

64th ANNUAL ASSESSMENT OF SHEARWATER BREEDING SUCCESS ON BARUNGUBA, 21–28 MARCH 2023

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A study of the breeding productivity of shearwaters (*Ardenna* spp.) co-existing on Barunguba (formerly known as Montagu Island) has continued annually since 1960. Before 1959 it was thought that only one species of shearwater bred on the island. In that year, the discovery of two additional species breeding there raised questions regarding the dynamics of this mixed colony.

In this long-term study we measure breeding productivity each year by counting the total number of chicks of each species within three fixed-area plots. This is completed in late March towards the end of the breeding season, thereby avoiding disturbance to breeding adults, eggs and young chicks. Results have been published annually since 1998 in *Nature in Eurobodalla* (e.g., Crowley *et al.* 2021). The format of this report and the abbreviations used are consistent with those in previous annual reports.

Barunguba is divided into two parts by a steep gulch and a beach that is passable at all tides. We refer to these two portions as north island and south island. Replanting of south island with taller vegetation, using plants known to have been on the island in the past, has occurred following systematic control of Kikuyu Grass *Cenchrus clandestinus*. This aborted programme, aimed at restoring seabird nesting habitat, was undertaken progressively between 2001 and 2014 across designated zones, and these zones (numbered 1–9 or assigned as Asset A, B or C and Accidental) are used in this report for reference purposes. They are briefly described (condition in March 2013) and shown on a map in Fullagar *et al.* (2013).

Our shearwater colony study site on the south-east side of north island (zone 9) is known as NISA (293 m²); the two study sites at the north end of south island are known as SISA (428 m²) and THISA (293 m²) and are located within zone 8. The exact location of each study site is shown in Fullagar and Heyligers (2006). The vegetation on each site is mapped annually in March.

Bird records for the island have been reviewed by Fullagar (1989), but many subsequent records are included in annual reports (similar to this one) dating back to 1998. The names and taxonomic order of birds follow the latest available IOC World Bird List (Gill *et al.* 2022); all other vertebrates follow Clayton *et al.* (2006), except for seals where we follow the recommendations of Shaughnessy and Goldsworthy (2015). Names of butterflies follow Braby (2016); moths follow Common (1990); and vascular plants follow Heyligers and Adams (1989, 2004).

No annual survey was possible in 2020 due to the COVID-19 pandemic. Previously no surveys were conducted in 1961 and 1966, thus this is only the third time since 1960 that an annual survey has been missed.

Survey Team

This year's team comprised Peter Fullagar, Chris Davey and David Priddel (MIPartners); Penny Beaver, Doug Brown, Thomas Cansse, Harvey Perkins, and Lesley Priddel.

Weather and Habitat Conditions

Monthly rainfall figures (mm) from April 2022 to the end of February 2023 are as follows: 217.0, 41.2, 14.4, 77.4, 18.2, 90.2, 160.0, 56.2, 20.2, 70.0, 54.6, the wettest period since 1992.

The vegetation on all study sites was exceptionally dense and lush, even more so than reported last year. Spiny-headed Mat-rush *Lomandra longifolia* was so dense that it was difficult to locate burrows. Kikuyu Grass has continued to spread alarmingly throughout the island. Kikuyu continues to consolidate along the extensive network of pathways that now criss-cross the island and is rapidly spreading laterally into the surrounding vegetation. Many pathways are no longer mown and although spraying occurs along some pathways, contrary to previous planning decisions, there is no evidence of any broad scale spraying program to restrict Kikuyu. Last year Kikuyu covered 77% of SISA, this year it covered 86%. To date Kikuyu Grass has not spread to THISA or NISA. Scarlet Runner *Kennedia rubicunda* continues to thrive on all study sites. During each of the last three years Scarlet Runner covered approximately 54% of SISA, whilst Bracken *Pteridium esculentum* has varied with coverage of between 36% and 50%. Morning Glory *Ipomoea cairica* has also continued to increase dramatically in many areas, often smothering other vegetation or covering formerly exposed rock surfaces, but as yet is not on any of the study areas. Coastal Saltbush *Rhagodia candolleana* continues to spread.

