

**PELAGIC OBSERVATIONS
GAMBIER ISLANDS TO TAHITI VIA AUSTRAL ISLANDS
OCTOBER–NOVEMBER 2019, AND PAST EXPEDITIONS
IN EAST POLYNESIA**

by

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ABSTRACT

This report documents detailed results of a 24-day-long pelagic survey of seabirds in October–November 2019, from the Gambier Islands to MacDonal Bank, continuing to the southern Austral Islands, and on to Tahiti, Society Islands, with a further six days broadly within that region. The report incorporates pelagic observations from previous expedition-cruise and land-based reports for East Polynesia. Based on the combined observations, we recommend that the list of avifauna for East Polynesia be amended to include Blue Petrel *Halobaena caerulea*, Gould’s Petrel *Pterodroma leucoptera*, Hawaiian Petrel *P. sandwichensis*, and Buller’s Shearwater *Ardenna bulleri*. White-necked Petrel *P. cervicalis* should be listed separately from Juan Fernández Petrel *P. externa*. Both taxa of Buller’s Albatross *Thalassarche bulleri* were recorded and should be listed. The occurrence of a number of other species should be amended as set out in the species accounts. Photographs of White-bellied Storm-Petrel *Fregetta grallaria* away from Rapa and Marotiri are discussed in the light of identification criteria for Titan Storm-Petrel *F. [g.] titan*. The three photographed birds from the Wandering Albatross complex *Diomedea exulans* are probable / actual Antipodean Albatross *D. antipodensis*. Sightings of Juan Fernández Petrel and Stejneger’s Petrel *P. longirostris* provide further evidence that they have a regular westward dispersal in mid-latitudes of the Pacific. Sightings of Soft-plumaged Petrel *P. mollis* show that it can be quite common at times in the eastern sector of East Polynesia. We found that both Grey Petrel *Procellaria cinerea* and White-chinned Petrel *P. aequinoctialis* occur farther north in East Polynesia than the literature reports. Sightings of Band-rumped Storm-Petrel *Hydrobates castro* suggest the possibility of local breeding that invites further investigation. The report includes an examination of plumage variation in Polynesian Shearwater *Puffinus polynesiae* off Tahiti, thereby contributing to the study of forms of Tropical Shearwater (*sensu lato*) in the Pacific. Our observations add to the understanding of seabird range, distribution, and variation in East Polynesia and contribute to future consideration of conservation measures in the region.

INTRODUCTION

The most up-to-date summary of the status of seabirds in East Polynesia is given in the biogeographic atlas for the region by Thibault & Cibois (2017). The atlas is a testament to the sparse knowledge about the range and distribution of seabirds in this vast oceanic realm. The complex logistical arrangements that lie behind oceanic surveys in remote locations is a major factor in this. Such surveys, however, are sorely needed because they contribute valuable insights into the life history, ecology, changing abundance, and conservation needs of species (e.g., Spear & Ainley 2007, Mannaerts *et al.* 2014, Carroll *et al.* 2019). In October and November 2019, we undertook an at-sea survey of seabirds, sailing from the Gambier Islands to Tahiti, via the southern Austral Islands. The survey results are reported herein except results for Rapa and Marotiri, Austral Islands, which are reported in Flood *et al.* (2021). In addition, we extracted pelagic observations from previous expedition-cruise and land-based reports for East Polynesia (leaders / observers known to us) and combine them with our survey sightings to provide a comprehensive and up-to-date account of seabirds in East Polynesia. Species are covered herein only if our findings add information to Thibault & Cibois (2017). Based on our findings, we recommend updating the status that Thibault & Cibois (2017) assign to a number seabirds in East Polynesia.

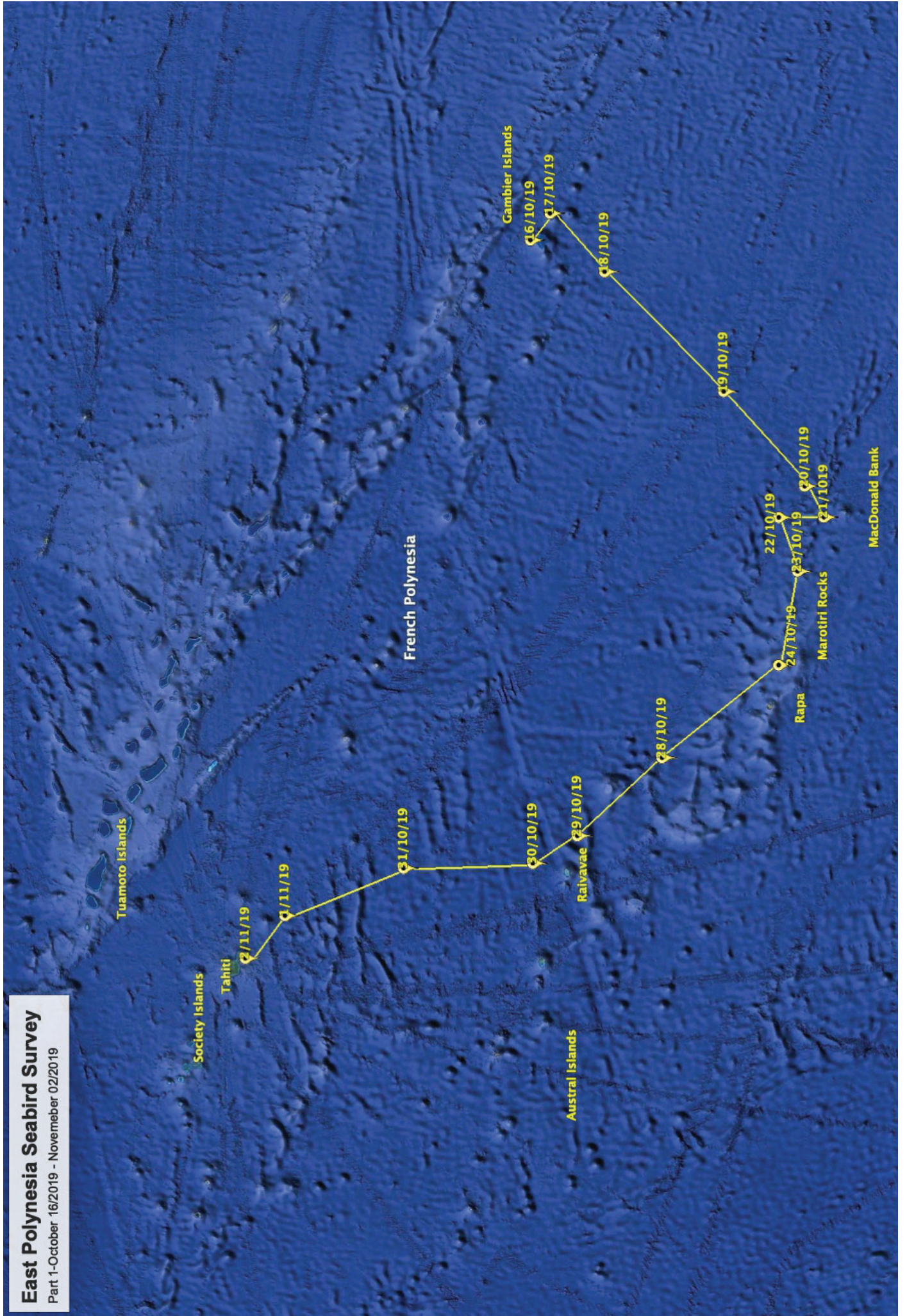
METHODS

Commencing on 16 October 2019, we sailed from Mangareva, Gambier Islands, via the southernmost Austral Islands, to Tahiti, Society Islands, then explored waters around Tahiti, finishing on 08 November 2019 (see Figures 1 and 2, Table 1). The survey team comprised six ornithologists aboard the 18-m expedition yacht *Sauvage*. The *Sauvage* expedition departed Rikitea, Mangareva and sailed southwest to MacDonal Bank, ca. 375 km east of Marotiri, arriving early on 20 October. After 36 hours becalmed, the expedition motored northwards to benefit from a 10–15 kt northeasterly wind and on 23 October the yacht swung back west to arrive at Marotiri early morning on 24 October. The period 24–27 October was spent surveying waters around and between Marotiri and nearby Rapa in a collaborative survey with Vincent Bretagnolle and Hadoram Shirihihi (see Flood *et al.* 2021). An earlier-than-planned departure from Rapa was necessitated by a tropical storm approaching from the Cook Islands. On 27 October, the expedition set sail for Raivavae, Austral Islands, arriving late evening on 29 October, continuing next day toward Tahiti, arriving early morning on 02 November. The remaining seven days were spent exploring waters off Tahiti Iti (southeastern Tahiti), a seamount ca. 80 km southeast of Tahiti, the volcano Mehetia ca. 115 km east of Tahiti, and waters around Makatea, northwest Tuamotu Islands, ca. 220 km northeast of Tahiti, finishing back at Tahiti on 08 November. The latitude and longitude limits of the *Sauvage* expedition are 15.82°–28.97°S and 134.32°–149.92°W.

Page 6 Figure 1. Approximate expedition route from Gambier Islands to Tahiti, Society Islands, via MacDonal Bank and the southern Austral Islands. **Page 7 Figure 2.** Approximate expedition route around Tahiti, Society Islands, exploring waters off Tahiti Iti (southeastern Tahiti), a seamount ca. 80 km southeast of Tahiti, the volcano Mehetia ca. 115 km east of Tahiti, and Makatea, Tuamotu Islands ca. 220 km northeast of Tahiti.

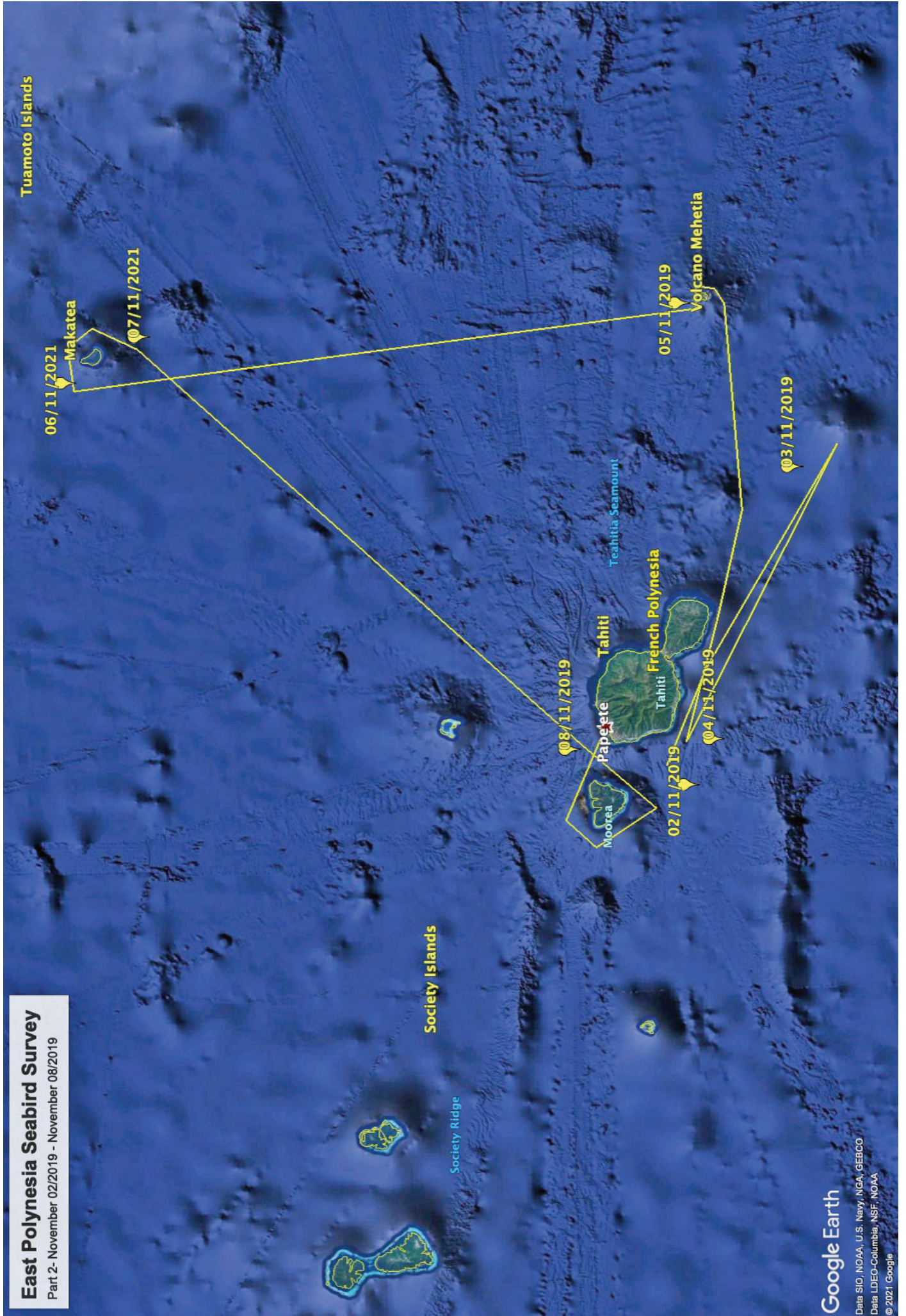
East Polynesia Seabird Survey

Part 1-October 16/2019 - November 02/2019



East Polynesia Seabird Survey

Part 2 - November 02/2019 - November 08/2019



Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data LDEO-Columbia, NSF, NOAA
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Table 1. Survey effort: date, location, weather conditions, and general notes.

Date	Location	Weather	General notes
16 Oct	23.116°S, 134.967°W 23.258°S, 134.872°W	Calm	Depart Rikitea, Mangareva, Gambier Islands, 1000 and explore nearby shelf-edge, dark by 1845
17 Oct	23.488°S, 134.323°W 23.431°S, 134.343°W	SE 15–20 kt	Sail overnight to Portland Bank, chum 0600 to 1000, chum 1500 to dusk
18 Oct	24.626°S, 135.603°W 25.392°S, 136.394°W	SE 25–30 kt to NE 15–20 kt	Sail toward MacDonald Bank, chum 1400 to dusk
19 Oct	26.714°S, 137.878°W 27.273°S, 138.531°W	NE 15–20 kt	Sail toward MacDonald Bank, chum 1400 to dusk
20 Oct	28.443°S, 139.718°W 28.972°S, 140.260°W	Calm	MacDonald Bank, chum 0800 to 1100, explore area, chum 1300 to 1600
21 Oct	28.971°S, 140.445°W 28.630°S, 140.171°W	Calm to NE 10–15 kt	MacDonald Bank, chum 0800 to 1000, motor N, chum 1400 to dusk, sunset 1833
22 Oct	28.005°S, 140.311°W 27.718°S, 140.763°W	NE 10–15 kt	Motor N, chum 1330 to dusk, sunset 1839
23 Oct	28.371°S, 141.673°W 28.143°S, 142.151°W	NE 15–20 kt	Sail W toward Marotiri, chum 1330 to 1720, sunset 1843
24–27 Oct			Survey waters around and between Marotiri and Rapa (see Flood <i>et al.</i> 2021)
28 Oct	25.866°S, 145.355°W 25.296°S, 145.831°W	NE 5–10 kt	Sail to Raivavae, Austral Islands, chum 1400 to dusk
29 Oct	24.316°S, 146.883°W 23.914°S, 147.764°W	N 5–10 kt, rain early am	Arrive Raivavae late evening, sunset 1804
30 Oct	23.821°S, 147.849°W 22.820°S, 147.491°W	NE 5–10 kt	Chum Lotus Bank, 16 km off Raivavae, depart NNE 0845 to avoid storm, sunset 1801
31 Oct	21.190°S, 147.409°W 20.397°S, 147.682°W	NE 5–10 kt	Sail to Tahiti, Society Islands, chum 1400 to dusk, sunset 1800
01 Nov	19.145°S, 148.287°W 18.502°S, 148.815°W	NE 5–10 kt	Sail to Tahiti, chum 1500 to 1700, sunset 1802, arrive after midnight
02 Nov	17.809°S, 149.296°W 17.908°S, 149.204°W	NE 15–20 kt, gusty	At anchor until 1400, then explore coastal Passe Vaiau, Tahiti Iti, southeast Tahiti, to dark, sunset 1804
03 Nov	18.211°S, 148.591°W 18.375°S, 148.558°W	SE 10–15 kt	Sail to seamount 80 km SE of Tahiti, chum 0600 to 0900, chum 1400 to dusk, sunset 1802, overnight sail to Tahiti Iti
04 Nov	17.897°S, 149.193°W 17.793°S, 148.806°W	N 10–20 kt	Morning coastal Tahiti Iti, afternoon en route to the volcano Mehetia 115 km E of Tahiti, sunset 1803
05 Nov	17.858°S, 148.073°W 17.949°S, 148.008°W	Calm	Volcano Mehetia at first light, chum 1300 to dusk, sunset 1800
06 Nov	17.899°S, 148.151°W 17.197°S, 148.270°W	N 15–25 kt	Sail to Makatea, Tuamotu Islands, chum 10 km NW of Makatea 1400 to dusk, sunset 1800
07 Nov	15.823°S, 148.279°W 15.826°S, 148.469°W	N 15–25 kt	Off Makatea, chum 1400 to dusk, 10 km S, sunset 1800
08 Nov	17.326°S, 149.398°W 17.494°S, 149.927°W	N 15–20 kt	Approach NW Tahiti am, coastal pm

A fish-oil drip fixed on the stern of the yacht ran throughout daylight hours. Drifting and chumming sessions used fish oil, dried fish meal mixed with fish oil, and offal from fish that we caught for food. Hourly counts were made for each species observed (submitted to eBird with GPS data).

Each day we made a rough conservative estimate of the total number of birds for each species seen (A). The day was divided into three equal periods covering daylight hours 0600 to 1800: X = 0600–0959, Y = 1000–1359, Z = 1400–1759. ‘A’ was estimated from counts for each period (A: X, Y, Z). ‘A’ was adjusted downward when specific birds were known to be present over several time periods (e.g., typical of *Procellaria* petrels). Only the total number of birds was recorded (A) when the count was small. The counts for each day are comparable because they are hour-based and result from the same chumming techniques.

Thibault & Cibois (2017) incorporate sightings from expedition-cruise reports and other sources in their assessment of the status of seabirds that occur in East Polynesia. We searched for more of these reports from colleagues, tour operators, and internet posts (complete list of reports in Appendix 1). The months covered by reports are April, June, July, September, October, and November, though most expedition cruises were undertaken in September–November. The most frequently reported regions are the Marquesas Islands, the Pitcairn Islands, and the southern Tuamotu Islands. In accounts of rarer and some cryptic taxa, we note where a trip report documents a sighting with a photograph. We combine records from Thibault & Cibois (2017), trip reports, and our survey, to amend where necessary the status of several species in East Polynesia.

The next section presents species accounts for the tubenoses recorded during our survey, and sightings of species documented in other reports. Each account begins with our assessment of the species’ status in East Polynesia, then presents our sightings, notes on range, sightings from other trip reports, criteria for species recognition, behaviour, taxonomy, variation, and moult. Short species accounts for other seabirds follow that document our survey results. A conclusion rounds off the report. We mainly adhere to the IOC World Bird List.

