

Chatham Island Mollymawk research on Te Tara Koi Koia: November 2016



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EXECUTIVE SUMMARY

Te Tara Koi Koia, the sole breeding site of the Chatham Island Mollymawk *Thalassarche eremita* is privately owned by the Daymond Whanau and we are very grateful for their permission to camp on the island to undertake research on Chatham Island Mollymawk.

A field team of two (Dave Bell and Dave Boyle) camped on the island from Nov 9th until Nov 14th.

A full census of the island counted 5296 nests sites of Chatham Island Mollymawk. This result is very similar to previous counts, with the average from 1999-2016 being 5,294 nest sites (range 5,194-5,407, n=11).

Most nests contained breeding birds, with 63.1% of nests containing eggs, 10.8% a chick and 22.6% had already failed; only 3.5% of nests were classified as empty. Chick hatching had only just started during this field trip.

A review of nest occupancy recorded during field trips since 1997 clarifies the breeding timetable of Chatham Island Mollymawk.

A total of 310 band recoveries we made of Chatham Island Mollymawk, this included 3 dead adults, 196 adults incubating eggs, 47 adults guarding a chick, 29 adults on a failed nest, 14 adults on an empty nest, and 21 adults caught away from nests where breeding status could not be determined.

A total of 65 study nests on the Camp Flat and Slopes had birds breeding in them, containing either an egg or chick. A further 9 marked nests were occupied by birds, but were empty.

1. INTRODUCTION

Chatham Island Mollymawk *Thalassarche eremita* breeds only on Te Tara Koi Koia (44°26'S, 176°14'W) (Checklist committee 2010). Te Tara Koi Koia, the southernmost island in the Chatham Islands, is privately owned by the Daymond Whanau. Permission is required to land and camp on the island and we are very grateful to the Daymond Whanau for granting us permission to undertake this research.

The first full census of Chatham Island Mollymawk was carried out in the 1999 breeding season (Robertson *et. al.* 2003). Since then full counts have been carried out during the 2000, 2001, 2003, 2005, 2006, 2007, 2008, 2009, and 2010 breeding seasons (Robertson et al 2003; Fraser et al 2011). During this time the breeding population has been between 5,194 and 5,407 nests (Robertson *et. al.* 2003; Fraser *et. al.* 2011).

During the breeding season Chatham Island Mollymawk mainly forage between 38-48°S in waters South and East of the Chatham Islands. In the non-breeding season most birds winter in the mixing zone between the Humboldt Current and the Magellanic Current off central eastern Chile and Peru (Onley and Scofield 2007).

This report summarises the results of a field trip to Te Tara Koi Koia in November 2016 to undertake a population census and to re-capture as many banded birds as possible to continue collecting data for demographic studies.

