Field trip report: Dampier Archipelago, 16–23 June 2014

Judy Dunlop, Julia Lees, John Angus, Sean Garretson

Science and Conservation Division

Pilbara northern quoll ecology and monitoring project

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Department of Parks and Wildlife

Department of Parks and Wildlife
Locked Bag 104
Bentley Delivery Centre WA 6983
Phone: (08) 9219 9000
Fax: (08) 9334 0498

www.dpaw.wa.gov.au

This report was prepared by Judy Dunlop and Julia Lees.

Science and Conservation Division
Department of Parks and Wildlife
Locked Bag 104
Bentley Delivery Centre WA 6983

Cover image: Dolphin Island. Judy Dunlop/Department of Parks and Wildlife

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Objectives

- To monitor the northern quoll population on Dolphin Island as part of the northern quoll regional monitoring program.
- To survey for introduced species (particularly black rats, foxes and feral cats) on islands in the eastern part of the Dampier Archipelago.

Summary of Results

NORTHERN QUOLL MONITORING:

- Trapping for northern quolls using standard monitoring protocols resulted in 45 captures of 22 individual quolls (9 F, 13 M) captured in 200 trap nights.
- Quolls were in very good condition, probably in response to the recent fire regrowth, which has potentially provided additional foo resources.
- One captured female was at least 2.5 years old (first chipped in 2012)

BLACK RAT SURVEY:

- Baited paired remote cameras (48 camera-nights) on Legendre Island detected pale field rats *Rattus tunneyi,* but no black rats *R. rattus*. Six bird species and one varanid were also detected.
- Elliott trapping (60 trap-nights) on Legendre Island in a separate location, captured 19 native pale field rats and zero black rats.
- Elliott trapping on Collier Rocks 1 and 2 (10 trap nights at each site) captured 8 black rats on Collier 1 and 1 black rat on Collier 2. A specimen from each island was taken for the WA Museum. No pale field rats were detected on these islands.

CAT/FOX SURVEY:

- Opportunistic track and scat searches on several beaches on Dolphin Island, Legendre Island and Collier Rocks revealed no evidence of cats or foxes.
- No cats or foxes were detected from 100 camera-nights at the north end of Dolphin Island.

OPPORTUNISTIC SPECIES DETECTION:

- Other vertebrate species records from the 8 days are listed here, including 45 bird, six mammal and four reptile species.

1 Introduction

Dolphin Island, off the Burrup Peninsula Western Australia, supports the Pilbara's only island population of northern quolls. Although foxes have been detected on the island in the past (tracks sighted in 2012 and 2013), it currently appears to remain feral cat free (DEC, 2013; DPaW, 2014), making it an important refuge population for this endangered species. Previous survey efforts have revealed a healthy population of quolls that appears to be at greater density than the majority of Pilbara mainland sites. This insular population has been shown to have a reduced genetic variability compared to the Pilbara mainland population (Spencer *et al*., 2013), consistent with separation from the mainland approximately eight thousand years ago (McDonald and Veth, 2009). The Dolphin Island quoll population is of particular importance to the regional monitoring program because of its isolation from the mainland, differing threatening processes and relatively high population density.

As is the case for many of Australia's islands, the protection provided by separation from the mainland makes them important refuges for many species. The Dampier archipelago has been recognised for its important turtle nesting beaches and seabird diversity (Richardson *et al*., 2007). The land status of islands in the archipelago varies; Legendre (the only limestone island in the Dampier Archipelago, and WA's second largest island of this geology) is not currently protected by the A-Class Reserve status encompassing the other islands in the archipelago. Invasive rodents such as the black rat (*Rattus rattus*), brown rat (*Rattus norvegicus*) and Pacific rat (*Rattus exulans*) are known to have significant negative effects on seabird nesting success as well as changing native flora and fauna communities. Surveys in previous years have identified black rats on several islands in the Dampier archipelago.