RESULTS AND DISCUSSION

TUBENOSES

WILSON’S STORM-PETREL *Oceanites oceanicus*

Status East Polynesia Seasonally regular in small to moderate numbers. Distinct paucity of records in the southeast quadrant of East Polynesia.

Sightings 01 November One at 19.22°S, 148.28°W, *ca.* 190 km southeast of Tahiti. This is farther south than published records, though is consistent with the species’ north–south migration.

Range Rare in Melanesia and West Polynesia (Dutson 2011, Watling 2004). In Hawaiian Islands, scarce in the northwest and rare in the southeast (Pyle & Pyle 2009). In East Polynesia, transequatorial passage migrant from Antarctic and subantarctic breeding grounds during April–May northward migration, and October–November southward migration (Thibault & Cibois 2017). Non-breeders, mainly birds in their first year, to be expected in the tropical region during the breeding season December–March (as tropical Atlantic Ocean; Flood & Fisher 2013a). **Line Islands** Presumed migrants recorded October and November in the early 1970s, one near Kiritimati and two near Jarvis (Crossin 1974). Spear & Ainley (2007) recorded 22 in ship-based surveys 1980–1995 in the South Equatorial Current, in the region, 12.87°N–2.65°S, 166°–119°W, which incorporates the northern *ca.* 60% of the Line Islands. **Marquesas Islands to Society Islands** Non-breeders seen from a ship at a rate of three to five per day in February 1990, ‘but never farther south’ (V. Bretagnolle *in litt.*). **Pitcairn Islands** One October 2017 attracted to chum off Oeno (Morris & Beaman 2017a). Substantial effort across East Polynesia during the non-breeding period and at the time of southward migration has demonstrated that this storm-petrel is uncommon at those times. Not observed in the southeast quadrant of East Polynesia when southward migration expected, despite coverage by expedition cruises. Relatively little effort made at the time of northward migration.

Recognition *O. o. oceanicus* / *exasperatus* blackish with a white wrap-around rump and pale upperwing ulnar bar (*O. o. chilensis* and other *Oceanites* taxa variously have white in the underwing-coverts and on the underbody). Wings are straightened and the wing action is stiff. The wing has a moderately angled leading edge, a straight trailing edge, and the inner wing is shorter than the outer wing. The caudal projection (rear body and tail behind the wings) is long, with a toe projection beyond the tail end, unless the legs are retracted. Flies low over the sea and flight style reminiscent of a Barn Swallow *Hirundo rustica*. To collect prey, foot-patters on long spindly legs, ‘pogo dances’, and ‘walks on water’ (Flood & Fisher 2013a).

Behaviour Attracted to the wake of the sailing yacht by dripping fish oil. Kept pace with the yacht in spells of purposeful and direct flight, wingbeats stiff, interspersed by short to long glides, stopping from time to time to collect fish oil by foot-pattering.

Taxonomy, variation, & moult Polytypic or clinal. Polytypic taxonomy variously recognises *O. o. oceanicus*,

pan-oceanic, breeds subantarctic islands; *O. o. exasperatus*, pan-oceanic, breeds Antarctic coastline and islands of Scotia Sea; and *O. o. chilensis* of central and south Pacific waters of Chile and possibly Falkland Islands, southwest Atlantic. *Oceanicus* is one of the similar-looking *Oceanites*-complex, though taxa other than *oceanicus* / *exasperatus* largely restricted to Pacific waters of Chile, Peru, and the Galapagos Islands.

Conservation Least Concern (IUCN Red List of Threatened Species). Tropical East Polynesia apparently utilised by non-breeders in the breeding season and migrants pass through the region, suggesting that the waters are of some importance to the species.

WHITE-FACED STORM-PETREL *Pelagodroma marina*

Status East Polynesia Seasonally regular in small to moderate numbers. Distinct paucity of records in the western sector of East Polynesia.

Sightings Thirteen birds found within 23.44°–28.21°S, 142.15°–134.34°W, between Gambier and Marotiri, with none between Rapa and Tahiti, or in the surrounding waters of Tahiti. **17 October** Two in the morning and three in the afternoon while drifting (Figure 3). **19 October** One in the afternoon while drifting. **20 October** One in the morning and one in the afternoon while drifting. **21 October** One in the morning and one in the afternoon while drifting. **22 October** One in the afternoon while drifting. **23 October** Two in the afternoon while drifting. These 13 birds are a substantial addition to the 34 or so previously documented records for East Polynesia and demonstrate for the first time that *P. marina* is widely distributed in October across the stretch of ocean from Gambier to MacDonal Bank and Marotiri. None were found between Rapa and Tahiti, or in the surrounding waters of Tahiti, reflecting just two previous records in the western sector of East Polynesia.

Range Thibault & Cibois (2017) reason that breeders from Australasia (*albiclunis*, *dulciae*, *maoriana*) must pass through East Polynesia during the non-breeding season, April–September, given that good numbers reach the west coast of South America (Spear & Ainley 2007). Sightings summarised herein provide evidence of this. Non-breeders, mainly birds in their first year, are to be expected during the breeding season October–March. We found 34 or so previously documented records (19 of them reported in Thibault & Cibois 2017) and in addition six were observed during our Rapa / Marotiri survey (Flood *et al.* 2021). **Line Islands** One undated, Jarvis (King 1967). **Society Islands** One moribund, September 2009, Papeete Harbour, Tahiti (Gouni 2009). **Gambier & southern Tuamotu Islands** One October 2005, between Mangareva and Morane (Hoff 2005). Two September 2013, between Tenararo and Morane (Sargeant 2013). Two September 2013, close offshore, Mangareva (Sargeant 2013). **Gambier Islands to Pitcairn Island** One September 2005 (Hoff 2005), one September 2013 (Sargeant 2013), one November 2014 (Collins 2014). **Pitcairn Islands** One dead October 1990, Henderson (Brooke 1995). Two September 2005 (Hoff 2005), four September 2013 (Sargeant 2013), and ‘a few’ October 2017, between Pitcairn and Henderson (Morris & Beaman 2017a). Two September 2013, between Henderson and Oeno (Sargeant 2013). Three September 2010, in Pitcairn Islands waters (van Beirs 2010). **Gambier Islands to Austral Islands** One September 2006 (C. Gaskin *in litt.*). **Austral Islands** One December 1989 (J.-C. Thibault *in litt.*). Five near Marotiri and one south of the Austral Islands, September 2006 (C. Gaskin *in litt.*). A wrecked bird and a dead bird on Rurutu, October 2010 (Y. Gentilhomme *in litt.*).

Recognition & behaviour

See Flood *et al.* (2021).

Taxonomy, variation, & moult All birds seen well or photographed during our survey were identified to the southwest Pacific taxa, with sullied pale greyish rump and large, though not deep, dark pectoral breast-side patches (e.g., Figure 3). None in wing moult.

Conservation Least Concern (IUCN Red List of Threatened Species). Taxonomic recognition of birds in East Polynesia requires confirmation to eliminate a threatened taxon.



Figure 3. White-faced Storm-Petrel *Pelagodroma marina*, 17 October 2019, Portland Bank, off Gambier Islands (Kirk Zufelt). Note pale greyish rump and the just visible large, though not deep, dark pectoral breast-side patches.

WHITE-BELLIED STORM-PETREL *Fregetta grallaria*

Status East Polynesia Widespread in small numbers. *F. [g.] titan* is an endemic breeder on islets off Rapa and on Marotiri, Austral Islands, where it is easily found in good numbers, certainly October–December in the breeding period, to at least 32 km offshore Rapa (Flood *et al.* 2021), but its distribution away from the breeding islands is virtually unknown with just two confirmed records based on mensural data (Thibault & Cibois 2017, Flood *et al.* 2021). Other taxa of *F. grallaria* may occur in the region.

Sightings Examples of *F. grallaria* were found within 17.24°–28.84°S, 148.62°–140.17°W, in all except for the most northerly latitudes and the most easterly longitudes of the *Sauvage* expedition. **21 October** Two in the afternoon while drifting. **23 October** One in the afternoon while drifting. **30 October** One at 1400 while sailing. **03 November** Two in the morning and two in the afternoon while drifting. **06 November** One in the afternoon while drifting. These nine birds add to the eight at-sea records of ‘unstreaked’ *F. grallaria* (see below for records of ‘streaked’ *F. grallaria*) away from Rapa and Marotiri and confirm for the first time that, in October at the minimum, *F. grallaria* is distributed in small numbers across the stretches of ocean from the Gambier Islands to MacDonal Bank and from Raivavae, Austral Islands to Tahiti, Society Islands. The identification of five of these birds that that were photographed is discussed below under ‘Recognition’ (Figures 7–11).

Range Based on current taxonomy, taxa that frequent the Pacific are *F. [g.] titan* that breeds on Rapa and Marotiri, *F. [g.] segethi* that breeds in the Juan Fernández Islands and Desventuradas Islands, southeast Pacific, and the nominate form that breeds on Lord Howe Island and in the Kermadec Islands, southwest Pacific. *F. [g.] titan* has been recorded at 5°N, 140°W in November 1988 (Spear & Ainley 2007, p. 46) and 4.33°S, 93.50°W in June 1906 (*ca.* 435 km south of Galápagos Islands; Murphy 1936, p. 762), both identifications are based on mensural data. In East Polynesia, eight *F. grallaria* have been recorded from expedition cruises mainly in the region of the Gambier and Pitcairn Islands; five presumed *F. [g.] titan*, one ‘large’ individual, and two indeterminate (two birds photographed are discussed under ‘Recognition’). **Pitcairn Islands to southern Tuamotu Islands** One indeterminate October 2014 (Scott 2014) and one presumed *F. [g.] titan* October 2017 (Morris & Beaman 2017a) between Oeno and Tenararo. **Gambier Islands & southern Tuamotu Islands** One indeterminate October 2014 between Tenararo and Morane (Scott 2014). Two presumed *F. [g.] titan* November 2018 between Mangareva and Morane (Figure 6; Collins 2018; Simpson 2018). **Gambier Islands to Pitcairn Island** One presumed *F. [g.] titan* September 2013 (photograph; Howell 2014), one presumed *F. [g.] titan* September 2014 (Collins 2014). **Pitcairn Islands** One ‘large’ individual October 2014 between Henderson and Oeno (Scott 2014). **North of East Polynesia** Worthy of note, a survey that ran intermittently between 1980 and 1995 found 16 *F. grallaria* within 3.82°N–13.27°S, 175°–119°W, most to the west of 140°W, with all bar one logged during the austral autumn (Spear & Ainley 2007). **Streaked storm-petrels** A bird collected by Rollo Beck off Ua Pou, Marquesas Islands, September 1922, with dark streaking over the underbody, was assigned to *F. grallaria* by Murphy & Snyder (1952) based on morphology and this was confirmed genetically by Cibois *et al.* (2015). In September 2013, one or two similar-looking birds were seen briefly over chum 25 km southwest of Fatu Hiva, Marquesas Islands (Sargeant 2013). **Bone records** *Fregetta* bones were found at Ua Huka and Tahuata, Marquesas Islands, and at Henderson, Pitcairn Islands (Thibault & Cibois 2017).

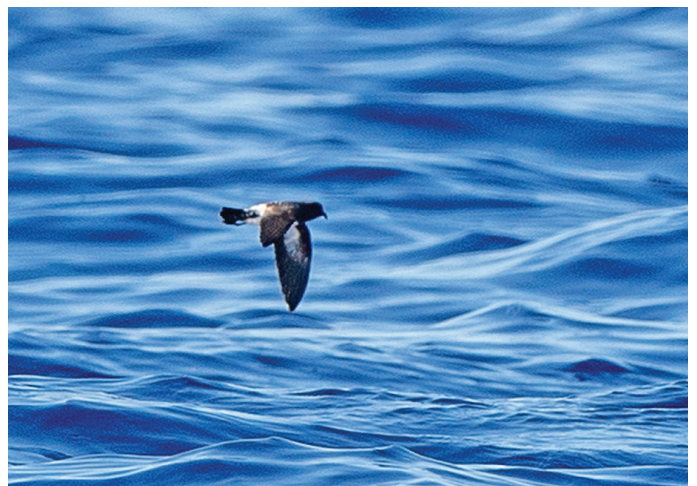


Figure 4. Titan Storm-Petrel *Fregetta [grallaria] titan* (right) and Polynesian Storm-Petrel *Nesofregetta fuliginosa* (left), 25 October 2019, off Rapa, Austral Islands (Kirk Zufelt). Polynesian of Austral Islands and Gambier Islands are larger than those of Marquesas Islands (Holyoak & Thibault 1984) and Titan and Polynesian are similar in size.

Recognition *F. [g.] titan* is unique in its large size, approximating the size of the local-breeding Polynesian Storm-Petrel *Nesofregatta fuliginosa* (Figure 4). It has a moderate to strong build, and particularly broad white fringes to the scapulars, mantle to rump, and upperwing greater, median, and longest lesser secondary coverts (Figure 5). Most birds that we observed off Rapa were ‘classic’ broadly fringed *F. [g.] titan* in relatively fresh plumage, though the depth of the fringes varied somewhat, probably reflecting the degree of wear. The plumage of a few birds was notably more worn. A minority of birds had narrower white fringes, irrespective of wear, and looked more lightly built. Explanations include variation in ‘classic’ *F. [g.] titan*, two seasonal populations of *F. [g.] titan*, or another taxon of *F. grallaria* visiting or breeding on Rapa, Marotiri, or both. For details see Flood *et al.* (2021). Below we assess six *F. grallaria* photographed in East Polynesia away from Rapa and Marotiri, one bird recorded during expedition cruises and five during the *Sauvage* expedition.

Of the seven photographed birds (Figures 6–11, plus the one in Howell 2014), two had quite fresh plumage (4 September 2013 and 23 October 2019) and features that point to ‘classic’ *F. [g.] titan*. The other five had worn plumage, whereas only a few *F. [g.] titan* off Rapa and Marotiri showed equivalent wear at the same time of the year. Four showed evidence of broad feather fringes, though (including 4 September 2013). All had a moderate to robust build and size was largish to large. Possible identification of the five worn birds are ‘classic’ *F. [g.] titan* of a different age group from breeding birds, or representatives of a different taxon or taxa of *F. grallaria*.

Right Figure 5. Titan Storm-Petrel *Fregatta [grallaria] titan*, 25 October 2019, Rapa, Austral Islands (Kirk Zufelt). Particularly broad white fringes to scapulars, mantle to rump, and upperwing greater, median, and longest lesser secondary coverts. *F. [g.] segethi* (breeds Desventuradas) has Titan-like broad white fringes, but is the smallest form of *grallaria*. A safe identification of Titan away from Rapa and Marotiri thus requires confidence in judgement of size.





Facing page, bottom four figures, top left to bottom right Figure 6. White-bellied Storm-Petrel *Fregetta grallaria*, 18 November 2018, ca. 90 km west of Mangareva, Gambier Islands (*Hiroyuki Tanoi*). Worn plumage, remnants of broad white fringes mainly to outer greater secondary coverts, few scapulars, and some feathers of the mantle to rump, moderately robust build. Thought to appear large (S. Tanoi *in litt.*). Identification indeterminate, possibly worn ‘classic’ *titan* or another taxon. **Figure 7.** White-bellied Storm-Petrel *Fregetta grallaria*, 21 October 2019, MacDonald Bank, ca. 360 km northeast of Marotiri, Austral Islands (*Kirk Zufelt*). Worn plumage, as far as can be seen, broad white fringes to scapulars, moderate build, impression of largish *Fregetta*. Identification indeterminate, possibly worn ‘classic’ *titan* or another taxon. **Figure 8.** White-bellied Storm-Petrel *Fregetta grallaria*, 23 October 2019, ca. 100 km northeast of Marotiri, Austral Islands (*Kirk Zufelt*). Quite fresh plumage, full complement of broad white fringes, robust build, impression of large *Fregetta*. Features point to ‘classic’ *titan*. **Figure 9.** White-bellied Storm-Petrel *Fregetta grallaria*, 30 October 2019, ca. 530 km northwest of Rapa, Austral Islands (*Kirk Zufelt*). Worn plumage, remnants of white fringes (not obviously broad, though) on few greater secondary coverts, several scapulars, and many feathers mantle to rump, plus moderate build and impression of largish *Fregetta*. Identification indeterminate, possibly worn ‘classic’ *titan* or another taxon. **Above, top left Figure 10.** White-bellied Storm-Petrel *Fregetta grallaria*, 03 November 2019, ca. 1,200 km northwest of Rapa, Austral Islands (*Kirk Zufelt*). Worn plumage, remnants of white fringes (not obviously broad, though) on a few scapulars and many feathers mantle to rump, plus moderate to robust build and impression of largish *Fregetta*. Identification indeterminate, possibly worn ‘classic’ *titan* or another taxon. **Top right Figure 11.** White-bellied Storm-Petrel *Fregetta grallaria*, 06 November 2019, ca. 1,400 km northwest of Rapa, Austral Islands (*Kirk Zufelt*). Worn plumage, remnants of white fringes to greater secondary coverts, scapulars and mantle to rump (a few remnant fringes apparently broad), moderate build, impression of largish *Fregetta*. Identification indeterminate, possibly worn ‘classic’ *titan* or another taxon.

Behaviour See Flood *et al.* (2021).

Taxonomy, variation, & moult *Fregetta* taxonomy is not resolved (Cibois *et al.* 2015, Robertson *et al.* 2016). See ‘Recognition’ for wear and moult and Flood *et al.* (2021) for further details of variation in *F. grallaria*.

Conservation *F. grallaria* complex is listed as Least Concern (IUCN Red List of Threatened Species). Several taxa if treated separately are probably Endangered.

POLYNESIAN STORM-PETREL *Nesofregetta fuliginosa*

Status East Polynesia Knowledge on the past and present breeding ranges is incomplete and about 60% of data has been obtained since the year 2000, with breeding or possible breeding currently known on only 17 islands (Thibault & Cibois 2017). In the northern region, breeding is restricted to the Line Islands and the Marquesas Islands. In the southern region, breeding is restricted to the southernmost Austral Islands, the Gambier Islands, and the Eastern Islands. There is no known breeding across the central swathe of islands where historically extinct populations are documented. During the *Sauvage* expedition, none were observed in this central region, from Rapa to Tahiti, via Raivavae, or during the week exploring waters around Tahiti, in stark contrast to the forerunning leg Gambier to Rapa.

Sightings 16 October During the evening, six foraging at the shelf-edge, southeast of Gambier, two of which were rafting with Polynesian Shearwaters *Puffinus polynesiae*. **17 October** Present most of the day, involving ca. 18 birds, four while sailing and, while drifting, four in the morning and 10 in the afternoon. **18 October** Four before 0700 while sailing and one in the afternoon while drifting (Figure 12). **19 October** Two while sailing, one at 0700 and one at 1000, but none in the afternoon while drifting. **20 October** None recorded over MacDonald Bank while drifting, though a lack of wind prevented dispersal of the smell of chum. **21 October** One in the afternoon while drifting. **22 October** Three in the afternoon while drifting. **23 October** Two in the afternoon while drifting.