2. METHODS

2.1 Census

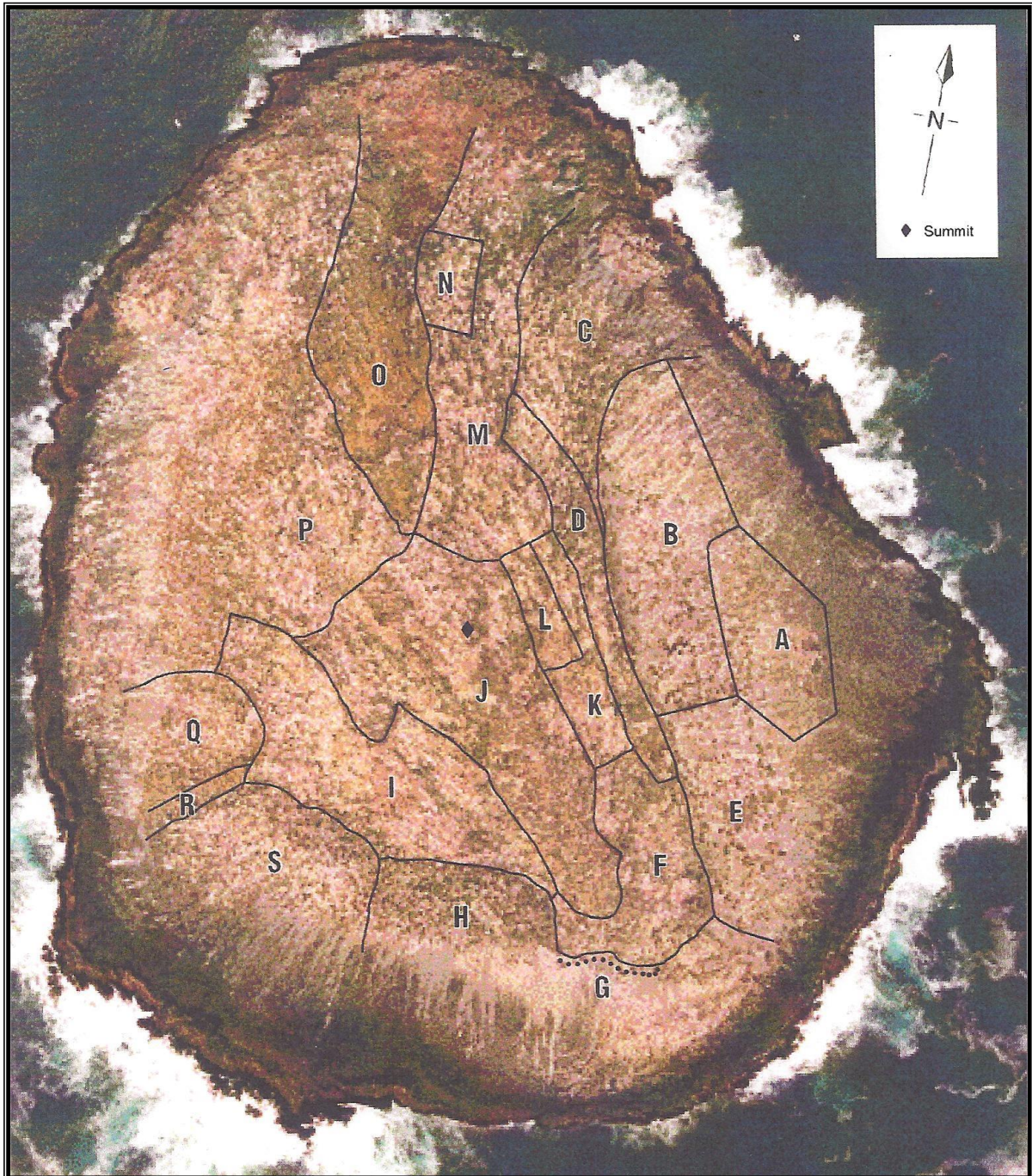
A full census of all nest sites on Te Tara Koi Koia was carried out using the same format used since the original 1999 census (Robertson *et. al.* 2003). The island is divided into 19 count sections (Figure 1) and each of these sections was counted. At each nest the nest contents were recorded as either-

- Egg – a nest with an adult bird incubating an egg
- Chick – a nest with an adult bird guarding a chick, or a live chick alone in a nest
- Failed nest – a nest with a broken or abandoned egg, or dead chick. Representing a nest where a breeding attempt was undertaken this season, but had already failed
- Empty – a nest without an egg or chick, which may have an adult bird present, but shows no evidence of attempted breeding this season

Each nest site was marked with a small dot of spray paint to ensure no nests were double counted.

Parts of Section H were not accessible on foot, with 50% of this section counted using binoculars from vantage points. Nest contents were inferred by the bird's behaviour (i.e. birds standing on an empty nest, birds feeding/guarding a chick or birds repositioning on egg etc). This is consistent with the 1999-2001 censuses (Robertson *et. al.* 2003). Nest contents in sections Q, H, S and R were not determined in censuses during 2008-2010 (Fraser *et. al.* 2011).

Figure 1. Chatham Island Mollymawk count sections on Te Tara Koi Koia; for section names see Table 1.



2.2 Band recoveries

Chatham Island Mollymawks have been banded on Te Tara Koi Koia since 1974, with a large number of chicks banded in 1993, 1994, and 1995 (Robertson *et. al.* 2003). Two study areas were established on the Camp Flat and Slopes, and many of these birds have been banded with engraved alpha-numeric colour bands (Robertson *et. al.* 2003, Fraser *et. al.* 2011). Twice daily checks (early morning and evening) of the study areas were carried out to check each study nest for banded birds. All other nests on the Camp Flat and Slopes were also checked to look for banded birds which may have shifted to un-marked nests.

