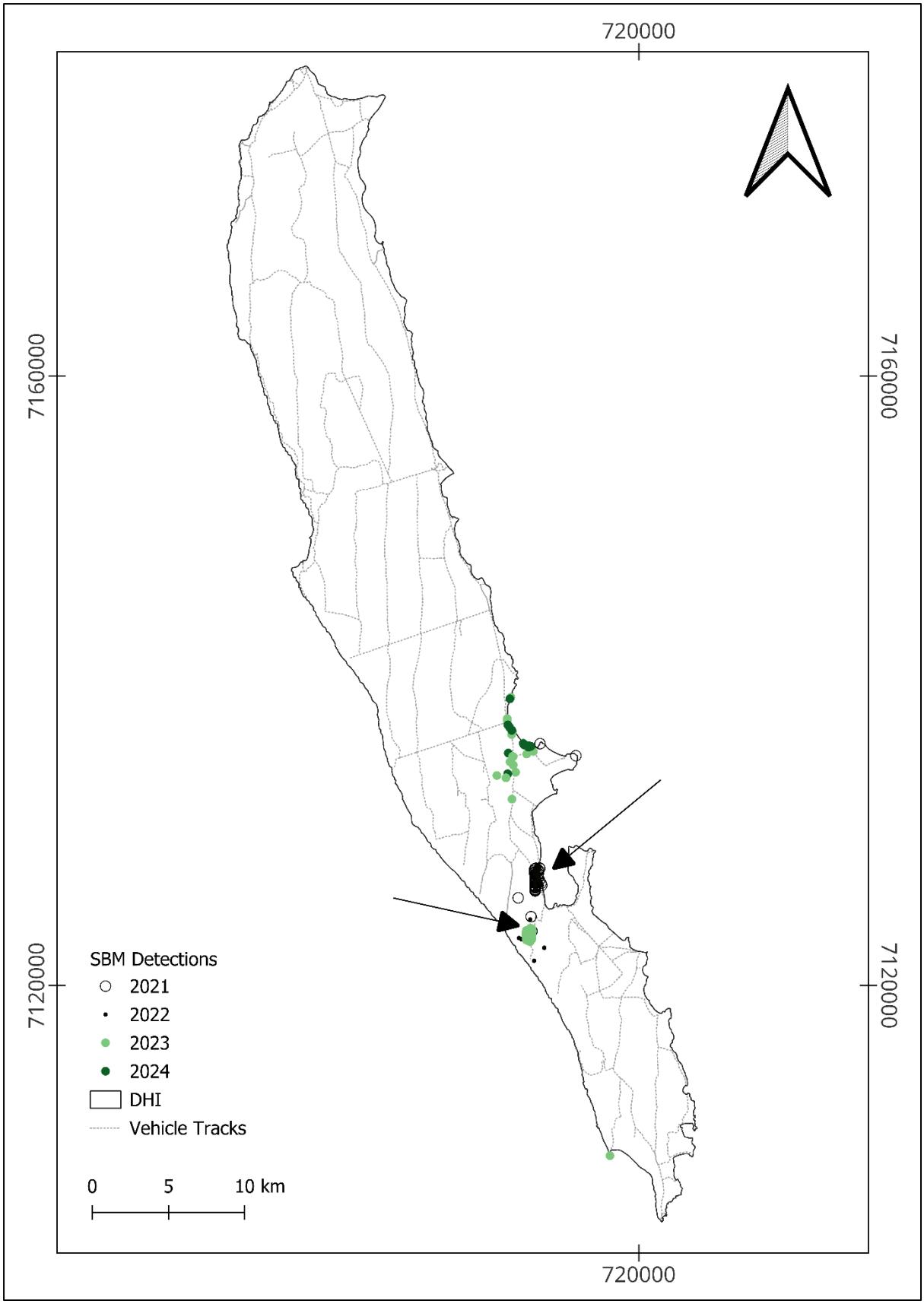

Figure 15: Annual Shark Bay mice (SBM) detections (n = 434). Arrows indicate general release areas.

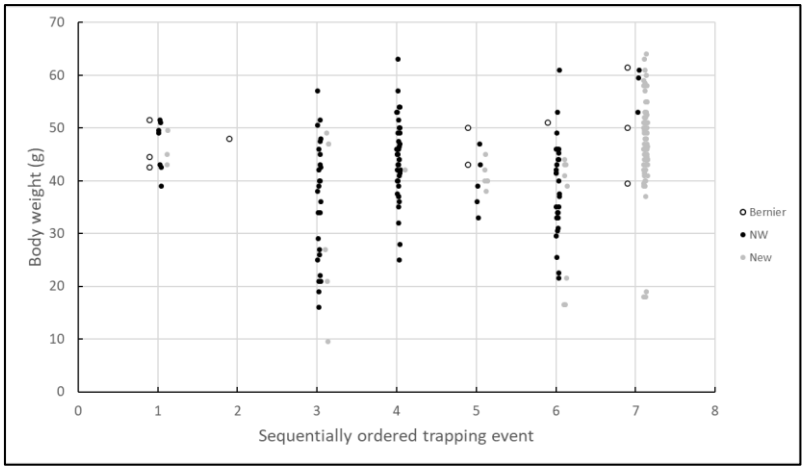

Figure 16: Weights (g) of individual Shark Bay mice caught since the original translocation during all major trapping events from 2021 to 2023. Symbol colours indicate source populations (Bernier and Northwest (NW) Islands) and individuals born on the island. Points are slightly jittered to facilitate interpretation. 1 = May 2021, 2 = June 2021, 3 = September 2021, 4 = early May 2022, 5 = late May 2022, 6 = September 2022, 7 = April 2023.

The **long-term success criteria** (> 24 months post last translocation) and their status are:

Population has continued to expand area of occupancy to at least twice that initially occupied by the founder group (as confirmed through increased number of sites with positive detections) and monitoring indicates increase in population size.

- The species has dispersed and appears to be establishing itself in areas far removed from the original release area (Figure 1 and Figure 15), indicating this criterion is being met.

F2 (and longer) generation present and reproducing.

- As indicated by Figure 15 and Figure 16, this success criterion is being met.

Genetic variability (allelic richness and heterozygosity) maintained at >90% of released individuals at 5- and 10-years post-release.

- Still to be determined (genetic analysis underway).

Population persists and recovers their area of occupancy and relative activity or relative abundance after a first drought cycle.

- Still to be determined.

2.1.9 Discussion

Monitoring suggests that all short- and medium-term success criteria for SBM have been met. All the long-term criteria for which we currently have appropriate information are also being met. The species is persisting, dispersing away from the release area and there is ongoing evidence of reproduction.

9. Dibbler

2.1.10 Background information

Activity	Key points
Translocations	203 dibblers have been translocated to the island from Perth Zoo: • 26 in 2019 (13M:13F) • 31 in 2020 (14M:17F) • 36 in 2021 (17M:19F) • 44 in 2022 (24M:20F) • 66 in 2023 (28M:38F) Total: 203 The release protocols in 2023 mirrored those described previously (Cowen et al., 2022, 2021, 2020), but individuals were released directly from release canisters that constituted PVC tubing (≈ 200mm long by 100mm diameter) end capped with 50mm exit holes, and approximately 60 by 8mm holes drilled on two sides. Each canister contained paper straw.
Monitoring	
Physical trapping	Elliott traps have been used to try to trap dibblers, with little success (Cowen et al., 2022, 2021, 2020; Department of Biodiversity, Conservation and Attractions, 2023).
Camera trapping	Camera traps have been used extensively to monitor dibblers, especially around the Herald Bay area (Cowen et al., 2022, 2021, 2020; Department of Biodiversity, Conservation and Attractions, 2023).
WildTrack Scanners	38 scanning units were deployed in the dibbler release area (Cowen et al., 2023) from 2022 to 2023 (Figure 17). In 2023, the units were serviced, with many requiring significant repair and the batteries had reached the end-of-life in nearly all units. In October 2023, 18 units were redeployed in the Herald Bay area with original batteries (Figure 17), but the majority were not working by the end of 2023. New batteries were purchased in 2024, all units were taken in for servicing and the units are in the process of being tested, repaired, and 16 units have been successfully redeployed in the Herald Bay area so far (Figure 17). These units were deployed at release sites with the brass loop located next to a release box. More units will be redeployed in the Herald Bay area in 2024.

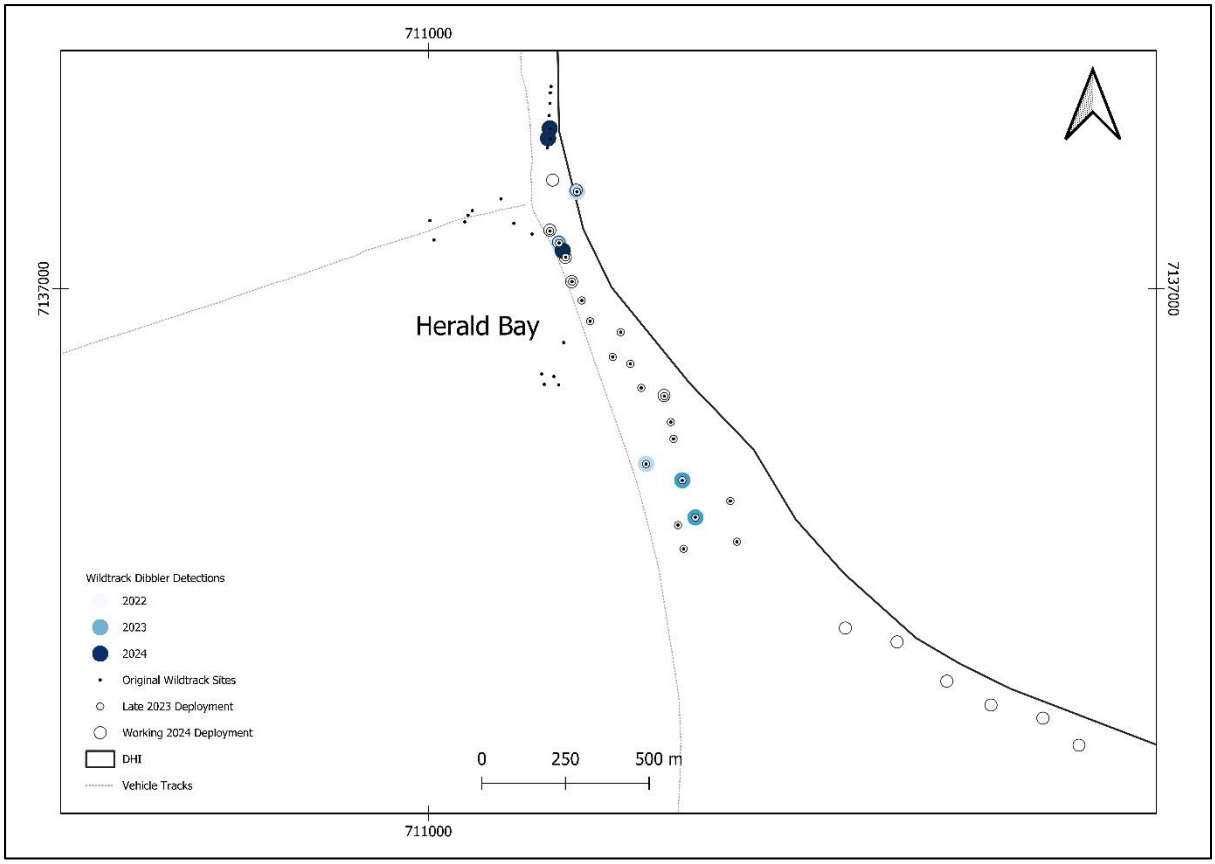

Figure 17: Deployment history of WildTrack scanners and sites where dibblers have been detected.

