

# PITT ISLAND SHAG AND CHATHAM ISLAND SHAG CENSUS



*2020 Breeding population census of Pitt Island Shag and Chatham Island Shag*



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# 2020 BREEDING POPULATION CENSUS OF PITT ISLAND SHAG AND CHATHAM ISLAND SHAG

## 1. INTRODUCTION

The Pitt Island shag (*Stictocarbo featherstoni*) is endemic to the Chatham Islands (Checklist Committee 2010). They have been recorded breeding on Chatham Island, Pitt Island, Southeast Island, Mangere Island, Little Mangere Island, The Castle, The Murumuru Rocks, Rabbit Island, Rangitatahi (The Sisters), Motuhara (The Forty Fours), The Western Reef and The Star Keys (Bell & Bell 2000).

The breeding season is poorly known, and is somewhat extended, with most laying occurring in August-September, but it can continue until December (Heather & Robertson 2005). There also appears to be some variation both between and within colonies in different parts of the island (see Bell et al. 2017a).

The first full census of Pitt Island shags was carried out in the 1997/98 breeding season (Bell & Bell 2000), and since then further censuses have been conducted in 2003/04, 2011 and 2016 (Bester & Charteris 2004, Debski et. al. 2012, Bell et al. 2017a). A small population with a high ongoing or predicted decline (50- 70%) has led to the species being listed as Nationally Critical (Robertson et. al. 2017).

The Chatham Island shag (*Leucocarbo onslowi*) is endemic to the Chatham Islands (Checklist Committee 2010). Birds have been recorded breeding on Chatham Island, Pitt Island, Rabbit Island, the Star Keys, and the Northeast Reef (Bell & Bell 2000).

The breeding season is poorly known, but laying mostly occurs from August-December, although there is some variation both between and within colonies (Heather & Robertson 2005, Debski et. al. 2012).

The first full breeding census occurred in 1997 (Bell & Bell 2000) with further census in 2003, 2011 and 2014-16 (Bester and Charteris 2004, Debski et. al. 2012; Bell et. al. 2017b). A very high ongoing or predicted decline (>70%) led to the species being listed as Nationally Critical (Robertson et. al. 2017).

This report summarises the results of a census carried out on both Pitt Island Shag and Chatham Island Shag in the 2020/21 summer in the Chatham Islands, covering as many islands as possible within the group.

## 2. METHODS

### 2.1 Pitt Island Shag

This census followed the methods of Bell & Bell (2000) as closely as possible to maximise comparability and similar methods were also used in the 2003/04, 2011 and 2016 census (Bester & Charteris 2004, Debski et. al. 2012, Bell et al. 2017a). All areas of potential Pitt Island shag breeding habitat, essentially all coastal areas with a rocky shoreline, and the rocky margins of Te Whanga Lagoon where search, either on foot or from a boat.

All breeding sites of Pitt Island shag were recorded on a handheld GPS and the number of Apparently Occupied Nests (AON) counted. A breeding site is defined as a group of nests, separated by >100m from another group of nests.

An Apparently Occupied Nest (AON) was defined as, and is considered to represent a breeding pair:

- An adult bird incubating or apparently incubating if the nest contents could not be observed (i.e., an adult bird sitting tight).
- An adult bird, or birds, guarding small chicks (guard stage adults on nest).
- Chick/s on a nest site.
- An adult bird/s on an empty nest and showing signs of nest building.
- A pair of adult birds together on a nest site in breeding plumage showing signs of courting.
- A nest site with immature birds of the year which have recently fledged, and the nest site shows obvious signs of successful breeding this season.
- An empty nest with evidence of recent predation where a breeding attempt was made this season.

Main Chatham, Pitt island and outlying islands were surveyed during October and November 2020. Motuhara was surveyed in January 2021 when breeding was finished, and a count of sites occupied by recently fledged young was used to determine the number of AON and as such these counts likely underestimate the breeding population here. Unfortunately, due to weather and logistical constraints with organising boats and issues with availability of the Air Chatham's Cessna the Western Reef and Rangitahi were not surveyed.