Coverage

We departed Narooma 1100 on Monday 21 March. Due to our late arrival work began on THISA at 1425 and continued until 1755. The following day, work to complete THISA started at 0900 and finished at 1045. We then moved to SISA, starting at 1108 and finishing on this site at 1825. Because of damp conditions no work was possible on 23 March. We started work on NISA at 0850 on 24 March completing this site at 1445. From 24 to 27 March, we made general observations along most tracks on the south island and during a circuit of north island on 26 March. Southerly winds of 20 knots or greater persisted throughout the day on 25 March, but for most of the week conditions were unsettled with scattered showers. We returned to Narooma on 28 March at noon on a charter boat with strong southerly winds and a 1.5 m south-easterly swell. Ten shearwaters (species undetermined), one Greater Crested Tern and one Silver Gull were observed during the crossing.

Survey Results

1. Shearwaters

The results of this year's survey, together with those for 2022, are summarised in Table 1.

Table 1. Number of shearwater chicks and burrows found in the three study sites in 2023 (2022 data in brackets)

	NISA	THISA	SISA	Total 2023	Total 2022
Wedge-tailed Shearwater	44 (31)	26 (24)	35 (23)	105	78
Short-tailed Shearwater	23 (12)	33 (31)	29 (22)	85	65
Sooty Shearwater	0 (0)	1 (0)	0 (0)	1	0
Number of burrows	113 (117)	95 (91)	99 (93)	307	301
Occupied burrows (%)	59 (37)	63 (60)	65 (48)	62	48

The overall density of chicks this year, combining data from the three study sites, was 1,884 chicks per hectare; an increase compared with the figure from last year of 1,410 chicks per hectare and the long-term average of 1,605 per hectare (1967–2022).

Wedge-tailed Shearwater comprised 66% on NISA, 43% on THISA and 55% on SISA, giving an overall figure of 55%, the same as for last year. NISA continues to be heavily dominated by Wedge-tailed Shearwaters. The number of chicks on THISA was the highest recorded since the first survey on this site in 1992.

The average weight of Wedge-tailed Shearwater chicks in 2023 was 530 g (212–969 g), higher than the last two year's averages of 363 g in 2021 and 311 g in 2022. The average weight of Short-tailed Shearwater chicks in 2023 was 742 g (285–1104 g), also greater than the previous two year's averages of 570 g in 2021 and 677 g in 2022.

Mean chick weights for Short-tailed and Wedge-tailed Shearwaters in 2023 were among the heaviest recorded since 2012 (Figure 1). However, there were no statistically significant differences in mean chick weights amongst years due to the large standard deviation associated with each mean (Figure 1). The weight of provisioned chicks varies due to: feeding frequency; time of last meal; and the volume of meals, the average meal volume being largest during the late chick-rearing phase (Thalmann *et al.* 2010). Additional variation may also result from the surveys being conducted slightly earlier (2–6 days) in 2016 and 2018 and slightly later (2–4 days) in 2012 and 2021, due to unavoidable logistical constraints.

