Survey of the Avifauna of the Houtman Abrolhos Archipelago

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Executive Summary

A complete survey of the numbers and breeding stages of seabirds, shorebirds, migratory waders and raptors at the Houtman Abrolhos Islands, central west coast, Western Australia, was undertaken. One hundred and ninety two (192) islands, islets and rocks were surveyed over 21 days in December 2006.

Seabird nesting habitat was mapped in its entirety for those islands considered as significant breeding areas (i.e. Pelsaert Island, Leo Island) and estimates of both breeding and roosting seabirds were made for each island. Notes on the stage of breeding were also taken, and where applicable, eggs were measured and weighed for some species to obtain breeding dates. Permanent monitoring transects were established on West Wallabi and Pelsaert Islands to monitor longer-term changes in the nesting density of the Wedge-tailed Shearwater, Lesser Noddy, Brown Noddy and Sooty Tern.

We recorded 15 species of seabirds, 16 species of migratory waders, three shorebirds and 2 raptors during this survey. Of these, 14 species of seabirds, three shorebirds and the two raptors bred at the Houtman Abrolhos Islands. These breeding populations are considered significant in a regional and national context. Of the 192 islands surveyed, 148 (77 %) had breeding seabirds.

Population sizes had decreased in some species, and increased in others since the last survey undertaken in 1999. Reasons for the changes and recommendations for future surveys are discussed.

1 Introduction

The Houtman Abrolhos archipelago consists of three major island groups with one solitary island to the north (North Island). The Wallabi, Easter and Pelsaert (or Southern) groups are located at the edge of the continental shelf between 28°15'S and 29°00'S, approximately 60 km off the coast of Geraldton, Western Australia. The islands are classified as an A-Class Reserve and are vested in, and managed by, Fisheries Western Australia.

Geographically, the islands are on one of the southernmost extensions of coral reef in the Indian Ocean. The Leeuwin Current surrounds the Houtman Abrolhos (Pearce 1997) and is the source of a unique assemblage of tropical larval fishes, corals and algae which inhabit the reef areas (Hatcher 1991) in association with temperate species. These islands support the largest populations, and most species-rich assemblage, of seabirds in the eastern Indian Ocean (Surman 1992). Most reports on the status, timing of breeding and behaviour of breeding seabirds prior to 1991 were based on short visits to the islands, although CALM undertook population surveys (see Burbidge and Fuller 199X, Fuller *et al*. 1994, Burbidge and Fuller 2004). The first long-term research into seabird breeding biology at the Houtman Abrolhos was undertaken at Pelsaert Island in the Pelsaert Group in 1991, and continued until 2001 (Surman 1992, Surman and Wooller 1995, Surman 1997, Surman 1998, Surman and Wooller 2000, Surman and Wooller 2003, Gaughan *et al.* 2002). Since this time baseline data has been maintained on the basis of short field trips throughout the seabird breeding season.

The Houtman Abrolhos is one of the most significant seabird breeding locations along Australia's coastline. Eighty percent (80%) of Brown Noddies *Anous stolidus*, 40% of Sooty Terns and all Lesser Noddies *Anous tenuirostris* found in Australia nest at the Houtman Abrolhos (Ross *et al*. 1995). It also contains the largest breeding colonies in Western Australia of Wedge-tailed Shearwaters, Little Shearwaters, White-faced Storm Petrels *Pelagodroma marina*, White-breasted Sea Eagles, Osprey, Caspian Terns, Crested Terns, Roseate Terns and Fairy Terns (Storr *et al.* 1986). The Houtman Abrolhos also represents the northernmost breeding islands for the Little Shearwater and White-faced Storm Petrel.

As a result of this long-term data set, seabirds on Pelsaert Island at the Houtman Abrolhos have shown short-term and long-term responses to variations in the strength of the Leeuwin Current, and indirectly to the El Nino Southern Oscillation (ENSO) (Gaughan *et al.* 2002, Surman and Dunlop, in prep). In ENSO years the timing of tern and noddy breeding commenced later, with reduced breeder participation rates and lower breeding success. These three indicators have been directly linked to the Southern Oscillation Index and sea level changes and are most likely linked to Leeuwin Current driven productivity changes (Surman 1997, Gaughan *et al.* 2002). The diet and foraging areas of each seabird species has also been documented for several seasons, revealing oceanographic and prey distribution patterns for inshore foragers, such as the Roseate Tern *Sterna dougalli*, over-shelf foragers, such as the Crested Tern *Sterna bergii*, and off-shelf foragers, such as the Brown Noddy *Anous stolidus*, Lesser Noddy *Anous tenuirostris melanops* and Sooty Tern *Sterna fuscata* (Surman and Wooller 2003). In ENSO years the diet composition of the indicator species the Lesser Noddy and Brown Noddy varied, with major prey species being completely absent (*ibid.*).

Knowledge of the breeding location, population size and timing of breeding of seabirds of the Houtman Abrolhos is essential to formulate a successful management plan for the region.

This study presents the results of a "snapshot" survey of the avifauna present at the Houtman Abrolhos in December 2006. This survey was specifically designed to meet, wherever practicable, the methodology established by A. Burbidge and P. Fuller, formerly of CALM (see Fuller *et al*. 1994, Burbidge and Fuller 2004) in order to compare population sizes of the major seabird colonies, and to identify any long-term changes in the use of islands and population sizes.

The objectives of this survey were:

- To quantify the population size of the threatened Lesser Noddy, and map nesting habitats.
- To estimate breeding populations of seabirds throughout the Houtman Abrolhos, utilising the methods established by previous researchers.
- To assess the latent or roosting seabird population of seabirds and migratory waders.
- To obtain ongoing data for the whole island group so that seasonal variation in species richness and abundance of breeding seabirds, and other avifauna, in the area can be assessed.

2 Methods

2.1 Field Visits

The Houtman Abrolhos was visited between 1-21 December 2006 inclusive. The survey commenced at the Pelsaert Group (Figure 1) between 1-10 December, proceeded to the Easter Group from10-16 December and was completed in the Wallabi Group from16-21 December. North Island and the Hummock were not surveyed during this census.

A total of 192 islands were surveyed (Figure 1) during daylight hours, most on foot after gaining access in a plate aluminium 4.6m open dinghy.

2.2 Habitat Mapping

Seabird breeding habitat was mapped in the field onto current aerial photographs of each island. These maps were then used to generate plots of colony areas electronically. A graduated 100 x 100 m (1 Hectare) grid was then positioned over the aerial images in Adobe Illustrator to calculate total colony areas (m^2) for each seabird species on each island.

2.3 Population Estimates

Breeding population sizes of seabirds were calculated using two techniques, namely, total island counts of active nests or burrows and estimates of populations based on nest/burrow densities on the larger islands.

It was not always practicable or desirable (in terms of disturbance to breeding colonies) to locate all nests of breeding seabirds on those islands small enough to survey efficiently with aerial (count of the number of birds rising into the air upon our approach) and territory counts (count of the number of nests/adults present within a colony using binoculars).

Permanent monitoring transects were established for Wedge-tailed Shearwaters on Pelsaert and West Wallabi Islands. Similarly, permanently marked transects established by Burbidge and Fuller (Fuller *et al*. 1994) were used to estimate the breeding population of the Lesser Noddy on Pelsaert, Wooded and Morely Islands.

Nesting densities of both surface and burrow-nesting species were obtained for significant breeding islands. For example, we obtained nesting densities on Pelsaert Island for the Lesser Noddy, Brown Noddy, Sooty Tern, and Wedge-tailed Shearwater. Nest densities were obtained for different habitat types on each island, for both Wedge-tailed Shearwaters and Bridled Terns, by counting the numbers of nests within consecutive 5m x 5m quadrats, established along marked transects. Total breeding populations could then be estimated by extrapolating this density to the observed habitat area, with the use of the aerial photographs.

2.4 Burrow-nesting Species

The boundaries of nesting habitat were plotted onto aerial photographs of each island in the field. In the case of larger colonies on Pelsaert and West Wallabi Islands, we established permanent transects at strategic parts of colonies that were representative of the colony as a whole. Transects were 200m x 5m and were divided into consecutive 5 x 5m quadrats. All

burrows, including recently collapsed burrows (which were not included in population estimates, but gave an indication of the colony dynamics), were counted in each quadrat. Each intact burrow was inspected using an electronic burrowscope to determine both the stage of breeding and levels of occupancy. We also determined if burrows had a single entrance. If some had two or more entrances, these were counted as a single burrow.

For smaller islands and colony areas on larger islands we obtained burrow densities in randomly selected 5 x 5 m (25 m^2) quadrats. These were later used to estimate total burrow numbers, by applying observed burrow densities to differing habitat areas, depending upon island and species. This provided more accurate estimates due to the variability of burrow density based on habitat quality. The Burrowscope was designed and developed by Nic Nicholson, and has been used in surveys since 1996.

In some cases it was not possible to estimate breeding numbers due to the time of year this survey was undertaken. Little Shearwater populations may be misrepresented as in December most had fledged, and no adults were observed attending burrows. The estimates we provide for Little Shearwaters and White-faced storm Petrels, are therefore estimates of total burrows, rather than total breeding pairs. In contrast, both White-faced Storm Petrels and Wedge-tailed Shearwaters were present and breeding during the survey.

In addition, we report in the results that there are many mixed colonies of Little Shearwaters and White-faced Storm-petrels. In the absence of Little Shearwaters, empty burrows not occupied by White-faced Storm-petrels are difficult to assign to species. Whilst White-faced Storm Petrel burrows are typically smaller, entrances to burrows are often eroded and hence enlarged to some degree. It appears that at the Houtman Abrolhos, White-faced Storm-petrels breed in mixed colonies with Little Shearwaters on several islands. Unlike previous surveys (Fuller *et al.* 1994) we did not assign species on the basis of burrow size alone, instead we utilised burrow inspection and contents to ascertain species.

2.5 Timing of breeding

Wherever possible, given the strict time limitations, we obtained egg mass and sizes to determine the timing of breeding for the larger colonial nesting species (Surman and Wooller 1995), as well as estimating the ages of any nestlings observed. Timing of breeding in some species varies greatly from one year to the next, reflecting marine productivity in the seas adjacent to the Houtman Abrolhos. The use of simple measures taken at the nest allows an accurate assessment of the participation rate and timing of breeding, and hence potential reproductive performance (Surman 1997, 1998). This is essential in monitoring the health of seabird populations at the Houtman Abrolhos in a highly dynamic and variable marine environment.

Bridled Tern nests were cryptically located under dense shrubs or rocky holes and crevices and could easily be missed on foot, so where it was not possible to survey the smaller islands in their entirety, estimates were based on counts of birds overhead. This method may sometimes have resulted in a slight under-estimation of the breeding population (i.e. number of nests, or breeding pairs) for an island, as the number of overhead birds counted was always halved, to allow for the fact that often both partners of a pair were present. This method therefore, could not differentiate those cases where only one adult was present.

Disturbance of the colonies of surface-nesting species Crested Terns, Roseate Terns, Fairy Terns and Pied Cormorants was avoided. Colonies were not approached directly, and field personnel kept out of the direct view of nesting birds, to avoid the risk of disturbing the whole colony and creating opportunities for gull predation of eggs and/or young hatchlings. In these cases, nest counts were carried out from a safe distance, or from the vessel, using binoculars. This method is not considered as accurate as a foot survey, however most of each colony could be observed, and the well-being of the colony was considered to be the priority.

The stage of breeding for each species was recorded.

In some instances, measurements of eggs (volumes) or nestlings were taken in order to back date the commencement of breeding (Wooller and Dunlop 1980). Egg measurements were estimated using the following calculation (Surman 1997):

$$V = 0.496LB^2$$

$$D = M/V$$

$$\text{Fresh egg mass} = 1.06(V) + 0.34$$

$$\text{Egg age} = (D - 1.055)/-0.0033$$

Where M = egg mass, V = volume, D = density, L = maximal egg length and B = maximal egg breadth.

Where chicks were present, their age was estimated based upon feather development and size (Surman 1992).

These observations facilitated comparisons between the larger seabird breeding islands (Pelsaert, Leo's and East Wallabi) as well as providing a more accurate estimate of laying chronology, important in the management of Silver Gull populations.

2.6 Nomenclature

Wherever possible gazetted names for islands in the Houtman Abrolhos Group were used as those published in Harvey *et al*. (2001).

For the purposes of this report, the avifauna results have been separated into four main categories referred to throughout the report. These are:

- Seabirds - those birds associated with the sea and deriving most of their food from it, and typically breeding colonially.
- Raptors – those birds which capture their prey with curved talons, including the Osprey, White-bellied Sea Eagle, Brahminy Kite and Nankeen Kestrel.
- Shorebirds - Those birds that inhabit the intertidal zone and adjacent areas (i.e. Oystercatchers) and remain resident.
- Migratory Waders - Those birds that forage in the intertidal zone and migrate to the area from the northern hemisphere (i.e. Ruddy Turnstone).

Names for bird species follows that presented in Christidis and Boles (1994).

3 Results

3.1 Notes on species

Appendix 1 lists each species recorded by island, and Appendix 2 lists the breeding species for each island surveyed. Appendix 3 lists migratory waders observed for each island surveyed. Below is a brief account for each breeding seabird species observed.

Wedge-tailed Shearwater *Puffinus pacificus*
Estimated breeding total: 630 291 pairs on seven islands, although only 243 112 pairs were estimated to be participating in 2006/07 (Table 1). Examination of the contents of 325 burrows on both West Wallabi Island and Pelsaert Island indicate an actual breeding participation rate of 32.3% (Table 2). This is one of the lowest participation rates reported for the Houtman Abrolhos.