## 2.2 Chatham Island Shag

Aerial surveys of all known Chatham Island shag colonies were carried out using Air Chatham's Cessna 206 aircraft. Each colony was circled at a height of approximately 100m, with the aircraft flying as slow as possible (approximately 60 knots). Photos were taken out of an open window using either a Cannon ED50 or Canon EOS1D MKiii Digital SLR camera with a 100-400mm zoom lens. Each colony was circled until the photographer was confident that good images had been taken, usually needing 2-3 passes over each colony.

Due to weather and aircraft unavailability (with high tourist demand for flights to Pitt Island scheduling flights with Air Chatham's was problematic) multiple flights of colonies was not possible. As such repeat counts at colonies was conducted by foot (Main Chatham) or boat (offshore Islands) to supplement aerial surveys with the aim to get counts throughout the breeding season - one timed for early in the breeding season, and the second for mid-way through.

Photos were counted using the free open-source digital image counting software dot-dot-goose available from the American Museum of Natural History ([https://biodiversityinformatics.amnh.org/open\\_source/dotdotgoose/](https://biodiversityinformatics.amnh.org/open_source/dotdotgoose/)). Each breeding pair was marked with a dot, with the software automatically tallying the number of breeding pairs for each image (colony).

A breeding pair was defined as:

- An adult bird apparently incubating.
- An adult bird, or birds, guarding a chick.
- A chick, or chicks on a nest site.
- An adult bird, or birds, at a suitable site showing signs of nest building.
- A pair of adult birds together at a suitable nest site.

## 3. RESULTS

### 3.1 Pitt Island Shag

Between 14 September and 3 November 2020, a systematic survey of the entire rocky coastline on Chatham and Pitt Island (including offshore islets) was carried out on foot or by boat. Motuhara was

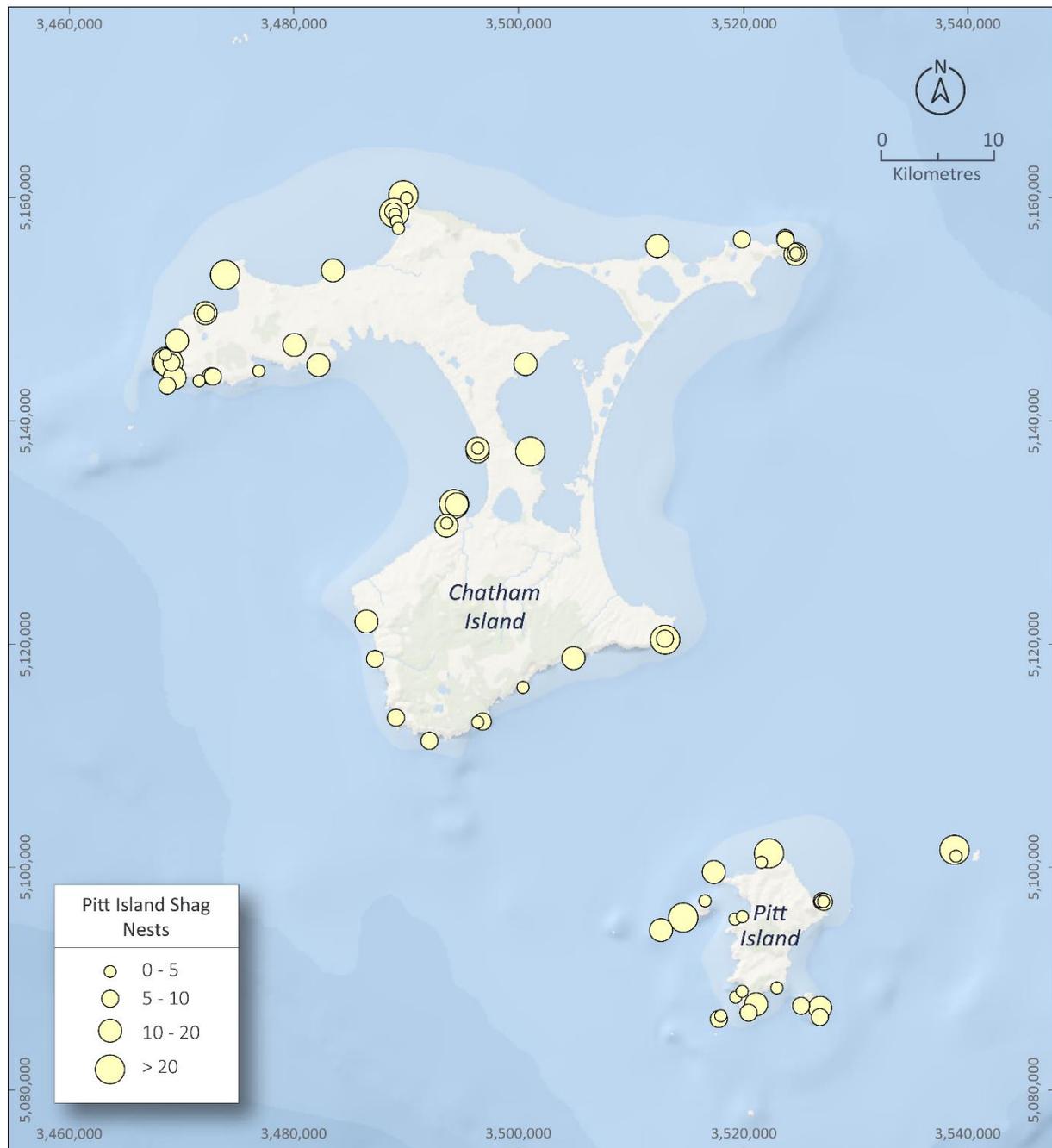
surveyed on 17 January 2021 when all nests had fledged, and numbers reported may be an underestimate for this island. Unfortunately, due to sea conditions and lack of boat and aircraft availability, Rangitahi and the Western Reef were not surveyed.