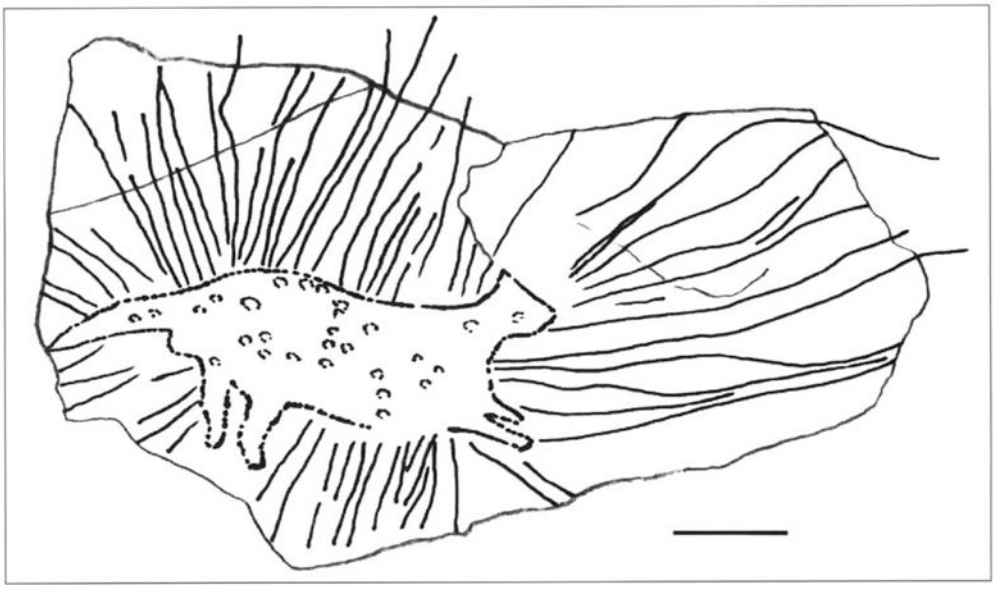

Figure 1. Quadruped petroglyph possibly depicting a northern quoll, from Paterson Valley on the Burrup Peninsula. From Mulvaney (2009)*.*

'Ngarda-Ngarli' is the term which local Aboriginal people use to refer to themselves; this includes the Ngarluma, Yaburara, Mardudhunera, Yindjibarndi and Wong-goo-tt-oo people. To Ngarda-Ngarli the Burrup Peninsula and islands in the Dampier archipelago retain intense cultural significance and feature tens of thousands of petroglyphs, stone arrangements and other artefacts. In 2013, the Burrup Peninsula was declared to be the new Murujuga National park, WA's first national park to be formally jointly managed. The national park is jointly managed with the Murujuga Aboriginal Corporation whose ranger group perform regular patrols and works both within the national park and the wider Dampier Archipelago. Although the Murujuga national park borders are within the Burrup peninsula, Ngarda-Ngarli see the whole Dampier Archipelago as Murujuga land and sea country which is rich in living culture and culturally connected to them. Strong cultural values include relevant faunal assemblages, as indicated by the high proportion of animal motifs engraved in the rocks (McDonald and Veth, 2009). These include motifs that have been interpreted as the formerly widespread but now extinct thylacine (*Thylacinus cynocephalus*). Other motifs include fish, birds and bird tracks, macropods and spotted quadrupeds possibly representing northern quolls (see Figure 1, from Mulvaney, 2009). Our work on these islands focuses on preserving and informing the valuable environmental and cultural significances of the area.

2 Methods

2.1 Quoll trapping

Trapping for northern quolls was undertaken according to the regional monitoring methods (Dunlop et al., 2014). Two parallel transects of 25 traps each (total of 50 traps) were set within gullies on the island (Figure 2). Traps were spaced at 50m intervals and baited with peanut butter, oats and sardines. Traps were opened for four consecutive nights (200 trap nights). Traps were checked and closed within three hours of sunrise, rebaited and opened in the late afternoon.

Morphometric, survivorship, dietary, breeding and genetic information is collected for comparison with populations of northern quolls in the Pilbara and across Australia. All captured quolls were implanted with a subcutaneous microchip (PIT) for individual identification. Standard measurements collected from all captured quolls included body weight, short pes length, head length, age class, sex and reproductive condition. A small amount of ear tissue was collected from all individuals at initial capture for genetic analysis.

2.2 Black rat detection

We used a combination of trapping and remote cameras in order to detect presence of black rats on Collier Rocks and Legendre Island.

On Legendre Island, 20 cage traps baited with peanut butter, oats and sardines were set for 3 consecutive nights (60 trap nights). On Collier Rocks 1 & 2, 10 traps were set on each island for one night only, as black rats were successfully captured on the first night. One black rat specimen was collected from each of Collier 1&2, euthanized with lethabarb and preserved in 2% formalin for lodgement at the Western Australian Museum.

Six pairs of baited cameras were set over 3 km of beach on Legendre Island (*Figure 1*). These followed the line of mangroves and area of the island that would potentially be accessible from Collier Rocks at low tide.

2.3 Cat and fox detection

Along with extensive beach searches at all landing points, we used remote cameras on Dolphin Island (Figure 1) to detect presence of cats or foxes. Baited cameras were set in two transects of ten, spaced at least 100 m apart, for four nights.