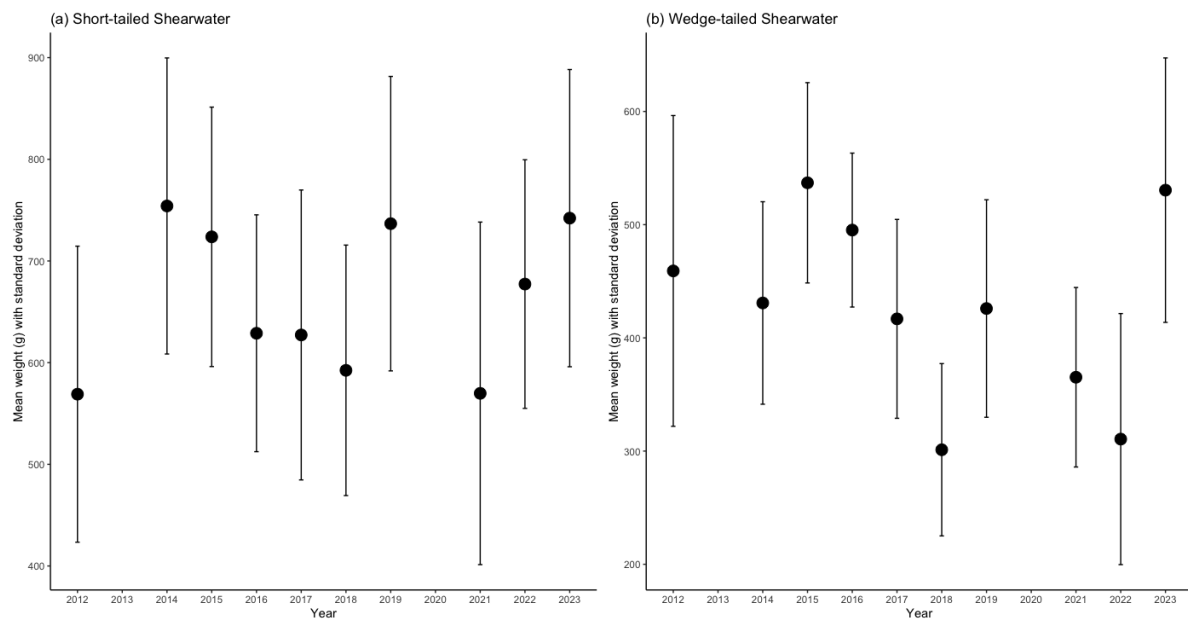


Figure 1: The mean and standard deviation of chick weights in grams from 2012 to 2023 of Short-tailed (a) and Wedge-tailed (b) Shearwaters.

2. General Observations of Birds, Mammals, Reptiles, Frogs and Butterflies

BIRDS

Twenty-nine species were recorded this year and 9 eBird lists were submitted. Movement around the island was restricted this year so all fauna counts tend to be reduced relative to previous years' reports.

Brown Quail *Coturnix ypsilophora*. Common and conspicuous on south island, along tracks, around the light station, and in lomandra and other scrub. Distraction behaviour indicative of young still present. Forty-four counted on one walk around south island on 26 March.

Shining Bronze Cuckoo *Chrysococcyx lucidus*. A single individual in scrub to the east of the light station in late afternoon of 23 and again on 26 March. Present at same time as *Cacomantis* cuckoo.

(Fantail?) Cuckoo *Cacomantis sp.* An immature bird (residual mottling on back) active in scrub to the east of the light station on 23 March.

Bar-shouldered Dove *Geopelia humeralis*. A single bird, south island on 23 March.

Buff-banded Rail *Hypotaenidia philippensis*. Common and conspicuous around the light station and surrounds, including a range of intermediate-sized immature birds. Also one black chick seen 21 March.

Sooty Oystercatcher *Haematopus fuliginosus*. Limited exploration opportunities meant no estimate of total number of birds on the island was possible this year although 10 counted on south island on 26 March and 5 on north island on 27 March.

Silver Gull *Chroicocephalus novaehollandiae*. Present in low numbers most days, either on rocky shores or at sea just off the island.

Caspian Tern *Hydroprogne caspia*. Seen most days. Maximum of six including a begging young on 26 March.

Greater Crested Tern *Thalasseus bergii*. Seen most days. Maximum 48 seen on north island, 27 March.

White-faced Storm-Petrel *Pelagodroma marina*. No surveys conducted this breeding season.