Range Breeds locally in the tropical and subtropical Pacific, from New Caledonia in the west to Salas y Gómez in the east. Reports for East Polynesia are concentrated around the main breeding locations, for example, with

ca. 37 birds in Marquesas Islands; *ca.* 18 birds Gambier, southern Tuamotu, Pitcairn Islands; and many by the breeding grounds of *F. [g.] titan* off Rapa and Marotiri, Austral Islands. **Marquesas Islands** Two September 2010 between Hiva Oa and Fatu Hiva (van Beirs 2010). Three July 2012 between Ua Huka and Nuka Hiva (van der Vliet & Zantingh 2012). Up to eight September 2013 (Sargeant 2013) and two October 2017 (Morris & Beaman 2017b) several km off Hatutu. ‘A few’ October 2013 (Sargeant 2013) and three October 2017 (Morris & Beaman 2017b) between Ua Huka and Tahuata. At least three October 2017 between Nuku Hiva and Hatutu (Morris & Beaman 2017b). Ten September 2018 (Jacob 2018) and four November 2018 (Collins 2018, Simpson 2018) near Fatu Huku. **Gambier Islands & southern Tuamotu Islands** Close to Gambier, a few in September and October 2005 (Hoff 2005), two September 2013 (Sargeant 2013), two November 2018 (Collins 2018, Simpson 2018). One September 2010 between Tenararo and Mangareva (van Beirs 2010). One November 2014 off Morane (Collins 2014). **Gambier Islands to Pitcairn Island** One September 2005 (Hoff 2005), two October 2010 (van Beirs 2010), one September 2013 (Sargeant 2013), one October 2014 (Scott 2014). **Pitcairn Island to southern Tuamotu Islands** One October 2017 between Oeno and Tenararo (Morris & Beaman 2017a). **Pitcairn Islands** One September 2013 (Sargeant 2013) and one October 2017 (Morris & Beaman 2017a) between Pitcairn and Henderson. Two November 2014 about 40 km west of Henderson (Collins 2014). **Austral Islands** Easily found in good numbers at Rapa and Marotiri October–December 2019 (Flood *et al.* 2021).

Recognition & behaviour See Flood *et al.* (2021).

Taxonomy, variation, & moult Classed as monotypic in most key references (e.g., HBW^a 2020) and polymorphic, with exclusively light morph in East Polynesia. None were in wing moult, though the remiges and rectrices of some birds were heavily worn, consistent with birds at the end of the breeding season (similar to birds off Marotiri and Rapa; Flood *et al.* 2021).

Conservation Endangered (IUCN Red List of Threatened Species) with numerous historically extinct populations. East Polynesia contains several important breeding sites with significant populations and is an important region for conservation of the species.



Figure 12. Polynesian Storm-Petrel *Nesofregatta fulginosa*, 18 October 2019, approximately midway between Gambier Islands and MacDonal Bank (Kirk Zufelt).

STORM-PETREL SP.

Sightings Two probable *F. grallaria* observed distantly. **21 October** One at 26.69°S, 140.18°W. **04 November** One at 17.81°S, 148.95°W.

WANDERING ALBATROSS COMPLEX *Diomedea exulans*

Status East Polynesia ‘Wandering Albatross’ is a regular visitor in small numbers to 25°S.

Sightings 20 October One first-cycle bird, probably a male *D. a. antipodensis*, at 28.38°S, 139.64°W (Figures 13 & 14).

Range The complex is circumpolar in the Southern Oceans, very roughly 25–65°S. A clearer picture of the at-sea ranges is emerging from BirdLife’s Seabird Tracking Database: *D. a. antipodensis* breeds December / January to January / March mainly in the Antipodes Islands (*D. a. antipodensis* and *D. a. gibsoni* combined, 9,050 pairs and 50,000 mature individuals in 2016; Elliott & Walker 2014, Elliott *et al.* 2016) and some forage across the Pacific to the Humboldt Current off Chile. *D. a. gibsoni* breeds December / January to January / February mainly in the Auckland Islands and some forage to the central South Pacific. *D. exulans* breeds December / January to November / December on subantarctic islands of the South Atlantic and South Indian Oceans (6,000 pairs and 20,100 mature individuals; BirdLife International 2021a) and has a circumpolar at-sea foraging range. Neither *D. amsterdamensis* (breeds Amsterdam Island, South Indian Ocean) nor *D. dabbenena* (breeds Tristan da Cunha and Gough Island, South Atlantic) has been tracked to the Pacific. Based on this, the most likely candidate taxa for records in East Polynesia are *D. a. antipodensis* and *D. exulans*. Nine previously documented records for East Polynesia include three actual / probable *D. a. antipodensis*. **Tuamotu Islands** One *D. a. antipodensis* ringed as an adult in February 1969 in the Antipodes Islands was recovered dead on Taiaro in December 1971 (Robertson 1972). **Pitcairn Islands** Immature April 1921 ca. 100 km west of Pitcairn (Brooke 1995). One 29 September 2005 between Pitcairn and Henderson (Hoff 2005). One fourth-cycle bird, probably male *D. a. antipodensis* 13 June 2006 between Pitcairn and Oeno (Figures 15 & 16, Cooper 2006). **Gambier Islands to Rapa Island** One 06 March 1931 at 29.44°S, 139.20°W and one September 1931 at 28.52°S, 140.55°W (Harrison 1962, p. 45). **Austral Islands** One April 1921 ca. 45 km north of Rapa (R. Beck *in litt.*). Sightings on 29 September 2014 off Rapa / Marotiri (Figure 17, Skipworth 2014) reported as ‘several birds in October’ by Thibault & Cibois (2017), but the two photographs show a single ‘classic’ adult male *D. a. antipodensis*. One September 2006 near Marotiri (C. Gaskin *in litt.*). Including our 2019 sighting, all 10 sightings were made south of the latitudes of the Pitcairn Islands (approximately south of 25°S).

Recognition At-sea separation of the Wandering Albatross complex is challenging because plumage maturation and ageing across the taxa is not fully elucidated (for insights, see captions to Figures 13–17 and lengthier accounts in Shirihai 2007, Howell & Zufelt 2019, Harrison *et al.* 2021).



Figures 13 & 14. Probable Antipodean Albatross *Diomedea a. antipodensis*, 20 October 2019, approximately midway between Gambier Islands and MacDonal Bank (Kirk Zufelt). First-cycle based on fresh, uniform, juvenile-like plumage, with beginnings of whitening on hindneck and lower breast and belly. Early whitening of hindneck and our judgement of relatively small size in the field point to *antipodensis*. Quite deep bill most typical of males.



Figures 15 & 16. Probable Antipodean Albatross *Diomedea a. antipodensis*, 13 June 2006, between Pitcairn and Oeno, Pitcairn Islands (*John Cooper*). Fourth-cycle male. Aged by moult contrast between old worn outermost three primaries and fresh adjacent replaced primaries, with blocks of retained juvenile secondaries (Howell & Zufelt 2019). Mixed age upperwing feathers, some faded and worn, though no whitening. Hindneck, lower breast and belly whitening, leaving a broad, densely marked upper-breast band and flanks. Quite deep bill.



Figure 17. Antipodean Albatross *Diomedea a. antipodensis*, 29 September 2014, off Rapa / Marotiri, Austral Islands (*Jan Skipworth*). ‘Classic’ adult male, with whitened head, neck, and body; small, well-defined dark cap; unevenly dark mottled mantle, back, and rump; extensively dark scapulars, broad smudgy upper-breast band, upperwing solidly dark with no sign of whitening, solidly dark tail, and quite deep bill.

Behaviour Foraged widely over the open ocean, occasionally inspected the travelling yacht, though quickly moved on, presumably because we offered no fish discard.

Taxonomy, variation, & moult The ‘Wandering Albatross complex’ *Diomedea exulans* comprises five taxa: Snowy Albatross *D. exulans*, Tristan Albatross *D. dabbenena*, Antipodean Albatross *D. a. antipodensis*, Gibson’s Albatross *D. a. gibsoni*, and Amsterdam Albatross *D. amsterdamensis* (also see ‘Range’). Treated variously as one species (Howard & Moore v2021, Clements *et al.* v2021), four species with *D. a. antipodensis* and *D. a. gibsoni* lumped (BirdLife International v2021; IOC World Bird List v11.1), and five species (Howell & Zufelt 2019).

Conservation Taxa in this complex are listed from Critically Endangered to Vulnerable (IUCN Red List of Threatened Species). East Polynesia south of 25°S is an important foraging area for *D. a. antipodensis*, probably *D. exulans*, and possibly *D. a. gibsoni*. It may be more important to females and younger birds, which generally forage farther north than males (e.g., *D. a. antipodensis*; Elliott & Walker 2014, Bose & Debski 2020).

BULLER'S ALBATROSS *Thalassarche bulleri*

Status East Polynesia Both taxa seasonally regular in small numbers.

Sightings A total of nine individuals recorded, all but one between Gambier Islands, MacDonald Bank, and Marotiri, Austral Islands. **19 October** One at 26.71°S, 137.88°W. **20 October** One at 28.44°S, 139.72°W. **22 October** Three between 27.78°S, 140.70°W and 28.06°S, 140.21°W. **23 October** Three between 28.14°S, 142.15°W and 28.37°S, 143.49°W. **01 November** One at 19.23°S, 148.28°W. The latitude limits of the sightings are 19.23°S to 28.44°S.

Range Southern Buller's *T. [b.] bulleri* breeds January–September in the Snares Islands (8,704 pairs) and Solander Islands (5,280 pairs) (Sagar 2014, Thompson *et al.* 2016). Northern Buller's *T. [b.] platei* breeds November–June mainly in the Chatham Islands (*ca.* 18,130 pairs) (ACAP 2012). Disperses across the South Pacific and is regular in the Humboldt Current off Chile and Peru (BirdLife Seabird Tracking Database), where both adults and immatures are found (Shirihai *et al.* 2016, Flood *et al.* 2017) *contra* Marchant & Higgins (1990). Eight previous records documented for East Polynesia. **Pitcairn Islands** One off Henderson 30 September 2005 (Hoff 2005). **Gambier Islands to Pitcairn Island** An adult and one other September 2010 (taxon uncertain, photograph; van Beirs 2010), one 05 November 2014 (Collins 2014), and an adult 07 November 2018 (Figure 18, apparently *T. [b.] bulleri*, Collins 2018, Simpson 2018, Talbot 2018). **Austral Islands** An adult 23 September 2014 off Rapa / Marotiri (apparently *T. [b.] bulleri*, Figure 19; Skipworth 2014). Latter listed as ‘sub/adult in October’ by Thibault & Cibois (2017), but the photograph shows an adult and metadata of the photograph gives 23 September 2014. Two 23 October off Marotiri (Flood *et al.* 2021). These records plus our nine sightings indicate that the species is seasonally regular in East Polynesia in small numbers. All birds observed during the *Sauvage* expedition were adults. Timing of the observations were during the non-breeding period of *T. [b.] bulleri* and at the start of the breeding season of *T. [b.] platei*.

Recognition Based on current knowledge, field separation of young immatures of the two taxa is not possible, and of older immatures is only possible when they have attained adult-like plumage and bill colouration. Adult *T. [b.] platei* invariably has a distinctly darker hood than *T. [b.] bulleri*, a broader base to the yellow culminicorn stripe, and a narrower, clearly defined rather than broader, diffuse distal end to the yellow ramicorn stripe. Example photographs of adult *T. [b.] platei* and *T. [b.] bulleri*, taken during the *Sauvage* expedition, respectively are given in Figures 20 and 21. Thibault & Cibois (2017) do not separate sightings into *bulleri* or *platei*. Our photographic documentation is evidence that both taxa occur and should be included on the list of avifauna for East Polynesia.



Figure 18. Southern Buller's Albatross *Thalassarche [bulleri] bulleri*, 7 November 2018, between Mangareva and Pitcairn, Pitcairn Islands (*Bill Simpson*). Adult with relatively pale hood and broad, diffuse distal end to the yellow ramicorn stripe. See over page for comparison of darkness of Northern and Southern hoods.



Figure 19. Southern Buller's Albatross *Thalassarche [bulleri] bulleri*, 23 September 2014, off Rapa / Marotiri, Austral Islands (Ian Skipworth). Adult, with relatively pale hood and broad, diffuse distal end to the yellow ramicorn stripe. See below for comparison of darkness of Northern and Southern hoods.



Left Figure 20. Northern Buller's Albatross *Thalassarche [bulleri] platei*, 23 October 2019, between MacDonald Bank and Marotiri, Austral Islands (Kirk Zufelt). **Right Figure 21.** Southern Buller's Albatross *Thalassarche [bulleri] bulleri*, 23 October 2019, between MacDonald Bank and Marotiri, Austral Islands (Kirk Zufelt). Adults, respectively, dark versus pale hood, and narrow, clearly defined, versus broad, diffuse distal end to yellow ramicorn stripe. Both Northern and Southern forms were seen during the 2019 *Sauvage* expedition.

BAND-RUMPED STORM-PETREL *Hydrobates castro* (*sensu lato*)

Status East Polynesia Uncertain. Probably a scarce visitor in the South Equatorial Current, though local breeding is worthy of consideration.

Sightings None.

Range The *castro*-complex has known representatives in the North and South Atlantic and Pacific, and unknown populations could occur in the Pacific. Several populations have been formally described as species and it is likely that some / many of the other populations will follow. In the Pacific, breeding occurs in Japan (June–November), the Hawaiian Islands (May–November), and the Galapagos Islands (two seasonal populations, May–October, December–May). At-sea ranges away from these breeding sites are poorly known, but it is likely that populations disperse into the tropical and subtropical Pacific from their breeding sites. In East Polynesia, the Pacific Ocean Biological Survey Program recorded *castro* several times in the 1960s, from 120°W to the Marquesas Islands (Thibault & Cibois 2017). Recorded six times in the Line Islands

Behaviour See Flood *et al.* (2021).

Taxonomy, variation, & moult Polytypic, the species comprising Northern Buller's *T. [b.] platei* and the nominate Southern Buller's. Variation outlined above. None in wing moult.

Conservation The two taxa combined are listed as Near Threatened (IUCN Red List of Threatened Species). The northerly part of the passage from the breeding grounds to the Humboldt Current off Chile passes through East Polynesia, north roughly to 25°S (BirdLife Seabird Tracking Database), emphasising the importance of East Polynesia to this species.

(Crossin 1974, pp. 178–179). Recorded over the South Equatorial Current in the region of the Line Islands and Marquesas Islands 1980–1995 (Spear & Ainley 2007, pp. 35–37). No further documented records until at least two observed at dusk in October 2017 while sailing south from Nuku Hiva, Marquesas (Morris & Beaman 2017b). The distances from the nearest breeding locations of the *castro*-complex, the Hawaiian Islands, to Kiribati, Line Islands, is *ca.* 2,000 km, and to Nuku Hiva, Marquesas Islands, is *ca.* 3,700 km. The distance to the Galapagos Islands is over 5,000 km. Thus, while it is known that storm-petrels can travel such distances, the possibility of local breeding should be borne in mind.

Recognition The *castro*-complex comprises multiple cryptic populations / taxa. Field separation is virtually impossible in most cases. All taxa are mid-sized storm-petrels, blackish-brown overall, most with indistinct upperwing carpal bars (*cf.* Leach's Storm-Petrel *Hydrobates leucorhous*), and a white rump of variable width that wraps around to the underside, reaching from 50–80% of the way to the central line of the underbody (extent varies among taxa). Flight is steady with regular wingbeats and few sudden movements. The *castro*-complex is most easily confused with nominate Leach's Storm-Petrel (see Flood & Fisher 2013a).

Behaviour Nothing documented for sightings in East Polynesia.

Taxonomy, variation, & moult Taxonomy of the *castro*-complex is not resolved (see Howell & Zufelt 2019, Flood *et al.* 2021). Nothing specific noted for variation and moult.

Conservation Least Concern if treated as one species (IUCN Red List of Threatened Species). However, if considered separately, most populations would be treated as more threatened, some Critically Endangered (Japanese population now estimated at less than 50 pairs). Sightings listed here are extremely important and relevant to conservation given limited knowledge about the at-sea ranges of populations, the Japanese population crash, and the possibility of an undiscovered population or populations in the tropical and subtropical Pacific. Taxonomic recognition of birds in East Polynesia requires confirmation to eliminate a threatened taxon.

GIANT PETREL *Macronectes giganteus* / *halli*

Status East Polynesia Immature Giant Petrels of both taxa scarce but regular visitors.

Sightings See Northern Giant Petrel.

Range Southern Giant *M. [g.] giganteus* has a circumpolar breeding range, roughly 40–60°S (68°S West Antarctica), on subantarctic and Antarctic islands, September–April. Northern Giant *M. [g.] halli* has a circumpolar breeding range, roughly 46–54°S, on subantarctic islands, August–March. All birds recovered in East Polynesia were in their first year, except a single second-year bird, and 29 of the 40 records in Thibault & Cibois (2017) and our survey fall within June–October, following the fledging periods March–May for Southern Giant and February–March for Northern Giant. The only island groups without records are Northern Cook and Line. Giant Petrel is considered a vagrant to East Polynesia by Thibault & Cibois (2017) with all but one record to the south of 16°S. However, 40 previous records, sightings on four out of 11 expedition cruises, and the bird recorded during our survey, indicate that immature Giant Petrels are scarce but regular visitors. Thibault & Cibois (2017) note that Giant Petrels are rarely seen flying at sea except in southern Polynesian waters and most birds are injured and found in lagoons or near islands. This only reflects the paucity of both at-sea surveys and expedition cruises in the region, which as stated have a *ca.* 40% success rate of finding Giant Petrel. Also, there are numerous reports of healthy birds, e.g., Brooke (1995) reports two apparently healthy Southern Giants, with one enjoying food scraps on the jetty of Pitcairn.

Recognition Thibault & Cibois (2017) consider field separation of Northern and Southern Giant Petrels problematic. They separate records into one or other taxon only for the diagnostic white morph of *giganteus* and ringed birds from known breeding sites. Thibault & Cibois (2017) state that the only reliable identification criteria for Southern Giant are the unique white morph, the pale green colour of the bill tip (ungues, as opposed to dusky / reddish in Northern Giant), and the dark iris of the eye. However, for dark morphs, the colour of the unguis is often clear to see in the field and in photographs and is a good field mark. Also note, both taxa can have a pale iris. Although all birds recorded to date were young immatures, it is worth learning differences in plumage maturation between the two taxa. Put simply, Southern Giant develops a pale head and the rest of the plumage remains dark, while Northern Giant becomes contrastingly paler ventrally, though the plumage of old birds of both taxa becomes overall pale / grey (Flood & Fisher 2016).

Taxonomy, variation, & moult Treated as a polytypic species by Thibault & Cibois (2017), but as two distinct species by some authorities (e.g., Shirihai 2007, Techow *et al.* 2010, Harrison *et al.* 2021, IOC World Bird List v11.2.). No unusual variation noted. No photographed birds in wing moult. The plumage of the Northern Giant seen on 14 June 2006 was fresh and uniform, indicating a fresh juvenile. The outer primaries of the Northern Giant on 27 September 2014 were heavily abraded, suggesting weak juvenile feathers (Figure 23).