2.1.11 Monitoring results 2023 to 2024

As dibblers were first translocated more than 4-years ago, we provide an assessment of progress towards the medium- and long-term success criteria – noting that most of the short-term success criteria were met (Appendix 2).

The **medium-term success criteria** (13 to 36 months post last translocation) and their status are:

Animals persist on island 36 months since first release.

- Founder individuals captured up to 24 months post-release.
    - Only one founder individual has been recaptured more than five days since first release (Figure 19). Dibblers remain difficult to trap on the island.
    - Four individuals have been detected with the WildTrack system, with the largest number of days between captures equal to 181 (Table 3).

This criterion is yet to be met.

Table 3: WildTrack dibbler detections.

	Device ID	RFID_ID	RFID_ID	RFID_ID	RFID_ID
		13363912	14678435	15932423	15972972
Actual date	Module 046		24/11/2022		
	Module 017		26/12/2022		
	Module 030		06/03/2023		
	Module 038		11/03/2023		
	Module 036	17/12/2022			
	Module 031			30/03/2024	
	Module 041			01/04/2024	
	Module 052				27/03/2024
Days since release date	Module 046		40		
	Module 017		72		
	Module 030		142		
	Module 038		147		
	Module 036	63			
	Module 031			179	
	Module 041			181	
	Module 052				176

- Naïve occupancy at lured camera and soft-release/nest-box sites increases.
    - Some individuals still appear to be occupying the general release area, but it is possible that the density in the release area will decrease over time as animals disperse to preferred habitat, and/or die.
- Founder animals maintain health and condition.
    - Given the poor trappability of this species, we do not have enough data to assess this criterion appropriately. However, individuals captured on camera appear to be in good condition. This success criterion may never be assessable.
- Body weight and condition maintained within variation observed in initial release data and taking climatic variation into account.
    - The one individual captured over more than 5 days post release increased in body size (Figure 19). However, as per the previous criterion, we do not have enough data to assess this criterion appropriately. This success criterion may never be assessable.

Successful reproduction and population recruitment

- ≥50% of trapped females with pouch young at 19 months and 31 months after first release.
    - Currently not assessable.
- Island-born juveniles (F1) trapped by 36 months successful reproduction and population recruitment.
    - One F1 adult was captured in May 2023, with a full complement of pouch young. However, beyond this single observation, we do not have enough data to assess this criterion appropriately.

Population expansion

- Extent of occurrence increases between 12 and 36 months based on trapping/camera trap data.
    - This success criterion is still to be determined.

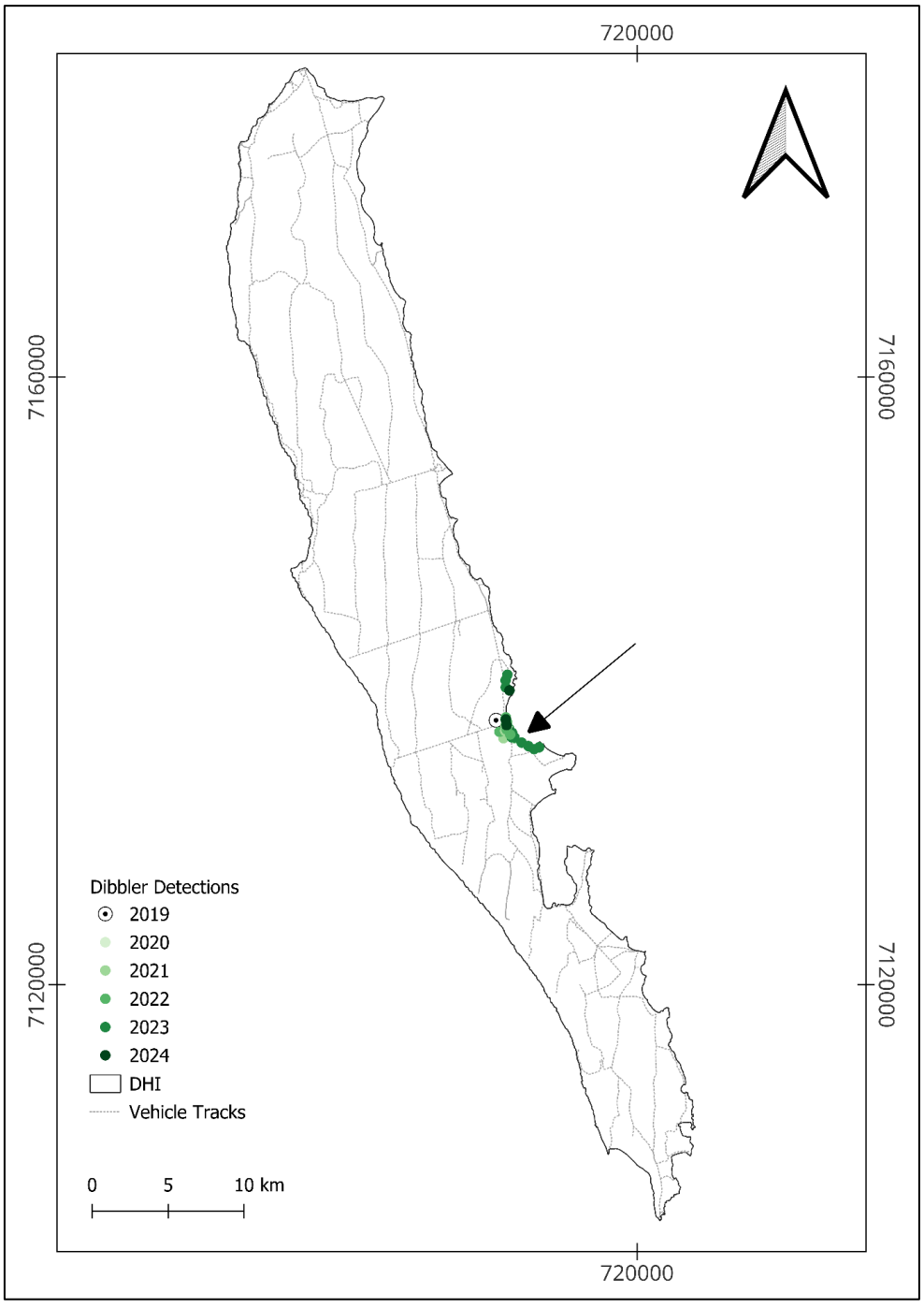

Figure 18: Annual dibbler records (n = 156). Arrow indicates general release area.

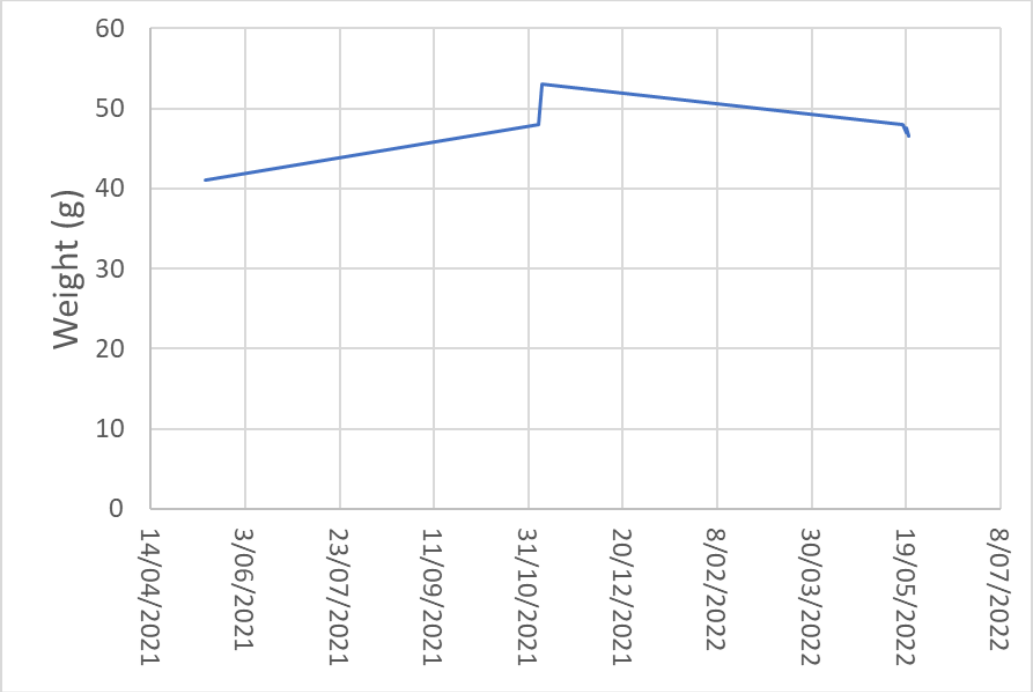

Figure 19: Changes in body weight of most captured dibbler.

The **long-term success criteria** (> 24 months post last translocation) and their status are:

Population persists on Dirk Hartog Island

- Population size at 3 years maintained or increased at 10 years.
    - This success criterion is still to be determined.

Population maintains health and condition.

- Body weight and condition maintained within variation observed in initial release data and taking climatic variation into account.
    - Given the low trapping rates, this success criterion may never be assessable.

Successful reproduction and population recruitment.

- Evidence of young/juveniles in trappable population at 10 years. At least 50% of females breeding (depending on climatic conditions).
    - This success criterion is still to be determined.

Animals establish themselves in suitable habitat.

- Area of occupancy increased between 3 and 10 years based on trapping or camera trap data.
    - This success criterion is still to be determined.

Population maintains genetic diversity of founder group and commensurate with island source population.

- >90% allelic diversity and >95% heterozygosity of founder group is maintained at 10 years.
    - This success criterion is still to be determined. Currently not assessable due to the lack of tissue samples.

Genetic admixture is maintained and not biased to one island source population.

- Frequency of island-specific alleles ('private alleles') does not diverge significantly from founder group.
    - This success criterion is still to be determined. Currently not assessable due to the lack of tissue samples.

2.1.12 Discussion

There is some evidence that dibblers are persisting and reproducing on the island, but there is insufficient data to quantitatively assess many of the current criteria due to a need to capture animals. Alternative approaches to monitoring, other than trapping and cameras, will need to be developed to truly assess the success criteria. Wildtrack units have been useful in providing some additional information, however, the success of these is also limited as the units rely on animals having already been fitted with PIT tags. The possibility that some form of environmental or insect-borne DNA (eDNA or iDNA) will be detectable and monitorable is currently being investigated.