Little Shearwater *Puffinus assimilis*
Estimated breeding total: 60 356 burrows (the number of pairs could not be calculated as this species was not present at the time of the survey). Breeding recorded on 46 islands. Our estimates greatly increase the potential breeding population in the Houtman Abrolhos compared with those previously recorded (Fuller *et al*. 1994). However, the main portion of the breeding season was over by the time of our visit in December, thus we can only provide an estimate of the number of burrows, rather than an estimate of participation. We located large colonies on West Wallabi Island, as well as large mixed colonies of this species and the White-faced Storm Petrel on several islands. We record for the first time this species on Gun Island, where Little Shearwater burrows were interspersed amongst burrows of the larger Wedge-tailed Shearwater.

White-faced Storm Petrel *Pelagodroma marina*
Estimated breeding total: 17 995 pairs. We recorded this species breeding on 13 islands, with significant colonies on Stick Island (5 886), Morely Island (5 344), Dick Island (2 016), Bynoe Island (794), Long Island (612) and Suomi Island(1 500). This species is commonly found amongst colonies of Little Shearwaters, where it may have been missed previously.

Red-tailed Tropicbird *Phaethon rubricauda*
Estimated breeding total: 0 pairs. We found no breeding pairs of this species on any islands, although it has bred in the past on Pelsaert Island. Surman (pers obs.) observed 4 pairs overhead on several occasions in the following years, and 3 pairs breeding in 2001…. Between 1993 – 2001, no fledgling birds survived to flying age, and bodies were often found predated, presumably by White-breasted Sea Eagles.

Pied Cormorant *Phalacrocorax varius*
Estimated breeding total: 1 436 pairs on eight islands. We observed a single active colony of this species on Wooded Island where there were numerous large nestlings and juvenile birds dispersed across the lagoon.

Eastern Reef Egret *Egretta sacra*
Estimated breeding total: >4 pairs.
Breeding in this species was completed by the time of our survey in December 2006, however, we recorded 59 individuals throughout the group. In 2005, a nest of this species was observed on Long Island, Wallabi Group located under a limestome overhang and just above high water (Surman, pers. obs).

Osprey *Pandion haliaetus*
Estimated breeding total: 42 pairs. We observed nests of this species on 53 islands, however only 33 islands contained recently used nests. Significant islands with more than one nest were West Wallabi Island (4), Pelsaert Island (5), Suomi (2), Campbell (2), East Wallabi Island (2). Most nestlings had fledged by the time of our survey.

White-bellied Sea Eagle *Haliaeetus leucogaster*
Estimated breeding total: 25 pairs. We recorded nest sites on 25 islands, and 18 islands had currently active nest sites. The most significant island was West Wallabi Island, where eight active nest sites were observed.

Pied Oystercatcher *Haematopus longirostris*
Estimated breeding total: 18 pairs on 15 islands (Appendix 3). This species was recorded roosting on 38 islands, and its breeding population is likely significantly larger than that reported here. We recorded 68 individuals on Pelsaert Island, and 11 on East Wallabi Island. Pied Oystercatchers had finished breeding and several juvenile birds were observed. In October 2005, 3 nests of this species were located on Long Island.

Sooty Oystercatcher *Haematopus fuliginosus*
Estimated breeding total: 5 pairs on five islands (Appendix 3). This species is far scarcer than its cogener, the Pied Oystercatcher. A total of 12 indivduals were observed, with most on Gun Island and West Wallabi Island.

Silver Gull *Larus novaehollandiae*
Estimated breeding total: 356 pairs. Silver Gulls were recorded nesting on 25 islands. The largest colonies were observed on Long Island (142), Pelsaert Island (43), Leo Island (34) and Wooded Island (33). There are significant differences in the size of colonies in summer and autumn, with approximately 50 pairs nesting on Post Office Island in the autumn compared with only 2 pairs during the summer period (Surman pers obs). In May 2007 on Long Island there were at least 142 pairs of Silver Gulls attending nests, whereas in December 2006 only three nests were active (Surman, pers. obs). This reflects increased food availability to this species during the presence of Rock-lobster fishers.

Pacific Gull *Larus pacificus*
Estimated breeding total: 138 pairs breeding on 59 islands. Significant breeding islands include Pelsaert Island (39), Three Island (13) and Wooded Island (4). A large colony of this typically solitary breeder nests approximately 100m north of the main Lesser Noddy mangroves on Pelsaert Island. Another relatively large colony breeds on Three Island, part of the Numbered Group. During the summer this species feeds predominately upon whelks, trochus, baler shells, grapsid crabs, mantis shrimp and cuttlefish and squids (Surman unpub. obs). However, during the autumn, many juvenile, sub-adult and adult birds congregate at the Houtman Abrolhos to take advantage of fish bait discarded during the rock-lobster fishing season. The colonies at the Houtman Abrolhos represent one of the most significant breeding sites for this species in Australia.

Caspian Tern *Hydroprogne caspia*
Estimated breeding total: 71 pairs on 22 islands. Caspian Terns typically nest solitarily. However several small colonies were found at the Houtman Abrolhos, on Leo's Island (at least 13 pairs), West Wallabi Island (at least 18 pairs) and White Bank (6 pairs). At least 10

pairs nest on Pelsaert Island, mostly solitarily, although a small colony of 4 pairs regularly breeds near Big Lagoon (central Pelsaert Island).

Crested Tern *Sterna bergii*
Estimated breeding total: 2 928 pairs on 10 islands. At the time of our survey Crested Terns were tending medium sized runners, although some still incubated eggs. In the past, a large Crested Tern colony on Pelsaert Island would commence laying in mid-October (Surman 1998, Gaughin *et al*. 2002), however the age of runners present during our survey suggest that eggs were laid in mid November during 2006. The largest colonies were found on Pelsaert Island (1 200 pairs), Morely/Crake Islands (the colony had spread from one island to the other – 756 pairs), Long Island (190 pairs) and Bynoe Island (180 pairs).

Sooty Tern *Sterna fuscata*
Estimated breeding total: 105 407 pairs on eight islands (Table 3). Sooty Terns were incubating eggs or young chicks in December. The colony on Pelsaert Island appears to have decreased in both numbers of pairs and area occupied. This is discussed further in the Discussion. The colony areas and participation rates were far lower than previously estimated. During an extended study of the breeding biology of this species at the Houtman Abrolhos, Surman (1997) recorded a mean lay-date between 1993-1995 of 7-11 October. All nests examined still contained eggs, and we estimate a lay date in mid November, indicating that it is an exceptionally late and reproductively poor year for this species.

Bridled Tern *Sterna anaethetus*
Estimated breeding total: 2 274 pairs on 90 islands. This is by far the most cosmopolitan of all seabird species breeding at the Houtman Abrolhos. Whilst there are not large colonies of this species, since it usually nests in relatively low density colonies, it has inhabited all islands with suitable nesting habitat. The absence of this species on many islands during the day in December was in stark contrast to previous observations. In other years, Bridled Terns return to the islands in October, and commence laying in November. By the time of our visit in December there were very few Bridled Terns in attendance, and those that were nesting had only just laid their eggs. In most years, several thousand Bridled Terns may be observed overhead on Gun Island (Surman, pers. obs), but in 2006 we only counted 178 pairs.

Roseate Tern *Sterna dougalli*
Estimated breeding total: 4 210 pairs on 19 islands. Significant colonies were found on Pelsaert Island (2 004 pairs in 2 colonies), and Dick Island (719 pairs). Most birds were still incubating eggs or on very young chicks.

Fairy Tern *Sterna nereis*
Estimated breeding total: 547 pairs on 13 islands. Significant colonies were found on West Wallabi Island (162 pairs), Pelsaert Island (160 pairs) and Sandy Island (71 pairs). Often we would observe a few pairs of this species amongst larger Roseate Tern colonies.

Brown (Common) Noddy *Anous stolidus*
Estimated breeding total: 121 320 pairs on Pelsaert Island. We estimated a potential breeding population based on existing nest sites of 163 980 pairs, however based on actual breeding attempts we estimate 121 320 pairs breeding for 2006/07 (Table 4). Brown Noddies were incubating eggs which were either pipped or hatching, giving a lay date of early November. Brown Noddies have a highly variable lay date, linked to food supply which is determined by oceanographic conditions offshore. In comparably poor food years,

Brown Noddies commence laying in mid-late November, compared with early September in food rich years (Surman 1997, Surman and Wooller 2003).

Lesser Noddy *Anous tenuirostris*

Estimated breeding total: 28 839 pairs on three islands, Pelsaert Island, Wooded Island and Morely Island (Table 5). There were significantly more empty unused nest sites than those that were occupied across all colonies surveyed (Table 6. The total maximal breeding population, if all existing nests were utilized, would be 80 271 pairs (Table 5). The decline in the Lesser Noddy population can be attributed in part to a decline in available nesting habitat, as large areas of each colony had died off and were no longer occupied. The lateness of the season, and the poor attendance indicates that food supply was poor in this season.

There has been some significant deterioration in nesting habitat at all three Lesser Noddy colonies. On Morely Island, approximately 26% of available mangrove areas had died off, and on Wooded Island approximatley 33% had died off. The die-off on Wooded Island is in part linked to the presence of the large Pied Cormorant colony there. Similar die back is evident in the main mangroves on Pelsaert Island. However, here Lesser Noddies have started to relocate to the intact mangroves of the Big Lagoon. Lesser Noddies were first observed returning to these mangroves in 2005, after an absence of 13 years.

White Tern *Gygis alba*

Estimated breeding total: 0 pairs.

A single individual of this species was regularly observed amongst Lesser Noddies, adjacent to mangroves on Wooded Island during the December survey. A White Tern was also observed offshore of Pelsaert Island in January 2001. The nearest breeding colony is on Ashmore Reef.

Table 1: The mean nesting density (nests/25 m^2) and mean estimated population sizes for Wedge-tailed Shearwater colonies at the Houtman Abrolhos during 2006 for Pelsaert Island and West Wallabi Island (see text for explanation). We calculated population estimates based on three measures; total burrows observed including those recently collapsed, total intact burrows (excluding collapsed) and finally total active burrows.

		Burrow Density			Population Size (pairs)		
Island	**Colony Area (Ha)**	**Mean burrow density**	**Mean burrow density**	**Mean Active Burrows**	**Mean Total**	**Mean Intact Burrows**	**Mean Active Burrows**
Pelsaert	26.02	4.67 (0.34)	4.22 (0.34)	1.22 (0.21)	48 570 (3 561)	43 944 (3 532)	12 700 (2 177)
West Wallabi	311.36	4.80 (1.80)	4.48 (1.82)	1.59 (1.49)	610 280 (35 365)	600 939 (35 390)	230 412 (29 110)
Total					**658 850**	**644 883**	**243 112**

Table 2: The contents of burrows examined using an electronic camera at the Houtman Abrolhos in December 2006

	Burrow Contents						
	Unused		Used				
Island	**Empty**	**Collapsed**	**Adult & egg**	**Predated Egg**	**Adult Alone**	**Contents Unknown**	**Total Examined**
Pelsaert	80	12	30	1	2	1	126
West Wallabi	109	3	71	3	13	0	199

Table 3: The mean nesting density (nests/25 m^2) and mean estimated population sizes for Sooty Tern colonies at the Houtman Abrolhos during 2006 (see text for explanation)

Island	**Colony Area (m^2)**	**Mean nest Density**	**Mean Population Size**
Pelsaert	105 650	13.2 (1.6)	56 064 (6 665)
Alexander	13 670	17.0	9 295
Wooded	8 200	20.5	6 724
Leo	24 100	19.0	20 096
White	17 200	17	11 696
Total			**105 407**

Table 4: The mean nesting density (nests/25m^2) and mean estimated population sizes for Brown Noddy colonies at the Houtman Abrolhos during 2006 (see text for explanation)

		Nest Density			Population Size (pairs)		
Island	**Area**	**Mean total nests**	**Mean recent nests**	**Mean Active nests**	**Mean Max Popu**	**Mean Potential 2006**	**Mean Actual Participants**
Pelsaert	70 500	58.1	43.1	43	163 980 (14 140)	121 560 (13 655)	121 320 (13 681)

Table 5: The mean nesting density (nests/20m^2) and mean estimated population sizes for Lesser Noddy colonies at the Houtman Abrolhos during 2006 (see text for explanation) We counted all nests in each quadrat and assigned each nest a status based on previous observations collected by Surman. Population estimates were then calculated using the mean density for the maximum total population (including unused nests), the total potential for 2006 (including those nests now empty and unused) and the mean actual based on observed participation (those nests with active attempts).

			Nest Density			Population Size (pairs)		
Island	**Colony No.**	**Colony Area (m^2)**	**Mean total nests**	**Mean recent nests**	**Mean Active nests**	**Mean Max Popu**	**Mean Potential 2006**	**Mean Actual Participants**
Pelsaert	1	15 030	33.4 (3.1)	20.6 (2.6)	9.2 (1.2)	25 081 (2 324)	15 468 (1 926)	6 951 (917)
	2	9 530	41.8 (3.6)	37.9 (3.5)	24.6 (2.6)	19 942 (1 730)	18 050 (1 690)	11 716 (1 248)
	5	5 730	15.5 (5.0)	14.8 (4.8)	10.5 (3.1)	4 440 (1 434)	4 225 (1 390)	3 008 (887)
	8	600	16	12	6	192	192	192
								21 867
Wooded		3 670	43.9 (7.1)	36.1 (6.1)	13.5 (2.9)	8 062 (1 311)	6 617 (1 125)	2 477 (546)
Morely		8 400	53.7 (7.3)	48.2 (6.7)	16.6 (2.5)	22 554 (3 077)	20 244 (2 810)	6 972 (1 040)
Total						**80 271**	**64 796**	**31 316**

Table 6: Nest contents of all Lesser Noddy nests surveyed on Pelsaert, Wooded and Morely Islands during December 2006. Colony number refers to that given in Burbidge and Fuller (1992).