Pitt Island shags were recorded breeding at 76 sites throughout the islands, with a total of 793 breeding pairs recorded (Figure 1). Significantly more birds were found breeding on Chatham Island than Pitt and surrounding offshore islands (73% of breeding pairs).

The mean colony size was 10.4 pairs (range 1-39 nests), with most (61%) colonies having  $\leq 10$  breeding pairs; and only 15% of colonies having  $> 20$  breeding pairs.

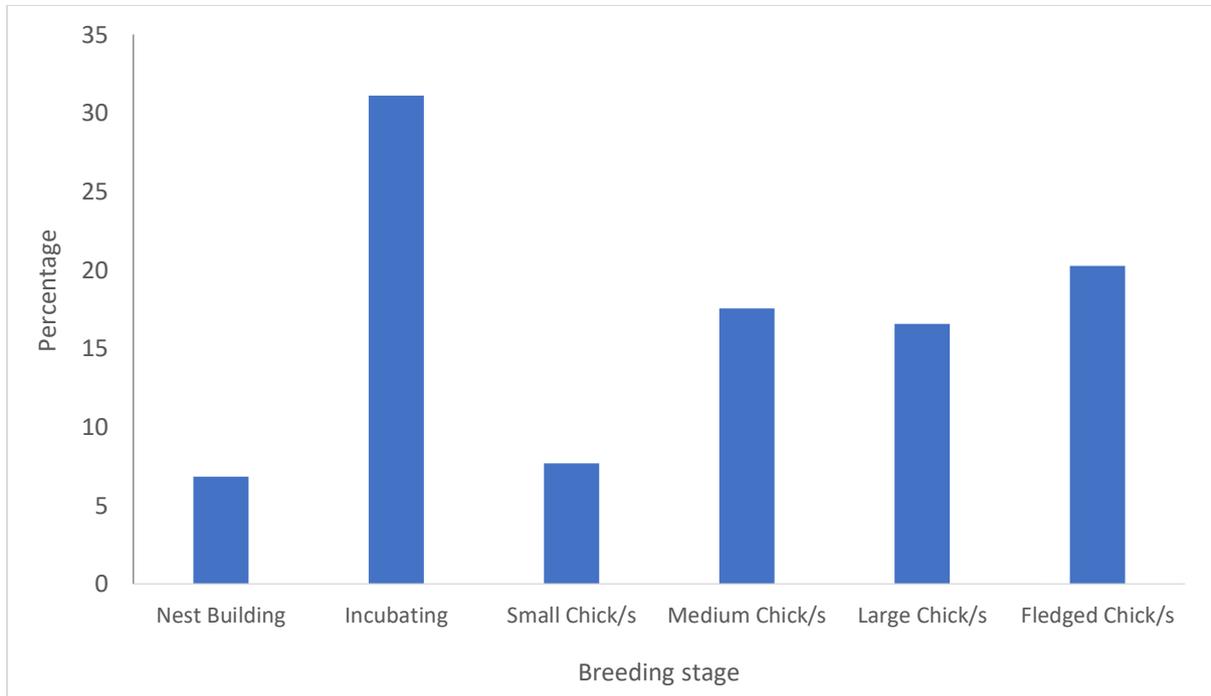
Interestingly birds are breeding on the shipwrecked rusting hulk of the “*Thomas Carroll*” in Port Hutt, this is the first recorded occurrence of Pitt Island shag using a human structure for breeding.