10. Shark Bay bandicoot

2.1.13 Background information

Activity	Key points
Translocations	• Shark Bay bandicoots (SBB) were first translocated to the island in September 2019 (Cowen et al., 2020). A total of 70 animals were transferred directly from Bernier (n = 20) and Dorre (n = 50) Islands. The sex ratio for Dorre was 1:1 but 13 females were translocated from Bernier compared to seven males. A further two males from Dorre Island which had been used for captive collar trials were released on the island in October (with the dibbler release). An additional translocation to reinforce these initial founder cohorts was undertaken in September 2020. Twenty-seven bandicoots (10M:17F) were translocated from Bernier Island bringing the total number of bandicoots translocated to the island to 99. • 59 SBB were trapped and translocated from WDHI to AWC's Pilliga Wildlife Sanctuary in September 2023 (Australian Wildlife Conservancy, 2023, 2024).
Monitoring	
Physical trapping	SBBs are easily trappable and consequently, trapping information on this species has been collected from programs specifically targeting them in addition to programs targeting other species.
Camera trapping	SBBs are easily captured on camera traps. There are currently no cameras set to specifically target SSBs but information from camera trapping efforts for other species are available for this species.
WildTrack Scanners	Microchipped SBBs are readily detected on the scanning arrays.

2.1.14 Monitoring results 2023 to 2024

Given Shark Bay bandicoots (SBB) were last translocated in 2020, an assessment of progress towards the long-term success criteria is now required — noting the short- and medium-term success criteria were all met (Appendix 2).

The **long-term success criteria** (24 to 120 months post last translocation) and their status are:

Population has increased and continued to expand area of occupancy to at least twice that initially occupied by the founder group and up to 25% of suitable habitat south of the management fence.

- SBBs are consistently detected within and away from the release area (Figure 20), demonstrating that this success criterion has been met. For example:
    - 59 SBBs were trapped for translocation to the Pilliga Wildlife Sanctuary between 26-30 September 2023, of which 53 were new individuals (see Appendix 3). An additional 116 SBB were trapped and released, of which 29 were new.

- SBB trapping conducted in May 2024 in the Herald Bay area resulted in captures of 85 SBB, of which 37 were new (see Appendix 3)
- SBBs captured during the BTM 2024 trapping effort in the Louisa Bay area included 5 new individuals.
- There are two roadkill records that are some distance from the release area (Figure 20).

F2 (and longer) generation present and reproducing.

- This success criterion has been met as there are many animals now on the island, far more than the original number translocated.

Body weight and condition is maintained at levels like source populations, >50% females breeding (as appropriate to prevailing seasonality and variable rainfall).

- This criterion has been met. In terms of the body weight of animals captured, there is no indication of any issues (Figure 21).

Genetic variability (allelic richness and heterozygosity) maintained at >85% of released individuals at five- and 10-years post-release (alternative criteria may be developed based on deviations of genetic diversity from a mean value).

- Tissues collected in 2024 for subsequent genetic analyses. Genetic analysis is underway.

Population persists and recovers their area of occupancy and density after a first 'drought' cycle.

- This criterion is still to be assessed.

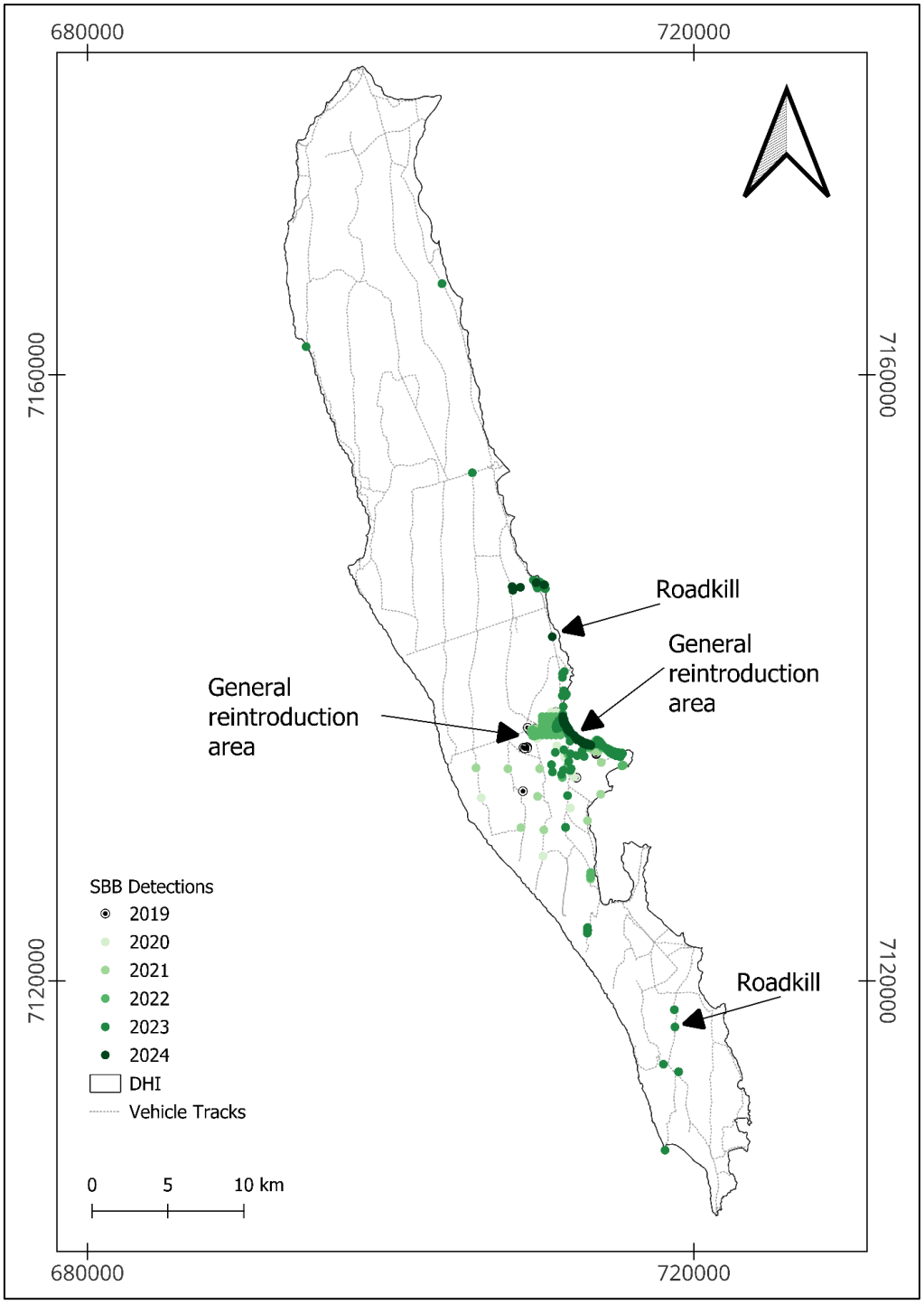

Figure 20: Annual Shark Bay bandicoot (SBB) records (n = 1801). The arrow indicates general release area.

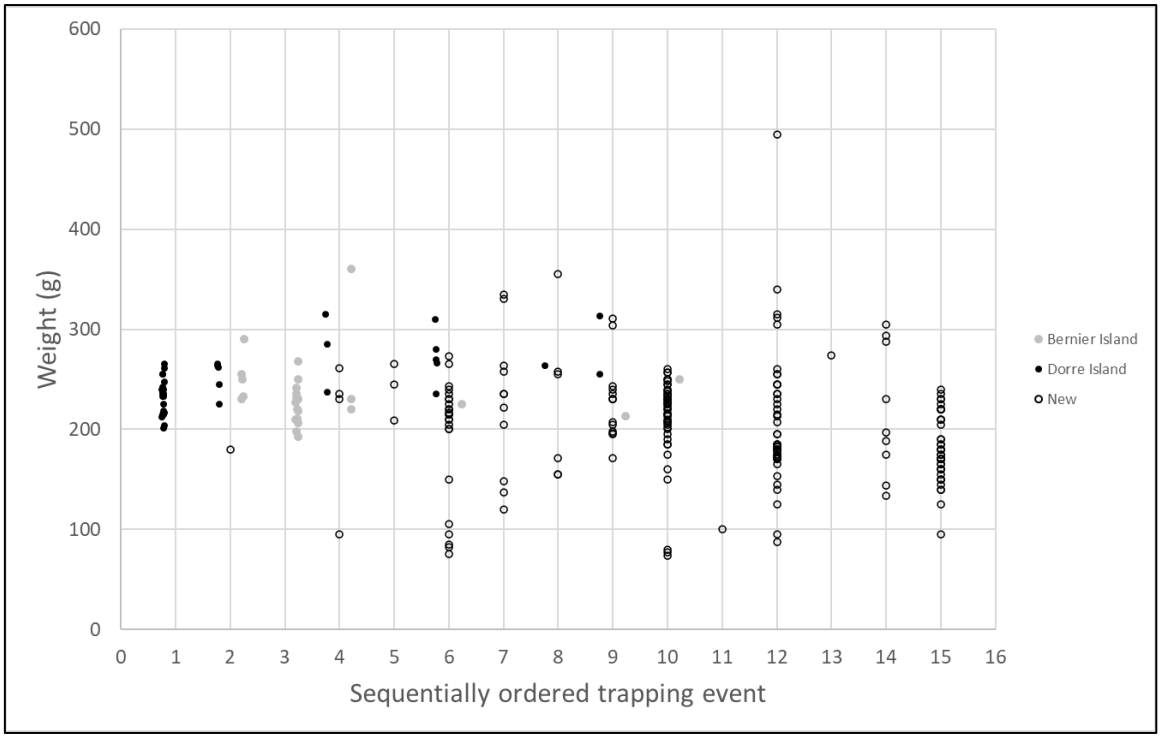

Figure 21: Weights (g) of individual Shark Bay bandicoots (SBB) caught since the original translocation during all major trapping events from 2019 to 2023. Symbol colours indicate source populations and individuals born on the island (New). Points are slightly jittered to facilitate interpretation.

2.1.15 Discussion

Shark Bay bandicoots appear to be establishing well on the island. More widespread monitoring will help to develop a more detailed understanding of their distribution. With an expansion of the species, the incidences of roadkill are likely to increase. Management solutions to reducing the extent of roadkill are warranted.

11. Western grasswren

2.1.16 Background information

Activity	Key points
Translocations	Eighty-five western grasswren (WGW) were translocated from Hamelin Station Reserve (38) and Peron Peninsula (47) to the island in October 2022 (Department of Biodiversity, Conservation and Attractions, 2023). Birds were released at forty different locations in the greater release area (Department of Biodiversity, Conservation and Attractions, 2023).
Monitoring	
Initial radiotracking	Twenty-nine WGW were fitted with VHF transmitters and all birds were released with unique combinations of three colour bands to allow for field identification in the future (Department of Biodiversity, Conservation and Attractions, 2023).
Camera trapping	Camera traps have been deployed throughout the release area. Lures consisting of wool contained in a wire box have been trialled to assess reproductive behaviour (Figure 22).
Automatic recording Units (ARU)	18 Automatic Recording Units (ARUs) have been deployed in the release area since the initial release (ARU locations provided in Figure 22).
Visual/aural surveys	A visual survey along transects was trialled in 2023 to estimate occupancy and to provide additional information on sex, age, reproduction, filial status (transect locations provided in Figure 22).