Conservation Both taxa are listed separately as Least Concern (IUCN Red List of Threatened Species). East Polynesian waters have some value to immature birds and possibly long-line fishing in the region is responsible for a high proportion of the injured birds reported by Thibault & Cibois (2017).



Left Figure 22. Northern Giant Petrel *Macronectes halli*, 14 June 2006, off Oeno, Pitcairn Islands (John Cooper). Scavenging on a dead Red-tailed Tropicbird *Phaethon rubricauda* **Right Figure 23.** Northern Giant Petrel *Macronectes halli*, 27 September 2014, Rapa / Marotiri, Austral Islands (Ian Skipworth). The dusky / reddish unguis is evident on both birds, rather than the greenish unguis of Southern Giant. This is a reliable field mark, though the coloration can be more subtle on the youngest birds, such as the fresh juvenile shown in Figure 22 (with uniform plumage). Figure 23 is dark overall, but moult contrast in the remiges indicates that it is not a juvenile bird (though it retains some presumed juvenile feathers, such as a small block of trashed outermost secondaries).

SOUTHERN GIANT PETREL *Macronectes [g.] giganteus*

Sightings None.

Range Southern Tuamotu Islands One 07 October 2005 between Tenararo and Morane (Hoff 2005). Eight more records assigned to this taxon by Thibault & Cibois (2017) making nine in total.

NORTHERN GIANT PETREL *Macronectes [g.] halli*

Sightings 18 October One in the morning at 24.63°S, 135.60°W (reddish unguis).

Range Southern Tuamotu Islands to Pitcairn Island One 03 October 2005 between Oeno and Tenararo (Hoff 2005). An all-dark bird with the fresh uniform plumage of a juvenile on 14 June 2006 off Oeno (reddish unguis, Figure 22; Cooper 2006). **Austral Islands** An all-dark bird 27 September 2014 Rapa / Marotiri (reddish unguis, Figure 23; Skipworth 2014). Two more records assigned to this taxon by Thibault & Cibois (2017) making six in total.

Behaviour Foraged widely over the open ocean and showed no interest in the travelling yacht.

BLUE PETREL *Halobaena caerulea*

Status East Polynesia Vagrant.

Sightings Not recorded during the *Sauvage* expedition (see 'Range' for the single record).

Range Breeds October–February circumpolar on subantarctic islands and ranges roughly between 35°S and the pack ice. Commonly seen in waters of the Antarctic Convergence, which varies seasonally in latitude from 41–61°S, but typically closer to 55°S. Not recorded in East Polynesia, though one badly damaged bone of this species was found during an archaeological excavation on Rapa Nui (Carr 1980). **Southern Tuamotu Islands** One 08 October 2005 off Morane, roughly at 23°S, seen extremely well by an experienced observer (known to us) (Hansbro 2005). A record this far north of the species' main range represents a vagrant.

Recognition '... it was pale blue above with a dark M-mark across the wings typical of a prion, but it had a white tail tip ... and it had a black head – definitely a Blue Petrel.' (Hansbro 2005).

Behaviour Observed under attack by frigatebirds *Fregata*. The observer attempted to rescue it by wading into the surf and catching it with his hat, but the bird bit his hat and flew off.

Taxonomy, variation, & moult All major authorities treat Blue Petrel as a single-species genus. Nothing noted for variation and moult.

Conservation Least Concern (Red List of Threatened Species). East Polynesia is of no importance to Blue Petrel.

WHITE-HEADED PETREL *Pterodroma lessonii*

Status East Polynesia Uncommon but regular visitor mainly south of 25°S.

Sightings 19 October One at 26.71°S, 137.88°W. **20 October** One at 28.69°S, 139.91°W.

Range Breeds November–June on subantarctic islands in the Indian and Pacific Oceans, circumpolar range roughly 25–65°S, though scarce in the Atlantic Ocean. There are 16 previously documented records for East Polynesia, seven of which were found wrecked or dead. **Society Islands** One dead July 2009 on Tetiaroa (Russell *et al.* 2015). Juveniles wrecked on Moorea August 2014 and Bora Bora June 2015 (Thibault & Cibois



Figures 24 & 25. White-headed Petrel *Pterodroma lessonii*, 6 September 2013, Forty Mile Reef *ca.* 75 km south of Pitcairn, Pitcairn Islands (Kirk Zufelt). Plumage unlike any other petrel making recognition straightforward – uniquely white head, dark eye mask, light grey tail, and white underbody contrasting with all-dark underwings.

2017). **Gambier Islands** One dead August 1971 on Tekava Islet (Holyoak & Thibault 1984). Three at sea September 2006 (C. Gaskin *in litt.*). **Pitcairn Islands** In 1991, one dead 04 July on Henderson, and individuals 20 June 8 km off Henderson and 14 July between Henderson and Pitcairn (Brooke 1995). One off Oeno 03 October 2005 (Hansbro 2005). One 06 September 2013 at Forty Mile Reef *ca.* 75 km south of Pitcairn (Figures 24 & 25; Sargeant 2013). **Austral Islands** Individuals wrecked July 2006 on Rurutu and July 1975 on Tubuai (Thibault & Cibois 2005, 2017). Two at sea September 2006 southwest of Rapa (C. Gaskin *in litt.*). All records post-breeding June–October, but birds may visit in other months, for which there has been little observational effort.

Recognition Highly distinctive, large *Pterodroma*, dark grey mantle to rump and upperwings, dark M-shape across the open upperwings, less evident when plumage bleached browner, light grey uppertail-coverts and tail, striking white ‘beacon head’ with distinct blackish eye mask and blackish bill, white chin to undertail-coverts and undertail, variable greyish neck tabs / collar, and largely blackish underwings.

Behaviour Impressively dynamic in the strong wind, swooping back and forth over the chum slick, making steep rises and descents, stalling before descent, sharp twists and turns, without flapping wings, several times slowed and flew steadily along the fish-oil slick making shallow wingbeats (video <https://youtu.be/g32pohaFNEg>). Flew off after several minutes.

Taxonomy, variation, & moult Monotypic. No indication of morphological differences between *lessonii* observed in East Polynesia and those observed elsewhere. Neither bird in wing moult.

Conservation Least Concern (IUCN Red List of Threatened Species). East Polynesia is in the northern limits of the main range of White-headed Petrel and of relatively minor importance to its conservation.

MURPHY’S PETREL *Pterodroma ultima*

Status East Polynesia The region houses much of the breeding population of Murphy’s Petrel, concentrated in the Pitcairn Islands, with smaller numbers in the adjacent southern Tuamotu Islands, and small ‘outposts’ in the southern Austral Islands and Easter Islands, all south of 17°S (Thibault & Cibois 2017). At sea, during the breeding season, it is frequently encountered in the region from southern Tuamotu Islands to southern Austral Islands and the Pitcairn Islands. Scarce or largely absent in the northwest region.

Sightings Frequently encountered during the first leg of the *Sauvage* expedition, from Gambier Islands to Marotiri, Austral Islands, but less frequent in the two days at MacDonal Bank, southeast of Marotiri, during a calm period (Figures 26 & 27). Very few found while sailing from Rapa to Raivavae, in the Austral Islands, and none between Raivavae and Tahiti, Society Islands, or around Tahiti. Not surprisingly, at-sea sightings were concentrated in the breeding range in the southeast of East Polynesia.

Date	Counts
17 Oct	39: 4, 8, 27
18 Oct	105: 26, 29, 50
19 Oct	75: 11, 21, 43
20 Oct	30: 13, 7, 10
21 Oct	24: 4, 10, 10
22 Oct	29: 7, 5, 17
23 Oct	93: 26, 16, 51
28 Oct	4: 3, 0, 1
29 Oct	1: 0, 1, 0

Range Endemic breeder of East Polynesia south of 17°S, including regular colonies in the Austral Islands, June–December, though slight differences in dates between locations (Thibault & Cibois 2017). Migrates for the non-breeding period mainly to the Subarctic Gyre in the North Pacific, to forage in cool mesotrophic waters (Clay *et al.* 2017). Recorded east to the Juan Fernández Islands (Flood *et al.* 2017).

Recognition See Grey-faced Petrel.

Behaviour Attracted to the travelling yacht by dripping fish oil, typically first seen at distance looking over the oily wake, then flying up and down the wake, at times swooping back and forward close to the stern (video <https://youtu.be/NQwlfOyNc7g>). Travelling flight fast and direct, tilted and banked, occasionally turned back on itself, and arced in windy conditions.

Taxonomy, variation, & moult Monotypic. No indication of morphological variation. None in wing moult.

Conservation Near Threatened (IUCN Red List of Threatened Species). Estimated total population 800,000 to one million individuals (Brooke 2004). East Polynesia holds nearly the entire known breeding population and thus conservation in the region is crucial to protecting this species.



Figures 26 & 27. Murphy's Petrels *Pterodroma ultima*, 23 October 2019, between MacDonald Bank and Marotiri, Austral Islands (Kirk Zufelt). The regular *Pterodroma* species from Gambier Islands to the southern Austral Islands.

GREY-FACED PETREL *Pterodroma gouldi*

Status East Polynesia Scarce visitor mainly south of 25°S.

Sightings At least six birds. **20 October** Three or more individuals seen on and off throughout the day, from 28.59°S, 139.86°W to 28.99°S, 140.26°W. **21 October** One at 28.99°S, 140.25°W and one at 28.91°S, 140.20°W (Figure 28). **23 October** One at 28.13°S, 142.17°W.

Range Breeds north New Zealand, June–January, and ranges west to Australia from South Australia to Queensland, and east to the central South Pacific, mainly 30–50°S. The similar-looking Great-winged Petrel *P. macroptera* ranges across the South Atlantic and South Indian Oceans to southeast Australia. There are two previously documented records of Grey-faced Petrel for East Polynesia involving five live birds. **Pitcairn Islands** Four 03 October 2005 off Oeno (Hansbro 2005, Hoff 2005). **Austral Islands** One September 2006 off southern Austral Islands (C. Gaskin *in litt.*). All records fall within the breeding period and probably involved non-breeders, mainly immature birds. **Bone records** Bones ascribed to Grey-faced Petrel found on Tubai, Austral Islands (Worthy & Bolt 2011), and bones ascribed to Grey-faced Petrel or White-headed Petrel found

on Rapa Nui, Eastern Islands (Carr 1980). All observations to date have been in the eastern sector of East Polynesia.

Recognition An ‘all-dark’ brown-toned *Pterodroma*, medium–large, with a robust blackish bill, long and slimmish wings, a wedge-shaped, medium-length caudal projection, typically shows a large light grey chin / noseband, and the under primaries and greater primary coverts are reflective and greyish when catching the light. Potential confusion with four other ‘all-dark’ *Pterodroma* petrels in the Pacific: Murphy’s Petrel *P. ultima* is medium-sized, with a small blackish bill, mid-length narrowish wings, a small whitish chin, is grey-toned, and has an extensive light grey base to the under primaries. Providence Petrel *P. solandri* is large, with a robust blackish bill, long and broadish wings, is grey-toned, and has a ‘double white underwing flash’ formed by: (1) white basal ‘half’ to primaries, and (2) white basal crescent to greater primary coverts. Darkest dark-morph Kermadec Petrel *P. neglecta* is medium–large and stocky, with a relatively slender blackish bill, relatively broad wings, a short caudal projection with a broad rounded tail, is brown-toned, has a ‘single or double white underwing flash’ (sometimes lacking a basal crescent to greater primary coverts) and, uniquely, white primary shafts to the outer primaries of the upperwing. Henderson Petrel *P. atrata* is medium-sized and lightly built, with a slender blackish bill, long narrow wings, a slim body, a longish tapering caudal projection, underside of remiges and greater coverts reflective and greyish when catching the light, and a whitish leading edge to the underside of the inner forewing.

Behaviour Attracted to the travelling yacht by dripping fish oil, typically first seen at distance looking over the oily wake, then flew toward the stern before typically peeling away and departing. Travelling flight was fast and direct, tilted and banked, and arced in windy conditions.

Taxonomy, variation, & moult Treated as a polytypic species by Thibault & Cibois (2017) – Great-winged Petrel *P. [m.] macroptera* and Grey-faced Petrel *P. [m.] gouldi*. Considered two distinct species by most other authorities (e.g., BirdLife International v2021, Clements Checklist of Birds of the World v2021, IOC World Bird List v11.1). No indication of morphological differences between Grey-faced Petrel observed in East Polynesia and those observed elsewhere. None in wing moult.

Conservation Least Concern (IUCN Red List of Threatened Species). Much of East Polynesia is north of the main range of Grey-faced Petrel and is of minor importance to its conservation.



Figure 28. Grey-faced Petrel *Pterodroma gouldi*, 21 October 2019, between MacDonald Bank and Marotiri, Austral Islands (Kirk Zufelt).

SOFT-PLUMAGED PETREL *Pterodroma mollis*

Status East Polynesia Thibault & Cibois (2017) state that Soft-plumaged Petrel is rarely seen in subtropical Oceania, with few records for East Polynesia. However, our study found that it is quite common at times, with apparent influxes into the region, possibly weather related, to at least 130°W.

Sightings Seen daily between Gambier Islands and Marotiri, Austral Islands, south of 25°S and east to about 135°W, with a total of 59 birds, but subsequently none seen between Rapa, Austral Islands, and Tahiti, Society Islands, or in waters around Tahiti (Figures 29 & 30).

Date	Counts
18 Oct	2: 0, 2, 0
19 Oct	3: 0, 2, 1
20 Oct	17: 4, 7, 6
21 Oct	17: 7, 4, 6
22 Oct	11: 3, 5, 3
23 Oct	9: 1, 4, 4

Range Breeds mainly December–May on Gough Island and in Tristan da Cunha, South Atlantic, and on subantarctic islands in the South Indian Ocean east to the Antipodean Islands, New Zealand. Ranges mainly 30–55°S across the South Atlantic and South Indian Oceans, into the South Pacific to approximately 140°W (longitude of central / eastern East Polynesia; Shirihai 2007, Flood & Fisher 2013b, Howell & Zufelt 2019, Harrison *et al.* 2021). The small number of previous sightings in East Polynesia are restricted to September and October (most effort is carried out in these months). **Gambier Islands to Pitcairn Island** Two or three 04 September 2013, and over 10 birds 15 September 2013 (photograph; Sargeant 2013). One 05 October 2017 (photograph; Morris & Beaman 2017a). **Gambier Islands to Austral Islands** Several at-sea records in September 2006 south of Gambier Islands (C. Gaskin *in litt.*). **Austral Islands** Several at-sea in September 2006 around Marotiri (C. Gaskin *in litt.*). None seen around or between Rapa and Marotiri in October–December 2019 (Flood *et al.* 2021).

Recognition A distinctive medium-sized *Pterodroma*, rather compact, with a slimmish blackish bill, grey head with white chin and throat, typically leaving a variable unbroken grey neck collar, blackish eye patch and white fore supercilium, mid-grey upperparts, a bold dark M-shape across the open upperwings, less evident when bleached browner, white underbody to undertail, largely blackish underwings (*ca.* 5% have narrow whitish underwing-covert stripes), and a small whitish L-shaped inner forewing patch in the underwing.

Behaviour Typically, first seen at distance inspecting the oily wake, then flying up and down the wake, at times swooping back and forth across the wake close to the stern. Travelling flight highly acrobatic, fast and direct, tilted and banked, occasionally turned back on itself, and arced in windy conditions, with occasional eccentric flight behaviour.

Taxonomy, variation, & moult Considered monotypic by most authorities, though *P. m. dubia* has been ascribed to breeders in the South Indian Ocean (Brooke 2004). No indication of clear morphological variation from individuals seen elsewhere. None in wing moult.

Conservation Least Concern (IUCN Red List of Threatened Species). Influxes into East Polynesia reported herein significantly extend the known foraging range of presumed Antipodean breeders.



Figures 29 & 30. Soft-plumaged Petrels *Pterodroma mollis*, 20 October 2019, MacDonald Bank (Kirk Zufelt).

JUAN FERNÁNDEZ PETREL *Pterodroma externa*

Status East Polynesia Seasonally regular and occasionally quite common (based on sightings below and in Flood *et al.* 2021).

Sightings Between one and four birds encountered most days while sailing from Gambier Islands to Marotiri, Austral Islands (Figure 31). Also, one near Tahiti, Society Islands, and three while sailing from Tahiti to Makatea, Tuamotu Islands.

Date	Counts
18 Oct	2: 0, 2, 0
20 Oct	1: 1, 0, 0
21 Oct	2: 2, 0, 0
22 Oct	4: 0, 2, 2
31 Oct	1: 1, 0, 0
01 Nov	1: 1, 0, 0
06 Nov	3: 2, 1, 0

Range Endemic breeder of the Juan Fernández Islands, December–May (*ca.* one million pairs; Brooke 2004). Undertakes northward transequatorial migration post-breeding (HBWa 2020). Considered a vagrant to the central Pacific in the non-breeding period (Thibault & Cibois 2017). However, significant numbers reported here and in Flood *et al.* (2021), in six months spread across the calendar year, provide clear evidence that Juan Fernández Petrel has a regular westward dispersal in mid-latitudes of the Pacific and should be included in these terms in the avifauna of East Polynesia. **Line Islands to Society Islands** One May 1990 (Phillips & Wragg 1993). **Marquesas Islands** One November 2018 just south of Fatu Huku (photograph; Simpson 2018). **Marquesas Islands to Tuamotu Islands** Over 20 in October 2017 en route to Rangiroa (Morris & Beaman 2017b). **Tuamotu Islands** One March 2003 between Manuhangi and Reitoru (Vanderwerf *et al.* 2006). **Gambier Islands & southern Tuamotu Islands** Nine in October 2014 (Scott 2014). About 10 in October 2017 (photograph; Morris & Beaman 2017a). **Gambier Islands to Pitcairn Island** Sixteen in October 2014 (Scott 2014). Sightings on eight days in November 2014 involving low single-figure counts, except 05 November when several 10s observed (Collins 2014). Sightings on nine days in November 2018 involving low single-figure counts, except 13 November when several 10s observed (photograph; Collins 2018, Talbot 2018). Over 27 in November 2018 (photograph; Simpson 2018). **Pitcairn Islands** In 1991, singles near Ducie on 24 October and between Ducie and Henderson on 29 October (Brooke 1995). One off Pitcairn 10 June 2006 (Cooper 2006). One in October 2017 (Morris & Beaman 2017a). Several sightings during 20–23 October 2019 (Gibbons 2019). **Eastern Islands to Pitcairn Islands** In 2016, two on 16 January about 160 km west of Easter Island and one on 17 January a day's sailing off Pitcairn Island (Mackiernan 2016). **Eastern Islands** Thirteen on 10 December 2013 off Rapa Nui (Fraser 2014).



Figure 31. Juan Fernández Petrel *Pterodroma externa*, 22 October 2019, north of MacDonal Bank (Kirk Zufelt). Our sightings add to growing evidence that *externa* has a regular westward dispersal in mid-latitudes of the Pacific.