Gould's Petrel *Pterodroma leucoptera*. Monitoring occurred between October 2022 and March 2023. Between 37 and 44 nests were active this season and many were monitored using surveillance cameras. Global Light Sensing dataloggers were attached to 25 adults to track their movements in the breeding and non-breeding seasons to 2024 (Nicholas Carlile pers. comm).

Wedge-tailed Shearwater *Ardenna pacifica*, **Sooty Shearwater** *Ardenna grisea*, and **Short-tailed Shearwater** *Ardenna tenuirostris*. See Table for this year's chick count. Individuals of both Wedge-tailed and Short-tailed seen on the crossing and at sea most days.

Little Penguin *Eudyptula minor*. No landing site surveys were conducted.

Australasian Gannet *Morus serrator*. Small numbers of immatures and adults seen offshore most days, including on the crossing to the island.

Great Cormorant *Phalacrocorax caro*. No records.

Little Black Cormorant *Phalacrocorax sulcirostris*. Thirty-six flying over south island on 26 March.

Little Pied Cormorant *Microcarbo melanoleucos*. A single bird on rocks off south island and possibly same individual at northern end of north island on 27 March.

White-faced Heron *Egretta novaehollandiae*. One seen flying over jetty bay on 25 March and over north island on 27 March.

Osprey *Pandion haliaetus*. A single bird off north island on 27 March.

White-bellied Sea Eagle *Haliaeetus leucogaster*. At least three (including two sub-adults and at least one adult) seen on most days.

Peregrine Falcon *Falco peregrinus*. Two seen briefly over the north island on 27 March.

Crimson Rosella *Platycercus elegans*. One calling in woodland on south island on 24 and 26 March.

New Holland Honeyeater *Phylidonyris novaehollandiae*. Common in scrub and wooded areas to east and south-west of the light station all days, maximum of 43 on 26 March.

Yellow-faced Honeyeater *Caligavis chrysops*. Common in thick scrub and wooded areas on south island with an estimated maximum of 15 on 23 March.

Grey Fantail *Rhipidura albiscapa*. Two in dense woodland between the jetty track and vegetable gardens on 21 March.

Sacred Kingfisher *Todiramphus sanctus*. One seen in woodland on south island on 26 March.

Welcome Swallow *Hirundo neoxena*. Seen daily. Maximum number estimated at 15 around the light station buildings on evening of 23 March. Up to 14 observed on north island on 27 March.

Little Grassbird *Poodytes gramineus*. Seen most days, maximum 6 on south island, 26 March.

Golden-headed Cisticola *Cisticola exilis*. Very few seen or heard. Single bird on south island, 21 March.

Silvereye *Zosterops lateralis*. Unusually scarce. Four seen in scrub to east of the light station on 23 March.

Red-browed Finch *Neochmia temporalis*. Up to 6 recorded most days on track near south landing.

MAMMALS

Seals. Found along the east and west shoreline of south island and along the northern and western shoreline of north island. Twenty-two on south island on 25 March, 237 on north island on 27 March.

REPTILES

White's Skink *Liopholis whitii*. A few seen on rock outcrops.

Grass Sun-skink *Lampropholis guichenoti*. One small immature seen in Lomandra at SISA.

AMPHIBIANS

Striped Marsh Frog *Lymnodynastes peronii*. Widespread on south island. Adults still present in the well at the kitchen garden (zone 6). One adult was seen in a courtyard of the light station, and some were heard calling. Calls were heard and tadpoles found around the soaks and pools in the extreme north of north island on 27 March confirming that the frog is now widespread throughout north and south island. See Appendix for description of introduction and spread over the island.

BUTTERFLIES

Black Jezebel *Delias nigrina*. A single individual in woodland on south island, 26 March.

Cabbage White *Pieris rapae*. A few seen.

Common Brown *Heteronympha merope*. A few seen most days, only females.

Common Grass-blue *Zizina otis*. A few seen.