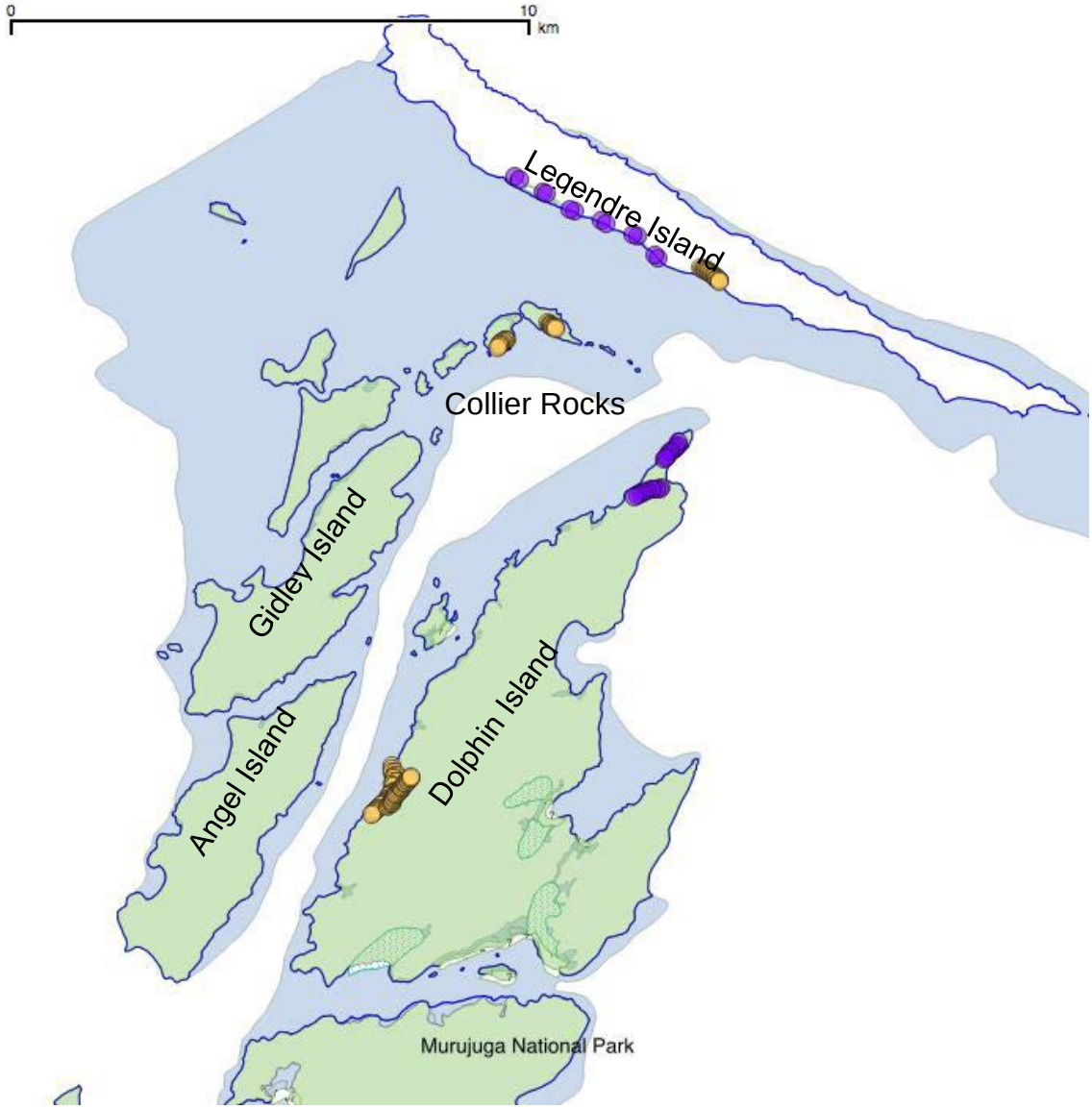

Figure 2. Trap locations (yellow) and camera locations (purple) for Dolphin Island, Collier 1, Collier 2 and Legendre Island

3 Results and Discussion

Quolls inhabited all areas of Dolphin Island we visited. They were recorded on the majority of cameras set on the north of the island, and quoll tracks were found at all locations visited on Dolphin Island and scats were opportunistically collected. A large number of animals were trapped; we recorded 45 captures of 22 individual quolls (9 F, 13 M), with trap success averaging 22.5% each day. One captured female was first chipped in 2012, making her at least 2.5 years old.