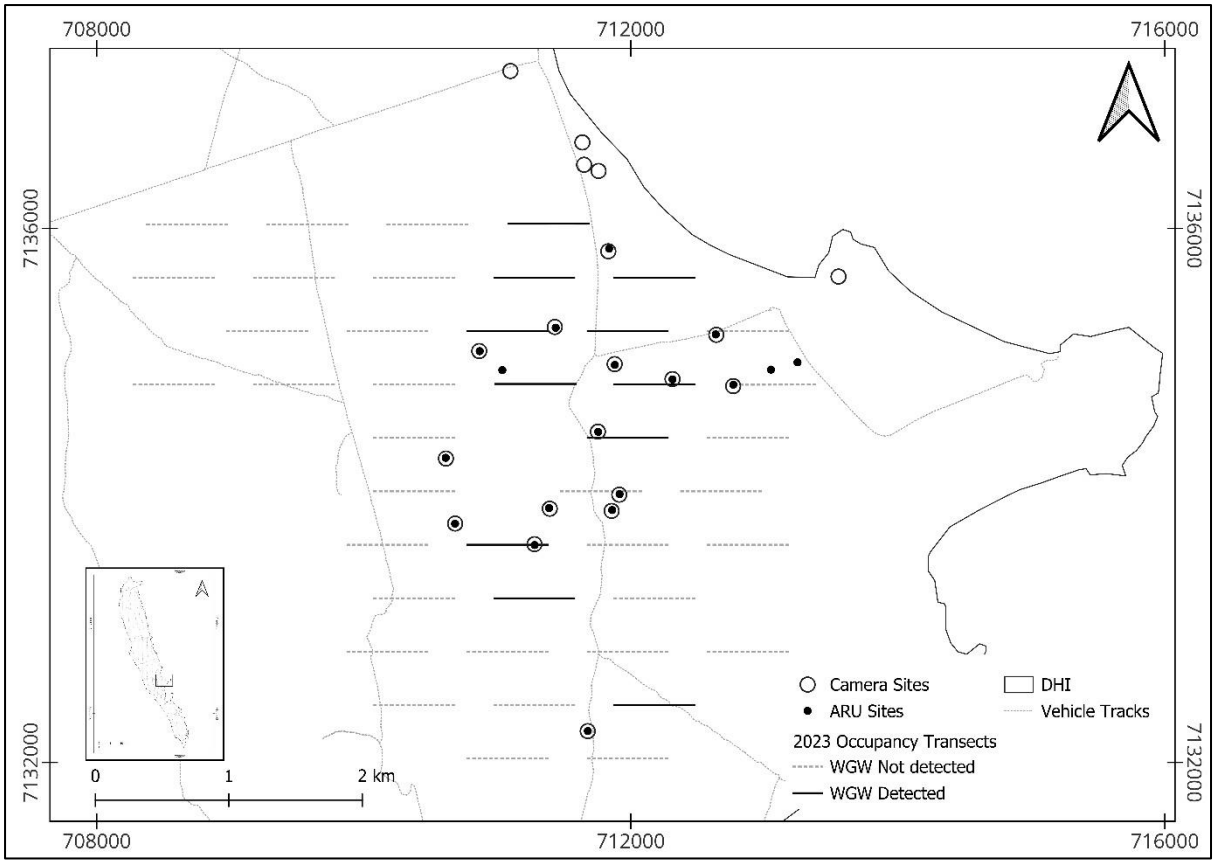

Figure 22: Location of western grasswren (WGW) monitoring sites. Transects where WGW were detected (or not) are also depicted.

2.1.17 Monitoring results 2023 to 2024

As western grasswrens (WGW) were translocated in 2022, we provide an assessment of progress towards the medium-term success criteria – noting the short-term success criteria were all met (Appendix 2).

The **medium-term success criteria** (6 to 48 months post last translocation) and their status are:

Evidence of reproductive behaviour (e.g., nest-building activity) (10 months post-release).

- This success criterion has been met (Table 4), as one nest was located and a group of WGW with juveniles (along with observations of juvenile-like calls) was recorded in September 2023.

Continued survivorship of founders with grasswrens detected (via sighting (including call broadcast surveys) or recording) at ≥50% of 'territories' established during initial post-release period (12 months post-release).

- This criterion has been met. WGWs continue to persist on the island as demonstrated by the ARU data (Department of Biodiversity, Conservation and Attractions, 2023) and individuals with leg bands were sited during an October

2023 visual/aural walking survey (Table 4), indicating survival of founders 12 months post release. Based on radio-tracking data, WGWs have established at a number of independent locations in the release area. Thirteen independent groups or territories were detected within the survey area in September 2023 meeting the second component of the criterion while accounting for the reproductive movement behaviour associated with this species.

Evidence of successful reproduction (e.g. observations of juveniles or unbanded birds) (13 months post-release).

- As described in Table 4, WGWs appear to have reproduced and as such this criterion is being met.

The extent of occurrence of grasswrens continued to expand beyond initial release area (24 months post-release).

- This criterion is still under assessment.

Table 4: Information from observations of banded WGW. Table taken from Rayner et al. (In preparation).

Record No	Date	Age	Sex	Band colours
1	29/09/2023	Unknown	Unknown	Unknown
2	27/09/2023	Unknown	Unknown	Unknown
3	1/10/2023	Unknown	Female	Unknown
4	1/10/2023	Unknown	Unknown	Unknown
5	30/09/2023	2 x adult, 1 likely juvenile, 1 unknown	1 adult male, 1 adult female, 2 unknown	Unknown
6	30/09/2023	Unknown	Unknown	Unknown
7	02/10/2023	Unknown	Unknown	Unknown

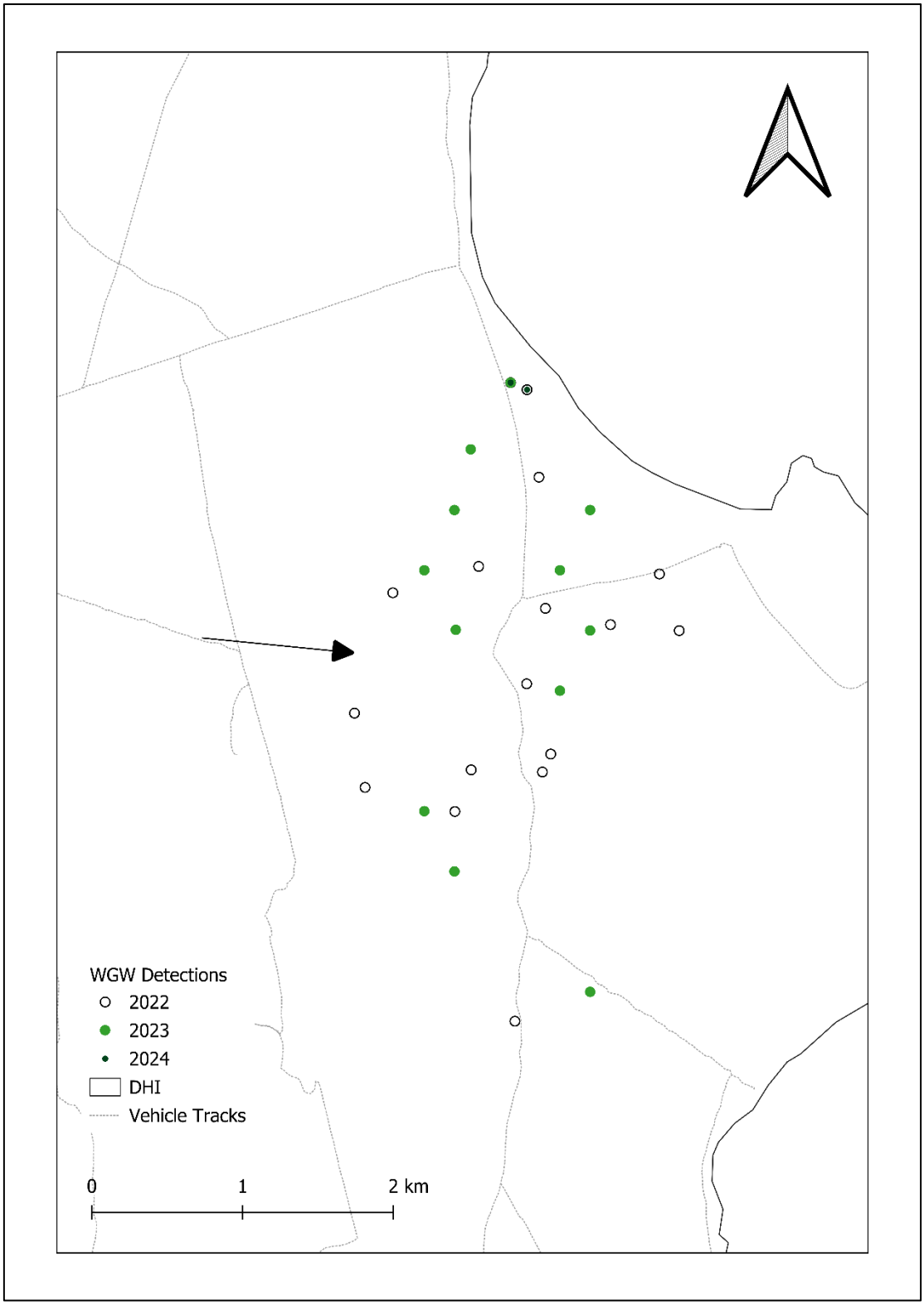

Figure 23: Annual western grasswren (WGW) records (n = 31). Arrow indicates general release area.

2.1.18 Discussion

Monitoring to date suggests that WGW are successfully establishing on the island.

12. Hare-wallabies

2.1.19 Background information

Activity	Key points
Translocations	As described previously (Cowen et al., 2020), rufous hare-wallabies (RHW) and banded hare-wallabies (BHW) were released in 2017 and 2018, between Notch Point and Cape Ransonnet (Figure 1). Additionally, a third release of RHW took place in 2019 around Herald Bay (Figure 1).
Monitoring	
Camera trapping	Camera traps are a key approach to monitoring the wallabies. The camera IWS (Figure 3) will hopefully provide more evidence of expansion and establishment across the island by both species.
Scat-DNA surveys	The key approach to estimate wallaby density is to strategically collect freshly dropped faecal pellets for DNA analysis. Additional methodological details for the 2023 scat collections are provided in Appendix 4.

2.1.20 Monitoring results 2023 to 2024

As the hare-wallabies were last translocated in 2019, we provide an assessment of progress towards the long-term success criteria – noting the short-term and medium-term success criteria were mostly met (Appendix 2).

2.1.20.1 Rufous hare-wallaby

The **long-term success criteria** (3 to 10 years post last translocation) and their status are:

Population size improved from initial release and area of occupancy expanded.

- Based on ad hoc observation, there are likely many more wallabies on the island than originally released, indicating this criterion has been met.
- 835 wallaby faecal pellets were collected in November 2023 with a view to obtaining another density estimate for the species. The faecal pellets have been genotyped to species and 732 individual scat samples were identified as being from RHWs. Of these, individual information was gained from 549 scat samples representing a total of 228 unique RHW individuals (Table 5). Density analyses are still to be conducted but based on raw numbers the RHW abundance has increased dramatically since 2020 at each of the three sites surveyed.
- RHW detections now span the whole island, noting that the IWS camera deployment for the northern part of the island is due in July 2024 and images from the previous deployment are not yet fully processed and as such are not yet represented in Figure 24.
- There have been 5 incidences of roadkill reported since September 2023.

Table 5: Numbers of rufous hare-wallaby individuals detected via faecal pellet analysis at each survey site across three survey years. The number of scats successfully genotyped per site is in parentheses.

Site | Year	2019	2020	2023
Blowholes	9 (33)	14 (30)	80 (165)
Notch Point	-	7 (12)	104 (209)
Herald Bay	-	5 (5)	44 (175)

Health and condition maintained providing non-drought conditions experienced.