**Figure 1.** Size and location of Pitt Island shag breeding colonies, September-November 2020.



A record of nest status was undertaken for all nests (Figure 2), 31% of nest contained incubating pairs, whilst 36% had large chick or had already fledged chicks. This suggests that Pitt Island shag have two peaks in laying, one in winter, with a further peak in mid spring/early summer.

**Figure 2.** Proportion of nests at different breeding stages of Pitt Island Shag recording during breeding census (September-November 2020).

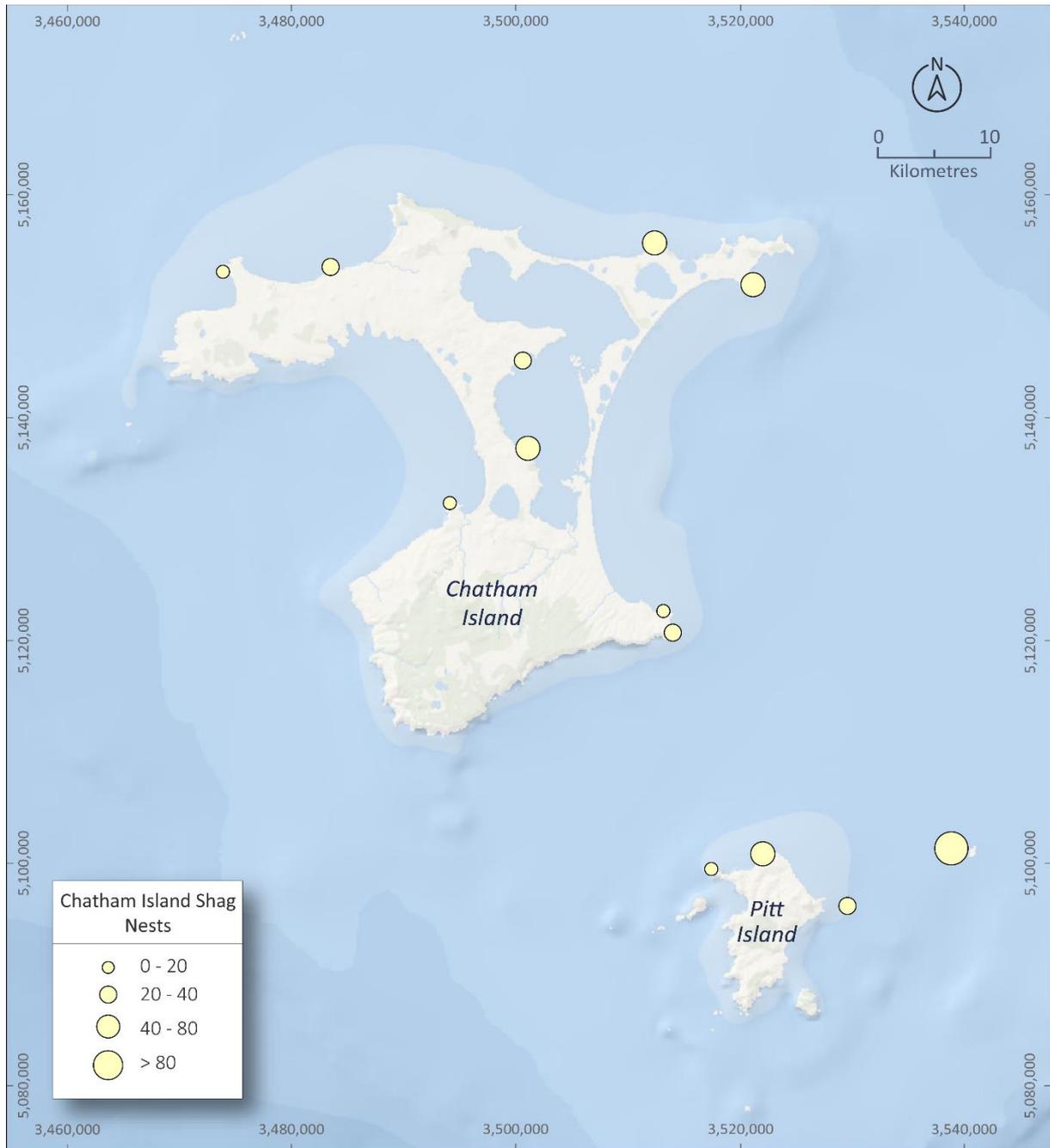


### 3.2 Chatham Island Shag

Chatham Island Shag were recorded breeding at 13 locations throughout the Islands, with a total of 582 breeding pairs recorded (Figure 3).

Breeding was recorded at Manukua Point, the first-time breeding has been recorded here since the 1970's. This was mirrored by a decline in numbers at the Cape Fournier colony and suggests birds have shifted. Significantly fewer birds were recorded breeding at The Star Keys, indicating that either the peak breeding period was missed, or not all birds were breeding this season.

**Figure 3.** Location and size of Chatham Island Shag breeding colonies 2020.



## 4. DISCUSSION

### 4.1 Pitt Island Shag

The total of 792 Pitt Island Shag breeding pairs is the highest recorded census for this species (Table 1). Given that Rangitatahi (The Sisters) and Western Reef were not able to be surveyed, it is likely that the population was even higher than what was recorded.