Recognition Thibault & Cibois (2017) state that Juan Fernández Petrel cannot be reliably separated at sea from the White-necked Petrel complex – White-necked Petrel *P. [c.] cervicalis* and Vanuatu Petrel *P. [c.] occulta*. However, our studies in the Juan Fernández Islands (Shirihai *et al.* 2016, Flood *et al.* 2017) permitted formulation of identification criteria to reliably separate these taxa (see Flood *et al.* 2021).

Behaviour Most flew straight past the yacht, but a number inspected dripping fish oil at the stern. Travelling flight observed from the yacht was mainly low, fast, and direct, birds often tilted and banked, occasionally turned back on themselves, and arced in windy conditions.

Taxonomy, variation, & moult Monotypic. No indication of morphological differences between Juan Fernández Petrel observed in East Polynesia and the Juan Fernández Islands. None in wing moult.

Conservation Vulnerable (IUCN Red List of Threatened Species). Juan Fernández Petrel evidently has a significant westward dispersal throughout the year that includes East Polynesia, making the region important for the species.

KERMADEC PETREL *Pterodroma neglecta*

Status East Polynesia Breeds in southern East Polynesia in the southern Austral Islands (ca. 1,000 pairs; Thibault & Cibois 2017), southern Tuamotu Islands (several 10s of pairs; Thibault & Cibois 2017), Pitcairn Islands (40,000 pairs; Brooke 1995), and Eastern Islands (small number). At sea, quite common in waters off Pitcairn Islands, uncommon in the rest of southern East Polynesia, rare or absent elsewhere.

Sightings **18 October** One at 25.21°S, 136.20°W. **23 October** One at 28.18°S, 142.11°W (Figure 32). **30 October** One at 23.82°S, 147.85°W.



Figure 32. Kermadec Petrel *Pterodroma neglecta*, 23 October 2019, northeast of Marotiri, Austral Islands (Kirk Zufelt). An intermediate morph (see Flood *et al.* 2021).

Taxonomy, variation, & moult Considered polytypic by the four main taxonomic listings, with *P. n. juana* in the southeast Pacific (see HBWa 2020), though recent evidence indicates that it is monotypic (Jones *et al.* 2017, V. Bretagnolle *in litt.* 2021). Polymorphic. None in wing moult.

Conservation Least Concern (IUCN Red List of Threatened Species). The Pitcairn Islands is one of two principal stations for Kermadec Petrel (Brooke 2004), highlighting the importance of the breeding islands and surrounding waters to the species.

HAWAIIAN PETREL *Pterodroma sandwichensis*

Status East Polynesia Vagrant.

Sightings Not recorded during the *Sauvage* expedition (see ‘Range’ for the single record).

Range Breeds April–November exclusively in the Hawaiian Islands and ranges across much of the subtropical and tropical North Pacific. On 19 November 2018, one came to chum a few kilometres off the Gambier Islands at 23.23°S, 134.41°W (Figures 33 & 34; Collins 2018, Talbot 2018). This is the first confirmed record and Hawaiian Petrel should be added to the list of avifauna for the Gambier Islands and East Polynesia. Birds identified as Galapagos Petrel *Pterodroma phaeopygia* (now split into two species, Galapagos Petrel and Hawaiian Petrel, see below) September 1958 in Marquesas Islands (King 1958) and May and July 1971 off Tahiti (Thibault 1974) may have been misidentified Juan Fernández Petrel (Holyoak & Thibault 1984, p. 24).

Recognition See caption to Figures 33 & 34.



Figures 33 & 34. Hawaiian Petrel *Pterodroma sandwichensis*, 19 November 2018, a few kilometres south of Gambier Islands (Chris Collins). Separated from the very similar Galapagos Petrel *Pterodroma phaeopygia* by smaller bill, dark cap rather than dark cowl, narrower dark ulnar bar in the underwing, and clean white flanks (Force *et al.* 2007, Pyle *et al.* 2011). Also, possibly more likely based on range map in Howell & Zufelt (2019).

Range In the Pacific, breeds mainly November–May, from Lord Howe Island in the west, eastwards to Easter Island, the Juan Fernández Islands, and Desventuradas Islands (150,000–200,000 birds; Brooke 2004). Recent recognition of a substantial population on San Ambrosio (22,686 pairs in accessible areas; Marin *et al.* 2020). Ranges across the tropical and subtropical Pacific. Expedition cruises regularly report Kermadec Petrel in small to moderate numbers, respectively in the southern Tuamotu Islands and the Pitcairn Islands, most frequently seen near breeding islands, but none reported elsewhere.

Recognition See Grey-faced Petrel for recognition of dark morph.

Behaviour See Flood *et al.* (2021).

Behaviour Nothing noted by observers.

Taxonomy, variation, & moult Previously considered conspecific with Galapagos Petrel under the vernacular name Dark-rumped Petrel. The two taxa recently recognised as good species following genetic studies (Browne *et al.* 1997, Friesen *et al.* 2006).

Conservation Endangered (Red List of Threatened Species). East Polynesia not important to Hawaiian Petrel.

WHITE-NECKED PETREL *Pterodroma cervicalis*

Status East Polynesia Seasonally regular in small numbers.

Sightings Not recorded during the *Sauvage* expedition.

Range Breeds December–June in the Kermadec Islands and on Phillip Island off Norfolk Island (*ca.* 50,000 pairs; Brooke 2004), and for the non-breeding season mainly moves east to the central subtropical Pacific.

Line Islands to Society Islands Three in May 1990 (Phillips & Wragg 1993). **Southern Cook Islands** One undated that ‘could be identified as *cervicalis* by its white neck’ at 21.51°S, 158.49°W (Holyoak & Thibault 1984, p. 23). **Gambier Islands** One 07 June 2006 off Mangareva (Figures 35 & 36; Cooper 2006). **Pitcairn Islands** One 10 June 2006 off Pitcairn (Cooper 2006). Assuming that all these records are White-necked Petrel (see ‘Recognition’), White-necked Petrel is a regular visitor to East Polynesia and should be included as such in the list of avifauna for East Polynesia and the island groups Southern Cook, Line, Society, Gambier, and Pitcairn. Observations in May and June, at the conclusion of the breeding season, suggest failed or non-breeders, probably immatures, but conceivably breeders foraging in East Polynesian waters leading up to fledging. Flood *et al.* (2021) recommend addition to the list of avifauna of Rapa and Marotiri, and the Austral Islands. The following are reports of White-necked Petrel or Juan Fernández Petrel in Thibault & Cibois (2017): **Line Islands** One May 1990 (Phillips & Wragg 1993). **Line Islands to Society Islands** Eight May 1990 (Phillips & Wragg 1993). **Marquesas Islands** Several at sea with no date given (Thibault & Cibois 2017). **Tuamotu Islands** A ‘flock’ (Pitman 1986). **Pitcairn Islands** In 2010, several in the region of Ducie and Henderson. **Austral Islands** One October 1974 between Rapa and Raivavae at 25.30°S, 145°W (Thibault & Cibois 2017). **Bone records** Tahuata, Marquesas Islands (Steadman 2006), Henderson, Pitcairn Islands (Schubel & Steadman 1989), and Rapa Nui, Eastern Islands (Steadman 2006).

Recognition Thibault & Cibois (2017) state that Juan Fernández Petrel cannot be reliably separated at sea from the White-necked Petrel complex – White-necked Petrel *P. [c.] cervicalis* and Vanuatu Petrel *P. [c.] occulta*. They list records under White-necked Petrel or Juan Fernández Petrel. See Juan Fernández Petrel species account in Flood *et al.* (2021) for separation of this species pair. That said, the appearance of White-necked Petrel is like Vanuatu Petrel, which breeds exclusively on Vanua Lava, Vanuatu Islands (breeds possibly December–May and the size of the population is unknown; Imber & Tennyson 2001, Shirihai & Bretagnolle 2010). The at-sea range of Vanuatu Petrel is unknown. At-sea identification depends on a correct identification of size, Vanuatu Petrel being the smaller of the two, as plumage is nearly identical (Shirihai & Bretagnolle 2010). Most notable, the two taxa differ in the extent of white ‘tongues’ in the inner web at the base of the under primaries, with Vanuatu Petrel tending to have the least amount (Shirihai & Bretagnolle 2010). However, we photographed a bird at Vanua Lava (Flood *et al.* 2017) with white tongues equivalent to extreme examples of White-necked Petrel as illustrated by Figure 6 in Shirihai & Bretagnolle (2010). The bird photographed off Mangareva on 07 June 2006 (Figure 36) showed white tongues most typical of White-necked Petrel.

Behaviour At-sea behaviour similar to Juan Fernández Petrel (see Flood *et al.* 2021). A bird in wing moult was sat on the sea 07 June 2006 (Figure 35).



Figures 35 & 36. White-necked Petrel *Pterodroma cervicalis*, 7 June 2006, off Mangareva, Gambier Islands (John Cooper). Separated from Juan Fernández Petrel *Pterodroma externa* by its wide and distinct white collar across the hindneck. Worn Juan Fernández Petrel can appear to have such a neck collar, but the collar typically is narrower, and patchy. Also, the under forewing typically has more black feathering.

Taxonomy, variation, & moult White-necked Petrel and Vanuatu Petrel are treated as separate species in the Clements Checklist of Birds of the World and the IOC World Bird List, while Vanuatu Petrel is treated as a subspecies in the Howard & Moore Complete Checklist of Birds of the World and as a subspecies group in Clements Checklist of Birds of the World. No indication of morphological differences between White-necked Petrel in the individual photographed in June 2006 and birds off New Zealand. Wing moult on one individual photographed 07 June 2006 had reached p5/6 (Figure 36).

Conservation Vulnerable (IUCN Red List of Threatened Species). White-necked Petrel is an internationally protected species and the ocean of East Polynesia evidently is an important region for the species in the non-breeding season. Taxonomic recognition of birds in East Polynesia requires confirmation to ascertain if Vanuatu Petrel occurs, which is presumed threatened.

BLACK-WINGED PETREL *Pterodroma nigripennis*

Status East Polynesia Breeds mid-November to April in the Austral Islands, on two islets off Rapa – Rapa Iti and Tautourou Iti (*ca.* 1,000 pairs in 1989–1990; Thibault & Cibois 2017), probably Marotiri, and a few 10s of pairs on Raivavae (Shirihai 2020). During the breeding season, common around Rapa and occasionally observed elsewhere in East Polynesia. Absent from breeding sites in the non-breeding season, when probably largely absent from East Polynesia (Hutton & Priddel 2002).

Sightings 18 October One at 24.80°S, 135.80°W. The paucity of sightings prior to commencement of breeding season is consistent with a total absence from breeding sites in the Austral winter (Hutton & Priddel 2002).

Range Breeds mid-November to May in the Tasman Sea area, Kermadec Islands, New Caledonia, Chatham Islands, and East Polynesia (8–10 million birds; Brooke 2004). Widespread across the tropical and subtropical Pacific in the non-breeding season. **Tuamotu Islands to Marquesas Islands** One 02 July 2012, outside breeding season, between Fakarava and Nuku Hiva (van der Vliet & Zantingh 2012). **Southern Tuamotu Islands** During breeding season, 15 November 2014, at least one to the west of Morane (Collins 2014). **Southern Tuamotu Islands to Gambier Islands** Three 16 November 2014, between Morane and Gambier Islands (Collins 2014). **Austral Islands** See ‘Status East Polynesia’. Further details in Flood *et al.* (2021).

Recognition & behaviour See Flood *et al.* (2021).

Taxonomy, variation, & moult Monotypic. The individual appeared typical for the species. Not in wing moult.

Conservation Least Concern (IUCN Red List of Threatened Species). East Polynesia holds the most easterly breeding location and may be important in this respect.

GOULD’S PETREL *Pterodroma leucoptera*

Status East Polynesia Seasonally regular in small numbers.

Sightings Recorded most days in small numbers, from one to four, with nine in total, while sailing from the Gambier Islands to MacDonal Bank and Marotiri, Austral Islands (Figure 37). Also, two observed while sailing from Raivavae, Austral Islands, to Tahiti, Society Islands, and three recorded north of Tahiti while sailing to Makatea, Tuamotu Islands.

Date	Counts
18 Oct	2: 0, 2, 0
20 Oct	1: 1, 0, 0
21 Oct	2: 2, 0, 0
22 Oct	4: 0, 2, 2
31 Oct	1: 1, 0, 0
01 Nov	1: 1, 0, 0
06 Nov	3: 2, 1, 0

Range Nominate form breeds late November to April off central New South Wales, Australia (*ca.* 1,000 pairs; Priddel & Carlile 2007, 2009); *P. [l.] caledonica* breeds on New Caledonia (1,000–10,000 pairs; Brooke 2004). The non-breeding range extends to the tropical east Pacific (Priddel *et al.* 2014, Rayner *et al.* 2016).

Marquesas Islands One off Hatutu 22 September 2019 (Talbot 2019). One sometime 13–16 October 2019 (Gibbons 2019). One 25 November 2018, between Hiva Oa and Fatu Hiva (photograph; Simpson 2018).

Marquesas Islands to Tuamotu Islands Reasonable confidence expressed that several *Pterodroma* petrels between Fatu Hiva and Rangiroa were this species (photograph; Morris & Beaman 2017b). **Tuamotu Islands** One 23 October 2018 between Makatea and Rangiroa (Jacob 2018). One east of Rangiroa 28 September 2019 (Talbot 2019). **Pitcairn Islands** One 09 November 2014 west of Henderson (Collins 2014). Two 09 November



Figure 37. Gould's Petrel *Pterodroma leucoptera*, 22 October 2019, north of MacDonal Bank (Kirk Zufelt).

2018 east of Pitcairn (photograph; Collins 2018, Simpson 2018, Talbot 2018). One or two 09 November 2018 west of Pitcairn. **Austral Islands** Found in small numbers off Rapa mid-November to mid-December (Flood *et al.* 2021). Not included in Thibault & Cibois (2017). Observations reported here reinforce the point in Flood *et al.* (2021) that Gould's Petrel utilises the subtropical central South Pacific and should be added to the list of avifauna of East Polynesia.

Recognition See Flood *et al.* (2021).

Behaviour During the *Sauvage* expedition, while sailing and dripping fish oil, birds briefly visited the stern of the travelling yacht. While drifting and chumming, birds looked over the chum slick and moved on rather quickly. Further details in Flood *et al.* (2021).

Taxonomy, variation, & moult Polytypic. No indication of morphological differences with birds observed in East Polynesia and those observed off Australia. None in wing moult.

Conservation Vulnerable (IUCN Red List of Threatened Species). Our sightings highlight the importance of East Polynesia for *leucoptera*.

COLLARED PETREL *Pterodroma brevipes*

Status East Polynesia Possibly breeds / bred on Rarotonga, Southern Cook Islands, on Moorea and Tahiti, Society Islands, and on Raivavae, Austral Islands (Thibault & Cibois 2017, H. Shirihai *in litt.*). A small number of breeders may survive. Otherwise, an irregular visitor in small numbers.

Sightings Not recorded during the *Sauvage* expedition.

Range Breeds in Fiji Islands and in Vanuatu Islands, possibly elsewhere. See 'Status East Polynesia'.

Marquesas Islands One sometime 13–16 October 2019 (Gibbons 2019). **Marquesas Islands to Tuamotu Islands** A few dark and intermediate birds of the nominate form observed October 2017 between Fatu Hiva and Rangiroa (Morris & Beaman 2017b). **Pitcairn Islands** One Oeno September 2010 (van Beirs 2010).

Recognition Light morph makes a confusion pair with Gould's Petrel (see Flood *et al.* 2021). Unique among regional *Pterodroma* species, the underbody of intermediate to dark morph is progressively darker.

Behaviour Well-watched individual observed flying over Oeno, suggesting prospecting or even breeding there (van Beirs 2010).

Taxonomy, variation, & moult Polytypic, comprising the nominate form and the newly described taxon Magnificent Petrel *P. [b.] magnificens* that breeds on Vanua Lava, Vanuatu Islands (Bretagnolle & Shirihai 2010). Polymorphic. Wing moult not mentioned.

Conservation Vulnerable (IUCN Red List of Threatened Species). If confirmed, breeding in East Polynesia would represent a significant extension to the breeding range, albeit presumably involving small numbers, requiring conservation measures to secure the breeding site/s.

COOK'S PETREL *Pterodroma cookii*

Status East Polynesia Seasonally regular in small numbers.

Sightings 17 October One at 23.46°S, 134.35°W. **23 October** One at 28.31°S, 141.91°W (Figure 38).

Range Breeds November–March in the Hauraki Gulf, North Island, New Zealand (650,000 mature individuals in 2012; BirdLife International 2021b), and to the south, on Codfish Island, off Stewart Island (15,000 mature individuals and increasing following eradication of Pacific Rats *Rattus exulans* and Wekas *Gallirallus australis*; Rayner *et al.* 2008). **Society Islands** About 20 *Pterodroma* petrels September 1973 off Tahiti tentatively assigned to *cookii* (Holyoak 1974). **Marquesas Islands** One 13–16 October 2019 (Gibbons 2019). **Gambier Islands** Three September 2006 to the south (C. Gaskin *in litt.*). **Gambier Islands to Pitcairn Island** One 13 October 2014 (Scott 2014). Two 04 October 2017 (photograph; Morris & Beaman 2017a). **Pitcairn Islands** Two September 2013 off Henderson (pers. obs.). Two 09 November 2014 attracted to chum west of Henderson and one 10 November 2014 while steaming west from Oeno (photograph; Collins 2014). One 09 November 2018 between Pitcairn and Henderson. **Southern Tuamotu Islands to Pitcairn Island** One 14 November 2018 between Oeno and Tenararo (Collins 2018). Thibault & Cibois (2017) state that Cook's Petrel could



Figure 38. Cook's Petrel *Pterodroma cookii*, 23 October 2019, east of Marotiri, Austral Islands (Kirk Zufelt). Relatively long wings and slender structure, including a long neck and long slender bill. Seen fairly regularly during our survey.

STEJNEGER'S PETREL *Pterodroma longirostris*

Status East Polynesia Seasonally regular in small numbers.

Sightings 22 October One at 27.86°S, 140.54°W (Figure 39). **01 November** One at 19.22°S, 148.28°W.

Range Breeds in Juan Fernández Islands December–April (ca. 131,000 pairs; Brooke 2004), after which it migrates to the subtropical northwest Pacific (Brooke 2004). **Line Islands** Several records at sea (King *et al.* 1967, Kepler *et al.* 1992, Phillips *et al.* 1995). **Marquesas Islands** Two 30 September 2013 soon after departure from Fatu Hiva for Rangiroa, Tuamotu Islands (Sargeant 2013). **Pitcairn Islands** One 17 October 2014 off Henderson (Scott 2014). One 09 November 2014 to the west of Henderson (photograph; Collins 2014). **Austral Islands** Seen in small numbers 26 October to 03 December 2019 off Rapa and Marotiri (Flood *et al.* 2021). Sightings reported here add to the growing evidence that Stejneger's Petrel has a modest though regular westward dispersal at mid-latitudes (see Flood *et al.* 2021).

Recognition See Flood *et al.* (2021).