- Based upon photographic evidence from remote cameras, condition of road kills and ad hoc observations of animals at night, there does not appear to be any issues with animal condition thus far. This is supported by animals continuing to breed (informed by the same observations described above). More detailed information regarding the condition of individuals is not possible due to live trapping not being an appropriate or effective monitoring method for this species.

Evidence of F2 (and longer) generations, at least 50% of females breeding (depending on climatic conditions).

- Given the expansion of this species across the island and the ongoing observations of breeding, it is clear that there are F2 and/or above generations present. This may be confirmed with genetic information derived from the scat surveys. More detailed information regarding the breeding condition of individuals is not possible due to trapping not being an appropriate or effective monitoring method for this species. A roadkill RHW with a joey was detected in 2024.

Population recovers area of occupancy and density after first drought cycle.

- This criterion is still under assessment.

Genetic variability is maintained at ≥90% of allelic diversity and heterozygosity of released individuals.

- This criterion is still under assessment.

2.1.20.2 Banded hare-wallaby

The **long-term success criteria** (37 to 120 months post last translocation) and their status are:

Population has increased and expanded area of occupancy.

- BHWs have now been detected as far north as Sandy Point indicating that their distribution across the island increased since release. However, compared to RHWs, BHWs are not as readily detected on cameras or seen at night so there is

less information available to confirm how much of that area is now occupied. (Figure 24). 835 wallaby faecal pellets were collected in November 2023 with a view to obtaining another density estimate for the species. The faecal pellets have been genotyped to species and 62 individual scat samples were identified as being from BHWs. Of these, 50 BHW scats were successfully genotyped, from which 39 individuals were identified (Table 6). Density analyses are still to be conducted but based on raw numbers, it appears the BHW population is stable across two of the three survey sites, with only a single detection confirmed in the Herald Bay site. It appears population growth of BHW has not been as rapid or as expansive as RHW.

Table 6: Numbers of banded hare-wallaby individuals detected via scat analysis at each survey site across three survey years. The number of faecal pellets successfully genotyped per site is in parentheses.

Site | Year	2019	2020	2023
Blowholes	15 (41)	23 (47)	19 (25)
Notch Point	-	19 (26)	19 (24)
Herald Bay	-	0 (0)	1 (1)

Body weight and condition maintained, >50% females breeding.

- Based upon photographic evidence from remote cameras and the condition of one road-kill animal, there does not appear to be any issues with animal condition thus far. This is supported by animals presumably continuing to breed, hence ongoing increases of distribution across the island. More detailed information regarding the condition of individuals is not possible due to trapping not being an appropriate or effective monitoring method for this species.
- Analysis of individuals ‘resighted’ across survey years indicates a turnover of individuals between 2020 and 2023 across all sites (data not shown). For example, at the Blowholes site, one individual detected in 2019 still persists in 2023 with remaining individuals (n = 18) sampled for the first time in 2023 (Table 7). Given the high fidelity and small home ranges of BHW, this turnover of individuals may represent evidence of succession (senescence of founders and establishment of new recruits).

Evidence of F2 (and longer) generations.

- Based upon the available information, there are likely to be more BHWs on the island than released up to 5 years ago, indicating that there are at least F2 generations.

Table 7: Numbers of banded hare-wallaby individuals 'resighted' across three survey years at the Blowholes site.

Blowholes	2019	2020	2023
2019	15	10	1
2020	-	13	0
2023	-	-	18

Population recovers area of occupancy and density after the first drought cycle.

- This criterion is still under assessment.

Genetic variability is maintained at ≥90% of allelic diversity and heterozygosity of released individuals 5 to 10 years post release.

- This criterion is still under assessment.

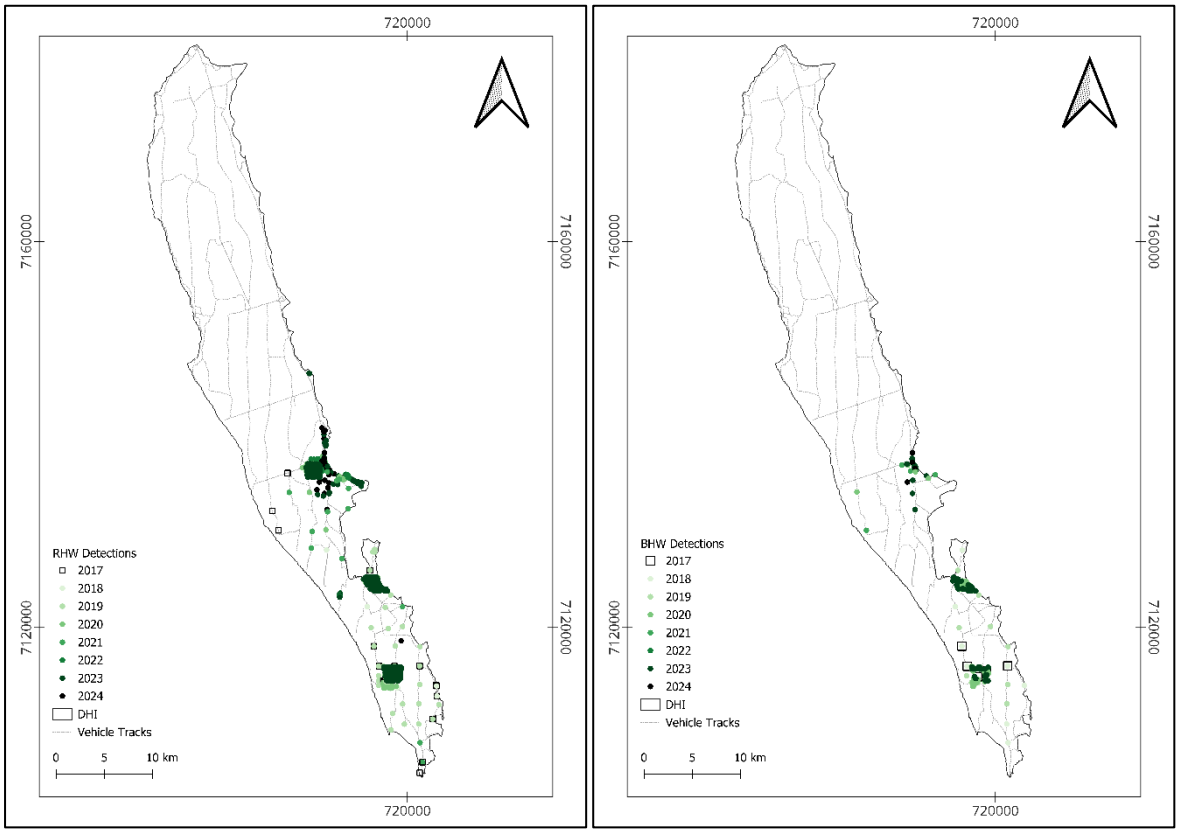

Figure 24: Annual rufous hare-wallabies (RHW; left) and banded hare-wallabies (BHW; right) records (n = 1529 and 347, respectively). Refer to Figure 1 for information regarding general release areas.

2.1.21 Discussion

There is consistent evidence in the form of continued RHW and BHW observational records to indicate that these species are dispersing and establishing on the island. While records for BHW are less numerous, evidence to date suggests ongoing survivorship and expansion north from the release area. As has already been noted, roadkill is likely to become an increasing problem that warrants further consideration in terms of possible management options.

13. General species list

A list of species detected on the island between July 2023 and June 2024 is provided in Appendix 5.

3 General discussion and conclusions

Overall, the results for the 2023 to 2024 period were positive. With the exception of dibblers, there is good evidence that the translocated species are generally establishing, breeding, and dispersing from their release areas. There were no significant indications of any animal health and welfare issues and an additional species, BTM was re-introduced to the island. Two more, and final, dibbler supplementations were also conducted. Success criteria are largely being met (with those not currently being met generally due to a lack of robust data rather than evidence of failure) indicating overall program success in terms of fauna reconstruction.

Several species present monitoring challenges that will be the focus of research over the next few years. For example, the use of faecal pellets DNA sampling for GSNR is being investigated. A scat and track guide has been proposed, and an assessment of interest in and feasibility of a scat/track species recognition phone App (that harnesses AI technologies) will be investigated. If desired, feasible and effective, the App would open the monitoring of species up to citizen involvement, further building people’s knowledge and valuing of the island and its wildlife. An initial assessment will also be made of the feasibility of using e-DNA (possibly collected from flies such as midges, mosquitos, water, or sand) to detect mammal species on the island.

4 Planning for 2024-2025

14. Translocations

- Woylie

15. Monitoring

- If viable, a radio-tracking network of temporary towers will be installed for woylies, boodies, and chuditch.
- Targeted trapping for woylies, SBM, BTM (with likely associated monitoring of SBB and SBM plus possible captures of dibblers and GSNRs).
- Visual/aural occupancy monitoring of WGW.
- Island-wide camera monitoring plus targeted camera monitoring of WGW and dibbler.
- Continued assessment of e-DNA/i-DNA in 2024 with the intention of trials in 2025.

16. Genetic analyses

- SBB, SBM and GSNR genetic diversity assessments.
- Development and validation of GSNR SNP array and faecal pellet DNA monitoring protocols.
- Density estimates of GSNR based on faecal pellet DNA analyses
- RHW and BHW founder diversity assessment

17. Future monitoring

- Continued use of camera, cage, and Elliott tapping.
- Continued redeployment of WildTrack units.
- Continued research into viability/effectiveness of e-DNA/i-DNA monitoring for mammals.
- Continued development of track monitoring approaches.

References

Algar, D., Morris, K., Asher, J., Cowen, S., 2020. Dirk Hartog Island 'Return to 1616' Project – The first six years (2014 to 2019). Ecol. Manag. Restor. 21, 173–183. https://doi.org/10.1111/emr.12424

Australian Wildlife Conservancy, 2024. Pilliga. Western Barred Bandicoot (*Perameles bougainville*) Reintroduction Update: January 2024. Australian Wildlife Conservancy, Perth, Western Australia.

Australian Wildlife Conservancy, 2023. Translocation proposal for the Western Barred Bandicoot (*Perameles bougainville*) to NSW. Australian Wildlife Conservancy, Perth, Western Australia.

Cowen, S., Rayner, K., Sims, C., 2021. Dirk Hartog Island National Park Ecological Restoration Project: Stage Two - Year Three Translocation and Monitoring Report. Department of Biodiversity, Conservation and Attractions, Perth, WA.

Cowen, S., Rayner, K., Sims, C., Friend, T., Knox, F., Ottewell, K., Gibson, L., 2020. Dirk Hartog Island National Park Ecological Restoration Project: Stage Two - Year Two Translocation and Monitoring Report. Department of Biodiversity, Conservation and Attractions, Perth, WA.

Cowen, S., Rayner, K., Sims, C., Van der Weyde, L.K., 2022. Dirk Hartog Island National Park Ecological Restoration Project: Stage Two - Year Four Translocation and Monitoring Report. Department of Biodiversity, Conservation and Attractions, Perth, WA.

Cowen, S., Van der Weyde, L.K., Smith, M.J., Rayner, K., Vega Gibson, A., Sims, C., 2023. Dirk Hartog Island National Park Ecological Restoration Project. Stage Two – Year Five Translocation and Monitoring Report. June 2022 to June 2023. Department of Biodiversity, Conservation and Attractions, Perth, Western Australia.