During the census each bird on a nest was checked to see if it was banded; most birds did not require capture and the band could be read with the bird remaining incubating its egg or guarding its chick, but birds were captured and the band read if necessary. Following the census all sections were checked repeatedly for banded birds to account for birds changing over at nests, or non-breeding birds coming ashore at various times during the day.

Each banded bird encountered was marked with a small dot of spray paint to prevent repeated capture/disturbance. The date, location (count section) and breeding status of each banded bird was recorded.

3. RESULTS

A field team of two (Dave Bell and Dave Boyle) arrived on Nov 9th, and camped on the island until they departed on Nov 14th. An overview of the field trip is provided below -

Nov 9th - Depart Owenga 0800 and arrived Te Tara Koi Koia 1000. Landing using Naiad, team and gear ashore by 1045. Gear up to Camp and Camp established by 1330. Start census, count and collect band recoveries from The Cave (G). Check Camp study nests and collect band recoveries from this area.

Nov 10th - Early morning check Camp study nests and collect band recoveries from this area. Rest of day spent on island census. Count Moriori Ledge (K + L), Summit Ledge (J), South Basin (F), Bells ledge (D) and Main Slope (M). Collect band recoveries at all sections. Evening collect band recoveries in The Cave (G), Yellow-nosed Basin (S) and Camp (A, B + E). Evening check of Camp study nests.

Nov 11th - Early morning check Camp study nests and collect band recoveries from this area. Continue island wide census. Count North Slopes (P), Yellow Spur (O) and start Yellow-nosed Basin/Ridge (S+R); stopped due to rain. Collect band recoveries at each section. Evening check of Camp study nests and collect band recoveries.

Nov 12th - Early morning collect band recoveries and check study nests on Camp Flat and Slopes. Island wide search to continue collecting band recoveries. Census Round Rock Basin (Q) and complete census of Yellow-nosed Basin/Ridge (S+R). Return to Camp Flat and Slopes and carry out census of these sections (A, B+E). Evening collect band recoveries and check study nests Camp, collect band recoveries from The Cave (G). In addition, spent time throughout the day checking on distribution, numbers and breeding status (presence of eggs and chicks) of Fulmar Prions all day.

Nov 13th - Early morning collect band recoveries from The Cave and Camp Flats and Slope. Check all study nests on Camp Flat and Slope. Continue Island wide search to collect band recoveries. Census Western Ledges (I), Inaccessible Basin (H), and The Steeps (C). Evening collect band recoveries from The Cave and Camp Flat and Slopes, and check study nests. Continue with Island wide collection of band recoveries throughout evening until 2030.

Nov 14th - Early morning collect band recoveries from The Cave and Camp area whilst checking study nests. Pack up camp and carry gear to landing by 0830. Continue Island wide search and collection of band recoveries. Return to landing at 1000. Picked up 1130 and back to Waitangi.

3.1 Habitat condition

During the field trip we found Te Tara Koi Koia to be well vegetated. With large areas of Ice Plant, Button Daisy, *Senecio*, and *Carex* (Figure 2). It is likely that there have been no major storms which have impacted on the vegetation cover of the island for some time.

Figure 2. Photos from the North Eastern slopes showing the amount of vegetation cover on the Te Tara Koi Koia, Nov 2016.



3.2 Census results

A full census was carried out from Nov 9th – Nov 13th 2016, with a total of 5296 nests counted (Table 1.)

This result is very similar to previous counts, with the average from 1999-2016 being 5,294 nest sites (Range 5,194-5,407) (Table 2, Figure 3).

The results of each count section are similar to that recorded from 1999-2010, with little variation in the number of nests recorded in each section (Table 2).

Table 1. Results of census of Chatham Island Mollymawk per count section on Te Tara Koi Koia, Nov 2016.

Area	Area code	Nest status				Total
		Egg	Chick	Empty	Failed	
Cave	G	113	11	22	44	190
Camp Slope and Flat	A+B+E	138	30	10	46	224
Western Ledges	I	453	130	17	206	806
South Basin	F	142	24	7	46	219
Bells Ledge	D	112	13	2	48	175
Main Slope	M+N	607	100	41	139	887
Yellow Spur	O	71	9	5	30	115
Moriore Ledge	K+L	181	31	14	36	262
Northern Slopes	P	653	117	24	265	1059
Round Rock Basin	Q	119	16	11	54	200
Summit Ridge	J	400	45	10	157	612
Inaccessible Basin	H	71	10	9	17	107
The Steps	C	118	12	8	31	169
Yellow-nosed Basin and Ridge	S+R	165	23	5	78	271
Total		3343	571	185	1197	5296

Figure 3. Nest counts of Chatham Island Mollymawk on Te Tara Koi Koia, 1999-2016.