		Nest Contents									
		Empty		**Occupied**							
Island	Colony	Old	New	Egg Alone	Egg Broken	Adult Egg	Chick Alone	Adult Chick	Adult and ?	Chick dead	**Total**
Pelsaert	1	307	272	76	1	17	46	10	66	6	
	2	135	452	228	14	32	198	88	264	12	
	5	7	23	3	0	0	0	13	32	0	
	Total	449	747	307	15	49	244	111	362	18	**2302**
Wooded		126	361	22	1	21	26	27	112	7	**703**
Morely		110	632	64	3	26	71	83	74	11	**1074**
Total		**685**	**1740**	**393**	**19**	**96**	**341**	**221**	**548**	**36**	**4079**
(%)		16.8	42.6	9.6	0.4	2.3	8.4	5.4	13.4	0.8	

Table 7: Total Population size (breeding pairs) and number of breeding islands for each species observed at the Houtman Abrolhos.

Species	**Number of Breeding Islands**	**Breeding Population Size (Pairs)**
Red-tailed Tropicbird	0	0
Pied Cormorant	8	1 436
Eastern Reef Egret	4	4
Osprey	33	42
White-breasted Sea Eagle	18	25
Wedge-tailed Shearwater	7	644 883
Little Shearwater	46	60 356
White-faced Storm Petrel	13	17 995
Pacific Gull	59	138
Silver Gull	25	356
Caspian Tern	22	71
Crested Tern	10	2 928
Roseate Tern	19	4 210
Fairy Tern	13	547
Bridled Tern	90	2 274
Sooty Tern	8	105 407
Brown Noddy	1	121 320
Lesser Noddy	3	28 839
White Tern	1	0
Total Islands Used	**148**	
Total Islands Unused	**44**	
Total Islands in Group	**192**	

Table 8: Total numbers of islands occupied by seabirds for each group at the Houtman Abrolhos.

Island Group	**Number of Islands**	**Number of Unused Islands**
Wallabi Group (incl. North)	48	8
Easter group	68	15
Pelsaert Group (incl. Hummock)	76	21
TOTAL	**192**	**44**

4 Discussion

This survey presents updated population estimates for the breeding seabirds of the Houtman Abrolhos. One hundred and ninety two (192) islands, islets and rocks were surveyed over 21 days in December 2006. Of these, 148 islands (77%) had breeding seabirds.

This survey shows significant differences in both the distribution and abundance of breeding seabirds when compared to previous surveys, the last comprehensive survey having taken place in 1999 (Fuller *et al*. 1994, Burbidge and Fuller 2004). These differences may be attributed to survey methodology or stochastic variables influencing populations. However, this survey was undertaken at the same time as previous surveys, and utilised comparable methodology. One major difference that we have made to the methodology is that we differentiated between those nests that were unused in the current season, recorded contents of nests wherever possible to provide an indication of reproductive stage and effort, and inspected burrow contents of burrow nesting species with a non-intrusive electronic camera. This difference could certainly improve the accuracy of active breeding participation estimates for each species. Another factor which may have contributed to this difference is the use of aerial photographs for each island to assist with habitat mapping and population estimates.

Previous research has demonstrated the strong influence of El Nino upon the strength of the Leeuwin Current, and as a result, both the timing of breeding and reproductive output of seabirds at the Houtman Abrolhos (Surman 1997, Surman and Wooller 2003). Although data from the last few years is yet to be analysed, it appears that there has been a gradual shift in the usual breeding window of colonial seabirds at the Houtman Abrolhos to later on in the year. The species most greatly affected includes all the offshore or pelagic foraging colonial species (i.e. Lesser Noddy, Brown Noddy, Sooty Tern and Wedge-tailed Shearwater). Inshore foragers, particularly Roseate Terns and Fairy Terns, appear to not be affected.

In the last survey on burrow-nesting species, Fuller *et al.* (1994) recorded Little Shearwaters on 26 islands, with a total population of 30 555 pairs, White-faced Storm Petrels on 14 islands with 4 227 pairs and Wedge-tailed Shearwaters from 12 islands with 1 117 816 pairs. Our estimates double the number of Little Shearwaters and islands on which they breed, and triple the number of White-faced Storm Petrels. In contrast we estimate that there were only 644 883 Wedge-tailed Shearwater burrows, of which only 243 112 were occupied during the 2006/07 season.

We found that Little Shearwaters share extensive areas of the Wedge-tailed Shearwater colony on West Wallabi Island (Figure 12), and that White-faced Storm Petrels readily breed in what previously may have been presumed to have been Little Shearwater burrows. We repeatedly found White-faced Storm Petrels on islands where previously only Little Shearwaters were reported. For example, we found that there were large numbers of White-faced Storm Petrels on Morely Island, where previously only Little Shearwaters bred, and a colony amongst Little Shearwaters on Suomi Island. We summise that one of the reasons for the differences in our estimates for burrow nesting species, when compared with previous surveys, is that burrow size was used as an indicator of species, whereas we were able to check burrow contents with a burrowscope. Erosion of burrow entrances may enlarge burrows, resulting in mis-identification. Another contributing factor which we found, due to being able to check burrow contents, was that the later breeding White-faced

Storm Petrel occupied burrows that may have been previously used by Little Shearwaters. Our findings greatly increase the importance of the Houtman Abrolhos for burrow nesting species. Both Little Shearwaters and White-faced Storm Petrels breed here at the northern limit of their range.

Our estimate of 105 407 pairs is a quarter of the estimate provided in Burbidge and Fuller (2004). In 1999, they estimated that 80 000 pairs bred on Alexander Island, and 120 000 pairs on Wooded Island. These estimates are far in excess of our counts for these two islands based on the density of nests for these islands, and greater than our estimate for the principle colony on Pelsaert Island in 2006. Our estimated colony area on Pelsaert Island was 10.5 ha compared with 12.5 ha (Burbidge *et al.* 2004) indicating that estimated nesting density was far lower on Pelsaert Island in 2006 than that recorded previously. We found that for Wooded Island to support the estimated population in 1999 of 120 000 pairs, all dry areas of the island (including beach areas) would have had to be occupied at a nesting density twice that recorded in 2006. Consequently we believe that the estimates obtained for this species in 1999 should be used with caution when comparing these two surveys, as it greatly enhances the decline, perhaps artificially. Regardless, the number of breeding pairs of this species is less than previously recorded, and this is probably the result of oceanographic influences affecting food supply for this pelagic forager (as discussed previously).

We estimate a total breeding population on Pelsaert Island, where this species is confined to, of 121 320 pairs. This is approximately 70% of the estimate provided by Burbidge and Fuller (2004). Interestingly, we report a mean density of 43.1 nests per $25m^2$, compared with that recorded previously of 24.8 nests per $25m^2$. It appears that in 2006, Brown Noddies occupied less of the southern portion of Pelsaert Island, but nested in higher densities. Brown Noddies had a high participation rate, with many birds incubating eggs or young chicks. Brown Noddies in recent years have colonised Lancelin Island, where approximately 1000 pairs breed each year. It is hypothesised that these individuals were originally from the Pelsaert Island colony.

Few Bridled Terns were present during our survey. We noticed a gradual increase in the numbers of Bridled Terns present at colonies during the day as we progressed northwards. By the time of our survey of the Wallabi Group, there were more representative numbers of Bridled Terns present. However, even so, both the numbers of Bridled Terns attending colonies, and the delayed timing of breeding again indicate that the 2006 breeding season was late, and thus potentially reproductively poor.

This survey also concentrated on locating nests of both gull species that breed at the Houtman Abrolhos. Both species weave large, conspicuous nests from either seaweeds (Pacific Gull) or grasses and Spinifex (Silver Gulls). We located 138 recently used nests of the Pacific Gull during this survey on 59 islands, more than double the number located by the previous survey (Burbidge and Fuller 2004). Similarly, we found 356 Silver Gull nests on 25 islands compared with only 32 on 14 islands previously. We believe that many of the Silver Gull nests we located were utilised during the autumn/winter period, however caution that our estimates would under represent the autumn breeding populations of this species. Pacific Gull numbers may be increasing too as a result of interactions with the local rock-lobster fishers. However, Pacific Gulls continue to nest exclusively during spring, and thus must locate food to raise young at a time when there are no fishers at the Houtman Abrolhos. The presence of extra food sources during the lobster fishing season however, may increase the fitness of breeding birds prior to commencement of nesting. The

population increase may be explained by either recruitment from other areas, or due to survey methods and prior knowledge of many nest sites. We believe that we have underestimated slightly the numbers of pairs of Pacific Gulls, most notably on East and West Wallabi Islands. The strength of the Pacific Gull population at the Houtman Abrolhos is particularly significant in the context of diminishing populations elsewhere due to coastal development, and along the eastern seaboard, to competition with the Kelp Gull.

This survey also shows the importance of many areas of the Houtman Abrolhos to migratory waders. 16 species of waders were identified during this survey (Appendix 3). Of the 192 islands, many were occupied by waders along shorelines, tidal flats or tidal ponds. There were significant flocks feeding on the tidal flats along the eastern shores of West Wallabi Island, along the sandy beaches of both East and West Wallabi Islands and along Pelsaert Island.

The results of this survey reveal the importance of maintaining regular, consistent surveys for avifauna. This survey if the first comprehensive survey since 1999 (Burbidge and Fuller 2004), and more significantly, the first for burrow nesting species since 1993 (Fuller *et al.* 1994). It is the first such survey to document the numbers of migratory waders on each island surveyed. To successfully monitor the population sizes of seabirds at a location such as the Houtman Abrolhos requires a survey of this calibre every second year. It is also important to maintain permanently marked transect areas as a guide to the numbers and stage of breeding, both are which are important indicators of the state of the marine environment, as established by the long term database for the Lesser Noddy. Surveys such as these are invariably limited by time and resources. A future survey should encompass a shorter survey during the peak periods for Little Shearwaters, to establish occupancy levels and the extent of colony areas. There is also some scope for assessing the autumn populations, particularly those of the Roseate Tern and Silver Gull. Finally, the deterioration in the state of some parts of the mangals on Wooded, Morely and Pelsaert Islands illustrates the importance of these areas to the Lesser Noddy. The populations at the Houtman Abrolhos are the only ones in Australia, and are isolated by other populations in the Western Indian Ocean. The Lesser Noddy can not nest in any other habitat at the Houtman Abrolhos.

5 Recommendations

Undertake a similar survey during the 2008/09 breeding season, and negotiate with other management agencies to co-fund the survey into the future.

Explore the potential to undertake annual monitoring of key species at key sites, most notably the Lesser Noddy, Brown Noddy, Sooty Tern and Wedge-tailed Shearwaters. These represent a high proportion of the breeding biomass, utilise regular nesting sites, are known to be regulated by oceanographic processes and are accessible at single locations.

Undertake an assessment of autumn/winter populations

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Appendix 1: The total numbers of roosting and breeding seabirds recorded during an island wide survey at the Houtman Abrolhos in December 2006. Direct counts, or estimates of nests are also included (see text)

Species	Group	Island	Roosting	Breeding	Nests
Red-tailed Tropicbird	Pelsaert	Pelsaert	0	0	0
Pied Cormorant	Wallabi	Dick	26	0	0
		Eagle Rock	10	0	0
		East Wallabi	7	0	0
		Far	2	0	0
		Hall Is.	14	0*	9*
		Long	12	0	0
		Pelican	5	0	0
		Plover	6	0	0
		Second Sister	5	0	0
		Shag Rock	85	0	0
		Third Sister	17	0	0
		Traitors	12	0	0
		Traitors (Islet 2)	0	0	2
		Wann	18	0	0
		West Wallabi	130	0	0
	Easter	Alexander (islet to far W)	1	0	0
		Bushby	3	0	0
		Crake	6	0	0
		Disappearing	97	0	0
		Gilbert	23	0	0
		Gilbert Islet 3	1	0	0
		Leo (islet to east)	15	0	0
		Little North	26	0	0
		Little Roma	0	0	0
		Serventy	1	0	0
		White Island	6	0	0
		Wooded	1500	>500	>500
	Pelsaert	Coral Patch 7	8	0	0
		Eight	0	400	200
		Gun	48	0	0
		One	67	0	<50
		Pelsaert	65	0	0
		Seven	0	0	<50
		Seven (islet to west)	66	0	0
		Sid Liddon	0	460	575*
		Sweet	350	0	>50
		Three	41	0	0

Species	Group	Island	Roosting	Breeding	Nests
		TOTAL	**2673**	**1 360**	**1 436**
Eastern Reef Egret	Wallabi	East Wallabi	4	0	0
		Long	0	2	1
		Marinula (islet to NE)	2	0	0
		Oystercacher	3	0	0
		Seagull	1	0	0
		West Wallabi	9	0	0
	Easter	Bushby	4	0	0
		Campbell	2	0	0
		Dry	1	0	0
		Leo	2	0	0
		Little Rat	3	0	0
		Rat	5	0	0
		Serventy	3	0	1?
		Shearwater (islet to south)	1	0	0
		Suomi	1	0	0
	Pelsaert	Burnett	1	0	0
		Burton	1	0	0
		Coronation	0	2	1
		Eight	3	0	0
		Fairbridge	1	0	0
		Gaze	1	0	0
		Gaze Islet 3	1	0	0
		Little Jackson	1	0	0
		Middle	1	0	0
		Murray	1	0	0
		Newman	3	0	0
		Pelsaert	0	2	1
		Post Office	1	0	0
		Three	1	0	0
		One	2	0	0
		TOTAL	**59**	**8**	**4**
Osprey	Wallabi	Dick	0	2	3
		East Wallabi	2	4	2
		Far	0	0	0
		Hall Is.	0	0*	1
		Little Pigeon	0	2	1
		Long	2	0	0
		Pigeon	0	2	1
		Plover	1	0	0
		Second Sister	0	0	1
		Short Is.	0	0	1
		Third Sister	0	2	1