Little is known about the timing of breeding in Pitt Island Shag, and how much interannual variation in the timing and extend of breeding occurs. It is likely that low counts in 2003 and 2011 are a result of the survey period missing the peak breeding period. Recording of nest contents of all nests indicates that this season there was two peaks in breeding, one early (probably late winter) and one later (mid spring), any shifts in timing of these laying periods could have significant impacts of census results.

Counts in 1997, 2016 and 2020 suggest that the population is likely to be stable at around 700-750 pairs, although it cannot be ruled out that the population declined between 2000-2011 and has since recovered.

Given the uncertainty in the population trends, it seems likely that the Pitt Island shag population is probably stable as such the threat classification of Critically Endangered is not warranted and the species should be listed as At Risk – Naturally Uncommon.

**Table 1.** Variation in the number of breeding pairs of Pitt Island Shag over time (See Bell & Bell 2000, Bester & Charteris 2004, Debski et. al. 2012, Bell et al. 2017a for source of data).

Area	1997	2003	2011	2016	2020
Matarakau	3	11	0	0	11
Point Munning	29	32	62	76	56
Okawa Point	7	0	0	5	0
Cape Fournier	31	24	22	47	75
South West Chatham	47	57	27	46	30
Waitangi	33	33	33	18	49
Red Bluffs	6	9	10	14	32
Port Hutt Bays	0	0	1	0	13
Ocean Bay	30	10	14	38	12
Point Somes	19	21	7	5	36
Western Reef	0	4	-	7	0
Te Raki Bay	38	20	36	76	97
Cape Pattison	0	0	0		27
Ngatikitiki Rocks	18	9	3	12	14
Cape Young	68	14	62	76	80
Motuhinahina Island	11	7	12	50	27
Waikato Point	0	0	0	11	12
<b>Chatham I. Sub Total</b>	<b>340</b>	<b>251</b>	<b>289</b>	<b>481</b>	<b>571</b>
Pitt Island North	55	54	28	33	23
Pitt Island East	32	36	0	10	17
Pitt Island South	49	43	15	29	44
Pitt Island West	6	11	2	1	3
Rabbit Island	29	18	6	13	12
Mangere Islands	23	19	15	23	33