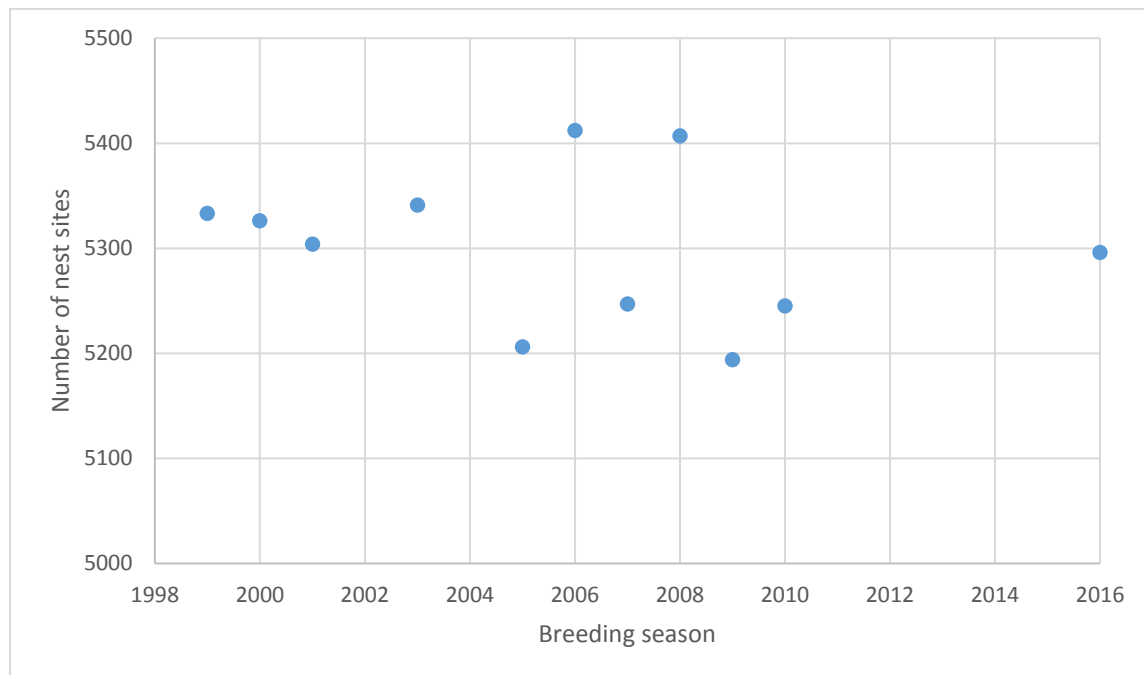


Table 2. Number of Chatham Island Mollymawk nests recorded in each count section on Te Tara Koi Koia 1999-2016.

Area	Area code	1999	2000	2001	2007	2008	2009	2010	2016	Average
Cave	G	224	204	235	240	249	245	256	190	230.4
Camp Slope & Flat	A+B+E	213	226	242	255	270	256	281	224	245.9
Western Ledges	I	825	873	774	735	754	741	739	806	780.9
South Basin	F	205	163	213	194	236	221	199	219	206.3
Bells Ledge	D	220	167	207	188	199	186	200	175	192.8
Main Slope	M+N	718	690	699	683	703	680	694	887	719.3
Yellow Spur	O	156	132	125	117	124	121	112	115	125.3
Moriuri Ledge	K+L	245	237	289	247	289	268	267	262	263.0
Northern Slopes	P	1198	1179	1035	1044	1010	989	949	1059	1057.9
Round Rock Basin	Q	180	222	224	245	257	233	235	200	224.5
Summit Ridge	J	641	611	717	715	706	697	719	612	677.3
Inaccessible Basin	H	101	103	100	102	109	96	111	107	103.6
The Steeps	C	152	208	174	218	221	217	227	169	198.3
Yellow-nosed Basin and Ridge	S+R	255	311	270	264	280	244	256	271	268.9
Annual Total		5333	5326	5304	5247	5407	5194	5245	5296	5294.0

3.2 Breeding status

63.1% of nests contained eggs, 10.8% of nests contained a chick, and 22.6% of nests had failed; only 3.5% of nests were classified as empty. Chick hatching had only just started during this field trip. In previous surveys the proportion of chicks was higher, as visits were carried out in late Nov/early Dec during early chick rearing (Fraser et. al. 2011).