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References

- Braby, M.F. (2016). *The Complete Field Guide to Butterflies of Australia (Second Edition)*. CSIRO Publishing, Melbourne.
- Clayton, M., Wombey, J.C., Mason, I.J., Chesser, R.T. & Wells, A. (2006). *CSIRO List of Australian Vertebrates: A Reference with Conservation Status*. CSIRO Publishing, Melbourne.
- Common, I.F.B. (1990). *Moths of Australia*. Melbourne University Press, Melbourne.
- Crowley, M.A., Fullagar P.J. & Priddel, D. (2021). 62nd Annual assessment of shearwater breeding success on Montagu Island, March 27 – 1 April 2021.
- Fullagar, P.J. (1989). Birds of Montagu Island, NSW. *Nature in Eurobodalla* 2: 27–35.
- Fullagar, P. & Heyligers, P. (2006). Shearwater colonies on Montagu Island: are they being affected by encroaching Kikuyu Grass? *Australian Zoologist* 33: 476–479.
- Fullagar, P.J., Davey, C. & Priddel, D. (2013). 54th Annual assessment of shearwater breeding success on Montagu Island, 22–28 March 2013. *Nature in Eurobodalla* 27: 63–71.
- Gill, F., Donsker, D. & Rasmussen P. (Eds). (2022). *IOC World Bird List (v 12.1)*. Doi 10.14344/IOC.ML.12.1. <http://www.worldbirdnames.org/>

- Heyligers, P.C. & Adams, L.G. (1989). Vascular flora of Montagu Island, NSW. *Nature in Eurobodalla* 2: 36–40.
- Heyligers, P.C. & Adams, L.G. (2004). Flora and vegetation of Montagu Island – past and present. *Cunninghamia* 8: 285–305.
- Shaughnessy, P.D. & Goldsworthy, S.D. (2015). Scientific Correspondence. Long-nosed Fur Seal: A new vernacular name for the fur seal, *Arctocephalus forsteri*, in Australia. *Marine Mammal Science* 31: 830–832.
- Thalman, S. J., Lea, M.-A., Hindell, M., Priddel, D., & Carlile, N. (2010). Provisioning in Flesh-footed Shearwaters (*Puffinus carnipes*): Plastic Foraging Behavior and the Implications for Increased Fishery Interactions. *The Auk*, 127(1), 140-150.
<https://doi.org/10.1525/auk.2009.09158>



The 2023 team: Chris Davey, Thomas Cansse, Harvey Perkins, David Priddel, Doug Brown and Penny Beaver.



Work on NISA, 24 March 2023



Looking east on THISA, 22 March 2023. No Kikuyu Grass (*Cenchrus clandestinus*)



Kikuyu Grass (*Cenchrus clandestinus*) infestation in the centre of SISA, 22 March 2023



Northern edge of SISA showing extent of Kikuyu Grass (*Cenchrus clandestinus*) cover along this border in March 2023.



Another view of Kikuyu Grass (*Cenchrus clandestinus*) invasion on north side of SISA, 22 March 2023
(Photo by Harvey Perkins)



Track down to North Landing from the light-station, March 2023



Along the track west of the lighthouse heading south, March 2023



South Landing, March 2023



Forested areas above North Landing jetty, March 2023



Brown Quail near the Head-keepers house



Buff-banded Rail near the Head-keepers house



Young Buff-banded Rail (photo by Harvey Perkins)



Sooty Shearwater chick on THISA (photo by Harvey Perkins)



Portrait of the THISA Sooty Shearwater (photo by Harvey Perkins)



Red-browed Finch



White-striped Weevil *Perperus lateralis* (Curculionidae: Entiminae) (Photo by Harvey Perkins)



Proteuxoa sanguinipuncta (no common name) (Noctuidae: Noctuinae) (Photo by Harvey Perkins)



Green-blotched Moth *Cosmodes elegans* (Noctuidae: Noctuinae) (Photo by Harvey Perkins)





An adult Wedge-tailed Shearwater, *Ardenna pacifica*, entangled in Morning Glory *Ipomoea cairica* vine.
Found 24 February 2023 NE side of South Island.