Species	Group	Island	Roosting	Breeding	Nests
Osprey		Traitors	1	0	0
		Traitors (Islet 2)	0	2	1
		Traitors (Islet 5)	0	2	1
		Wann	1	0	0
		West Wallabi	1	8	5
	Easter	Alexander (islet to far W)	0	0	1
		Bushby	0	2	1
		Bynoe	1	0	1
		Bynoe 1(1st islet to W)	0	0	1
		Bynoe 2(2nd islet to W)	0	2	1
		Campbell	0	2	4
		Campbell islet	1	0	0
		Crake	0	2	1
		Gibson	0	0	1
		Gilbert Islet 2	1	0	0
		Gilbert Islet 4	0	2	1
		Helms	0	0	1
		Helms (islet 2 to SW)	0	2	2
		Helms (islet 3 to ESE)	1	0	0
		Joe Smith	0	2	2
		Keru	0	0	1
		Leo	0	2	1
		Little Rat	2	0	2
		Little Stokes	0	0	1
		Rat	0	2	1
		Serventy	0	0	4
		Shearwater	0	0	1
		Suomi	0	4	3
		White Bank	0	0	1
		Wooded	0	0	1
	Pelsaert	Arthur	0	2	1
		Coral Patch 5	0	2	1
		Coronation	0	2	1
		Eight	0	0	1
		Gaze Islet 3	0	0	1
		Gun	0	0	1
		Gun (1st islet S)	0	2	2
		Jackson	4	0	0
		Jackson Islet 1	0	2	1
		Jackson Islet 7	0	0	1
		Jon Jim	0	2	1
		Lagoon	0	2	2
		Middle	0	0	1
		Murray	0	2	1
		Newman	0	2	1

Species	Group	Island	Roosting	Breeding	Nests
Osprey		One	1	0	0
		Pelsaert	0	10	8
		Post Office	1	0	0
		Robertson	2	0	0
		Seven	1	0	1
		Sid Liddon	3	2	1
		Square	0	2	1
		Stick	0	2	3
		Sweet	2	0	0
		Three	1	2	2
		Two	1	0	0
		Uncle Margie (Mangrove)	1	0	0
		TOTAL	**31**	**84**	**83**
White-breasted Sea Eagle	Wallabi	Eastern	1	0	0
		Akerstrom	0	2	2
		Dick	0	2	1
		Eagle Point Islet	0	0	1
		East Wallabi	1	2	1
		First Sister	0	2	1
		First Sister (3rd islet N)	0	2	1
		Long	0	2	1
		Oystercacher	0	2	1
		Pelican	0	2	1
		Seagull	0	2	1
		Tattler	0	2	1
		West Wallabi	1	16	9
	Easter	Alexander	0	2	1
		Disappearing	1	0	0
		Dry	0	0	1
		Gibson	3	0	0
		Gibson Islet 1 (large to N)	0	0	1
		Leo (islet to north)	0	2	1
		Rat	1	0	0
		Sandy	0	2	1
		Serventy	0	2	2
		Suomi	0	2	2
	Pelsaert	Davis	1	2	1
		Middle	0	0	1
		Murray	0	0	1
		Newman	1	0	0
		One	1	0	1
		Pelsaert	4	2	1
		Pelsaert Islet	0	0	0
		Two	0	0	1

Species	Group	Island	Roosting	Breeding	Nests
		TOTAL	**15**	**50**	**36**
Wedge-tailed Shearwater	Wallabi	West Wallabi	0	1220560	610280
	Easter	Rat	2	?	?
	Pelsaert	Davis	0	<160	<80
		Gun	0	8510	4255
		Middle	0	2074	1037
		Murray	0	3600	1800
		Pelsaert	0	25578	12789
		Sweet	0	>100	>50
		TOTAL	**2**	**1 260 582**	**630 291**
Little Shearwater	Wallabi	Eastern	0	524	262
		Akerstrom	0	>200	>100
		Alcatraz	0	16	8
		Beacon	0	4092	2046
		Dakin	0	418	209
		First Sister	0	106	53
		First Sister (2nd Islet N)	0	36	18
		Hall Is.	0	0	14
		Little Pigeon	0	100	50
		Long	0	752	376
		Marinula	0	32	16
		Pigeon	0	0	50
		Saville-Kent	0	576	288
		Seal	0	362	181
		Shag Rock	0	40	20
		Tattler	0	100	50
		Traitors	0	4	2
		Traitors (Islet 1)	0	12	6
		West Wallabi	0	76686	38343
	Easter	Alexander	0	204	102
		Bynoe	0	1688	844
		Campbell	0	726	363
		Crake	0	200	100
		Dry	0	100	50
		Gilbert	0	>34	>17
		Helms	0	20	10
		Keru	0	>18	>9
		Leo	0	6494	3247
		Little North	0	40	20
		Morely Islet	0	<20	<10
		Morley	0	13609	6804
		Rat	0	16	8
		Sandy	0	110	54

Species	Group	Island	Roosting	Breeding	Nests
Little Shearwater		Shearwater	0	<60	<30
		Shearwater (islet to south)	0	20	10
		Suomi		2 686	1 343
		White Bank	0	10	5
		White Island	0	952	476
		Wooded	0	5934	2976
	Pelsaert	Davis	0	20	<10
		Gun	0	3472	1736
		Iris Refuge	0	12	>6
		Middle	0	>1	>1
		One	0	0	6
		Pelsaert	0	52	26
		Three	0	2	1
		TOTAL	**0**	**120 556**	**60 356**
White-faced Storm Petrel	Wallabi	Beacon	0	2772	1386
		Eastern	0	118	59
		Dakin	0	114	57
		Dick	0	4032	2016
		First Sister	0	40	20
		Long	0	1224	612
		Seal	0	242	121
	Easter	Bynoe	0	1588	794
		Dry	0	200	100
		Little North	0	200	100
		Morley	0	10 688	5 344
		Suomi	0	3 000	1 500
	Pelsaert	Stick	0	11 772	5 886
		TOTAL	**0**	**35 990**	**17 995**
Pacific Gull	Wallabi	Eastern	0	2	1
		Akerstrom	2	0	0
		Alcatraz	0	0	0
		Beacon	0	2	1
		Dakin	0	2	1
		Dick	1	4	3
		East Wallabi	7	4	2
		Little Pigeon	5	2	1
		Long	10	4	2
		Marinula	0	4	3
		Marinula (islet to NE)	1	2	3
		Oystercacher	0	2	1
		Pigeon	2	2	1
		Plover	1	0	0
		Saville-Kent	2	2	1

Species	Group	Island	Roosting	Breeding	Nests
Pacific Gull		Seal Islet N (G Island)	0	2	1
		Third Sister	0	2	1
		Traitors	0	2	1
		Turnstone	0	2	1
		West Wallabi	11	2	1
	Easter	Bynoe	0	4	2
		Campbell	0	4	3
		Campbell islet	2	0	0
		Gibson	0	4	4
		Gibson Islet 1 (large to N)	0	2	0
		Gilbert	0	4	2
		Helms (islet 2 to SW)	0	2	1
		Helms (islet 3 to ESE)	3	0	0
		Joe Smith	0	2	2
		Landscope	0	2	2
		Leo	6	12	6
		Leo (islet to east)	0	2	1
		Little North	0	2	1
		Little Rat	2	0	0
		Little Stokes	0	2	1
		Morely Islet	0	2	1
		Morley	4	6	3
		Rat	6	6	6
		Serventy	0	2	1
		Shearwater (islet to south)	0	2	1
		Stokes	1	4	2
		Suomi	10	8	4
		White Bank	0	2	1
		Wooded	3	9	4
	Pelsaert	Arthur	0	2	1
		Basile	0	2	1
		Burnett	0	2	1
		Burnett (1st islet to North)	2	2	1
		Burton	1	0	0
		Coronation	0	2	1
		Diver (off W Post)	0	2	1
		Eight	0	2	1
		Fairbridge	0	4	2
		Foale	1	0	1
		Gaze islet 2	0	2	0
		Gun	1	2	1
		Jackson	1	2	1
		Jon Jim	0	2	1
		Little Jackson	0	4	2
		Middle	0	2	1

Species	Group	Island	Roosting	Breeding	Nests
Pacific Gull		Murray	0	2	1
		Newman	3	0	0
		One	3	0	0
		Pelsaert	44	78	39
		Rotondella	3	0	0
		Sandy	0	2	1
		Seven (islet to west)	1	0	0
		Sid Liddon	1	2	1
		Square	0	2	1
		Stick	0	2	1
		Sweet	9	>2	1
		Three	0	25	13
		Travia (2nd islet south east)	0	0	1
		Two	1	0	0
		Uncle Margie (Mangrove)	0	4	2
		TOTAL	**150**	**276**	**150**
Silver Gull	Wallabi	Eastern	12	0	0
		Beacon	4	0	0
		Dakin	1	0	0
		Dick	3	0	0
		East Wallabi	20	0	0
		First Sister	2	0	0
		Hall Is.	1	0	0
		Long	16	284	142
		Pigeon	2	0	0
		Plover	1	0	0
		Saville-Kent	2	0	0
		Seagull	5	0	0
		Seal	1	0	0
		Shag Rock	2	0	0
		Third Sister	2	0	0
		Traitors	3	0	0
		Turnstone	5	0	0
		West Wallabi	32	0	0
	Easter	Alexander	28	>8	>4
		Alexander 2 (Islet to S)	2	0	0
		Bushby	1	0	0
		Bynoe	7	2	1
		Campbell	5	0	0
		Campbell islet	1	0	0
		Disappearing	17	0	0
		Dry	5	2	1
		Gibson	2	0	0

Species	Group	Island	Roosting	Breeding	Nests
Silver Gull		Gilbert	9	20	10
		Gilbert Islet 3	2	0	0
		Helms (islet 2 to SW)	1	0	0
		Keru	2	2	1
		Leo	24	68	34
		Little North	17	0	0
		Little Rat	4	0	0
		Morley	17	0	0
		Rat	13	12	6
		Roma	28	0	0
		Serventy	8	20	10
		Shearwater	1	2	1
		Shearwater (islet to south)	1	0	0
		Stokes	7	8	4
		Suomi	12	0	0
		White Bank	3	0	0
		White Island	4	0	0
		White Islet	2	0	0
		Wooded	82	70	33
	Pelsaert	Arthur	3	0	0
		Basile	1	0	0
		Burnett	2	0	0
		Burton	2	0	0
		Coral Patch 9	2	0	0
		Coronation	0	28	14
		Eight	0	7	>3
		Fairbridge	12	4	2
		Gaze Islet 3	1	0	0
		Gregory	3	0	0
		Gun	8	>2	>1
		Iris Refuge	1	0	0
		Jackson	7	0	0
		Jackson Islet 5	0	2	1
		Lagoon	0	0	2
		Little Jackson	12	4	2
		Middle	15	0	0
		Murray	7	0	0
		Newman	0	24	>8
		One	16	4	2
		Pelsaert	107	112	43
		Pelsaert Islet	2	0	0
		Post Office	15	4	2
		Robertson	2	0	0
		Rotondella	2	0	1
		Rotondella (2nd islet to S)	2	0	0

Species	Group	Island	Roosting	Breeding	Nests
Silver Gull		Seven	1	0	0
		Sid Liddon	1	2	1
		Square	1	0	0
		Stick	1	0	0
		Sweet	16	>18	>9
		Three	8	2	1
		Travia (2nd islet south east)	2	0	0
		Two	2	0	0
		Uncle Margie (Mangrove)	3	0	0
		TOTAL	**676**	**711**	**339**
Caspian Tern	Wallabi	Akerstrom	1	0	0
		Dick	0	2	1
		East Wallabi	1	0	0
		First Sister	1	0	0
		Long	0	2	1
		Seal	0	2	1
		Second Sister	2	0	0
		Turnstone	4	2	1
		West Wallabi	4	45	>18
	Easter	Alexander 2 (Islet to S)	0	2	1
		Bushby	0	2	1
		Disappearing	2	0	0
		Leo	2	28	13
		Morley	0	2	1
		Rat	0	2	1
		Serventy	0	2	1
		Shearwater (islet to south)	1	0	0
		Tapani	0	2	1
		White Bank	0	12	6
		Wooded	0	2	1
	Pelsaert	Burnett	0	2	1
		Eight	0	2	1
		Gun	10	2	1
		Lagoon	0	2	1
		Murray	0	2	1
		Pelsaert	18	20	10
		Sid Liddon	0	2	1
		Stick	1	0	0
		Three	0	2	1
		Two	2	0	0
		TOTAL	**49**	**141**	**65**
Crested Tern	Wallabi	Beacon	50	0	0