Combining data for all of the field trips, where nest contents were checked, a pattern of the breeding cycle of Chatham Island Mollymawk is emerging, with chick's first hatching in October and all chicks hatched by mid Dec (Table 3).

Table 3. Percent of nests containing eggs, chicks or empty nests by survey date, 1997-2016.

	15- Oct	12- Nov	25- Nov	26- Nov	30- Nov	30- Nov	5- Dec	5- Dec	5- Dec	10- Dec	15- Feb
Egg	70	63	9	7	7	4	3	4	3	1	0
Chick	1	11	60	56	52	61	56	61	67	40	53
Empty	29	26	31	37	41	35	41	35	29	59	47

3.2 Band recoveries

A total of 310 band recoveries were made of Chatham Island Mollymawk, this included 3 dead adults, 196 adults incubating eggs, 47 adults guarding a chick, 29 adults on a failed nest, 14 adults on empty nests, and 21 adults caught away from nests where breeding status could not be determined. Additionally a closed band was found in a nest (presumably fallen off a chick), one open unused band was found on the ground, and two broken Darvic bands were also found. One Chatham Island Mollymawk carrying a Geolocator was caught, and the Geolocator removed.

This is the most band recoveries in a field trip on Te Tara Koi Koia to date (Table 4). Most recoveries were from the Camp Flat and Slopes (Table 5), which is where the most banding activity has taken place due to the study nests being located in this area.

Three banded Salvin's Mollymawks were recorded, two adults on nests and one away from a nest where breeding status could not be determined.

The details of band recoveries are provided in Appendix 1.

Table 4. Number of band recoveries of Chatham Island Mollymawk on Te Tara Koi Koia 2001-2016.

Year	Band recoveries
2001	209
2007	71
2008	276
2009	241
2010	304
2016	310

Table 5. Location of band recoveries Chatham Island Mollymawk on Te Tara Koi Koia 2016.

Area	Area code	Number of recoveries
Cave	G	14
Camp Slope and Flat	A+B+E	175
Western Ledges	I	13
South Basin	F	3
Bells Ledge	D	1
Main Slope	M+N	42
Yellow Spur	O	4
Moriori Ledge	K+L	7
Northern Slopes	P	35
Round Rock Basin	Q	
Summit Ridge	J	13
Inaccessible Basin	H	
The Steeps	C	1
Yellow-nosed Basin and Ridge	S+R	2
Total		310

3.3 Study nests

All of the study nests on the Camp Flat and Slopes were checked at least twice daily. Of these, 65 nests had birds breeding in them, containing either an egg or chick. A further 9 marked nests were occupied by birds, but were empty. Four nests were present, but did not appear to be in use, and 38 nests gone (nest tag located glued to the rock, but there was no nest present). Details of study nests are provided in the Appendix 2.

3.4 Fulmar Prions

The population of Chatham Island Fulmar Prion *Pachyptila crassirostris pyramidalis* in the Chatham Island's is estimated at 1,000-5,000 pairs, with birds breeding on Te Tara Koi Koia and Motuhara, although there is no specific population estimate for each island.

We found Fulmar Prion to be very common on Te Tara Koi Koia, and feel that the population estimate is low. Birds were found incubating eggs under rocks, in burrows dug in accumulated guano and in mollymawk nests and in caves, often in groups throughout the island. At dusk thousands of birds came ashore. Although we did not carry out a comprehensive survey, we estimate the population on Te Tara Koi Koia alone to be greater than 5000 pairs

4. DISCUSSION

This year's population count of Chatham Island Mollymawk on Te Tara Koi Koia is very similar to previous counts. As Tara Koi Koia is the only breeding site of this species further census work is warranted at regular intervals to monitor the population.