Behaviour Birds observed during the *Sauvage* expedition raced past the yacht and showed no interest in the

be a migrant through East Polynesia and the sightings reported above provide good evidence of regular passage in small numbers. Numbers should increase given success in the conservation and recovery programmes at breeding islands (see 'Conservation').

Recognition A confusion species pair with Pycroft's Petrel *Pterodroma pycrofti* and good views or photographs are required for safe identification at sea. A mid-sized *Cookilaria* (subgenus), grey upperparts and dark M-shape across the open upperwings, white underparts and a narrowish dark ulnar bar across the inner wing. Cook's Petrel is less compact than Pycroft's Petrel, with relatively longer wings and more slender structure. Pycroft's Petrel appears to have an enlarged head and short neck in comparison. Cook's Petrel has both narrowish dark eye patch and white fore supercilium; Pycroft's Petrel has a dark hood to below the eye, though can show a short and narrow white fore supercilium. Such impressions change with lighting and angle of view.

Behaviour Neither bird showed interest in the yacht and raced past on a trajectory coincidental with our route.

Taxonomy, variation, & moult Monotypic. No indication of morphological differences between Cook's Petrel observed in East Polynesia and those observed off New Zealand. None in wing moult.

Conservation Vulnerable (IUCN Red List of Threatened Species). Significant population recovery following conservation efforts at breeding colonies justify a change in status from Endangered to Vulnerable (Rayner *et al.* 2007, 2008).

COOKILARIA SP. *Pterodroma* sp.

Sightings One 29 October at 24.20°S, 147.04°W, one at 31 October at 20.60°S, 147.65°W, and one at 21.43°S, 147.35°W. All three birds probably Cook's Petrel.



Figure 39. Stejneger's Petrel *Pterodroma longirostris*, 22 October 2019, north of MacDonald Bank (Kirk Zufelt). A distinctive *Cookilaria* petrel (subgenus), with short neck and relatively long tail, and bold pattern including a distinctive black tail end.

dripping fish oil. Further details in Flood *et al.* (2021).

Taxonomy, variation, & moult Monotypic. No indication of morphological differences between Stejneger's Petrel observed in East Polynesia and in the Juan Fernández Islands. Neither bird in wing moult.

Conservation Vulnerable (IUCN Red List of Threatened Species). Combined sightings highlight importance of East Polynesia for Stejneger's Petrel.

TAHITI PETREL *Pseudobulweria rostrata*

Status East Polynesia Population estimates for East Polynesia: Society Islands, several 1,000s or more pairs; Marquesas Islands, lower numbers than Society Islands; Gambier Islands, several 10s of pairs (Thibault & Cibois 2017).

Sightings Three on the first full day sailing from the Gambier Islands were the only ones recorded en route to MacDonald Bank and Marotiri, Austral Islands. Sightings resumed soon after departure from Rapa, Austral Islands, and subsequently recorded daily to end of *Sauvage* expedition. Common Raivavae, Austral Islands to Tahiti, Society Islands, where chumming sessions attracted 10–20 birds (Figures 40 and 41). Common in vicinity of Tahiti and off Makatea, Tuamotu Islands, where it is listed as a visitor in Thibault & Cibois (2017).

Date	Counts
17 Oct	3: 2, 1, 0
28 Oct	3: 0, 2, 1
29 Oct	13: 6, 3, 4
30 Oct	29: 10, 10, 9
31 Oct	34: 10, 8, 16
01 Nov	103: 33, 15, 55
02 Nov	37: 0, 0, 37
03 Nov	76: 37, 18, 21
04 Nov	74: 12, 11, 51
05 Nov	48: 4, 14, 30
06 Nov	61: 12, 9, 40
07 Nov	46: 1, 5, 40
08 Nov	145: 57, 3, 85

Range Breeds year-round in the tropical Pacific, eastwards from New Caledonia, with various sites in Melanesia to East Polynesia. Ranges across the tropical and subtropical Pacific (Brooke 2004). World population estimate *ca.* 10,000 pairs (Brooke 2004). Frequency of observation at sea contingent on proximity to breeding colony and size of colony population (e.g., Vanderwerf *et al.* 2006, Talbot 2018, pers. obs.). **Rapa, Austral Islands** Only one bird was observed throughout an at-sea survey of seabirds off Rapa and Marotiri, October–December 2019 (Flood *et al.* 2021).

Recognition See Flood *et al.* (2021).

Behaviour During the *Sauvage* expedition, easily attracted to chumming operations from the rear of the yacht, where groups of up to 20 birds gathered and fed aggressively, nosily, and chased and successfully stole food from each other. Also collected food by landing on the sea, wings raised, facing into the wind, taking chum off the surface (Figure 40), and frequently surface dived and plunge dived for subsurface chum. Further details in Flood *et al.* (2021).

Taxonomy, variation, & moult Polytypic. All birds that we observed had essentially uniform dark underwings, typical of eastern Pacific populations. None in wing moult.

Conservation Near Threatened (IUCN Red List of Threatened Species). Tropical East Polynesia is of great importance to the conservation of Tahiti Petrel as it holds perhaps 20–30% of the world population, which is declining owing to introduced invasive predators and human activity (Thibault & Cibois 2017).



Figures 40 & 41. Tahiti Petrels *Pseudobulweria rostrata*, 1 November 2019, between Raivavae, Austral Islands and Tahiti, Society Islands (Kirk Zufelt). As here, easily attracted in numbers to discarded fish offal.

GREY PETREL *Procellaria cinerea*

Status East Polynesia Seasonally regular in small numbers and regular to 23°S.

Sightings Seen daily in small numbers while sailing from Gambier Islands to Marotiri, Austral Islands and seen off Raivavae, Austral Islands. None from Raivavae to Tahiti, Society Islands, or in waters around Tahiti (Figures 42 & 43). Survey results similar to Black Petrel *Procellaria parkinsoni*, though half as many logged.

Date	Counts
18 Oct	1: 0, 0, 1
19 Oct	3: 1, 1, 1
20 Oct	2: 0, 2, 1
21 Oct	2: 1, 1, 1
22 Oct	3: 1, 1, 2
23 Oct	1: 0, 0, 1
29 Oct	1: 1, 0, 0

Range Breeds on subantarctic islands March–October (*ca.* 400,000 birds; Brooke 2004) in cool temperate waters 37–49°S and ranges widely in subtropical and subantarctic waters mainly 30–60°S (Marchant & Higgins 1991). **Southern Tuamotu Islands to Pitcairn Islands** One 04 October 2005 between Oeno and Tenararo (Hoff 2005). **Pitcairn Islands** One October 2019 offshore Henderson (Gibbons 2019). **Gambier Islands & southern Tuamotu Islands** One 09 October 2005 on departure from Morane (Hoff 2005). **Austral Islands** September 2006, one attracted to chum off Marotiri and one farther south between 29–30°S (C. Gaskin *in litt.*). Frequently found off Rapa November to early December 2019 (Flood *et al.* 2021). Daily sightings from *Sauvage* while sailing Gambier to Marotiri demonstrate that, at least in East Polynesia, Grey Petrel regularly ranges over 500 km farther north than the main range given in the main literature.

Recognition Distinctive, large petrel, with a mostly yellowish bill, grey hood and upperside, whitish underside, and contrasting largely uniform dark underwings and undertail-coverts.



Figures 42 & 43. Grey Petrels *Procellaria cinerea*, 19 October 2019, north of MacDonald Bank (Kirk Zufelt). On 21 and 22 October, one bird was known to be present in two count periods, hence ‘A’ does not equal ‘X+Y+Z’. Our regular encounters surprised us because the range limit given in the literature is over 500 km to the south (Marchant & Higgins 1991).

Behaviour Habitually followed the sailing yacht. Easily attracted to chum, where it preferred to land on the sea to feed, though occasionally surface dived. Stayed at chum for hours at a time, often sitting on the sea for long periods, making short forays around the chum slick before again settling on the sea. In natural feeding behaviour, frequently mixed with other petrels and shearwaters and was an extremely aggressive scavenger at feeding frenzies. Further details in Flood *et al.* (2021).

Taxonomy, variation, & moult Monotypic. No indication of morphological differences with birds observed in East Polynesia and at many locations in the Southern Oceans. None in wing moult.

Conservation Near Threatened (IUCN Red List of Threatened Species). Conservation should consider the range extension established by our sightings.

WHITE-CHINNED PETREL *Procellaria aequinoctialis*

Status East Polynesia Irregular, usually in small numbers, and ranges to 23°S.

Sightings Not recorded during the *Sauvage* expedition.

Range Breeds on subantarctic islands from South Georgia, southwest Atlantic Ocean, to New Zealand, southwest Pacific (around 5–7 million birds; Brooke 2004). Ranges 45–65°S during the breeding season and 20–45°S during the non-breeding season (Howell & Zufelt 2019). ***Southern Tuamotu Islands to Pitcairn Islands*** Four 11 September 2013, Oeno to Tenararo (Sargeant 2013). ***Gambier Islands to Pitcairn Island*** Regular September 2010 involving 38 sightings (photograph; van Beirs 2010). One 14 October 2014 (Scott 2014). A few on 04 October 2017 (photograph; Morris & Beaman 2017a). Although normally scarce or absent, disperses considerably farther north of 40°S in East Polynesia *contra* Marchant & Higgins (1991)

Recognition See Black Petrel in Flood *et al.* (2021).

Behaviour As Grey Petrel.

Taxonomy, variation, & moult Monotypic. No variation or moult reported.

Conservation Vulnerable (IUCN Red List of Threatened Species). East Polynesia of marginal importance to White-chinned Petrel.

BLACK PETREL *Procellaria parkinsoni*

Status East Polynesia Seasonally regular in small numbers to 23°S.

Sightings Seen daily in small numbers while sailing from Gambier Islands to Marotiri, Austral Islands (Figures 44 & 45), and seen off Raivavae, Austral Islands. None from Raivavae to Tahiti, Society Islands, or around Tahiti. Survey results similar to *P. cinerea*, though twice as many *P. parkinsoni* logged. On 21 and 29 October, one bird or more known to be present in two count periods, hence ‘A’ does not equal ‘X+Y+Z’.

Date	Counts
17 Oct	1: 0, 1, 0
18 Oct	2: 0, 1, 1
19 Oct	3: 1, 1, 1
20 Oct	2: 0, 1, 1
21 Oct	2: 1, 1, 1
22 Oct	8: 2, 4, 2
23 Oct	4: 2, 0, 2
29 Oct	3: 3, 2, 2
30 Oct	1: 0, 0, 1

Range Breeds in the Hauraki Gulf, New Zealand, November–May, where conservation efforts are facilitating a significant recovery (*ca.* 2,750 pairs; Richard & Abraham 2015). Migrates to the east Pacific, reaching southern Mexico to northern Peru (Brooke 2004). Also see Westland Petrel *Procellaria westlandica*. **Gambier Islands** One 25 October to the west and one 26 October to the southeast (Scott 2014). **Gambier Islands to Austral Islands** Regularly seen with up to 12 together in September 2006 (C. Gaskin *in litt.*). **Gambier Islands to Pitcairn Island** Several on 04 October 2017 (photograph; Morris & Beaman 2017a). **Pitcairn Islands** Recorded at sea September 2006 (Steadman 2006). Fourteen reported Westland Petrels in September 2010 (van Beirs 2010) may have been Black Petrels. One 06 September 2013 southeast of Pitcairn (photograph; Sargeant 2013). In 2014, two 18 October off Henderson, one 20 October west of Oeno (Scott 2014). One 09 November 2014 west of Henderson (Collins 2014). Two 09 November 2018 east of Pitcairn (photograph; Collins 2018, Simpson 2018). **Pitcairn Islands to southern Tuamotu Islands** One 21 October between Oeno and Tenararo. **Austral Islands** Frequently found November to early December 2019 around Rapa and Marotiri (Flood *et al.* 2021).

Behaviour & recognition See Flood *et al.* (2021).

Taxonomy, variation, & moult Monotypic. No indication of morphological differences with those observed at the breeding grounds in New Zealand, or off the west coast of South America. None on the *Sauvage* expedition in wing moult.

Conservation Vulnerable (IUCN Red List of Threatened Species).



Figures 44 & 45. Black Petrels *Procellaria parkinsoni*, 22 October 2019, north of MacDonal Bank (Kirk Zufelt). Note that Westland Petrel *Procellaria westlandica* has a relatively larger and squarer head, on average a more robust bill, and typically more solid dark over the unguis.

WESTLAND PETREL *Procellaria westlandica*

Status East Polynesia Single report of multiple birds given below.

Sightings Not recorded during the *Sauvage* expedition.

Range Breeds on South Island, New Zealand, and migrates to the Humboldt Current off Chile (population *ca.* 20,000 birds, Brooke 2004). Seabird Tracking Database shows that Westland Petrel passage from New Zealand breeding grounds to the Humboldt Current is more southerly than that of Black Petrel – to the south of East Polynesia, whereas Black Petrel passes through East Polynesia. **Pitcairn Islands** Fourteen observations of Westland Petrel September 2010 (van Beirs 2010), though not documented with photographs. No other expedition cruise in the region has reported Westland Petrel. Either an exceptional record or confusion with Black Petrel.

Recognition See Black Petrel in Flood *et al.* (2021).

Behaviour Nothing reported.

Taxonomy, variation, & moult Monotypic. No other information.

Conservation Endangered (IUCN Red List of Threatened Species).

WEDGE-TAILED SHEARWATER *Ardenna pacifica*

Status East Polynesia Localised, with breeding or possible breeding at 25 localities in the Line Islands, Marquesas Islands (a few localities), Society Islands (scarce), Cook Islands, Gambier Islands, northern Austral Islands, Eastern Islands (latter possibly occasional; Thibault & Cibois 2017).

Sightings The only concentrations of birds during our survey were encountered close to known breeding locations south of Gambier Islands and around Raivavae, Austral Islands. None were encountered while sailing between Gambier Islands and MacDonal Bank. Thereafter, in the Austral Islands, encountered on approach to Marotiri and throughout the survey of Marotiri and Rapa (Flood *et al.* 2021). None were logged between Rapa and Raivavae, but subsequently quite common around Raivavae (Figure 46). Only two birds were observed while continuing to Tahiti, Society Islands, and between two and four birds were logged daily while exploring waters around Tahiti, underlining its scarcity in this region.



Figure 46. Wedge-tailed Shearwater *Ardenna pacifica*, 29 October 2019, Raivavae, Austral Islands (Kirk Zufelt). As here, all of our observations involved the dark morph.

Date	Counts
16 Oct	20: 0, 0, 20
29 Oct	25: 0, 0, 25
30 Oct	21: 20, 1, 0
31 Oct	1: 1, 0, 0
01 Nov	1: 0, 0, 1
03 Nov	4: 0, 0, 4
04 Nov	3: 0, 0, 3
05 Nov	2: 1, 0, 1
06 Nov	2: 0, 2, 0
07 Nov	2: 0, 2, 0
08 Nov	2: 0, 0, 2

Range Breeds Pacific and South Indian Oceans, with season varying between populations (*ca.* 5.2 million birds; Brooke 2004), tropical populations largely sedentary, others migrate to the tropics. **Society Islands** Eight while departing Bora Bora on 25 January 2016 (Mackiernan 2016). **Marquesas Islands** Routine sightings of a few to 12 birds during sea crossings between Hiva Oa and Fatu Hiva in October and November (Scott 2014, Morris & Beaman 2017b, Simpson 2018). In April 2014, hundreds were offshore Fatu Hiva at dusk (Millar 2014). **Gambier Islands** One to five in October and November to the south (Collins 2014, Scott 2014, Morris & Beaman 2017a). **Pitcairn Islands** Scarcely encountered during expedition cruises, though five on 11 November 2014 (Collins 2014, 2018, Simpson 2018).

Recognition See Flesh-footed Shearwater.

Behaviour See Flood *et al.* (2021).

Taxonomy, variation, & moult Polytypic, with *A. p. chlororhyncha* in the South Pacific. All birds recorded during our survey and reported from expedition cruises were dark morph, except one light morph on 10 July 2012, off Ua Pou, Marquesas Islands (van der Vliet & Zantingh 2012). None in wing moult.

Conservation Least Concern (IUCN Red List of Threatened Species). The waters around the Gambier Islands, Raivavae in the Austral Islands, and Fatu Hiva in the Marquesas Islands provide important feeding areas for breeders.

BULLER'S SHEARWATER *Ardenna bulleri*

Status East Polynesia Seasonally regular in small numbers.

Sightings One 06 November at 17.79°S, 148.81°W.

Range Breeds Poor Knights Islands, North Island, New Zealand, September–May, then undertakes clockwise transequatorial migration in the Pacific (*ca.* 2.5 million individuals; Brooke 2004). Not mentioned in Thibault & Cibois (2017). None reported from expedition cruises. Encountered roughly every other trip off Rapa, Austral Islands, November and December 2019 (Flood *et al.* 2021). The *Sauvage* sighting supports Flood *et al.*'s (2021) recommendation to add Buller's Shearwater to the list of avifauna for East Polynesia.

Behaviour & recognition See Flood *et al.* (2021).

Taxonomy, variation, & moult Monotypic. No indication of morphological differences between those observed in East Polynesia and elsewhere in the Pacific. The sighted bird was not in wing moult.

Conservation Vulnerable (IUCN Red List of Threatened Species). Regular sightings off Rapa reported in Flood *et al.* (2021) indicate waters off Rapa are of some importance to Buller's Shearwater.

SOOTY SHEARWATER *Ardenna grisea*

Status East Polynesia Seasonally regular in small numbers.

Sightings Four observed after departing Raivavae, Austral Islands (none before): One 29 October at 24.43°S, 146.75°W. One 01 November at 19.08°S, 148.33°W. One 03 November at 18.45°S, 148.57°W. One 07 November at 15.88°S, 148.38°W.

Range Breeds November–April, southeast Australia and New Zealand, and southern South America and the Falkland Islands (20+ million birds, vast majority in the Pacific, though recent significant decline; Brooke 2004). Transequatorial migrant in the non-breeding season in the Atlantic and Pacific. Undertakes clockwise passage in the Pacific. **Marquesas Islands** Six on 25 November 2018 between Fatu Hiva and Hiva Oa (Simpson 2018). **Marquesas Islands to Tuamotu Islands** One between Fatu Hiva and Rangiroa October / November 2017 (Morris & Beaman 2017b). **Tuamotu Islands** Three October / November 2017 (Morris & Beaman 2017b). **Southern Tuamotu Islands** One 16 November 2018 between Tenararo and Morane (Collins 2018). **Gambier Islands** One to the northwest on 17 November 2014 (Collins 2014). **Gambier Islands to Pitcairn Island** One 08 June 2006 (photograph; Cooper 2006). One 07 November 2018 (Collins 2018). **Pitcairn Islands** One 09 November 2018 between Pitcairn and Henderson (Collins 2018). **Gambier Islands to Pitcairn Island to southern Tuamotu Islands** Three individuals 6–21 November 2018 (Simpson 2018). **Austral Islands** Regular in small numbers November and December 2019 off Marotiri and Rapa (Flood *et al.* 2021).