Species	Group	Island	Roosting	Breeding	Nests
Crested Tern		East Wallabi	6	0	0
		Far	1	0	0
		First Sister	12	0	0
		Hall Is.	28	0	0
		Long	8	380	190
		Seal	21	0	0
		Second Sister	1	0	0
		Turnstone	13	0	0
		Wann	0	212	106
		West Wallabi	15	0	0
	Easter	Bynoe	20	360	180
		Campbell	1	0	0
		Crake	0	972	486
		Disappearing	8	0	0
		Gilbert	5	0	0
		Gilbert Islet 1	1	0	0
		Morley	1	>540	>270
		Roma	2	0	0
		Shearwater (islet to south)	2	0	0
		White Bank	21	0	0
		Wooded	0	>20	>10
	Pelsaert	Coral Patch 7	2	0	0
		Coronation	0	372	186
		Gregory	3	0	0
		Gun	13	520	260
		Jackson	1	0	0
		Middle	2	0	0
		Murray	4	0	0
		Newman	2	0	0
		Pelsaert	24	2400	1200
		Post Office	6	0	0
		Robertson	3	0	0
		Rotondella	3	0	0
		Sid Liddon	0	80	40
		Sweet	3	0	0
		TOTAL	**282**	**5 856**	**2 928**
Roseate Tern	Wallabi	Eastern	2	0	0*
		Beacon	15	0	0
		Dick	344	1438	719
		Far	0	60	30
		Long	38	130	65
		Seal	9	0	0
		Second Sister	7	0	0
		Third Sister	28	0	0

Species	Group	Island	Roosting	Breeding	Nests
Roseate Tern		West Wallabi	112	20	10
	Easter	Disappearing	10	0	0
		Gilbert	3	380	190
		Helms	0	82	41
		Keru	3	>42	>21
		Leo	0	>2	>1
		Little North	38	0	0
		Little Stokes	0	500	250
		Morley	15	0	0
		Roma	2	0	0
		Sandy	29	20	10
		Serventy	2	0	0
		Shearwater	0	8	4
		Suomi	9	0	0
		White Bank	24	0	0
		White Island	0	90	45
		Wooded	0	>358	>179
	Pelsaert	Burnett	0	238	119
		Coral Patch 3	3	0	0
		Coral Patch 6	4	0	0
		Coral Patch 9	31	0	0
		Coronation	0	38	19
		Fairbridge	0	500	250
		Gun	30	0	0
		Iris Refuge	3	0	0
		Jon Jim	20	0	0
		Little Jackson	0	500	250
		Newman	6	0	0
		Pelsaert	17	4008	2004
		Post Office	13	0	0
		Robertson	0	6	3
		Square	48	0	0
		Sweet	80	0	0
		Travia	4	0	0
		TOTAL	**949**	**8 420**	**4 210**
Fairy Tern	Wallabi	Eastern	2	0	0
		Akerstrom	7	0	0
		Dick	0	58	29
		East Wallabi	29	2	1
		Long	0	24	12
		Oystercacher	2	0	0
		Seal	2	0	0
		Second Sister	18	0	0
		Third Sister	8	0	0

Species	Group	Island	Roosting	Breeding	Nests
Fairy Tern		West Wallabi	229	324	162
	Easter	Bushby	1	0	0
		Bynoe	2	0	0
		Campbell	2	0	0
		Disappearing	12	0	0
		Gilbert	0	38	19
		Helms	2	24	12
		Keru	14	0	0
		Leo	15	94	47
		Little North	10	0	0
		Rat	8	0	0
		Sandy	0	142	71
		Shearwater	0	16	8
		Suomi	2	0	0
		White Bank	4	0	0
		White Island	1	0	0
	Pelsaert	Coronation	0	30	15
		Jackson	2	0	0
		Lagoon	0	14	7
		Newman	0	8	4
		Pelsaert	23	320	160
		Uncle Margie (Mangrove)	2	0	0
		TOTAL	**397**	**1 094**	**547**
Bridled Tern	Wallabi	Akerstrom	7	6	3
		Alcatraz	0	8	4
		Beacon	0	206	103
		Dakin	0	30	15
		Dick	0	200	100
		Eastern	0	46	23
		Little Pigeon	0	24	>12
		Long	0	304	152
		Marinula	0	28	14
		Marinula (islet to NE)	0	24	12
		Pelican	0	36	18
		Pigeon	0	62	31
		Plover	3	0	0
		Saville-Kent	0	22	>11
		Seal	0	12	6
		Tattler	0	2	1
		Traitors	0	6	3
		Traitors (Islet 5)	0	6	3
		Wann	0	6	3
	Easter	Alexander	0	>42	>21
		Alexander 1 (Islet to N)	0	4	2

Species	Group	Island	Roosting	Breeding	Nests
Bridled Tern		Alexander 2 (Islet to S)	1	16	8
		Bynoe	0	154	77
		Bynoe 1(1st islet to W)	0	4	2
		Bynoe 2(2nd islet to W)	0	8	4
		Bynoe 3(3rd islet to W)	0	6	3
		Campbell	0	162	81
		Crake	0	10	5
		Dry	0	10	5
		Gibson Islet 1 (large to N)	0	8	4
		Gilbert	0	148	74
		Gilbert Islet 2	0	2	1
		Gilbert Islet 3	0	2	1
		Gilbert Islet 4	0	2	1
		Helms	0	26	13
		Helms (islet 1 to SW)	0	18	9
		Helms (islet 2 to SW)	0	6	3
		Joe Smith	0	8	4
		Keru	0	122	61
		Landscope	0	4	2
		Leo	0	128	64
		Leo (islet to east)	0	10	5
		Leo (islet to north)	0	12	6
		Little North	11	486	243
		Little Rat	0	56	28
		Little Roma	0	10	5
		Little Stokes	0	6	3
		Morely Islet	0	8	4
		Morley	2	>2	>1
		Nitraria	0	10	5
		Rat	0	180	90
		Roma	4	>6	>3
		Serventy	0	278	139
		Shearwater (islet to south)	0	8	4
		Stokes	0	106	53
		Suomi	0	438	219
		Tapani	0	8	4
		Tapani Islet SW	0	2	1
		White Island	0	92	46
		White Islet	0	4	2
		Wooded	3	40	20
	Pelsaert	Arthur	0	30	15
		Basile	0	8	4
		Burnett	1	10	5
		Burton	0	10	5
		Coral Patch 5	0	16	8

Species	Group	Island	Roosting	Breeding	Nests
Bridled Tern		Coronation	0	10	>5
		Coronation (1st islet NW)	0	8	4
		Davis	0	8	<8
		Eight	0	11	>6
		Fairbridge	0	15	>7
		Gaze	0	6	3
		Gregory	0	24	12
		Gun	0	356	178
		Iris Refuge	0	8	>4
		Jackson	0	53	>26
		Jackson Islet 5	0	3	>2
		Lagoon	0	13	>6
		Little Jackson	0	15	>7
		Newman	0	34	>17
		One	26	26	13
		Pelsaert	2	42	21
		Post Office	5	8	4
		Rotondella	0	1	1
		Rotondella (2nd islet to S)	0	5	3
		Seven	1	0	0
		Square	0	>38	>19
		Stick	0	>80	>40
		Three	0	2	5
		Two	0	6	3
		Uncle Margie (Mangrove)	3	3	3
		TOTAL	**69**	**4 529**	**2 274**
Sooty Tern	Wallabi	Dick	0	10	5
	Easter	Alexander	0	21434	10717
		Leo	0	40192	20096
		Little North	0	10	5
		Morley	0	70	0
		Serventy	0	<200	<100
		White Island	300	23392	11696
		Wooded	0	13448	6724
	Pelsaert	Pelsaert	0	112128	56064
		TOTAL	**300**	**210 884**	**105 407**
Brown Noddy	Pelsaert	Pelsaert	0	242 640	121 320
		TOTAL	**0**	**242 640**	**121 320**
Lesser Noddy	Easter	Morley	0	13944	6972
		Wooded	0	4954	2 477
	Pelsaert	Pelsaert	0	43734	21867
		Coral Patch 9	1	0	0

Species	Group	Island	Roosting	Breeding	Nests
Lesser Noddy		**TOTAL**	**1**	**62 632**	**28 839**
White Tern	Easter	Wooded	1	0	0
		TOTAL	**1**	**0**	**0**

Appendix 2: Species of seabirds observed from each island surveyed at the Houtman Abrohos in December 2006. The list includes those observed roosting, direct counts of or estimates of nest sites, and estimates of breeding numbers of seabirds.

Group	Island	Species	Roosting	Breeding	Nests
Wallabi	Akerstrom	Little Shearwater	0	>200	>100
		Pacific Gull	2	0	0
		Caspian Tern	1	0	0
		Fairy Tern	7	0	0
		Bridled Tern	7	6	3
		White-breasted Sea Eagle	0	2	2
		Curlew Sandpiper	1	0	0
		Greenshank	1	0	0
		Grey-tailed Tattler	1	0	0
		Red Capped Plover	4	0	0
		Red-necked Stint	1	0	0
	Alcatraz	Little Shearwater	0	16	8
		Pacific Gull	0	0	0
		Bridled Tern	0	8	4
	Barge Rock	Nil			
	Beacon	Little Shearwater	0	4092	2046
		White-faced Storm Petrel	0	2772	1386
		Pacific Gull	0	2	1
		Silver Gull	4	0	0
		Crested Tern	50	0	0
		Roseate Tern	15	0	0
		Bridled Tern	0	206	103
		Ruddy Turnstone	20	0	0
	Dakin	Little Shearwater	0	418	209
		White-faced Storm Petrel	0	114	57
		Pacific Gull	0	2	1
		Silver Gull	1	0	0
		Bridled Tern	0	30	15
		Pied Oystercatcher	1	0	0
		Ruddy Turnstone	5	0	0
	Dick	Pied Cormorant	26	0	0
		White-faced Storm Petrel	0	4032	2016
		Pacific Gull	1	4	3
		Silver Gull	3	0	0

Group	Island	Species	Roosting	Breeding	Nests
	Dick	Caspian Tern	0	2	1
		Roseate Tern	344	1438	719
		Fairy Tern	0	58	29
		Sooty Tern	0	10	5
		Bridled Tern	0	200	100
		Osprey	0	2	3
		White-breasted Sea Eagle	0	2	1
		Pied Oystercatcher	2	0	0
	Eagle Rock	Pied Cormorant	10	0	0
	Eastern	Little Shearwater	0	524	262
		White-faced Storm Petrel	0	118	59
		Pacific Gull	0	2	1
		Silver Gull	12	0	0
		Roseate Tern	2	0	0*
		Fairy Tern	2	0	0
		Bridled Tern	0	46	23
		White-breasted Sea Eagle	1	0	0
		Grey-tailed Tattler	1	0	0
		Ruddy Turnstone	5	0	0
	Eagle Point Islet	White-breasted Sea Eagle	0	0	1
	East Wallabi	Pied Cormorant	7	0	0
		Eastern Reef Egret	4	0	0
		Pacific Gull	7	4	2
		Silver Gull	20	0	0
		Caspian Tern	1	0	0
		Crested Tern	6	0	0
		Fairy Tern	29	2	1
		Osprey	2	4	2
		White-breasted Sea Eagle	1	2	1
		Pied Oystercatcher	11	2	1
		Bar-tailed Godwit	49	0	0
		Grey-tailed Tattler	3	0	0
		Large Sand Plover	16	0	0
		Red-capped Plover	78	0	0
		Red-necked Stint	75	0	0
		Ruddy Turnstone	77	0	0
		Sanderling	15	0	0
	Far	Pied Cormorant	2	0	0
		Crested Tern	1	0	0

Group	Island	Species	Roosting	Breeding	Nests
	Far	Roseate Tern	0	60	30
		Osprey	0	0	0
	Far Is 1	NIL	0	0	0
	Far Is 2	NIL	0	0	0
	First Sister	Little Shearwater	0	106	53
		White-faced Storm Petrel	0	40	20
		Silver Gull	2	0	0
		Caspian Tern	1	0	0
		Crested Tern	12	0	0
		White-breasted Sea Eagle	0	2	1
	First Sister Islet	NIL			
	First Sister (2nd Islet N)	Little Shearwater	0	36	18
	First Sister (3rd islet N)	White-breasted Sea Eagle	0	2	1
	Hall Is.	Pied Cormorant	14	0*	9*
		Little Shearwater	0	0	14
		Silver Gull	1	0	0
		Crested Tern	28	0	0
		Osprey	0	0*	1
	Little Pigeon	Little Shearwater	0	100	50
		Pacific Gull	5	2	1
		Bridled Tern	0	24	>12
		Osprey	0	2	1
		Pied Oystercatcher	0	2	1
		Ruddy Turnstone	3	0	0
	Long	Pied Cormorant	12	0	0
		Eastern Reef Egret	0	2	1
		Little Shearwater	0	752	376
		White-faced Storm Petrel	0	1224	612
		Pacific Gull	10	4	2
		Silver Gull	16	284	142
		Caspian Tern	0	2	1
		Crested Tern	8	380	190
		Roseate Tern	38	130	65
		Fairy Tern	0	24	12
		Bridled Tern	0	304	152

Group	Island	Species	Roosting	Breeding	Nests
	Long	Osprey	2	0	0
		White-breasted Sea Eagle	0	2	1
		Pied Oystercatcher	3	2	1
		Grey-tailed Tattler	9	0	0
		Red-capped Plover	6	0	0
		Ruddy Turnstone	14	0	0
		Whimbrel	1	0	0
	Marinula	Little Shearwater	0	32	16
		Pacific Gull	0	4	3
		Bridled Tern	0	28	14
		Pied Oystercatcher	2	0	0
		Greenshank	1	0	0
	Marinula (islet to NE)	Pacific Gull	1	2	3
		Bridled Tern	0	24	12
		Eastern Reef Egret	2	0	0
	Oystercacher	Eastern Reef Egret	3	0	0
		Pacific Gull	0	2	1
		Fairy Tern	2	0	0
		White-breasted Sea Eagle	0	2	1
		Common Sandpiper	1	0	0
		Greenshank	1	0	0
		Red Capped Plover	2	0	0
	Pelican	Pied Cormorant	5	0	0
		Bridled Tern	0	36	18
		White-breasted Sea Eagle	0	2	1
	Pelican Islet	NIL			
	Pigeon	Little Shearwater	0	0	50
		Pacific Gull	2	2	1
		Silver Gull	2	0	0
		Bridled Tern	0	62	31
		Osprey	0	2	1
	Plover	Pied Cormorant	6	0	0
		Pacific Gull	1	0	0
		Silver Gull	1	0	0
		Bridled Tern	3	0	0
		Osprey	1	0	0