Trapped animals were in good health, with fat tails. No females had pouch young at this time of year. Dolphin Island is probably one of Western Australia's healthiest populations of the endangered northern quoll, due to the lack of feral species such as cattle and feral cats.

Although they are thought to be occasionally present, we did not detect any evidence of foxes at any of the above locations. Survey effort to detect these species included searching for scats and tracks on beaches and using baited remote cameras (20 cameras x 5 nights on Dolphin Is., 12 cameras x 4 nights on Legendre Is.). Surveys in 2012 and 2013 detected fox tracks at two and eight locations, respectively.

Black rats (*R. rattus*) were present on Collier 1 & 2, and trapped specimens were collected for the museum. No black rats were trapped or photographed on Legendre Island. Rodents that were detected on cameras on Legendre Island were all determined to be *Rattus tunneyi* due to head-body to tail length ratio. Small rodents were detected on many cameras on Dolphin Island and were determined to most likely be common rock-rats (*Zyzomys argurus*); none had sufficient tail length compared to head-body length to be *R. rattus*.

Other species present on remote cameras (see Table 1) included a large number of rock wallabies, euros, goannas, several bird species and a Pilbara olive python.

Table 1: Species list of all mammal and reptile sightings/captures from 8 days. S: sighting, P: signs (tracks, scats), C: remote camera, T: trapped, H: opportunistic hand capture.
Locations– DI: Dolphin Island, LI: Legendre Island, C1: Collier 1, C2: Collier 2

Species	Common name	Location	Method of detection
MAMMALS			
Dasyurus hallucatus	Northern quoll	DI	C, P, T
Macropus robustus	Euro	DI	S, C, P
Petrogale rothschildi	Rothschild's rock-wallaby	DI	S, C, P
Zyzomys argurus	Common rock-rat	DI	C, T
Rattus tunneyi	Pale field rat	LI	T, C
Rattus rattus	Black rat	C1 C2	T
REPTILES & AMPHIBIANS			
Liasis olivaceous barroni	Pilbara Olive Python	DI	C
	Python sp	C2	P
Litoria rubella	Desert tree frog	DI	H
Varanus gouldii* or *panoptes	Sand goanna	DI LI	C

Table 2: Species list of all bird sightings/image captures from 8 days. S: sighting, C: remote camera.

Species	Common name	Method of detection
BIRDS		
Coturnix ypsilophora	Brown Quail	C
Oceanites oceanicus	Wilson's Storm-petrel	S
Pelicanus conspicillatus	Australian Pelican	S
Phalacrocorax varius	Pied Cormorant	S
Gallirallus philippensis	Buff-banded Rail	C
Egretta novaehollandiae	White-faced Heron	S
Egretta sacra	Eastern Reef Egret	S
Nycticorax caledonicus	Nankeen Night Heron	S
Arenaria interpres	Ruddy Turnstone	S
Tringa brevipes	Grey-tailed Tattler	S
Actitis hypoleucos	Common Sandpiper	S
Esacus magnitrostrisd	Beach Stone-curlew	S, C
Haemotopus longirostris	Pied Oystercatcher	S
Haematopus fuliginosus	Sooty Oystercatcher	S
Charadrius ruficapillus	Red-capped Plover	S
Chroicocephalus novaehollandiae	Silver Gull	S
Hydroprogne caspia	Caspian Tern	S
Elanus axillaris	Black-shouldered Kite	S
Pandion cristatus	Osprey	S
Milvus migrans	Black Kite	S
Haliastur indus	Brahminy Kite	S
Haliaeetus leucogaster	White-bellied Sea-eagle	S
Accipiter fasciatus	Brown Goshawk	S
Circus assimilis	Spotted Harrier	S
Falco cenchroides	Australian Kestrel	S
Geopelia striata	Peaceful Dove	S
Geopelia humeralis	Bar-shouldered Dove	S, C
Cacatua sanguinea	Short beakedLittle Corella	S
Merops ornatus	Rainbow Bee-eater	S
Manorina flavigula	Yellow-throated Miner	S
Lichenostomus virescens	Singing Honeyeater	S

Lichenostomus penicillatus	White-plumed Honeyeater	S
Lichmera indistincta	Brown Honeyeater	S
Peneonanthe pulverulenta	Mangrove Robin	S
Rhipidura leucophrys	Willie Wagtail	S, C
Grallina cyanoleuca	Magpie-Larklark	S
Chlamydera Ptilornorhynchus guttatus	Western Bowerbird	S
Artamus cinereus	Black-faced Woodswallow	S
Cracticus nigrogularis	Pied Butcherbird	S
Corvus orru	Torresian Crow	S, C
Hirundo neonexa	Welcome Swallow	S
Anthus novaeseelandiae	Richard's Pipit	S
Eremiornis carteri	Spinifexbird	S
Taeniopygia guttata	Zebra Finch	S
Emblema pictum	Painted Finch	S

Appendices

Appendix 1: Images

Sean Garretson releasing a northern quoll following trapping and processing.