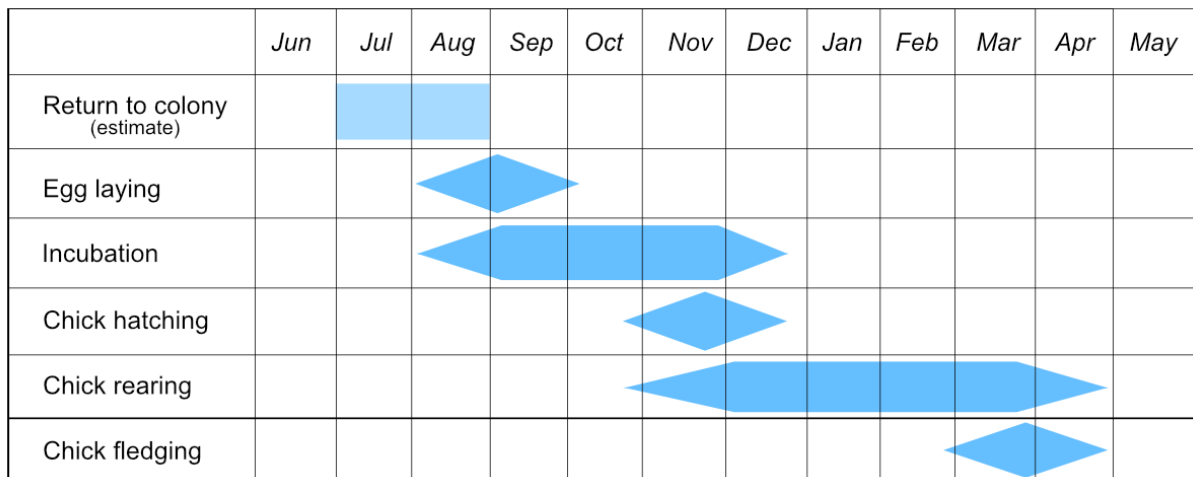
The number of New Zealand Fur Seals (*Arctocephalus fosteri*) on Te Tara Koi Koia is increasing and as the seal population increases, seals are expanding up the island. It is particularly noticeable that seals have moved up onto the Camp Flat and Slopes and are extending higher up the Main Slope. Nest sites, including study nests on the Camp Flat and Slope, have been taken over by fur seals and nests destroyed. As the seal population continues to increase this is likely to further impact Chatham Island Mollymawk breeding, and may limit the available breeding habitat and reduce productivity in areas accessible to seals.

The breeding timetable of Chatham Island Mollymawk is not well understood but comparison of nest occupancy data from field trips since 1997 has clarified this.

During a field trip in late October (Robertson *et. al.* 2003) hatching had just begun, with only 1% of nests containing chicks. This field trip, in mid-November, found 10% of nests containing small chicks with many eggs just starting to hatch. Field trips in early December (Fraser *et. al.* 2011) have consistently found that virtually all chicks have hatched. With an estimated 70 day incubation period, egg laying would therefore start during the first week of August and end in the first week of October.

Work carried out by the Chatham Island Taiko Trust suggests fledging occurs from the last week of March until the end of April. Chicks are therefore likely to be 140-150 days old when they fledge.

Figure 4. The breeding cycle of Chatham Island Mollymawk



Consideration should be given to banding further cohorts of chicks to ensure that there continues to be a significant number of known aged birds in the marked population. This work could potentially be done in partnership with the Chatham Island Taiko Trust which is involved in the translocation of Chatham Island Albatross chicks and is investigating undertaking further field trips to Te Tara Koi Koia to look for translocated chicks returning to the source island.

The number of Fulmar Prions breeding on Te Tara Koi Koia is likely to be higher than previous estimates. Although no comprehensive survey was carried out, the number of birds seen coming ashore, and the number of birds seen incubating eggs suggests a breeding population of >5,000 pairs. A survey of Fulmar Prion is recommended to determine the population size.

5. ACKNOWLEDGMENTS

Te Tara Koi Koia is privately owned by the Daymond Whanau and we are very grateful for their permission to Camp on the island to undertake this research. Thanks to Joss Thomas for helping to arrange access agreements with the Daymond Whanau. Special Thanks to Ruka Lanauze and Bubbles Gregory-Hunt for making their boat available to take us to the island, and to their Skipper Justin Greenbank for transporting us to and from the island. Robin Seymour, Hamish Tuanui, and Josh Lanauze assisted with landings. James Fox recovered the data from the recovered Geolocator. Nathan Guy (Ministry of Primary Industries) provided copies of past field trip reports to compare with this seasons results. Thanks to the Chatham Island Taiko Trust for sharing information on the fledging times of transferred Chatham Island Mollymawk chicks. This project was carried out with funding from the Department of Conservation Marine Threats Team, and we thank Kris Ramm for efficiently managing this.