Group	Island	Species	Roosting	Breeding	Nests
	Saville-Kent	Little Shearwater	0	576	288
		Pacific Gull	2	2	1
		Silver Gull	2	0	0
		Bridled Tern	0	22	>11
	Seagull	Eastern Reef Egret	1	0	0
		Silver Gull	5	0	0
		White-breasted Sea Eagle	0	2	1
		Red Capped Plover	3	0	0
		Red-necked Stint	1	0	0
		Ruddy Turnstone	4	0	0
	Seal	Little Shearwater	0	362	181
		White-faced Storm Petrel	0	242	121
		Silver Gull	1	0	0
		Caspian Tern	0	2	1
		Crested Tern	21	0	0
		Roseate Tern	9	0	0
		Fairy Tern	2	0	0
		Bridled Tern	0	12	6
		Pied Oystercatcher	0	2	1
		Ruddy Turnstone	3	0	0
		Red Capped Plover	2	0	0
	Seal Islet N (G Island)	Pacific Gull	0	2	1
		Ruddy Turnstone	1	0	0
	Seal Islet mid	NIL			
	Second Sister	Pied Cormorant	5	0	0
		Crested Tern	1	0	0
		Caspian Tern	2	0	0
		Roseate Tern	7	0	0
		Fairy Tern	18	0	0
		Osprey	0	0	1
	Shag Rock	Pied Cormorant	85	0	0
		Little Shearwater	0	40	20
		Silver Gull	2	0	0
		Red-capped Plover	2	0	0
		Ruddy Turnstone	1	0	0
	Short Is.	Osprey	0	0	1

Group	Island	Species	Roosting	Breeding	Nests
	Tattler	Little Shearwater	0	100	50
		Bridled Tern	0	2	1
		White-breasted Sea Eagle	0	2	1
	Turnstone	Pacific Gull	0	2	1
		Silver Gull	5	0	0
		Caspian Tern	4	2	1
		Crested Tern	13	0	0
		Pied Oystercatcher	0	2	1
		Grey-tailed Tattler	1	0	0
		Red-necked Stint	2	0	0
		Ruddy Turnstone	8	0	0
	Third Sister	Pied Cormorant	17	0	0
		Pacific Gull	0	2	1
		Silver Gull	2	0	0
		Roseate Tern	28	0	0
		Fairy Tern	8	0	0
		Osprey	0	2	1
		Pied Oystercatcher	2	0	0
		Red-capped Plover	2	0	0
	Traitors	Pied Cormorant	12	0	0
		Little Shearwater	0	4	2
		Pacific Gull	0	2	1
		Silver Gull	3	0	0
		Bridled Tern	0	6	3
		Osprey	1	0	0
		Pied Oystercatcher	3	0	0
	Traitors (Islet 1)	Little Shearwater	0	12	6
	Traitors (Islet 2)	Pied Cormorant	0	0	2
		Osprey	0	2	1
	Traitors (Islet 3)	NIL			
	Traitors (Islet 4)	NIL			
	Traitors (Islet 5)	Bridled Tern	0	6	3
		Osprey		2	1
	Traitors (Islet 6)	NIL			

Group	Island	Species	Roosting	Breeding	Nests
	Wann	Pied Cormorant	18	0	0
		Crested Tern	0	212	106
		Bridled Tern	0	6	3
		Osprey	1	0	0
	West Wallabi	Pied Cormorant	130	0	0
		Eastern Reef Egret	9	0	0
		Wedge-tailed Shearwater	0	1 220 560	610 280
		Little Shearwater	0	76 686	38 343
		Pacific Gull	11	2	1
		Silver Gull	32	0	0
		Caspian Tern	4	45	>18
		Crested Tern	15	0	0
		Roseate Tern	112	20	10
		Fairy Tern	229	324	162
		White-breasted Sea Eagle	1	16	9
		Osprey	1	8	5
		Sooty Oyster Catcher	3	2	1
		Pied Oystercatcher	3	2	1
		Bar-tailed Godwit	47	0	0
		Curlew Sandpiper	3	0	0
		Greenshank	6	0	0
		Grey Plover	1	0	0
		Grey-tailed Tattler	6	0	0
		Large Sand Plover	14	0	0
		Mongolian Sand Plover	1	0	0
		Red-capped Plover	165	0	0
		Red-necked Stint	254	0	0
		Ruddy Turnstone	138	0	0
		Sanderling	5	0	0
		Sharp-tailed Sandpiper	2	0	0
Easter	Alexander	Little Shearwater	0	204	102
		Silver Gull	28	>8	>4
		Bridled Tern	0	>42	>21
		Sooty Tern	0	21 434	10 717
		White-breasted Sea Eagle	0	2	1
		Red-capped Plover	1	0	0
		Ruddy Turnstone	9	0	0
	Alexander 1 (Islet to N)	Bridled Tern	0	4	2

Group	Island	Species	Roosting	Breeding	Nests
	Alexander 2 (Islet to S)	Silver Gull	2	0	0
		Caspian Tern	0	2	1
		Bridled Tern	1	16	8
	Alexander (islet to far W)	Pied Cormorant	1	0	0
		Osprey	0	0	1
	Bushby	Pied Cormorant	3	0	0
		Eastern Reef Egret	4	0	0
		Silver Gull	1	0	0
		Caspian Tern	0	2	1
		Fairy Tern	1	0	0
		Osprey	0	2	1
	Bynoe	Little Shearwater	0	1688	844
		White-faced Storm Petrel	0	1588	794
		Pacific Gull	0	4	2
		Silver Gull	7	2	1
		Crested Tern	20	360	180
		Fairy Tern	2	0	0
		Bridled Tern	0	154	77
		Osprey	1	0	1
		Sooty Oyster Catcher	0	2	1
		Pied Oystercatcher	1	0	0
		Bar-tailed Godwit	2	0	0
		Greenshank	1	0	0
		Grey-tailed Tattler	1	0	0
		Red-capped Plover	1	0	0
		Ruddy Turnstone	10	0	0
		Unid Plover	1	0	0
	Bynoe 1(1st islet to W)	Bridled Tern	0	4	2
		Osprey	0	0	1
		Ruddy Turnstone	1	0	0
	Bynoe 2(2nd islet to W)	Bridled Tern	0	8	4
		Osprey	0	2	1
	Bynoe 3(3rd islet to W)	Bridled Tern	0	6	3
		Ruddy Turnstone	1	0	0
	Bynoe 4	Nil			
	Campbell	Eastern Reef Egret	2	0	0

Group	Island	Species	Roosting	Breeding	Nests
		Little Shearwater	0	726	363
		Pacific Gull	0	4	3
		Silver Gull	5	0	0
		Crested Tern	1	0	0
		Fairy Tern	2	0	0
		Bridled Tern	0	162	81
		Osprey	0	2	4
		Pied Oystercatcher	2	2	1
		Bar-tailed Godwit	12	0	0
		Large Sand Plover	1	0	0
		Red-capped Plover	3	0	0
		Red-necked Stint	3	0	0
		Ruddy Turnstone	13	0	0
	Campbell islet	Pacific Gull	2	0	0
		Silver Gull	1	0	0
		Osprey	1	0	0
	Crake	Pied Cormorant	6	0	0
		Little Shearwater	0	200	100
		Crested Tern	0	972	486
		Bridled Tern	0	10	5
		Osprey	0	2	1
	Disappearing	Pied Cormorant	97	0	0
		Silver Gull	17	0	0
		Caspian Tern	2	0	0
		Crested Tern	8	0	0
		Fairy Tern	12	0	0
		Roseate Tern	10	0	0
		White-breasted Sea Eagle	1	0	0
		Sanderling	9	0	0
		Red-necked Stint	1	0	0
		Ruddy Turnstone	9	0	0
	Dry	Eastern Reef Egret	1	0	0
		Little Shearwater	0	100	50
		White-faced Storm Petrel	0	200	100
		Silver Gull	5	2	1
		Bridled Tern	0	10	5
		White-breasted Sea Eagle	0	0	1
		Large Sand plover	1	0	0
		Red-capped Plover	2	0	0
		Ruddy Turnstone	3	0	0

Group	Island	Species	Roosting	Breeding	Nests
	Gibson	Pacific Gull	0	4	4
		Silver Gull	2	0	0
		Osprey	0	0	1
		White-breasted Sea Eagle	3	0	0
	Gibson Islet 1 (large to N)	Pacific Gull	0	2	0
		Bridled Tern	0	8	4
		White-breasted Sea Eagle	0	0	1
	Gibson Islet 2 (large to S)	Nil			
	Gibson Islet 3 (small to S)	Nil			
	Gilbert	Pied Cormorant	23	0	0
		Little Shearwater	0	>34	>17
		Pacific Gull	0	4	2
		Silver Gull	9	20	10
		Crested Tern	5	0	0
		Roseate Tern	3	380	190
		Fairy Tern	0	38	19
		Bridled Tern	0	148	74
		Red-capped Plover	1	0	0
		Ruddy Turnstone	2	0	0
		Whimbrel	1	0	0
	Gilbert Islet 1	Pied Cormorant	1	0	0
		Crested Tern	1	0	0
		Osprey	1	0	0
	Gilbert Islet 2	Bridled Tern	0	2	1
	Gilbert Islet 3	Silver Gull	2	0	0
		Bridled Tern	0	2	1
	Gilbert Islet 4	Bridled Tern	0	2	1
		Osprey	0	2	1
	Helms	Little Shearwater	0	20	10
		Roseate Tern	0	82	41
		Fairy Tern	2	24	12
		Bridled Tern	0	26	13
		Ruddy Turnstone	4	0	0
		Osprey	0	0	1
	Helms (islet 1 to SW)	Bridled Tern	0	18	9

Group	Island	Species	Roosting	Breeding	Nests
	Helms (islet 2 to SW)	Pacific Gull	0	2	1
		Silver Gull	1	0	0
		Bridled Tern	0	6	3
		Osprey	0	2	2
	Helms (islet 3 to SE)	Pacific Gull	3	0	0
		Osprey	1	0	0
	Horseshoe	Nil			
	Joe Smith	Pacific Gull	0	2	2
		Bridled Tern	0	8	4
		Osprey	0	2	2
	Keru	Little Shearwater	0	>18	>9
		Silver Gull	2	2	1
		Roseate Tern	3	>42	>21
		Fairy Tern	14	0	0
		Bridled Tern	0	122	61
		Osprey	0	0	1
		Sooty Oyster Catcher	1	0	0
		Pied Oystercatcher	1	0	0
		Grey Plover	1	0	0
		Ruddy Turnstone	1	0	0
	Landscope	Pacific Gull	0	2	2
		Bridled Tern	0	4	2
		Ruddy Turnstone	3	0	0
	Leo	Eastern Reef Egret	2	0	0
		Little Shearwater	0	6494	3247
		Pacific Gull	6	12	6
		Silver Gull	24	68	34
		Caspian Tern	2	28	13
		Roseate Tern	0	>2	>1
		Fairy Tern	15	94	47
		Sooty Tern	0	40 192	20 096
		Bridled Tern	0	128	64
		Osprey	0	2	1
		Sooty Oyster Catcher	2	0	0
		Pied Oystercatcher	2	0	0
		Red-capped Plover	3	0	0
		Ruddy Turnstone	4	0	0

Group	Island	Species	Roosting	Breeding	Nests
	Leo (islet to east)	Pied Cormorant	15	0	0
		Pacific Gull	0	2	1
		Bridled Tern	0	10	5
	Leo (islet to north)	Bridled Tern	0	12	6
		White-breasted Sea Eagle	0	2	1
	Little North	Pied cormorant	26	0	0
		Little Shearwater	0	40	20
		White-faced Storm Petrel	0	200	100
		Pacific Gull	0	2	1
		Silver Gull	17	0	0
		Roseate Tern	38	0	0
		Fairy Tern	10	0	0
		Sooty Tern	0	10	5
		Bridled Tern	11	486	243
		White-breasted Sea Eagle	0	0	1?
		Pied Oystercatcher	2	0	0
		Ruddy Turnstone	10	0	0
	Little Rat	Eastern Reef Egret	3	0	0
		Pacific Gull	2	0	0
		Silver Gull	4	0	0
		Bridled Tern	0	56	28
		Osprey	2	0	2
		Grey-tailed Tattler	1	0	0
	Little Roma	Pied Cormorant	0	0	0
		Bridled Tern	0	10	5
	Nitraria	Bridled Tern	0	10	5
	Morley	Little Shearwater	0	13 609	6 804
		White-faced Storm Petrel	0	10 688	5 344
		Pacific Gull	4	6	3
		Silver Gull	17	0	0
		Caspian Tern	0	2	1
		Crested Tern	1	>540	>270
		Roseate Tern	15	0	0
		Sooty Tern	0	70	0
		Bridled Tern	2	>2	>1
		Lesser Noddy	0	13 944	6 972
		Pied Oystercatcher	2	0	0
		Bar-tailed Godwit	4	0	0
		Grey Plover	2	0	0