Post-fire regrowth at the trapping site.

Post-fire regrowth and remaining trees within one of the gullies.

Rodent tracks on Dolphin Island.

Northern quolls on Dolphin Island.

Rothschild's rock wallaby and northern quoll

Rothschild's rock wallaby with joey

Rothschild's rock wallaby during daytime, showing characteristic 'purple' markings on neck, and dark behind elbow

Appendix 2: Works diary

Sun 15/6/14

Gear sorting by SG & JA, loading, trailer delivered by KTA staff

Mon 16/6/14

JD & JL flew Perth – Karratha, arrived 0850. Murajuga cultural induction and welcome to country at Dampier 0930-1100. Contacts: Brad and Sean.

Picked up gear from KTA office, back to Dampier to meet boat. Steamed to Flying Foam passage, set 50 traps (25 along coastal rocky/sand edge, 25 along parallel gulley). Issues with generator not running (meaning desalinator not working).

Tue 17/6/14

Checked 50 traps; 10 northern quoll captures. 1 female was captured in 2012 and 2013, therefore at least 2.5 years old.

Set 20 cameras at north end of Dolphin Island. No fox or rat tracks seen. Much regrowth after fire 6 months ago (*Solanum sp., Corchorus sp., Triumfetta sp., Swainsona formosa, Trichodesma zeylancium*).
Reset traps in afternoon.

Wed 18/6/14

Checked 50 traps; 10 NQ captures, 3 common rock rats.

Steamed up to north of passage. John + Andy took tender out to check access to Collier rocks at different tides. Set 12 paired baited rodent cameras over 3km stretch behind mangroves on southern side of Legendre. Back to Dolphin to reset traps, then back to Dampier for electrician to fix generator. Steamed back to passage around 1900.

Thu 19/6/14

Checked 50 traps; 10 NQ captures, 4 common rock rats.

Steamed up to north of passage. John + Andy took tender out to check access to Legendre at different tides. Beach at mangroves is inaccessible in the mornings due to low tide, therefore not suitable for trapping. Another site (approx. -20.397747, 116.889771) found to be suitable. Afternoon trap reset on Dolphin Is.

Fri 20/6/14

Checked 50 traps; 15 NQ captures, 4 common rock rats. Picked up all traps and washed them on the back of the boat.

Scat and track search along east coast of Angel Island. Some good fig trees, but no evidence of NQs, fox or rats.

Set 20 cage traps on Legendre is, approx. 1km east of the cameras previously set.

Sat 21/6/14

Checked 20 Legendre traps; 7 pale field rats captured. No black rats.

Scat and track search at beaches on East side of Dolphin Island: cove near eastern peninsula and mangroves slightly to south of there. Rodent tracks photographed, probably *Zyzomys*. Quoll tracks seen. No fox or cat evidence.

Set 10 cage traps each on Collier 1 & 2, reset 20 on Legendre in late afternoon.

Sun 22/6/14

Checked 20 Legendre traps; *R. tunneyi* only. Checked 10 Collier 2 traps; 1 x *R. rattus* only. Checked 10 Collier 1 traps; 8 x *R. rattus* only. One of each R. rattus euthanised for WA museum.

Weather reports indicate incoming winds due to storms down south. Legendre and Collier landing points will be affected.

Picked up cameras from north end of Dolphin Island. SG & JA picked up Legendre cameras while JL & JD pulled in Collier 2 traps. Collier 1 traps left unset. Reset 20 Legendre traps. Picked up JA & SG. Tide very low, very slow in shallow water. Back to boat by 1800.

Mon 23/6/14

Checked and picked up 20 Legendre traps; *R. tunneyi* only. Collected 10 Collier 1 traps. Sorted gear and rewashed traps.

Steamed to Dampier, arrived ~1030. Picked up both cars, dropped gear. Met boat at Port Samson ~1500. Unloaded boat at very low tide!

Tue 23/6/14

JD to bus for Millstream workshop. JL stayed at Karratha to sort gear and fly to Perth the following day. SG & JA drove to Cape Range for next field trip.

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