Recognition Short-tailed Shearwater *Ardenna tenuirostris* reaches the westernmost border of East Polynesia (Thibault & Cibois 2017). Separation from Sooty Shearwater is notoriously difficult (see Flood & Fisher 2020). Numerous indeterminate birds between Society Islands and Line Islands March–May 1990 thought to be mainly Short-tailed Shearwater (Phillips & Wragg 1993), highlighting the need for great caution in identification. Further details in Flood *et al.* (2021).

Behaviour See Flood *et al.* (2021).

Taxonomy, variation, & moult Monotypic. No variation noted from birds observed in the Pacific and Atlantic. None in wing moult.

Conservation Near Threatened (IUCN Red List of Threatened Species). East Polynesia of marginal importance to passage Sooty Shearwater.

FLESH-FOOTED SHEARWATER *Ardenna carneipes*

Status East Polynesia Rare visitor.

Sightings Not recorded during the *Sauvage* expedition.

Range Breeds November to early May (220,000 pairs; Brooke 2004), southwest and South Australia and Lord Howe Island (125,000–350,000 pairs; Baker *et al.* 2002), northern New Zealand (10,000–15,000 pairs; nzbirdsonline.org.nz), and on St Paul Island in the South Indian Ocean (500 pairs). Western Australian

population migrates to western Indonesia where some may remain, with the rest mainly crossing the Indian Ocean to Sri Lanka, southern India, and the Arabian Sea. Broadly speaking, the rest undertake a clockwise journey, passing by Japan and northwest North America, before returning to colony. Thus, East Polynesia is not on the main migration route and sightings are most likely to occur in northern East Polynesia. *Marquesas Islands* Recorded to the northeast and southeast of the islands (Pitman 1986). One August 2008 (Raust 2008). *Gambier Islands and Pitcairn Island* One 28 September 2005 (Hoff 2005).

Recognition A quite large ‘all-dark’ *Ardeenna* shearwater, rather strongly built, with a mid-depth pinkish bill, mid-sized rounded head, long thickish body, and long broadish wings. Wedge-tailed Shearwater has a rangy structure, quite slender pale pinkish to dark brownish-grey bill, small squarish head, long and slim body, wings relatively long and large compared to body size (Figure 46). Flesh-footed flight is less buoyant than flight of Wedge-tailed. ‘All-dark’ *Procellaria* petrels are larger and chunkier with stronger flight and an essentially yellowish bill.

Behaviour Nothing mentioned.

Taxonomy, variation, & moult Monotypic. No report of morphological differences or wing moult in birds reported from East Polynesia.

Conservation Near Threatened (IUCN Red List of Threatened Species). Evidence of widespread decline (Priddel *et al.* 2006, Jamieson & Waugh 2015). However, East Polynesia is of little importance to conservation of the species.

CHRISTMAS SHEARWATER *Puffinus nativitatis*

Status East Polynesia Widespread though patchy distribution, breeding or possibly breeding roughly October–March at 27 localities in the island groups Line, Marquesas (several 10s of pairs), Society (possibly extirpated), Gambier, Pitcairn, Austral, and Eastern (4,000–7,000 pairs; total population East Polynesia less than 10,000 pairs; Thibault & Cibois 2017). Bone records demonstrate previously more widespread. Significantly impacted on by human activity (Thibault & Cibois 2017). Currently concentrated in two areas: (1) Northern Line Islands. (2) Southern strip running from the Austral Islands eastwards to the Gambier Islands, Pitcairn Islands, and Eastern Islands.

Sightings We did not visit Motu Teiko Islet (where breeds) on departure from Mangareva, though about 25 birds observed over the nearby shelf-edge late afternoon to dusk (Figures 47 & 48). None seen on the passage from the Gambier Islands to MacDonal Bank, though two seen near Marotiri, Austral Islands. A modest four recorded during a chumming session off Raivavae, Austral Islands.

Date	Counts
16 Oct	25: 0, 0, 25
17 Oct	1: 0, 0, 1
22 Oct	1: 0, 1, 0
23 Oct	1: 1, 0, 0
28 Oct	1: 0, 0, 1
29 Oct	1: 0, 0, 1
30 Oct	4: 1, 0, 3



Figures 47 & 48. Christmas Shearwaters *Puffinus nativitatis*, 16 October 2019, off Gambier Islands (Kirk Zufelt).

Range Two disparate breeding populations, respectively in the North and South Pacific. The southern population (*ca.* 50,000 pairs; Brooke 2004) breeds roughly October–March, from the Phoenix Islands to the Eastern Islands, East Polynesia (Thibault & Cibois 2017). In the non-breeding period migrates toward Middle America (Howell & Zufelt 2019). **Marquesas Islands** One circling the landing site at Hatutu in October 2017 (Morris & Beaman 2017b). One 25 September 2013 at Hatutu (Sargeant 2013). **Pitcairn Islands to southern Tuamotu Islands** One 16 June 2006 Oeno to Morane (Cooper 2006). **Gambier Islands & southern Tuamotu Islands** One 30 September 2012 between Tenararo and Gambiers (van Beirs 2010). **Gambier Islands** First stop for most expedition cruises shortly after departing Mangareva is Motu Teiko Islet with estimates of 100 birds on 27 September 2005 (Hoff 2005), 40 on 12 October 2014 (Scott 2014), and 40+ on 06 November 2018 (Simpson 2018). **Pitcairn Islands** Three 29 September 2005 between Pitcairn and Henderson and several nests on Oeno 03 October 2005 (Hoff 2005). One or two nests on Oeno 17 / 18 September 2012 (photograph; van Beirs 2010). Five October 2015 at Oeno (Scott 2014). Several October 2017 at Oeno (Morris & Beaman 2017a). Active near the shore of Pitcairn 05 September 2013 (Sargeant 2013). **Gambier Islands to Pitcairn Island to southern Tuamotu Islands** Single-figure numbers on five dates in November 2014 (Collins 2014). Fifteen November 2018 (Simpson 2018).

Behaviour & recognition See Flood *et al.* (2021).

Taxonomy, variation, & moult Monotypic, though northern and southern populations may have diverged. None in wing moult.

Conservation Least Concern (IUCN Red List of Threatened Species). Up to 20% of the total southern population breeds in East Polynesia, representing a significant proportion of southern breeders and highlighting the importance of the region to Christmas Shearwater.

SHEARWATER SP. *Puffinus* sp.

A reported Little Shearwater *Puffinus assimilis* flew south near Tahanea, Tuamotu Islands, March 2003 (Vanderwerf *et al.* 2006). Observers proposed the identification Rapa Shearwater *Puffinus myrtae*, ‘The only known breeding colonies of this species in southeastern Polynesia are on islets off Rapa ... the bird was flying in that direction.’ However, one Rapa Shearwater fitted with a data logger foraged far south and southeast of Rapa (Withers *et al.* 2020). Unfortunately, the observers of the bird did not provide a description and its identity remains a mystery. See Flood *et al.* (2021) for field identification of Rapa Shearwater.

POLYNESIAN SHEARWATER *Puffinus polynesiae*

Status East Polynesia Breeds or probably breeds on a total of 22 islands (10,000–20,000 pairs, likely an underestimate) in the island groups: Line (two locations, > 2,000 pairs), Southern Cook (one location, population unknown), Society (three locations, population unknown, though 10–99 pairs at one location), Marquesas (six locations, > 3,000 pairs), Gambier (several locations, > 400 pairs), Austral (one location, < 10 pairs) (Thibault & Cibois 2017). Our sightings off Tahiti Iti and the volcano Mehetia, Tahiti, Society Islands, 2–4 November, reveal a significant breeding population in the eastern region of Tahiti. Sightings from the ferry Tahiti to nearby Moorea, found in trip reports, suggest a notable population in the western region of Tahiti.

Sightings Observations were concentrated near to breeding locations, at the shelf-edge south of the Gambier Islands, in lagoons inside the reef of southern Tahiti Iti, en route to a seamount 80 km southeast of Tahiti, and between Tahiti Iti and the volcano Mehetia 115 km east of Tahiti Iti. Scarce on true oceanic crossings.

Date	Counts
16 Oct	40: 0, 0, 40
17 Oct	1: 0, 1, 0
01 Nov	6: 3, 1, 2
02 Nov	60: 0, 0, 60
03 Nov	56: 12, 1, 43
04 Nov	104: 3, 69, 32
06 Nov	2: 0, 0, 2
07 Nov	1: 0, 0, 1
08 Nov	11: 10, 1, 0

Range Breeding phenology and at-sea range unknown, though most found near actual / possible breeding localities and so may be largely sedentary. **Society Islands** Nine 30 June 2012 while sailing west from Tahiti and one between Tahiti and Moorea 26 July 2012 (van der Vliet & Zantingh 2012). ‘A flock’ April 2014 on the crossing Tahiti to Moorea (Millar 2014). A few off Moorea late October 2017 (photograph; Morris & Beaman

2017b). In 2012, 11 on 19 July sailing west from Tahiti and one 20 July between Bora Bora and Tahaa (van der Vliet & Zantingh 2012). A few on 07 October 2013 off Moorea (Sargeant 2013). About 20 on 05 November 2018 from the Tahiti to Moorea ferry (Morris & Beaman 2017a), same 05 November 2018 (Simpson 2018). Two in September 2018 off Papeete, Tahiti (Jacob 2018). **Marquesas Islands to Society Islands** Observed 22 September 2013 while crossing to Tetiaroa (Sargeant 2013). **Marquesas Islands** In 2012, two 09 July Ua Huka to Nuku Hiva, four 10 July Nuku Hiva to Ua Pou, eight 10 July sailing south from Ua Pou (van der Vliet & Zantingh 2012). Seen 26 September 2013 between Ua Huka and Tahuata (Sargeant 2013). Seen April 2014 between Hiva Oa and Fatu Hiva (Millar 2014). Four in November 2018 between Hiva Oa and Fatu Huku (photograph; Simpson 2018). In 2019, about 50 on 21 September at Nuku Hiva, one 22 September off Hatutu, and two 23 September off Ua Huka (Talbot 2019). **Marquesas Islands to Tuamotu Islands** Six on 27 September 2019 while sailing from Fatu Hiva (Talbot 2019). **Tuamotu Islands** A couple 02 October 2013 when approaching Rangiroa (Sargeant 2013). One late October 2018 between Rangiroa and Makatea (Jacob 2018). One 21 January 2016 at Fakarava (Mackiernan 2016). **Gambier Islands** First stop for all expedition cruises shortly after departing Mangareva is late evening at Motu Teiko Islet, with estimates of 40 in June 2006 (photograph; Cooper 2006), 12 in October 2014 (Scott 2014), *ca.* 50 in October 2017 (Morris & Beaman 2017a), and *ca.* 20 on 06 November 2018 (Simpson 2018). Also reported there in September 2013 (Sargeant 2013), November 2014 and November 2018 (Collins 2014, 2018). Small numbers reported off Gambier in September



Figure 49. Polynesian Shearwater *Puffinus polynesiae*, 4 November 2019, Tahiti Iti, Tahiti, Society Islands (Kirk Zufelt). Lightly spotted.

Recognition Mid-sized *Puffinus* shearwater (see Figures 49–57).

Plumage: Bicoloured, uniform blackish upperside in strong contrast to clean-white underside with craggy borders. Underside markings somewhat variable. **Head & neck** Blackish ‘falconer’s hood’ to well below the eye and over the hindneck. White feathering typically extends over the gape line. Neck sides variable; greyish, mottled or barred blackish, more densely blackish on others, craggy margin with white foreneck about 50% of the way to the underside median body line. Can show shortish pale auricular crescent. Appearance affected by wear and angle of view. **Upperwing** Whitish / buff tips to median and greater secondary coverts form distinct / indistinct ‘pencil lines’. Freshest bird had a greyish pencil line along median coverts and a striking whitish pencil line along greater coverts. Other birds showed worn buffy remnants of whitish pencil lines along greater coverts. Buff versus whitish also possibly age-related (juvenile / adult). **Underwing** Clean-white coverts with variable dark markings. Blackish ‘thumb print’ at the underside of the shoulder. Marginal coverts dark. Most lesser primary coverts blackish forming a thick dark leading edge to the outer wing, while only the shortest lesser secondary coverts blackish forming a narrower dark leading edge to the inner wing. Short to long blackish ‘splayed’ fingers basally, typically in outermost eight median primary coverts, thicker and longer outwardly. Some show darker centres to the outermost one or two greater primary coverts. Remaining lesser secondary coverts variable; from largely clean-white with a small amount of dark markings centrally in the longer lesser coverts, in a small V-shape, to dirtier looking, with a dark triangular wedge in the inner wing, base along leading edge, apex in the longest lesser secondary coverts. Variable greater secondary coverts; from light grey, to dark grey with a dark inner web. Dark remiges reflective, silvery grey when catching the light. **Undertail** White coverts with variable dark markings, from no or very few markings, to largely dark and dirty-looking. Lateral undertail-coverts blackish with whitish fringes to tips. **White saddlebags** Typically small and narrow. **Underside** A few birds had randomly distributed dark feathers, from the throat to the undertail-coverts, giving a lightly spotted appearance. **Legs & feet** Pinkish, rear tarsi and toe pads blackish, nails blackish. **Bill** Essentially glossy blackish with light reflecting greyish. **Eye** Large, rounded and blackish. Some show indistinct, paler, narrow eye ring extending into a short line behind the eye. **Moult & wear** None were in wing moult and plumage varied from somewhat worn to fairly fresh.

2005 (Hoff 2005), October 2014 (Scott 2014), November 2014 (Collins 2014). **Gambier Islands to Pitcairn Island** Singles on 27 and 28 September 2005 (Hoff 2005). **Pitcairn Islands** One 16 June 2006 off Oeno (photograph; Cooper 2006). **Pitcairn Islands to southern Tuamotu Islands** One 04 October 2005 (Hoff 2005) and one 11 September 2013 between Oeno and Tenararo (Sargeant 2013). **Gambier Islands to Pitcairn Island to southern Tuamotu Islands** A few in October 2017 (Morris & Beaman 2017a). Seen twice in November 2018 (Collins 2018). About 20 in November 2018 (Simpson 2018).

Structure: Bill Mid length and slender, with some variation in depth presumably reflecting sexual dimorphism and / or age differences. **Head & neck** Moderately sloping forehead and slightly rounded crown. Head, neck and body appear as distinct parts owing to a narrower, mid-length neck. **Body** Longish and ovate-shaped. **Front-end projection** Mid length, shorter than rear-end projection. **Rear-end projection** Longish. **Tail** Mid length, held closed in travelling flight when wedge-shaped, frequently fanned and rounded when actively feeding in frenzies. **Toe projection** None. **Sat on water** Primary tips fall short of, or just reach the tail end.

Behaviour Concentrations of birds in feeding frenzies dominated by *Anous* and *Gygis* terns. Feisty feeders. Flew into the centre of frenzies, made shallow plunge dives, or sat on the surface with wings open snatching bait fish at or very near the surface, occasionally made shallow surface dives. Quickly dispersed when a frenzy dissipated. Travelling at sea, flew low to the surface with fast wingbeats and occasional short glides, seemingly following a direct line.

Taxonomy, variation, & moult *Puffinus* taxonomy in the tropical Pacific is far from resolved. Currently, three taxa of the ‘Tropical Shearwater complex’ are recognised in the tropical west Pacific – *P. dichrous* (Micronesia), *P. polynesiae* (Polynesia), and *P. gunax* (Melanesia) (Austin *et al.* 2004, Howell & Zufelt 2019). Wing moult of one bird at Moorea, Society Islands, had reached about p4 in late October (photograph; Morris & Beaman 2017b).

Conservation Least Concern (IUCN Red List of Threatened Species), though this lumps Indian and Pacific Ocean populations, involving several taxa, some of which are considered distinct species by some authorities (see Taxonomy).



Above, from top left to bottom right **Figures 50–53**; opposite page, from top left to bottom right **Figures 54–57**. Polynesian Shearwaters *Puffinus polynesiae*, 2–4 November 2019, Tahiti Iti, Tahiti, Society Islands (Kirk Zufelt). Figures 50–52 show variable pale tips to upperwing median and greater secondary coverts due to feather wear. Figure 51 has the freshest plumage and tips to greater coverts are broad and whitish, forming a whitish pencil line across the inner wing, while tips to the median coverts are narrower and greyish. Figure 50 is the most worn of the trio and shows little more than a narrow indistinct buff pencil line along the greater coverts. ...continued overleaf...

OTHER SEABIRDS

Brown Noddy *Anous stolidus* Polytypic, nominate widespread and quite common to common in tropical oceans. Breeds throughout East Polynesia (Thibault & Cibois 2017). Ten encountered by shelf-edge south of Gambier Islands on 16 October and 80 next day in a feeding frenzy at nearby Portland Bank. None was seen during the passage to MacDonald Bank. Common at Marotiri and Rapa, Austral Islands (Flood *et al.* 2021). On 30 October, 44 were near Lotus Bank off Raivavae, Austral Islands. Common in waters around Tahiti, Society Islands, including 118 on 02 November in feeding frenzies in the reef lagoon off south Tahiti Iti. On 03 November, a feeding frenzy including 97 birds was encountered near the seamount 80 km southeast of Tahiti. On 05 November, a feeding frenzy including 78 birds was encountered near the volcano Mehetia. On 07 November, a feeding frenzy including 79 birds was encountered off Makatea, Tuamotu Islands. Sightings mostly inshore and offshore breeding localities, scarcely oceanic, and consistent with known range.

Black Noddy *Anous minutus* Polytypic, nominate widespread in tropical Pacific where it is locally common. In East Polynesia, breeds on all islands except the southernmost Austral Islands and the Eastern Islands (Thibault & Cibois 2017). None was encountered at the Gambier Islands, on the passage to MacDonald Bank, or at Marotiri and Rapa, Austral Islands (Flood *et al.* 2021). Nine were seen on 29 October approaching Raivavae, Austral Islands, and 29 next day at nearby Lotus Bank. Common in waters around Tahiti, Society Islands, with the largest number encountered *ca.* 350 on 02 November in feeding frenzies in the reef lagoon off south Tahiti Iti. Another 81 were logged there on 04 November. On 05 November, a feeding frenzy including 165 birds



Figure 52 is midway between the two and shows a more distinct pencil line along the outer greater coverts. The undertail-coverts appear largely dark in Figure 53, essentially white in Figure 54, and mottled in Figure 55. Underwing-covert markings also vary. They are largely clean-white in Figure 56, with a small amount of dark markings in the longer lesser secondary coverts and the greater secondary coverts are mainly light grey. The underwings look dirtier in Figure 57, with a dark triangular wedge in the inner wing, base along leading edge, apex in the longest lesser secondary coverts. The greater secondary coverts are mid grey with a dark inner web.

was encountered near the volcano Mehetia. On 07 November, about 50 to 60 birds were offshore Makatea, Tuamotu Islands. The first session on 08 November north of Tahiti encountered 67 birds and the second one 93 birds, mainly associated with feeding frenzies. Sightings mostly inshore and offshore breeding localities, scarcely oceanic. Notably, no birds observed around the Gambier Islands.

Blue Noddy *Anous ceruleus* Local breeder possibly year-round in tropical central South Pacific. One seen well on 06 November off Makatea, Tuamotu Islands.