Department of Biodiversity, Conservation and Attractions, 2024. Wildlife survey of northern airstrip and surrounding birrida on Wirruwana, Dirk Hartog Island. Department of Biodiversity, Conservation and Attractions, Perth, Western Australia.

Department of Biodiversity, Conservation and Attractions, 2023. Dirk Hartog Island National Park Ecological Restoration Project: Stage Two - Year Five Translocation and Monitoring Report. Department of Biodiversity, Conservation and Attractions, Perth, WA.

Dupont, G., Royle, J.A., Nawaz, M.A., Sutherland, C., 2021. Optimal sampling design for spatial capture–recapture. Ecology 102, e03262. https://doi.org/10.1002/ecy.3262

Rayner, K., Smith, M.J., Cowen, S., Burbidge, A.A., In preparation. A trial occupancy survey to monitor reintroduced Western Grasswrens (*Amytornis textilis textilis*) translocated to Dirk Hartog Island. Department of Biodiversity, Conservation and Attractions, Perth, Western Australia.

Appendices

Appendix 1: Additional BTM release information

BTM translocation

In 2023, 100 BTM were translocated to the island from Matuwa Kurrara Kurrara National Park. All individuals were adults and were released in the Louisa Bay area (Figure 1). No pouch young were translocated. 51 individuals (20 females and 11 males) were translocated on the 21 June 2023, 40 individuals (20 females and 20 males) on the 23 June 2023 and 29 individuals (20 females and 9 males) on the 24 June 2023.

Most individuals were released as pairs at a site with one of four different strategies (Figure 25): 48 individuals were released from their travel box, 22 individuals were released into a habitat pipe, 22 individuals were released from their travel box which was positioned next to a habitat pipe and 8 individuals were released into a 2.4 m by 2.4 m soft release pen with a netted roof to stop aerial predation. 12 individuals (6 males and 6 females) were released with radio collars. Habitat pipes and soft release pens were described by Cowen et al. (2022). Animals were fed a mixture of live mealworms, mince and rat pinkies.

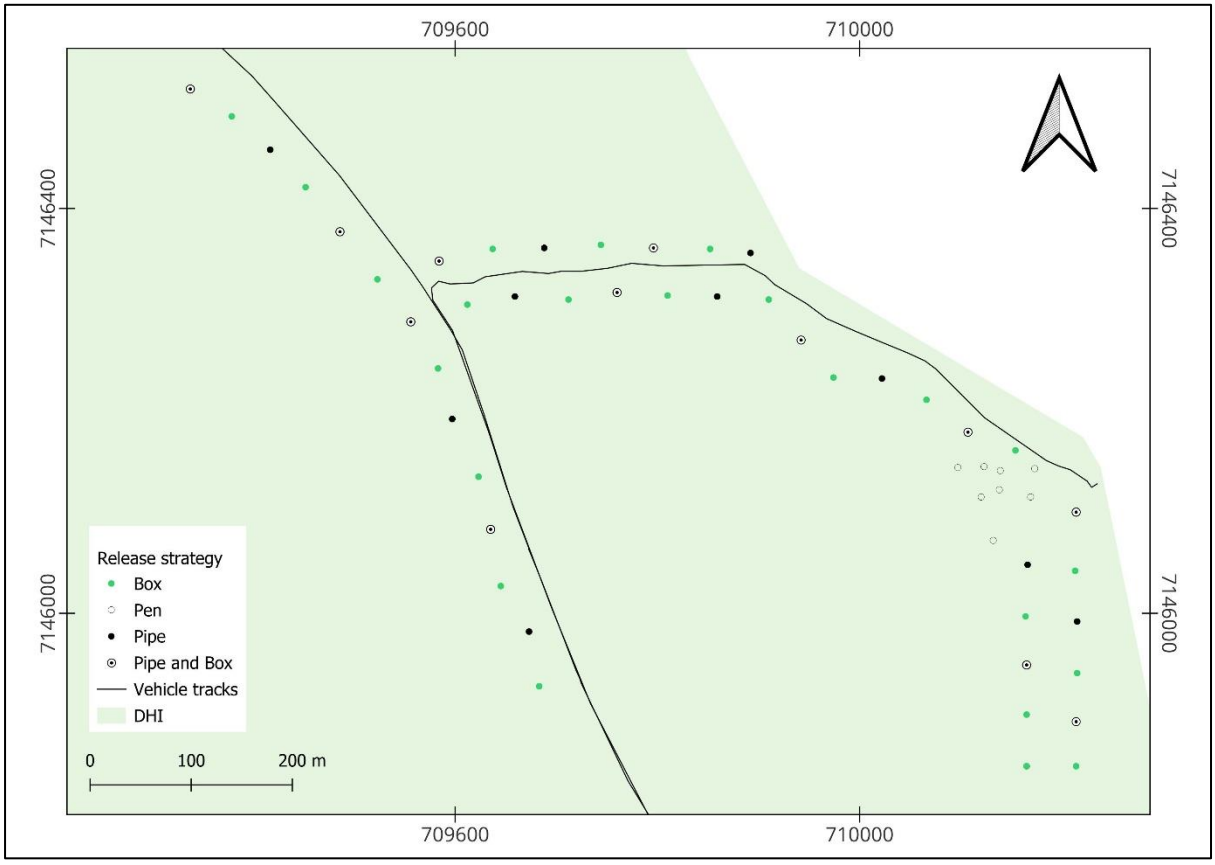

Figure 25: Brush-tailed mulgara (BTM) release locations and approach.

BTM trapping (2023)

Elliott traps were deployed in June and July 2023 (Table 8) as per Figure 2, to capture and assess the status of the translocated individuals and to remove their collars. Twelve individuals were trapped.

Table 8: 2023 brush-tailed mulgara collar trapping results. Cell contents are weight (g). d Individuals in bold were collared.

Individual	25-Jun	26-Jun	30-Jun	19-Jul	20-Jul	21-Jul	22-Jul	27-Jul
956000013350892						59		
956000014450094		69						
956000014452928								55
956000014455108	53							
956000014981802							63	
956000014982348							72	
956000014982779		87		55	57			
956000015805985	70		67					
956000015835267	78		83					
956000015972630	101		104					
956000015973363		99						
956000015974975							61	

Appendix 2: Completed or not yet addressed success criteria

Brush-tailed mulgara

Criteria	Assessment	Evidence
Long-term (> 24 months)		
Area of occupancy increased or dispersal of recruits > 5 km from release area as confirmed through monitoring methods like camera surveys, track and scat surveys, trapping or PIT-tag readers at 4- and 7-years post release.	TBD	
Population size (consistent in either occupancy, abundance, density or activity rates) has increased from original founder population size after 5 years (in absence of drought conditions).	TBD	
Evidence of F2 or later generations (as defined by new individuals) or reproductive activity after 5 years post release.	TBD	
Genetic diversity remains high (>90% allelic richness and >95% heterozygosity of founder group) with analysis confirmed by 7 years post-release.	TBD	

Shark Bay mouse

Criteria	Assessment	Evidence
Short-term (< 6 months)		
No more than 30% known mortality of ratio-tagged animals at the end of radio-tag life.	Successful	April 2021 release: • 12 animals collared. • 33% mortality. April-May 2022 release: • 12 animals collared. • 0.08% mortality. Overall mortality = 0.17%
Monitoring as measured by trap, track or camera surveys indicates continued survivorship of founder cohort for first 3 to 6 months and founders settle within an area indicating suitable habitat is being occupied.	Successful	Trapping at the 1st release area in September 2021 resulted in the capture of seven founders. Trapping at the 1st release area in May 2022 resulted in the capture of four founders. Trapping at the 2nd release area in September 2022 resulted in the capture of one founder. Trapping at all sites, on all occasions yielded new recruits indicating that founders had survived and settled in the area long enough to reproduce successfully.
No cause(s) of mortality which are unidentified or unable to be ameliorated.	Successful	All causes of mortality were presumed due to predation, however it is possible animals died from another cause first before being consumed by a predator: • In 2021, 3 individuals (collars) located in snake faecal pellets, and one located in the open with evidence typical of a raptor meal. • In 2022, one individual found dead in circumstances consistent with how butcherbirds store their prey.
Recaptured founders have maintained or increased bodyweight (after initial weight loss expected during translocation process).	Successful	2021 • Mean weight loss of collared animals was 24% • Mean weight loss of uncollared individuals was 12%. 2022 • Mean weight gain (across 7 individuals) 20 days post translocation was 3.9%.

Greater stick-nest rat

Criteria	Assessment	Evidence
Short-term (< 6 months)		
At least 70% of founder animals KTBA one to two months after release and monitoring indicates continued survivorship of animals for the next three to six months.	Successful	• After approximately one month post release, 67% of individuals collared during the 2021 release were alive when their collar was removed and 20% of collared individuals had shed their collars in circumstances indicating the animal was still alive (e.g. evidence of communal grooming). Thus, around 87% of collared individuals were known to be alive within 1 to 2 months post release. • Nine camera detections were made at protonest sites around one month post the 2021 translocation. • 77% of radio-tracked individuals from the May 2022 release were alive after four to five weeks post release. • Trapping in September 2021 (≈ five months post release) resulted in the capture of six individual GSNRs (3M:3F), of which five were founders. • Trapping in September 2022 at the second release site (≈ five months post release) resulted in the capture of eight individual GSNRs, of which five were from the 2022 release.
No significant causes of mortality which are unidentifiable and unable to be ameliorated	Successful	The known mortalities of collared individuals (14% of all collared individuals across both releases) was believed likely to be predation by birds and reptiles. The team at the time treated 14% as not significant as this level of predation still supports the survival of 70 % of founder animals as identified in first criterion.
Founders have maintained or increased bodyweight (after initial weight loss (<15%) expected during translocation process)	Successful	2021 post release: The average weight change of the 11 individuals whose collars were removed was -1.4%, noting that 55% of individuals increased in weight. 2022 post release: The average weight change of the 10 individuals whose collars were removed was +9.1%. Total average across all collared individuals from both years was 3.6% weight gain. Five founders trapped in September 2021 had an average weight gain of 6.8% with 60% of individuals increasing in weight.
Founders settle within an area and use daytime refuges/shelter, which may include constructed stick nests by females, use of hollows, rock caves and crevices, burrows and dead wood piles indicating suitable habitat is being occupied	Successful	GSNRs maintained activity around the protonests used at their release sites, indicating they 'settled in' and are using substrates in the immediate area.

Dibbler

Criteria	Target	Measure of success (Triggers for action and/or review)	Success	Evidence
Short-term: 0-12 months post-release				
Survivorship of founders	Dibblers continue to be detected at least 12 months post-release	Dibblers recorded at ≥50% of soft-release/nest-box camera sites ≥10 days post-release.	Successful	78% of cameras located at pens and nest box in 2021 recorded dibbler activity for more than 10 days post release.