Area	1997	2003	2011	2016	2020
The Castle	6	14	11	8	20
South East Island	63	45	10	13	25
The Star Keys	46	43	12	43	30
Pitt I. Sub Total	309	283	99	173	207
The Pyramid	0			0	15
Motuhara (The Forty Fours)	9	4		19	
Rangitatahi (The Sisters)	71	9		9	
Albatross I. Sub Total	80	13	0	28	15
<b>Total</b>	<b>729</b>	<b>547</b>	<b>388</b>	<b>682</b>	<b>793</b>

## 4.2 Chatham Island Shag

Chatham Island Shag breeding numbers were lower than recorded during 2014-16 and 1997, but higher than 2003 and 2011 (Table 2). This suggests that either peak breeding was missed at some colonies, or potentially that not all birds were breeding this season.

In particular, the Star Keys and Motutapu had significantly lower numbers (with numbers also down on Rabbit Island) suggesting later breeding around Pitt Island. Motuhinahina Island also had lower numbers, and a visit to this colony in April 2021 showed nesting had already commenced with 47 pairs occupying nests – almost twice the number recorded in the survey indicating that the survey was too late in the season and missed pairs in Te Whanga Lagoon.

It appears that in some seasons, there is significant fluctuations in the timing of breeding or the proportion of the population breeding. With this having flow on effects on census results if field work does not overlap with variation in breeding timing. For future census of Chatham Shag, it is recommended to span counts over several seasons, in order to correct for variability in timing of breeding both between and within colonies.

Given counting issues described above, it seems likely that the Chatham Island shag population is stable, probably at around 800 pairs. As such the threat classification of Critically Endangered is not warranted and the species should be listed as At Risk – Naturally Uncommon.

**Table 2.** Variation in the number of breeding pairs of Chatham Island Shag over time (See Bell & Bell 2000, Bester & Charteris 2004, Debski et. al. 2012, Bell et al. 2017b for source of data).

Area	1997	2003	2011	2014-16	2020
Cape Pattinson	0	11	5	15	17
Ngatikitiki Rocks	38	4	13	36	22
Cape Young	0	1	0	0	0
Matarakau	53	35	27	54	58
Kaingaroa	0	1	0	0	0
Okawa Point	114	47	42	96	80
Manakau	0	0	0	0	18
Cape Fournier	115	0	51	96	39
The Pinnacles	0	30	0	0	0
Ke Oreao Point	7	4	3	6	0
Point Weeding	6	5	19	16	15
Motuhinahina Island	68	0	72	55	23
Waikato Bay	0	0	0	44	32

Area	1997	2003	2011	2014-16	2020
Rabbit Island	83	20	18	28	18
Motutapu (Pitt Island)	0	0	6	101	64
Kokepa Rock (Pitt Island)	0	15	0	0	0
NE Reef	19	17	11	36	33
Star Keys	339	81	88	273	167
<b>Total</b>	<b>842</b>	<b>271</b>	<b>355</b>	<b>856</b>	<b>586</b>

## 5. ACKNOWLEDGMENTS

No work can be carried out in the Chatham Islands without the co-operation of residents, and we thank all those landowners who willingly granted access across their property to survey potential shag breeding habitat. Special thanks to Ruka Lanauze and Chris Morrison for providing boat transport to count shags. We thank Air Chatham's for undertaking the flights. This project was carried out with funding from the Department of Conservation Marine Threats Team, and we thank Graeme Taylor for efficiently managing this.

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