Grey Noddy *Anous albivitta* Monotypic, very local in subtropical South Pacific. Breeds across a southern strip of East Polynesia encompassing the Austral Islands, Pitcairn Islands, and Eastern Islands (Thibault & Cibois 2017). None was encountered in the Gambier Islands or on the passage to MacDonal Bank. Common at Marotiri and Rapa, Austral Islands (Flood *et al.* 2021). One on 29 October at Raivavae, Austral Islands. One 30 October nearby at Lotus Bank. None on the sail to or around Tahiti, Society Islands. Sightings exclusively inshore and offshore of breeding localities, never truly oceanic, and consistent with known range.

White Tern *Gygis alba* Polytypic, generally quite common to common in the tropical Indian and Pacific Oceans. Breeds throughout East Polynesia (Thibault & Cibois 2017). Seventy-two counted in the Gambier Islands on 16 October, and en route en route to MacDonal Bank, 14 on 17 October and two on 18 October. Modest numbers at Marotiri and Rapa, Austral Islands (Flood *et al.* 2021). Six on approach to Raivavae, Austral Islands, and 10 at nearby Lotus Bank. Then largely absent until approaching Tahiti, Society Islands, where regular and quite common at times (e.g., 30–40 per hour at the seamount 80 km southeast of Tahiti and up to 20 per hour at the volcano Mehetia). Quite common off Makatea, Tuamotu Islands, with up to 25 per hour. Sightings mainly inshore and offshore breeding localities, scarcely truly oceanic.

Grey-backed Tern (Spectacled Tern) *Onychoprion lunatus* Monotypic, locally quite common in the west and central Pacific. In East Polynesia, breeds at 14 locations in the island groups Line, Society, northern Tuamotu, and Marquesas, though probably overlooked on atolls (Thibault & Cibois 2017). None was encountered in the Gambier Islands, on passage to MacDonal Bank, at Marotiri and Rapa, Austral Islands (Flood *et al.* 2021), or on passage to Tahiti, Society Islands. On 02 November, six in the reef lagoon off south Tahiti Iti. On 08 November, 13 off nearby Moorea. Consistent with known range, though very localised and scarce.

Sooty Tern *Onychoprion fuscatus* Polytypic, subspecies definition complex, widespread in tropical oceans. In East Polynesia, breeds or possibly breeds at 36 locations, commonest north of 17°S (Thibault & Cibois 2017). None encountered in Gambier Islands or on passage to MacDonal Bank. Small numbers at Marotiri and Rapa, Austral Islands (Flood *et al.* 2021). Two on 30 October at Lotus Bank off Raivavae, Austral Islands, and three next day sailing towards Tahiti, Society Islands. Two on 03 November en route to the seamount 80 km southeast of Tahiti and one off Tahiti Iti 04 November. One 07 November off Makatea, Tuamotu Islands.

South Polar Skua *Stercorarius maccormicki* Monotypic, widespread breeder in Antarctic, transequatorial migrant March–October in Atlantic and Pacific. One 08 November at 17.21°S, 148.26°W, northeast of Tahiti, Society Islands. Only previous records are one 10 June 2006 between Pitcairn and Henderson, Pitcairn Islands (Figure 58; Cooper 2006) and reference to the species in the Gambier Islands (Gouni & Zysman 2007).

Figure 58. South Polar Skua *Stercorarius maccormicki*, 10 June 2006, Pitcairn Islands (John Cooper). Regular plumage, safe identification.



Arctic Skua *Stercorarius parasiticus* Monotypic, widespread breeder mainly on Arctic tundra, transequatorial migrant September–April in Atlantic and Pacific. One 20 October over MacDonal Bank at 28.38°S, 139.64°W, and two 04 November at 17.79°S, 148.81°W, east of Tahiti, Society Islands. Previously, two specimens collected at sea near Tahiti in December 1921 (Thibault & Cibois 2017). One on 09 November 2018 east of Pitcairn, Pitcairn Islands (Collins 2018). A few seen 10–29 October 2019, from Tahiti to Easter Island (Gibbons 2019). Two in November 2019 at Rapa, Austral Islands (Flood *et al.* 2021).

Long-tailed Skua *Stercorarius longicaudus* Monotypic, widespread breeder mainly on Arctic tundra, transequatorial migrant September–April in Atlantic and Pacific. One 20 October at 28.79°S, 139.64°W, over MacDonald Bank. One 01 November at 19.15°S, 148.29°W, south of Tahiti, Society Islands. One 03 November southeast of Tahiti at 18.42°S, 148.52°W. Previously, small numbers in Line Islands (King 1967). One early October 2017 between Henderson and Oeno, Pitcairn Islands (photograph; Morris & Beaman 2017a). Two moulting adults late October 2017 between Fatu Hiva, Marquesas Islands, and Rangiroa, Tuamotu Islands (Morris & Beaman 2017b). One 07 November between Gambier Islands and Pitcairn, Pitcairn Islands. One 18 November between Morane, Tuamotu Islands and Gambier Islands (Collins 2018). One 27 September 2019 sailing from Fatu Hiva, Marquesas Islands to northern Tuamotu Islands (photograph; Talbot 2019).

Red-tailed Tropicbird *Phaethon rubricauda* Monotypic, locally common in tropical South Indian, central and east Pacific Oceans. In East Polynesia, breeds or possibly breeds at 69 islands from all island groups, preferring low islands (Thibault & Cibois 2017). Observed in tropical and subtropical waters. One or two recorded far out to sea on three of the seven days 17–23 October, while sailing from the Gambier Islands to MacDonald Bank. In Austral Islands, common at Marotiri and Rapa (Flood *et al.* 2021); singles recorded 28 October between Rapa and Raivavae, 29 October on arrival at Raivavae, and 30 October at Lotus Bank off Raivavae. The only sightings in the vicinity of Tahiti, Society Islands, involved 13 birds on 05 November in waters adjacent to the volcano Mehetia. Observations are consistent with known breeding localities and range.

White-tailed Tropicbird *Phaethon lepturus* Polytypic, nominate widespread, locally quite common including in tropical Pacific. In East Polynesia, breeds or possibly breeds on at least 50 islands, preferring high islands (Thibault & Cibois 2017). Observed only in tropical waters. In the Gambier Islands, seven on departure on 16 October and one next day at nearby Portland Bank. No further sightings until one on arrival at Raivavae, Austral Islands, on 29 October. One to four birds daily 30 October to 02 November while sailing to Tahiti, Society Islands. Three on 03 November while sailing to the seamount 80 km to the southeast of Tahiti. Nine on 05 November at the volcano Mehetia. Seven on 07 November at Makatea, Tuamotu Islands. Three on 08 November while sailing Makatea to Tahiti. Sightings are consistent with known breeding localities and range.

Great Frigatebird *Fregata minor* Monotypic, widespread, locally quite common in tropical Indian and Pacific Oceans (small population South Atlantic). Widespread in East Polynesia, breeds at 59 locations across all island groups (Thibault & Cibois 2017). Seven noted 16 October on departure from Gambier Islands. None recorded thereafter until reaching Tahiti, Society Islands, with five 02 November. A few daily around Tahiti. Counts of 16 on 05 November at the volcano Mehetia, and 16 on 07 November off Makatea, Tuamotu Islands.

Lesser Frigatebird *Fregata ariel* Polytypic, nominate widespread, locally quite common in tropical Indian and central Pacific Oceans (tiny relict population in South Atlantic proposed as distinct taxon). In East Polynesia, breeds or possibly breeds at 41 locations in the island groups Line, northern Cook, Society (localised), Marquesas, and Tuamotu (Thibault & Cibois 2017). None recorded on the *Sauvage* expedition until reaching Tahiti, Society Islands, with one 02 November at Tahiti Iti, 10 on 07 November off Makatea, Tuamotu Islands, and one 08 November northwest of Tahiti. Sightings highly localised and numbers small.

Masked Booby *Sula dactylatra* Monotypic, widespread, mainly quite common in tropical Indian and Pacific Oceans. In East Polynesia, breeds or possibly breeds at 44 locations, though only single locations in the island groups Northern Cook, Society, and Austral, and absent Southern Cook (Thibault & Cibois 2017). On the *Sauvage* expedition, one 16 October on departure from Gambier Islands and one next day at nearby Portland Bank. The only subsequent observation involved 14 on 05 November at the volcano Mehetia.

Red-footed Booby *Sula dactylogram* Monotypic, quite common to common in tropical Indian and Pacific Oceans (smaller numbers in Atlantic). In East Polynesia, breeds at 89 locations in all island groups except the Eastern Islands and is by far the commonest booby (Thibault & Cibois 2017). A notable 134 birds seen on 17 October over Portland Bank, off Gambier Islands. None recorded thereafter until approaching Tahiti, Society Islands, with 10 on 01 November. Subsequently, between 60 and 260 seen daily, with three daily counts of over 100 birds – 122 on 03 November while visiting the seamount 80 km southeast of Tahiti, 260 on 05 November at the volcano Mehetia, and 115 on 07 November off Makatea, Tuamotu Islands.

Brown Booby *Sula leucogaster* Polytypic, *S. [l.] plotus* generally quite common in the tropical Indian and Pacific Oceans. In East Polynesia, breeds or possibly breeds at 67 locations north of 23°S (Thibault & Cibois 2017). Eleven noted on 16 October on departure from Gambier Islands. Small numbers at Marotiri and Rapa, Austral Islands (Flood *et al.* 2021). None between Rapa and Raivavae, Austral Islands. Two on 30 October on departure from Raivavae. None thereafter until reaching Tahiti, Society Islands, with two on 02 November. Subsequently, between five and 47 seen daily, with 47 on 05 November at the volcano Mehetia and 29 on 07 November off Makatea.

Conclusion

This report documents results of a 24-day-long pelagic survey of seabirds October–November 2019 – the *Sauvage* expedition – from the Gambier Islands to MacDonald Bank, continuing to the southern Austral Islands, and on to Tahiti, Society Islands, with a further six days broadly within that region. Our effort adds substantial information about seabirds to Thibault & Cibois' (2017) baseline biogeographic atlas for East Polynesia. We recommend that the status of seabird species be modified as set out in the species accounts and that the list of avifauna be amended as set out below.

Blue Petrel *Halobaena caerulea* should be added to the list of avifauna of the Tuamotu Islands and East Polynesia. Hawaiian Petrel *Pterodroma sandwichensis* should be added to the list of avifauna of the Gambier Islands and East Polynesia. White-necked Petrel *Pterodroma cervicalis* should be listed separately from Juan Fernández Petrel *Pterodroma externa* in the list of avifauna for East Polynesia. Both forms of Buller's Albatross *Thalassarche [bulleri] bulleri* and *T. [b.] platei* should be recognised in the list of avifauna of East Polynesia. The *Sauvage* expedition supports the recommendations in Flood *et al.* (2021) that Gould's Petrel *Pterodroma leucoptera* and Buller's Shearwater *Ardenna bulleri* should be added to this list of avifauna for East Polynesia.

The single sighting of Wilson's Storm-Petrel *Oceanites oceanicus* during the *Sauvage* expedition is consistent with the paucity of previous records in the southeast quadrant of East Polynesia. Thirteen White-faced Storm-Petrel *Pelagodroma marina* sightings during the *Sauvage* expedition is a significant addition to the 34 or so previously documented records. None were recorded on the leg from the southern Austral Islands to Tahiti, or in the environs of Tahiti, consistent with the previous paucity of records in the western sector of East Polynesia.

There are only eight previously documented records of White-bellied Storm-Petrel *Fregetta grallaria* away from Marotiri and Rapa, Austral Islands, the breeding grounds of Titan Storm-Petrel *F. [g.] titan*, of which five were presumed to be Titan Storm-Petrel. However, of the two records supported by photographs, the features of one point to 'classic' Titan Storm-Petrel, but the features of the other one suggest possibly worn 'classic' Titan Storm-Petrel or another taxon of *F. grallaria*. Of the five birds photographed during the *Sauvage* expedition, one resembled 'classic' Titan Storm-Petrel, the other four were worn, generally more worn than the Titans observed on the breeding grounds. The worn birds may have been 'classic' Titan Storm-Petrel of a different age group, or representatives of a different taxon or taxa of *F. grallaria*.

Analysis of representatives of the Wandering Albatross complex *Diomedea exulans* in East Polynesia provide evidence that Antipodean Albatross *D. [a.] antipodensis* is probably the regular taxon of the region and this is consistent with tracking studies.

The *Sauvage* expedition and expedition-cruise sightings of Juan Fernández Petrel and Stejneger's Petrel *Pterodroma longirostris* provide further evidence that they have a regular westward dispersal in mid-latitudes of the Pacific and should be included in these terms in the avifauna of East Polynesia. The two *Sauvage* expedition sightings of Cook's Petrel *Pterodroma cookii* and plentiful reports from expedition cruises support Thibault & Cibois's (2017) proposition that Cook's Petrel is a migrant through East Polynesia.

The *Sauvage* expedition added at least six Grey-faced Petrels *Pterodroma gouldi* to the existing records of five birds, all in the eastern sector of East Polynesia. The 59 Soft-plumaged Petrels *Pterodroma mollis* over six consecutive days indicate that Soft-plumaged Petrel is not entirely rare in East Polynesia, as previously reported, and may be quite common at times, possibly due to irregular weather-related influxes. All observations of Soft-plumaged Petrel are for the eastern sector of East Polynesia and several are farther east than the range given in the literature.

Both Grey Petrel *Procellaria cinerea* and White-chinned Petrel *Procellaria aequinoctialis* occur farther north in East Polynesia than reported in the literature and conservation programmes should consider this range extension.

Band-rumped Storm-Petrel *Hydrobates castro (sensu lato)* sightings in East Polynesia are at least 2,000 km and otherwise considerably farther away from the nearest known breeding populations, thus the possibility of local breeding should be borne in mind.

This report provides a detailed study of the plumage of Polynesian Shearwater *Puffinus polynesiae* found off Tahiti, contributing to the ongoing study of forms of Tropical Shearwater (*sensu lato*) in the Pacific.

This report, coupled with Flood *et al.* (2021), documents observations on the at-sea behaviour of many tubenoses recorded in East Polynesia. The observations document where possible travelling flight, natural foraging, foraging over chum, and styles of collecting prey.

Although our survey constitutes the most extensive at-sea study carried out along the route of the *Sauvage* expedition, there is still much to learn. The following key issues arose during the expedition. Polynesian Storm-Petrel has been extirpated from numerous islands. This underlines the vulnerability of the species and the great importance of surviving populations. The Rapa and Marotiri populations apparently remain healthy

and require protection. The Gambier population most likely is no more than a remnant population and existing breeding sites should be identified and protected. Although we did not find Polynesian Storm-Petrel in the environs of Tahiti, there were sightings from the region several decades ago (P. Harrison *in litt.*) and a small number of breeders may persist. There is need for a targeted search for this species in and around Tahiti and protection of any remnant population. DNA testing and tracking studies of *Fregetta* storm-petrels are needed to define *Fregetta* taxonomy and distribution in East Polynesia, and more widely across the Pacific. Collared Petrel *Pterodroma brevipes* is in serious decline and so a search for breeding locations in East Polynesia, such as Raivavae, Austral Islands, Oeno, Pitcairn Islands, and the Gambier Islands, is of high priority. Protection should be afforded to breeders, if found. Lastly, we recommend greater emphasis be placed on identification of taxa at subspecies level to help appreciate their conservation needs, e.g., the Wandering Albatross complex, the Buller's Albatross complex, and the *Puffinus* shearwaters.

Appendix 1: List of expedition-cruise and land-based reports

The following is a list of reports that we traced, mainly from expedition cruises, with useful observations made by experienced observers (reports available from RLF). Pitcairn Islands and southern Tuamotu Islands, 27 September to 15 October 2005 (Hansbro 2005, Hoff 2005). Pitcairn Islands and southern Tuamotu Islands, 4–21 June 2006 (Cooper 2006). Eastern French Polynesia and Pitcairn Islands, September 2006 (Gaskin 2006). Marquesas Islands, 5–9 September, and Pitcairn Islands and southern Tuamotu Islands, 11–25 September 2010 (van Beirs 2010). Land-based, visiting various islands of the Marquesas, southern Tuamotu, and Society groups, 29 June to 26 July 2012 (van der Vliet & Zantingh 2012). Pitcairn Islands and southern Tuamotu Islands, 3–16 September, and Marquesas Islands, 24 September to 07 October 2013 (Sargeant 2013). Easter Island to Chile, 10–16 December (Fraser 2014). Land-based, visiting 10 islands of the Austral, Marquesas, Society, and southern Tuamotu groups, 4–21 April 2014 (Millar 2014). Pitcairn Islands and southern Tuamotu Islands, 3–19 November 2014 (Collins 2014). Marquesas Islands, 4–11 October, and Pitcairn Islands and southern Tuamotu Islands, 12–28 October 2014 (Scott 2014). Rapa Island, Austral Islands, late September 2014 (Skipworth 2014). Valparaiso, Chile to Tahiti, French Polynesia, 6–28 January 2016 (Mackiernan 2016). Pitcairn Islands and southern Tuamotu Islands, 3–17 October, and Marquesas Islands, 17 October to 02 November 2017 (Morris & Beaman 2017a, b). Pitcairn Islands and southern Tuamotu Islands, 6–20 November 2018 (Collins 2018, Simpson 2018). Land-based, visiting 15 islands of the Austral, Cook, Marquesas, Society, and southern Tuamotu groups, 06 September to 27 October 2018 (Jacob 2018). Society, Marquesas and Tuamotu Islands, 19 September to 03 October 2019 (Talbot 2019). Tahiti to Easter Island, 10–29 October 2019 (Gibbons 2019).

Appendix 2: Tubenoses of East Polynesia not covered in this report

This report updates the status of seabirds in East Polynesia given in the biogeographic atlas for the region by Thibault & Cibois (2017). We found no new data for the following species and accordingly they are not dealt with herein (thus, consult Thibault & Cibois 2017): Black-bellied Storm-Petrel *Fregetta tropica*, Laysan Albatross *Phoebastria immutabilis*, Black-footed Albatross *Phoebastria nigripes*, Royal Albatross sp. *Diomedea epomophora* / *sandfordi*, Light-mantled Albatross *Phoebetria palpebrata*, Grey-headed Albatross *Thalassarche chrysostoma*, Black-browed Albatross *Thalassarche melanophris*, White-capped / Shy Albatross *Thalassarche cauta* / *stedi*, Leach's Storm-Petrel *Hydrobates leucorhous*, Southern Fulmar *Fulmarus glacialisoides*, Cape Petrel *Daption capense*, Pycroft's Petrel *Pterodroma pycrofti*, Henderson Petrel *Pterodroma atrata*, Phoenix Petrel *Pterodroma alba*, Mottled Petrel *Pterodroma inexpectata*, Short-tailed Shearwater *Ardenna tenuirostris*, Pink-footed Shearwater *Ardenna creatopus*, Fluttering Shearwater *Puffinus gavia*, Rapa Shearwater *Puffinus myrtae*, Bulwer's Petrel *Bulweria bulwerii*. Also, see Flood *et al.* (2021) for updates to Thibault & Cibois (2017) resulting from an at-sea survey of Rapa and Marotiri, Austral Islands, October–December 2019.

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