		Dibblers recorded at ≥25% of soft-release/nest-box camera sites ≥60 days post-release.	Successful	56% of cameras located at pens and nest box in 2021 recorded dibbler activity for more than 60 days post release.
		Dibblers recorded at lured and soft-release/nest-box camera sites at least 12 months after release.	Successful	19% of cameras located at pens and nest box in 2021 recorded dibbler activity for more than 330 days post release.
Health of founders	Founder animals maintain health and condition	Maintenance or increase in body weight and condition at 7 and 12 months compared to initial release.	Successful	Female trapped in May 2021 (≈ 8 months post release) increased in weight by 63% (noting she was carrying pouch young and was released as a subadult).
		Stabilisation or increasing body weight of animals released into 'soft release' pens, prior to opening of pens (~10-14 days).	Successful	In October 2021, all but one pen released dibbler lost weight over a 9-day period. In October/November 2022, pen released dibblers experienced an average weight loss of 5.57% over an average of 8 days. However, animal weight 'stabilised', thus meeting the criteria
Genetic diversity of founders	Sufficient numbers of animals are released to maximise genetic diversity on WDHI (as determined by PVA)	>95% allelic diversity has been conserved during captive breeding	TBD	
Reproduction by founders	Some evidence of successful breeding	≥50% of trapped founder females produce pouch young 7 months after initial release.	Successful	Only female capture in May 2021 trapping was a founder with 8 pouch young and was caught again in 2022 with 6 pouch young. Only female captured in May 2023 trapping was a non-founder adult carrying 8 pouch young.
		Juveniles trapped or recorded by camera traps within 12 months of initial release.	TBD	No juveniles have been trapped, but pouch young have been trapped twice and one island born individual has been captured as a breeding adult. Juveniles have been captured on camera, but juveniles were released on several occasions, making it impossible to differentiate new juveniles from released ones without trapping them.

Western grasswren

Criteria	Assessment	Evidence
Short-term (< 6 months)		
≥80% survival (or ≤20% mortality) of radio-tagged individuals (with known outcomes) (30 days post-release).	Successful	No individuals were tracked for 30 days, but of the 25 animals tracked (average of 13 days ± 6 days SD) there was only one confirmed mortality.
≥50% radio-tagged individuals settle within areas of suitable habitat in proximity to release area (30 days post-release).	Successful	All tracked birds were still within the greater release area at completion of their tracking period (<1.6km)
Founders continue to be seen or heard calling/singing AND/OR interacting socially with other conspecifics (2 months post-release).	Successful	ARU information indicated birds were singing as recently as March 2023; five months post release (most recent data analysis)
No significant causes of mortality which are unidentifiable and unable to be ameliorated (6 months post-release).	Successful	Only one known cause of mortality of a tracked bird which appeared to be predation, but predator unknown.

Long-term success criteria		
Population has increased and continued to expand extent of occurrence to at least twice that initially occupied by the founder group (4 years post-release).	TBD	
F1 generation birds confirmed to be alive and successfully reproducing (4 years post-release).	TBD	
Population persists and recovers their area of occupancy and density after a first 'drought' cycle (~10 years post-release).	TBD	
Genetic variability (allelic richness and heterozygosity) maintained at ≥90% of released individuals at five- and 10-years post-release (alternative criteria may be developed based on deviations of genetic diversity from a mean value) (5- and 10-years post-release).	TBD	
Genetic analysis indicates successful interbreeding between founders from Peron and Hamelin subpopulations (5- and 10-years post-release).	TBD	

Shark Bay bandicoot

Criteria	Assessment	Evidence
Short-term (0 - 6 months)		
At least 60% of founder animals known to be alive (KTBA) one-two months after release (based on radio-tracking and/or live-capture) and monitoring indicates continued survivorship of animals for the next four to seven months	Successful	100% survival of radio-tracked individuals released in 2019 and 2020 survived for 1 to 2 months post release.
No cause(s) of mortality which are unidentified and unable to be ameliorated	Successful	No mortality of radio-tracked individuals from 2019 and 2020 releases
Founders have maintained or increased bodyweight (after initial weight loss (<15%) expected during translocation process)	Successful	Average weight gain of recaptured founders after 6 months or more post release was 50.9 g (54.0 SD)
Founders settle within an area and use daytime refuges/shelter, indicating suitable habitat is being occupied	Successful	The species has survived, reproduced, colonised the release area and has dispersed both north and south.
No evidence of significant founder survival compromised by expression of BPCV1	Successful	To date, no cases of BPCV1 have been detected
Medium-term (6 - 24 months)		
Continued survivorship of founders (< 20% identified mortality of founders and > 50% of those alive at 7 months still known to be alive (KTBA) at 12 months)	Successful	Of the 14 animals known to be alive after 7 months, 11 (or around 79%), were recaptured after the 12-month mark post release.
Founder population has established and expanded habitat used	Successful	The founder population has clearly dispersed and established in new areas of the island. Not possible to determine if this is expanding habitat use, as habitat in new areas has not been qualified or compared to habitat in release area.
Evidence of reproduction (presence of pouch young) and successful recruitment of new F1 individuals into population	Successful	The species is clearly reproducing, recruiting and F1 if not F2 and F3 individuals are likely in the population.
Dispersal of new recruits and increasing activity (as measured by trap, track, spotlight or camera surveys)	Successful	The founder population has clearly dispersed and reproduced, as have island born individuals.
Expansion of the area of occupancy of initial founder group	Successful	The species has clearly expanded its area of occupancy from the initial release area.

Rufous hare-wallaby

Criteria	Assessment	Evidence
Short-term (0 - 9 months)		
At least 50% of the radio-collared, released hare-wallabies survive for the first four months after release.	Successful	In the 2017 trial release, 75% of collared individuals were known to be alive after 4 months post release. In the 2018 release, 83% of collared individuals were known to be alive after 4 months post release.
Any causes of mortality are understood and ameliorated.	Successful	In the 2017 trial release, one individual collared was known to have died, probably from myopathy. An individual was killed by a car in 2019. A second individual released in 2019 was found dead >6 months post release but the cause of the mortality identified could not be identified due to the level of decomposition. It was concluded that the mortality was not related to the actual translocation. Actions (reduced transport time through changed transport method) were taken in 2019 & 2020 to reduce risks associated with capture myopathy observed in 2017.
Founders have maintained or increased bodyweight, condition maintained.	NA	This is criterion cannot be assessed properly for this species using current monitoring techniques, but noting that in the 2017 and 2018 trial release, the weights of recaptured RHW had increased from time of collaring, although few had reached their original capture weight.

Some evidence of successful recruitment of those that may have been larger pouch young when translocated.	Successful	The number of animals on the island is now greater than the released population, indicating recruitment. Also, wallabies with large pouch young and young-at-heal continue to be observed and captured on camera.
Medium-term (10 - 36 months)		
Population has established and expanded habitat is used.	Successful	Individuals are now being recorded across the island.
Body weight and condition are maintained.	NA	This is criterion cannot be assessed properly for this species using current monitoring techniques. However, given the condition of road kills and ongoing observations of reproduction, along with the appearance of animals physically observed or captured on camera indicates animals are in good condition
Further evidence of successful reproduction; presence of pouch young, or F1 generation (from females with large pouch young when translocated).	Successful	Individuals with enlarged pouches and young-at-heal continue to be seen and captured on camera.
Hare-wallabies are recorded during spotlight and/or trapping monitoring sessions.	Successful	Scat DNA sampling being employed to monitor this species. Targeted spotlight and trapping sessions have not been used to monitor this species; however, animals are recorded anecdotally in weekly incidentals tallies during fieldwork periods and are regularly captured on remote camera.

Banded hare-wallaby

Criteria	Assessment	Evidence
Short-term (0 - 9 months)		
At least 50% of the radio-collared, released hare-wallabies survive for the first four months after release.	Successful	In the 2017 trial release, 100% of collared individuals were known to be alive after 4 months post release. In the 2018 release, 83% of collared individuals were known to be alive after 4 months post release.
Any causes of mortality are understood and ameliorated.	Successful	No known mortalities
Founders have maintained or increased bodyweight, condition maintained.	Successful	In the 2017 trial release, the weights of recaptured hare-wallabies decreased. In the 2018 release, recaptured wallabies (after around 9 and 12 weeks) regained lost weight. Some of the weight loss observed can be attributed to the natural weight loss over summer associated with this species.
Some evidence of successful recruitment of those that may have been larger pouch young when translocated.	Successful	Some recaptured wallabies had pouch young and young-at-foot were recorded
Founders settle within an area and use daytime refuges/shelter		Radio-collared animals settled within individual areas during the initial radio-tracking period (< 3 months), remaining in those areas until collars were retrieved (~ 9 months post release). Based on survivorship and attempts to recapture collared animals, available shelter and refuges were being utilised to great affect by BHW.
Medium-term (10 - 36 months)		
Continued survivorship of founders, >50% of those alive at 9 months still alive at 15 months	NA	Cannot be measured
Population has established and expanded habitat is used.	Successful	Individuals continue to be recorded and scat monitoring indicates establishment. The expanded habitat cannot be confirmed however, the area of occupancy has increased with animals observed and captured on camera as far north as Sandy Bay in 2023-2024.
Body weight and condition are maintained (within release data variation and taking into account climatic conditions)	NA	Cannot be measured
Further evidence of successful reproduction; presence of pouch young, or F1 generation (from females with large pouch young when translocated), >50% of surviving	Successful	The only individual in hand since collars were removed in 2019 was a road-kill male in 2023, which did not have a PIT tag indicating it was F1 or later. Given the ongoing presence and expanding distribution of this species, successful reproduction can be implied. To which generation individuals

founder females produce PY within 24 months, Young at heal/independent young recorded.		in the population below may be ascertained by genetic information from faecal pellets.
Hare-wallabies are recorded during spotlight and/or trapping monitoring sessions.	Successful	Scat DNA sampling is being employed to monitor this species. Targeted spotlight and trapping sessions have not been used to monitor this species; however, animals are captured sporadically on remote camera.

Appendix 3: SBB trapping in September 2023 and May 2024

Shark Bay bandicoots were targeted for trapping in the Herald Bay area from 26-30 September 2023 and 15-18 May 2024 with 130 and 180 trapping sites, respectively (Figure 26).

In September 2023, each site consisted of one small cage trap, each with a universal lure. Traps were checked multiple times each night.

In 2024, each site consisted of one cage trap and one Elliott trap. Cage traps were lured with standard universal lure and Elliott traps with universal lures supplemented with cat food.