Appendix

Striped Marsh Frogs – a new species for Barunguba. Compiled by Michael A. Crowley



Kitchen garden in March 2019 with the well, extreme left (photo: Michael A. Crowley)

Summary of observation 2018 to 2022

No frogs were reported during our shearwater colony survey on the island 15-20 March 2018 (Davey *et al.* 2018).

On 19 March 2019, at about 100m from the kitchen garden in the NW of south island, frogs could be heard calling. In the well at the garden there were at least ten large adult Striped Marsh Frogs *Lymnodynastes peronii* – some in amplexus and masses of egg spawn on the surface; no doubt triggered by the 40mm of rain that fell the night before. This is the first reported record of a frog on Barunguba (Montagu Island) (see Fullagar *et al.* 2019). Two days later, Striped Marsh Frogs were calling from the septic system (immediately south of the lighthouse) and on 24 March four Striped Marsh Frogs were seen on the track leading up from the Kitchen Garden (Emily Mowat pers. com.). She also reported hearing them in December 2018 on the SE side of the island. At the time we presumed that this frog may have been accidentally imported with mulch during a revamp of the garden in the winter of 2016.

On 3 July 2019, during a short winter visit to the island Striped Marsh Frogs were calling from the well at the garden (Crowley *et al.* 2019), and on 10 September 2019, during another visit to the island, a Striped Marsh Frog was seen half-way between the lighthouse and the track to cemetery. (Chris Davey pers. com)

No visits were possible in 2020 because of restricted access due to the covid pandemic.



At the well in March 2019. Striped Marsh Frogs calling and egg spawn. (Photos: Michael A. Crowley)

On 31 March 2021 adult Striped Marsh Frogs were heard calling in the well at the kitchen garden (zone 6). Tadpoles, ca. 1cm long, were present in the water along with three adults and two large egg masses (MAC). Also, on this day one desiccated adult was found in a courtyard of the light station (Photo MAC) and numerous small tadpoles were present in several slightly saline pools in the upper splash-zone at the north-east side of north island at the junction of the rock platform and vegetation (Harvey Perkins pers. comm.). One adult seen and several calling in soak adjacent to septic system immediately to the south of the lighthouse this visit.



Desiccated adult in courtyard

By 2022 Striped Marsh Frog were widespread on south island. Adults were still present in the well at the kitchen garden (zone 6). One adult was seen in a courtyard of the light station, and some were heard calling. Calls were heard and tadpoles found around the soaks and pools in the south-eastern section (zone 8) of south island on 27 March (PJF, MAC) (Beaver *et al.* 2022).

It seems reasonable to conclude that Striped Marsh Frogs arrived on the island sometime after March 2018 and were definitely present by December that year.

References

Beaver, P., Crowley, M., Fullagar, P. J., Priddel, D., Perkins, H. & Davey, C. (2022). 63rd Annual Assessment of Shearwater Breeding Success on Barunguba, 21-28 March 2022. Eurobodalla Natural History Society, 6pp.

See: <https://enhs.affordaweb.net/wp-content/uploads/2023/04/63rd-Montagu-Island-Shearwater-report-2022.pdf>

Crowley, M. A., Davey, C. C. & Fullagar, P. J. (2019). A Winter Visit to Montagu Island. *Nature in Eurobodalla* 33: 70-72.

Davey, C., Priddel, D., Crowley, M. & Fullagar, P. J. (2018). 59th Annual Assessment of Shearwater Breeding Success on Montagu Island, 15-20 March 2018. *Nature in Eurobodalla* 32: 56-63.

Fullagar, P. J., Davey, C., Priddel, D. & Crowley, M. (2019). 60th Annual assessment of Shearwater Breeding Success on Montagu Island, 19-27 March 2019. *Nature in Eurobodalla* 33: 60-69.