Group	Island	Species	Roosting	Breeding	Nests
		Grey-tailed Tattler	12	0	0
		Large Sand Plover	1	0	0
		Red-capped Plover	1	0	0
		Ruddy Turnstone	27	0	0
	Morely Islet	Little Shearwater	0	<20	<10
		Pacific Gull	0	2	1
		Bridled Tern	0	8	4
		Sooty Oyster Catcher	0	2	1
	Morely Rock W 1	Nil			
	Morely Rock W 2	Nil			
	Rat	Eastern Reef Egret	5	0	0
		Wedge-tailed Shearwater	2	?	?
		Little Shearwater	0	16	8
		Pacific Gull	6	6	6*
		Silver Gull	13	12	6
		Caspian Tern	0	2	1
		Fairy Tern	8	0	0
		Bridled Tern	0	180	90
		Osprey	0	2	1
		White-breasted Sea Eagle	1	0	0
		Pied Oystercatcher	6	2	1
		Greenshank	5	0	0
		Grey-tailed Tattler	1	0	0
		Large Sand Plover	1	0	0
		Red-capped Plover	9	0	0
		Red-necked Stint	4	0	0
		Ruddy Turnstone	14	0	0
		Sanderling	3	0	0
		Whimbrel	1	0	0
	Rat Islet	Nil			
	Roma	Silver Gull	28	0	0
		Crested Tern	2	0	0
		Roseate Tern	2	0	0
		Bridled Tern	4	>6	>3
	Roma (Islet 1)	Nil			
	Roma (Islet 2)	Nil			

Group	Island	Species	Roosting	Breeding	Nests
	Roma (Islet 3)	Nil			
	Sandy	Little Shearwater	0	110	54
		Roseate Tern	29	20	10
		Fairy Tern	0	142	71
		White-breasted Sea Eagle	0	2	1
		Red-capped Plover	3	0	0
	Serventy	Pied Cormorant	1	0	0
		Eastern Reef Egret	3	0	1?
		Pacific Gull	0	2	1
		Silver Gull	8	20	10
		Caspian Tern	0	2	1
		Roseate Tern	2	0	0
		Bridled Tern	0	278	139
		Sooty Tern	0	<200	<100
		Osprey	0	0	4
		White-breasted Sea Eagle	0	2	2
		Sooty Oyster Catcher	2	0	0
		Ruddy Turnstone	1	0	0
	Serventy (Islet 1)	Nil			
	Serventy (Islet 2)	Nil			
	Serventy (Islet 3)	Nil			
	Serventy (Islet 4)	Ruddy Turnstone	1	0	0
	Stokes	Pacific Gull	1	4	2
		Silver Gull	7	8	4
		Bridled Tern	0	106	53
		Grey-tailed Tattler	1	0	0
		Red-capped Plover	4	0	0
		Red-necked Stint	2	0	0
		Ruddy Turnstone	15	0	0
		Unid Plover	1	0	0
	Little Stokes	Pacific Gull	0	2	1
		Roseate Tern	0	500	250
		Bridled Tern	0	6	3
		Osprey	0	0	1
	Little Stokes Islet (islet to S)	Nil			

Group	Island	Species	Roosting	Breeding	Nests
	Shearwater	Little Shearwater	0	<60	<30
		Silver Gull	1	2	1
		Roseate Tern	0	8	4
		Fairy Tern	0	16	8
		Osprey	0	0	1
	Shearwater (islet to south)	Eastern Reef Egret	1	0	0
		Little Shearwater	0	20	10
		Pacific Gull	0	2	1
		Silver Gull	1	0	0
		Caspian Tern	1	0	0
		Crested Tern	2	0	0
		Bridled Tern	0	8	4
		Pied Oystercatcher	1	0	0
		Ruddy Turnstone	1	0	0
	Suomi	Eastern Reef Egret	1	0	0
		Little Shearwater	0	2 686	1 343
		White-faced Storm Petrel	0	3 000	1 500
		Pacific Gull	10	8	4
		Silver Gull	12	0	0
		Roseate Tern	9	0	0
		Fairy Tern	2	0	0
		Bridled Tern	0	438	219
		Osprey	0	4	3
		White-breasted Sea Eagle	0	2	2
		Pied Oystercatcher	2	2	1
		Bar-tailed Godwit	1	0	0
		Grey-tailed Tattler	1	0	0
		Red-capped Plover	7	0	0
		Ruddy Turnstone	25	0	0
	Tapani	Caspian Tern	0	2	1
		Bridled Tern	0	8	4
		Ruddy Turnstone	3	0	0
	Tapani Islet SW	Bridled Tern	0	2	1
	Tapani Islet NE	Nil			
	White Bank	Little Shearwater	0	10	5
		Pacific Gull	0	2	1
		Silver Gull	3	0	0
		Caspian Tern	0	12	6

Group	Island	Species	Roosting	Breeding	Nests
		Crested Tern	21	0	0
		Roseate Tern	24	0	0
		Fairy Tern	4	0	0
		Osprey	0	0	1
		Pied Oystercatcher	2	0	0
	White Island	Pied Cormorant	6	0	0
		Little Shearwater	0	952	476
		Silver Gull	4	0	0
		Roseate Tern	0	90	45
		Fairy Tern	1	0	0
		Sooty Tern	300	23392	11696
		Bridled Tern	0	92	46
		Sooty Oyster Catcher	1	0	0
		Pied Oystercatcher	0	2	1
		Red-capped Plover	4	0	0
		Ruddy Turnstone	1	0	0
	White Islet	Silver Gull	2	0	0
		Bridled Tern	0	4	2
	Wooded	Pied Cormorant	1500	>500	>500
		Little Shearwater	0	5 934	2 976
		Pacific Gull	3	9	4
		Silver Gull	82	70	33
		Caspian Tern	0	2	1
		Crested Tern	0	>20	>10
		Roseate Tern	0	>358	>179
		Sooty Tern	0	>300	>449
		Bridled Tern	3	40	20
		White Tern	1	0	0
		Lesser Noddy	0	4954	2 477
		Osprey	0	0	1
		Sooty Oyster Catcher	0	2	1
		Red-necked Stint	1	0	0
		Ruddy Turnstone	1	0	0
Pelsaert	Arthur	Pacific Gull	0	2	1
		Silver Gull	3	0	0
		Bridled Tern	0	30	15
		Osprey	0	2	1
	Basile	Pacific Gull	0	2	1
		Silver Gull	1	0	0
		Bridled Tern	0	8	4

Group	Island	Species	Roosting	Breeding	Nests
		Pied Oystercatcher	1	0	0
	Burnett	Eastern Reef Egret	1	0	0
		Pacific Gull	0	2	1
		Silver Gull	2	0	0
		Caspian Tern	0	2	1
		Roseate Tern	0	238	119
		Bridled Tern	1	10	5
		Pied Oystercatcher	0	2	1
		Grey-tailed Tattler	1	0	0
	Burnett (1st islet to North)	Pacific Gull	2	2	1
	Burnett (2nd islet to north)	Nil			
	Burton	Eastern Reef Egret	1	0	0
		Pacific Gull	1	0	0
		Silver Gull	2	0	0
		Bridled Tern	0	10	5
		Ruddy Turnstone	2	0	0
	Coral Patch 1	Nil			
	Coral Patch 2	Nil			
	Coral Patch 3	Roseate Tern	3	0	0
		Ruddy Turnstone	6	0	0
	Coral Patch 4	Nil			
	Coral Patch 5	Bridled Tern	0	16	8
		Osprey	0	2	1
	Coral Patch 6	Roseate Tern	4	0	0
	Coral Patch 7	Pied Cormorant	8	0	0
		Crested Tern	2	0	0
	Coral Patch 8	Nil			
	Coral Patch 9	Roseate Tern	31	0	0
		Silver Gull	2	0	0

Group	Island	Species	Roosting	Breeding	Nests
		Lesser Noddy	1	0	0
	Coral Patch 10	Nil			
	Coronation	Eastern Reef Egret	0	2	1
		Pacific Gull	0	2	1
		Silver Gull	0	28	14
		Crested Tern	0	372	186
		Roseate Tern	0	38	19
		Fairy Tern	0	30	15
		Bridled Tern	0	10	>5
		Osprey	0	2	1
		Pied Oystercacher	2	0	0
	Coronation (1st islet NE)	Nil			
	Coronation (1st islet NW)	Bridled Tern	0	8	4
	Davis (numbered)	Wedge-tailed Shearwater	0	<160	<80
		Little Shearwater	0	20	<10
		Bridled Tern	0	8	<8
		White-breasted Sea Eagle	1	2	1
	Diver (off W Post)	Pacific Gull	0	2	1
	Eight	Pied Cormorant	0	400	200
		Eastern Reef Egret	3	0	0
		Pacific Gull	0	2	1
		Silver Gull	0	7	>3
		Caspian Tern	0	2	1
		Bridled Tern	0	11	>6
		Osprey	0	0	1
		Pied Oystercatcher	3	0	0
		Ruddy Turnstone	7	0	0
	Fairbridge	Eastern Reef Egret	1	0	0
		Pacific Gull	0	4	2
		Silver Gull	12	4	2
		Roseate Tern	0	500	250
		Bridled Tern	0	15	>7
		Pied Oystercatcher	1	0	0
	Foale	Pacific Gull	1	0	1
		Pied Oystercatcher	1	0	0

Group	Island	Species	Roosting	Breeding	Nests
	Gaze	Eastern Reef Egret	1	0	0
		Bridled Tern	0	6	3
		Ruddy Turnstone	3	0	0
	Gaze islet 1	Nil			
	Gaze islet 2	Pacific Gull	0	2	0
	Gaze Islet 3	Eastern Reef Egret	1	0	0
		Osprey	0	0	1
		Silver Gull	1	0	0
	Gregory	Crested Tern	3	0	0
		Bridled Tern	0	24	12
		Silver Gull	3	0	0
	Gun	Pied Cormorant	48	0	0
		Wedge-tailed Shearwater	0	8510	4255
		Little Shearwater	0	3472	1736
		Pacific Gull	1	2	1
		Silver Gull	8	>2	>1
		Caspian Tern	10	2	1
		Crested Tern	13	520	260
		Roseate Tern	30	0	0
		Bridled Tern	0	356	178
		Osprey	0	0	1
		Sooty Oyster Catcher	5*	2	1
		Grey-tailed Tattler	2	0	0
		Large Sand Plover	1	0	0
		Red-capped Plover	4	0*	0
		Red-necked Stint	1	0	0
		Ruddy Turnstone	3	0	0
	Gun (1st islet S)	Osprey	0	2	2
	Gun (2nd islet 1to S)	Nil			
	Hummock	Not Surveyed			
	Iris Refuge	Little Shearwater	0	12	>6
		Silver Gull	1	0	0
		Roseate Tern	3	0	0
		Bridled Tern	0	8	>4

Group	Island	Species	Roosting	Breeding	Nests
	Jackson	Pacific Gull	1	2	1
		Silver Gull	7	0	0
		Crested Tern	1	0	0
		Fairy Tern	2	0	0
		Bridled Tern	0	53	>26
		Osprey	4	0	0
		Pied Oystercatcher	4	0	0
	Jackson Islet 1	Osprey		2	1
	Jackson Islet 2	Nil			
	Jackson Islet 3	Nil			
	Jackson Islet 4	Nil			
	Jackson Islet 5	Silver Gull	0	2	1
		Bridled Tern	0	3	>2
	Jackson Islet 6	Nil			
	Jackson Islet 7	Osprey	0	0	1
	Jackson Islet 8	Nil			
	Jon Jim	Pacific Gull	0	2	1
		Roseate Tern	20	0	0
		Osprey	0	2	1
		Sooty Oystercatcher	2	0	0
	Little Jackson	Eastern Reef Egret	1	0	0
		Pacific Gull	0	4	2
		Silver Gull	12	4	2
		Roseate Tern	0	500	250
		Bridled Tern	0	15	>7
		Pied Oystercatcher	1	0	0
	Lagoon	Silver Gull	0	0	2
		Caspian Tern	0	2	1
		Fairy Tern	0	14	7
		Bridled Tern	0	13	>6
		Osprey	0	2	2
		Ruddy Turnstone	1	0	0

Group	Island	Species	Roosting	Breeding	Nests
	Middle	Eastern Reef Egret	1	0	0
		Wedge-tailed Shearwater	0	2074	1037
		Little Shearwater	0	>1	>1
		Pacific Gull	0	2	1
		Silver Gull	15	0	0
		Crested Tern	2	0	0
		Osprey	0	0	1
		White-breasted Sea Eagle	0	0	1
		Sooty Oystercatcher	2	0	0
		Grey-tailed Tattler	1	0	0
		Red necked Stint	2	0	0
		Ruddy Turnstone	3	0	0
	Murray	Eastern Reef Egret	1	0	0
		Wedge-tailed Shearwater	0	3600	1800
		Pacific Gull	0	2	1
		Silver Gull	7	0	0
		Caspian Tern	0	2	1
		Crested Tern	4	0	0
		Osprey	0	2	1
		White-breasted Sea Eagle	0	0	1
		Pied Oystercatcher	2	0	0
		Grey-tailed Tattler	36	0	0
		Large Sand Plover	12	0	0
		Ruddy Turnstone	16	0	0
	Newbold	Nil			
	Newman	Eastern Reef Egret	3	0	0
		Pacific Gull	3	0	0
		Silver Gull	0	24	>8
		Crested Tern	2	0	0
		Roseate Tern	6	0	0
		Fairy Tern	0	8	4
		Bridled Tern	0	34	>17
		Osprey	0	2	1
		White-breasted Sea Eagle	1	0	0
		Pied Oystercatcher	0	2	0
		Ruddy Turnstone	5	0	0
		Whimbrel	1	0	0
	Newman Islet 1	Nil			
	Newman Islet 2	Nil			