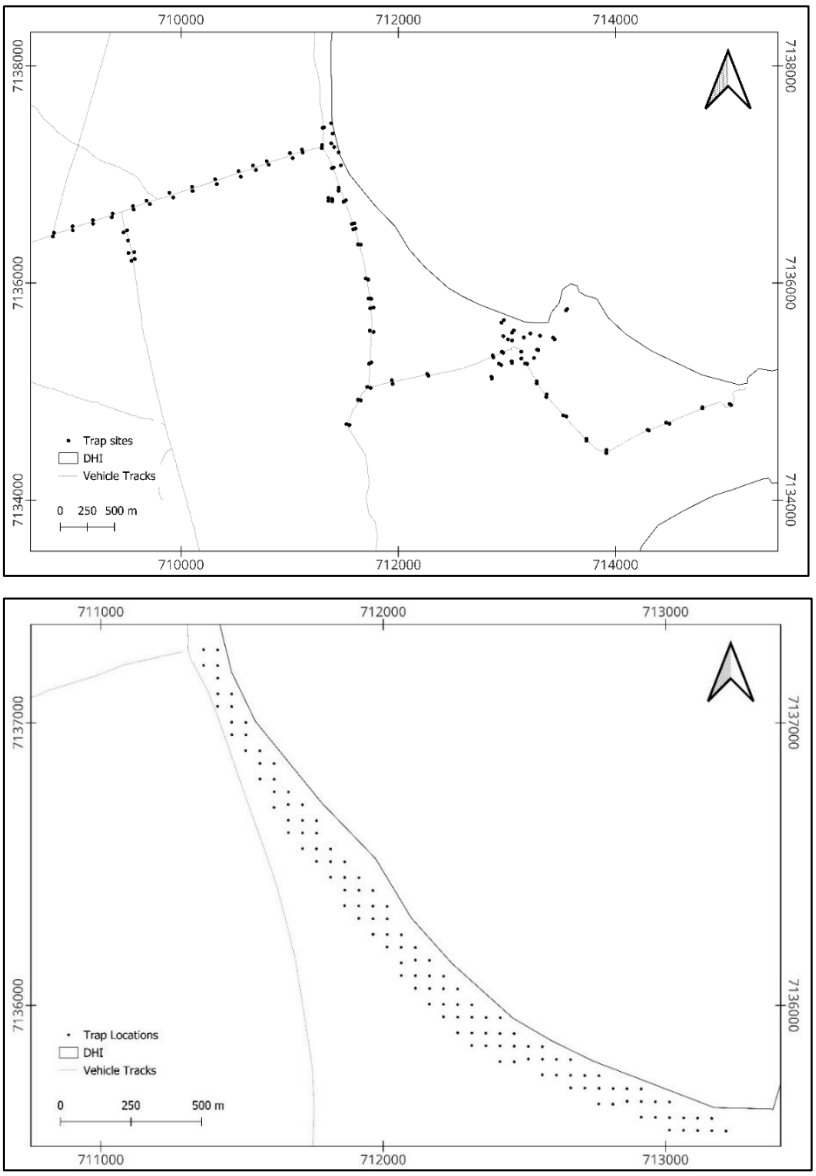

Figure 26: Location of trapping sites for Shark Bay bandicoots (SBB) in September 2023 (top) and in May 2024 (bottom).

Appendix 4: Additional methodological details for the 2023 hare-wallaby faecal pellets collection

Hare-wallaby faecal pellet transects (Figure 27) walked from the2-8 November 2023. Faecal pellets were collected as per Cowen et al. (2021).

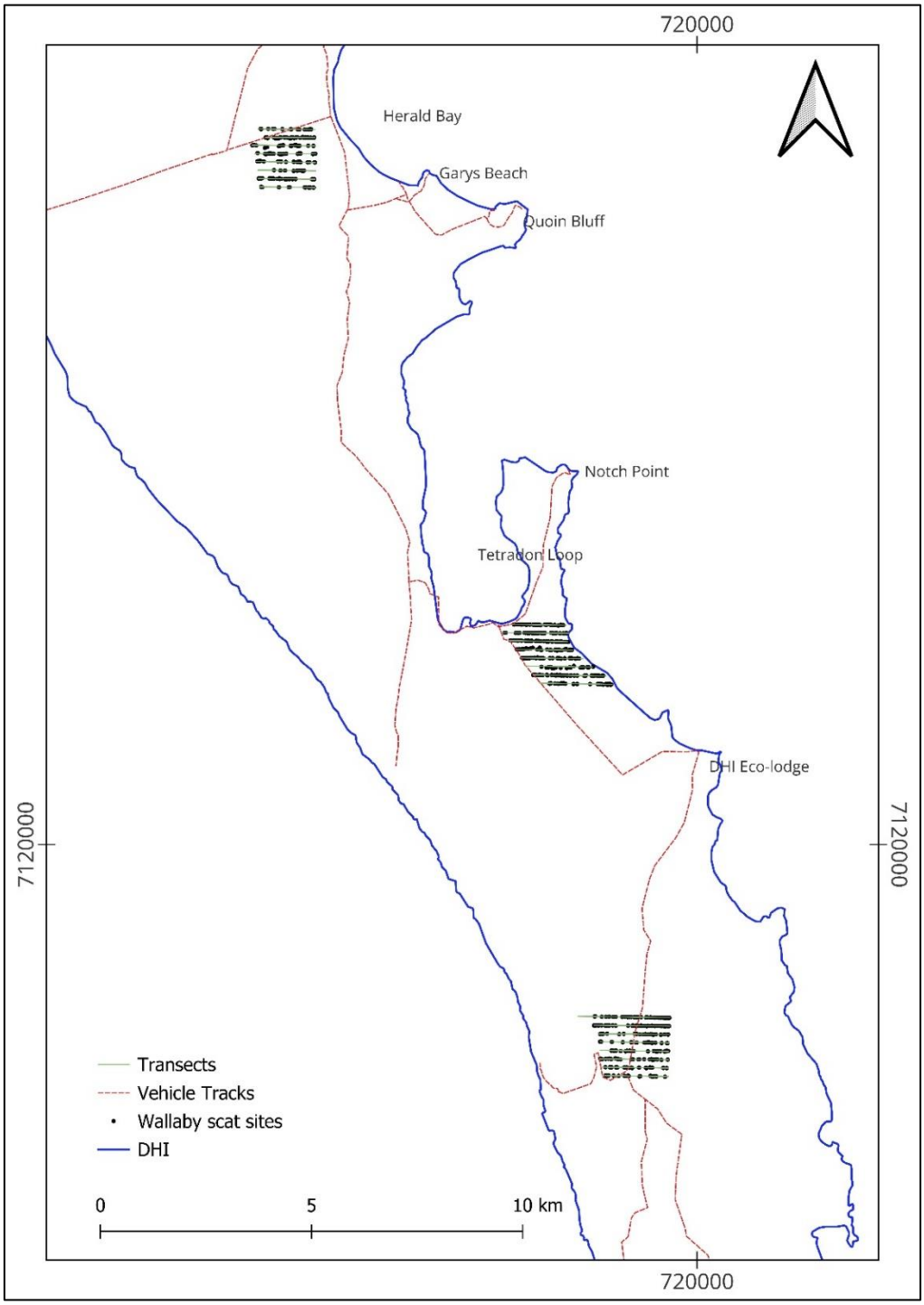

Figure 27: Transects walked to survey for banded-hare wallaby (BHW) and rufous hare-wallaby (RHW) faecal pellets. Black dots indicate faecal pellets collection sites.

Appendix 5: Species list for July 2023 to June 2024

Common name	Scientific name
Ash-grey Mouse	*Pseudomys albocinereus*
Australasian Gannet	*Sula serrator*
Australian Bustard	*Ardeotis australis*
Australian Kestrel	*Falco cenchroides*
Australian Pelican	*Pelecanus conspicillatus*
Australian Pipit	*Anthus australis*
Banded Hare-wallaby	*Lagostrophus fasciatus*
Banded Lapwing	*Vanellus tricolor*
Barking Gecko	*Underwoodisaurus milii*
Barn Owl	*Tyto alba*
Bar-tailed Godwit	*Limosa lapponica*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
Black-faced Woodswallow	*Artamus cinereus*
Black-shouldered Kite	*Elanus caeruleus*
Black-winged Stilt	*Himantopus himantopus*
Bobtail	*Tiliqua rugosa*
Bottlenose Dolphin	*Tursiops truncatus*
Brown Falcon	*Falco berigora*
Brown Goshawk	*Accipiter fasciatus*
Brown Quail	*Coturnix ypsilophora*
Brush-tailed Mulgara	*Dasycercus blythi*
Bungarra or Sand Monitor	*Varanus gouldii*
Burton's Snake-lizard	*Lialis burtonis*
Bynoe's Gecko	*Heteronotia binoei*
Common Greenshank	*Tringa nebularia*
Common Sandpiper	*Actitis hypoleucos*
Crested Tern	*Sterna bergii*
Dibbler	*Parantechinus apicalis*
Dirk Hartog Is. White-winged Fairy-wren	*Malurus leucopterus leucopterus*
Dugong	*Dugong dugon*
Dwarf Bearded Dragon	*Pogona minor*
Eastern Great Egret	*Ardea modesta*
Eastern Reef Egret	*Ardea sacra*
Fan-tailed Cuckoo	*Cacomantis flabelliformis*
Great Egret	*Ardea alba*
Great Knot	*Calidris tenuirostris*
Greater Sand Plover	*Charadrius leschenaultii*
Greater Stick-nest Rat	*Leporillus conditor*
Green Turtle	*Chelonia mydas*
Grey Butcherbird	*Cracticus torquatus*
Grey-breasted White-eye	*Zosterops lateralis*
Grey-tailed Tattler	*Tringa brevipes*
Horsfield's Bronze Cuckoo	*Chrysococcyx basalis*
House Mouse	*Mus musculus*
Humpback Whale	*Megaptera novaeangliae*

Indo-Pacific Bottlenose Dolphin	*Tursiops aduncus*
Laughing Turtle-Dove	*Streptopelia senegalensis*
Lesser Crested Tern	*Sterna bengalensis*
Little Crow	*Corvus bennetti*
Little Egret	*Ardea garzetta*
Little Woodswallow	*Artamus minor*
Mulga Snake	*Pseudechis australis*
Ornate stone gecko	*Diplodactylus ornatus*
Osprey	*Pandion haliaetus*
Pacific Gull	*Larus pacificus*
Peaceful Dove	*Geopelia striata placida*
Péron's snake-eyed skink	*Cryptoblepharus plagiocephalus*
Pied Cormorant	*Phalacrocorax varius*
Pied Oystercatcher	*Haematopus longirostris*
Red-capped Plover	*Charadrius ruficapillus*
Red-necked Avocet	*Recurvirostra novaehollandiae*
Red-necked Stint	*Calidris ruficollis*
Ruddy Turnstone	*Arenaria interpres*
Rufous Fieldwren (Dirk Hartog Is)	*Calamanthus campestris hartogi*
Rufous Hare-wallaby	*Lagorchestes hirsutus*
Sacred Kingfisher	*Todiramphus sanctus*
Sandy Inland Mouse	*Pseudomys hermannsburgensis*
Shark Bay Bandicoot	*Perameles bougainville*
Shark Bay Heath Dragon	*Ctenophorus butlerorum*
Shark Bay Mouse	*Pseudomys fieldi*
Silver Gull	*Larus novaehollandiae*
Singing Honeyeater	*Gavicalis virescens*
Smooth Knob-tailed Gecko	*Nephrurus levis*
Sooty Oystercatcher	*Haematopus fuliginosus*
Southern Emu Wren (Dirk Hartog Is)	*Stipiturus malachurus hartogi*
Spotted Military Dragon	*Ctenophorus maculatus*
Spotted Nightjar	*Eurostopodus argus*
Stimson's Python	*Antaresia stimsoni*
Tree Martin	*Hirundo nigricans*
Variegated Dtella	*Gehyra variegata*
Wedge-tailed Eagle	*Aquila audax*
Welcome Swallow	*Hirundo neoxena*
West Coast Worm-slider	*Lerista praepedita*
West-coast Laterite Ctenotus	*Ctenotus fallens*
Western Grasswren	*Amytornis textilis textilis*
Western limestone ctenotus	*Ctenotus australis*
Western Slender Blue-tongue	*Cyclodomorphus celatus*
Whimbrel	*Numenius phaeopus*
White-bellied Sea-Eagle	*Haliaeetus leucogaster*
White-browed Scrubwren	*Sericornis frontalis*
White-faced Heron	*Ardea novaehollandiae*
White-fronted Chat	*Epthianura albifrons*
White-winged Triller	*Lalage tricolor*

Willie Wagtail	*Rhipidura leucophrys*
Zebra Finch	*Taeniopygia guttata*