Group	Island	Species	Roosting	Breeding	Nests
	Nook (snowies)	Nil			
	One	Pied Cormorant	67	0	<50
		Eastern Reef Egret	2	0	0
		Little Shearwater	0	0	6
		Pacific Gull	3	0	0
		Silver Gull	16	4	2
		Bridled Tern	26	26	13
		Osprey	1	0	0
		White-breasted Sea Eagle	1	0	1
	Pelsaert	Pied Cormorant	65	0	0
		Eastern Reef Egret	0	2	1
		White-breasted Sea Eagle	4	2	1
		Osprey	0	10	8
		Wedge-tailed Shearwater	0	25 578	12 789
		Little Shearwater	0	52	26
		Pacific Gull	44	78	39
		Silver Gull	107	112	43
		Caspian Tern	18	20	10
		Crested Tern	24	2 400	1 200
		Roseate Tern	17	4 008	2 004
		Fairy Tern	23	320	160
		Bridled Tern	2	42	21
		Sooty Tern	0	112 128	56 064
		Brown Noddy	0	242 640	121 320
		Lesser Noddy	0	43 734	21 867
		Pied Oystercatcher	68	8	4
		Bar-tailed Godwit	26	0	0
		Common Sandpiper	2	0	0
		Great Knot	20	0	0
		Greenshank	1	0	0
		Grey Plover	5	0	0
		Grey-tailed Tattler	1	0	0
		Mongolian plover	7	0	0
		Red-capped Plover	18	0	0
		Red-necked Stint	19	0	0
		Ruddy Turnstone	207	0	0
		Unid plover	2	0	0
	Pelsaert Islet	Silver Gull	2	0	0
		White-breasted Sea Eagle	0	0	0

Group	Island	Species	Roosting	Breeding	Nests
	Post Office	Eastern Reef Egret	1	0	0
		Silver Gull	15	4	2
		Crested Tern	6	0	0
		Roseate Tern	13	0	0
		Bridled Tern	5	8	4
		Osprey	1	0	0
		Pied Oystercatcher	0	2	1
		Eastern Curlew	1	0	0
		Greenshank	1	0	0
		Grey-tailed Tattler	5	0	0
		Large Plover	2	0	0
		Ruddy Turnstone	19	0	0
	Post Office Islet	Pied Oystercatcher	2	0	0
	Robertson	Silver Gull	2	0	0
		Crested Tern	3	0	0
		Roseate Tern	0	6	3
		Osprey	2	0	0
		Ruddy Turnstone	1	0	0
	Rotondella	Pacific Gull	3	0	0
		Silver Gull	2	0	1
		Crested Tern	3	0	0
		Bridled Tern	0	1	1
	Rotondella (1st islet to S)	Nil			
	Rotondella (2nd islet to S)	Bridled Tern	0	5	3
		Silver Gull	2	0	0
	Sandy	Pacific Gull	0	2	1
	Seven	Pied Cormorant	0	0	<50
		Silver Gull	1	0	0
		Bridled Tern	1	0	0
		Osprey	1	0	1
		Ruddy Turnstone	2	0	0
	Seven (islet to west)	Pied Cormorant	66	0	0
		Pacific Gull	1	0	0
	Ship rock	Nil			

Group	Island	Species	Roosting	Breeding	Nests
	Sid Liddon	Pied Cormorant	0	460	575*
		Pacific Gull	1	2	1
		Silver Gull	1	2	1
		Caspian Tern	0	2	1
		Crested Tern	0	80	40
		Osprey	3	2	1
	Square	Pacific Gull	0	2	1
		Silver Gull	1	0	0
		Roseate Tern	48	0	0
		Bridled Tern	0	>38	>19
		Osprey	0	2	1
		Pied Oystercatcher	0	2	1
	Stick	White-faced Storm Petrel	0	11772	5886
		Pacific Gull	0	2	1
		Silver Gull	1	0	0
		Caspian Tern	1	0	0
		Bridled Tern	0	>80	>40
		Osprey	0	2	3
		Red-capped Plover	1	0	0
		Ruddy Turnstone	7	0	0
	Sweet	Pied Cormorant	350	0	>50
		Wedge-tailed Shearwater	0	>100	>50
		Pacific Gull	9	>2	1
		Silver Gull	16	>18	>9
		Crested Tern	3	0	0
		Roseate Tern	80	0	0
		Osprey	2	0	0
		Ruddy Turnstone	>10	0	0
	Three	Pied Cormorant	41	0	0
		Eastern Reef Egret	1	0	0
		Little Shearwater	0	2	1
		Pacific Gull	0	25	13
		Silver Gull	8	2	1
		Caspian Tern	0	2	1
		Bridled Tern	0	2	5
		Osprey	1	2	2
		Pied Oystercatcher	4	0	0
	Travia	Roseate Tern	4	0	0

Group	Island	Species	Roosting	Breeding	Nests
		Ruddy Turnstone	1	0	0
	Travia (1st islet south east)	Nil			
	Travia (2nd islet south east)	Pacific Gull	0	0	1
		Silver Gull	2	0	0
	Two	Pacific Gull	1	0	0
		Silver Gull	2	0	0
		Caspian Tern	2	0	0
		Bridled Tern	0	6	3
		Osprey	1	0	0
		White-breasted Sea Eagle	0	0	1
		Sooty Oystercatcher	1	0	0
		Ruddy Turnstone	1	0	0
	Uncle Margie (Mangrove)	Pacific Gull	0	4	2
		Silver Gull	3	0	0
		Fairy Tern	2	0	0
		Bridled Tern	3	3	3
		Osprey	1	0	0
		Pied Oystercatcher	0	2	1
		Grey-tailed Tattler	1	0	0
		Ruddy Turnstone	4	0	0

Appendix 3: List of shorebirds and migratory waders observed during the December 2006 survey of the Houtman Abrolhos.

Species	Group	Island	Roosting	Breeding	Nests
Pied Oystercatcher	Wallabi	Dick	2	0	0
		East Wallabi	11	2	1
		Little Pigeon	0	2	1
		Long	3	2	1
		Marinula	2	0	0
		West Wallabi	3	2	1
		Dakin	1	0	0
		Seal	0	2	1
		Third Sister	2	0	0
		Traitors	3	0	0
		Turnstone	0	2	1
	Easter	Bynoe	1	0	0
		Campbell	2	2	1
		Keru	1	0	0
		Leo	2	0	0
		Little North	2	0	0
		Morley	2	0	0
		Rat	6	2	1
		Shearwater (islet to south)	1	0	0
		Suomi	2	2	1
		White Bank	2	0	0
		White Island	0	2	1
	Pelsaert	Basile	1	0	0
		Burnett	0	2	1
		Coronation	2	0	0
		Eight	3	0	0
		Fairbridge	1	0	0
		Foale	1	0	0
		Jackson	4	0	0
		Little Jackson	1	0	0
		Murray	2	0	0
		Newman	0	2	0
		Pelsaert	68	8	4
		Post Office	0	2	1
		Post Office Islet	2	0	0
		Square	0	2	1
		Three	4	0	0
		Uncle Margie (Mangrove)	0	2	1

Species	Group	Island	Roosting	Breeding	Nests
Sooty Oyster Catcher	Wallabi	West Wallabi	3	2	1
	Easter	Bynoe	0	2	1
		Keru	1	0	0
		Leo	2	0	0
		Morely Islet	0	2	1
		Serventy	2	0	0
		White Island	1	0	0
		Wooded	0	2	1
	Pelsaert	Gun	5	2	1
		Jon Jim	2	0	0
		Middle	2	0	0
		Two	1	0	0
Grey Plover	Wallabi	West Wallabi	1	0	0
	Easter	Keru	1	0	0
		Morley	2	0	0
	Pelsaert	Pelsaert	5	0	0
Large Sand Plover	Wallabi	East Wallabi	16	0	0
		West Wallabi	14	0	0
	Easter	Campbell	1	0	0
		Dry	1	0	0
		Morley	1	0	0
		Rat	1	0	0
	Pelsaert	Post Office	2	0	0
		Gun	1	0	0
		Murray	12	0	0
Red-capped Plover	Wallabi	Akerstrom	4	0	0
		Oystercacher	2	0	0
		Seagull	3	0	0
		Seal	2	0	0
		East Wallabi	78	0	0
		Long	6	0	0
		Shag Rock	2	0	0
		Third Sister	2	0	0
		West Wallabi	165	0	0
	Easter	Alexander	1	0	0
		Bynoe	1	0	0
		Campbell	3	0	0
		Dry	2	0	0
		Gilbert	1	0	0
		Leo	3	0	0
		Morley	1	0	0

Species	Group	Island	Roosting	Breeding	Nests
Red-capped Plover		Rat	9	0	0
		Sandy	3	0	0
		Stokes	4	0	0
		Suomi	7	0	0
		White Island	4	0	0
	Pelsaert	Pelsaert	18	0	0
		Gun	4	0*	0
		Stick	1	0	0
Mongolian Sand Plover	Wallabi	West Wallabi	1	0	0
	Pelsaert	Pelsaert	7	0	0
Whimbrel	Wallabi	Long	1	0	0
	Easter	Gilbert	1	0	0
		Rat	1	0	0
	Pelsaert	Newman	1	0	0
Eastern Curlew	Pelsaert	Post Office	1	0	0
Bar-tailed Godwit	Wallabi	East Wallabi	49	0	0
		West Wallabi	47	0	0
	Easter	Bynoe	2	0	0
		Campbell	12	0	0
		Morley	4	0	0
		Suomi	1	0	0
	Pelsaert	Pelsaert	26	0	0
Greenshank	Wallabi	Akerstrom	1	0	0
		Marinula	1	0	0
		Oystercacher	1	0	0
		West Wallabi	6	0	0
	Easter	Bynoe	1	0	0
		Rat	5	0	0
	Pelsaert	Pelsaert	1	0	0
		Post Office	1	0	0
Common Sandpiper	Wallabi	Oystercacher	1	0	0
	Pelsaert	Pelsaert	2	0	0
Grey-tailed Tattler	Wallabi	Eastern	1	0	0
		Akerstrom	1	0	0
		East Wallabi	3	0	0
		Long	9	0	0

Species	Group	Island	Roosting	Breeding	Nests
Grey-tailed Tattler		Turnstone	1	0	0
		West Wallabi	6	0	0
	Easter	Bynoe	1	0	0
		Little Rat	1	0	0
		Morley	12	0	0
		Rat	1	0	0
		Stokes	1	0	0
		Suomi	1	0	0
	Pelsaert	Burnett	1	0	0
		Gun	2	0	0
		Middle	1	0	0
		Murray	36	0	0
		Pelsaert	1	0	0
		Post Office	5	0	0
		Uncle Margie (Mangrove)	1	0	0
Ruddy Turnstone	Wallabi	Beacon	20	0	0
		Dakin	5	0	0
		Eastern	5	0	0
		East Wallabi	77	0	0
		Little Pigeon	3	0	0
		Long	14	0	0
		Seagull	4	0	0
		Seal	3	0	0
		Seal Islet N (G Island)	1	0	0
		Shag Rock	1	0	0
		Turnstone	8	0	0
		West Wallabi	138	0	0
	Easter	Alexander	9	0	0
		Bynoe	10	0	0
		Bynoe 1(1st islet to W)	1	0	0
		Bynoe 3(3rd islet to W)	1	0	0
		Campbell	13	0	0
		Disappearing	9	0	0
		Dry	3	0	0
		Gilbert	2	0	0
		Helms	4	0	0
		Keru	1	0	0
		Landscope	3	0	0
		Leo	4	0	0
		Little North	10	0	0
		Morley	27	0	0
		Rat	14	0	0
		Serventy	1	0	0
		Serventy (Islet 4)	1	0	0

Species	Group	Island	Roosting	Breeding	Nests
Ruddy Turnstone		Shearwater (islet to south)	1	0	0
		Stokes	15	0	0
		Suomi	25	0	0
		Tapani	3	0	0
		White Island	1	0	0
		Wooded	1	0	0
	Pelsaert	Burton	2	0	0
		Coral Patch 3	6	0	0
		Eight	7	0	0
		Gaze	3	0	0
		Gun	3	0	0
		Lagoon	1	0	0
		Middle	3	0	0
		Murray	16	0	0
		Newman	5	0	0
		Pelsaert	207	0	0
		Post Office	19	0	0
		Robertson	1	0	0
		Seven	2	0	0
		Stick	7	0	0
		Sweet	>10	0	0
		Travia	1	0	0
		Two	1	0	0
		Uncle Margie (Mangrove)	4	0	0
Great Knot	Pelsaert	Pelsaert	20	0	0
Sanderling	Wallabi	East Wallabi	15	0	0
		West Wallabi	5	0	0
	Easter	Disappearing	9	0	0
		Rat	3	0	0
Red-necked Stint	Wallabi	Akerstrom	1	0	0
		East Wallabi	75	0	0
		Seagull	1	0	0
		Turnstone	2	0	0
		West Wallabi	254	0	0
	Easter	Campbell	3	0	0
		Disappearing	1	0	0
		Rat	4	0	0
		Stokes	2	0	0
		Wooded	1	0	0
	Pelsaert	Gun	1	0	0
		Middle	2	0	0
		Pelsaert	19	0	0

Species	Group	Island	Roosting	Breeding	Nests
Sharp-tailed Sandpiper	Wallabi	West Wallabi	2	0	0
Curlew Sandpiper	Wallabi	Akerstrom	1	0	0
		West Wallabi	3	0	0