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7. APPENDICES

Appendix 1. Details of band recoveries.

Prefix	Band no.	Darvic	Date	Location	Area code	Breeding status	Notes
M	42119		Nov-10	Cave	G	Egg	
M	42122		Nov-14	Cave	G	Chick	
M	42133		Nov-10	Cave	G	Egg	
M	42227		Nov-10	Yellow-nosed Basin	R		
M	42230		Nov-10	Cave	G	Egg	
M	42255		Nov-09	Camp	A+B+E	Egg	
M	42278		Nov-13	Main Slope	M	Egg	
M	42316		Nov-09	Cave	G	Egg	
M	42319		Nov-09	Cave	G	Egg	
M	42320		Nov-10	Cave	G	Failed nest	
M	42360		Nov-13	Western Ledges	I	Egg	
M	42527		Nov-09	Cave	G	Egg	
M	42582		Nov-12	Yellow-nosed Basin	S	Egg	
M	42596		Nov-09	Cave	G		
M	42622		Nov-10	Main Slope	M	Egg	
M	42634		Nov-10	Yellow Spur	O		
M	42655		Nov-10	Main Slope	M	Egg	
M	42671		Nov-10	Main Slope	M		
M	42708		Nov-12	Summit Ridge	J	Egg	
M	42709		Nov-10	Summit Ridge	J	Chick	
M	42743		Nov-11	Main Slope	M	Egg	
M	42756		Nov-12	Main Slope	M	Egg	
O	21397		Nov-13	Western Ledges	I	Egg	
O	21402		Nov-12	Main Slope	M	Chick	
O	21406		Nov-14	Northern Slopes	P		
O	21430		Nov-11	Northern Slopes	P	Egg	
O	21452		Nov-10	Main Slope	M	Egg	
O	21457		Nov-10	Main Slope	M	Failed nest	
O	21474		Nov-11	Main Slope	M	Egg	
O	21486		Nov-11	Main Slope	M	Failed nest	
O	21491		Nov-13	Bells Ledge	D		
O	21498		Nov-13	Main Slope	M	Egg	
O	21519		Nov-13	Moriori Ledge	L	Egg	
O	21532		Nov-10	South Basin	F	Egg	
O	21533		Nov-13	Northern Slopes	P	Egg	
O	21538		Nov-13	Moriori Ledge	K	Egg	
O	21544		Nov-13	Moriori Ledge	L	Chick	
O	21571		Nov-09	Cave	G	Egg	
O	21588		Nov-10	Cave	G		
O	21660		Nov-13	Western Ledges	I	Chick	

O	21703		Nov-13	Northern Slopes	P	Egg	
O	21705		Nov-11	Yellow Spur	O	Egg	
O	21711		Nov-13	Western Ledges	I	Egg	
O	21722		Nov-13	Western Ledges	I	Egg	
O	21739		Nov-11	Northern Slopes	P	Failed nest	
O	21805		Nov-13	Western Ledges	I	Egg	
O	21825		Nov-13	Western Ledges	I	Chick	
O	21840		Nov-13	Western Ledges	I	Failed nest	
O	21870		Nov-13	The Steeps	C	Egg	
O	21900		Nov-14	Moriori Ledge	K		
O	21937		Nov-10	Main Slope	M		Dead
O	21956		Nov-12	Summit Ridge	J	Egg	
O	22015		Nov-10	Main Slope	M	Egg	
O	22027		Nov-13	Northern Slopes	P	Egg	
O	22036		Nov-12	Northern Slopes	P	Egg	
O	25112		Nov-11	Northern Slopes	P	Egg	
O	25129		Nov-12	Main Slope	M	Failed nest	
O	25134		Nov-11	Yellow Spur	O	Failed nest	
O	25144		Nov-12	Camp	A+B+E	Egg	
O	25146		Nov-11	Northern Slopes	P	Egg	
O	25263		Nov-13	Northern Slopes	P	Egg	
O	25366		Nov-10	Western Ledges	I	Egg	
O	25392		Nov-10	Main Slope	M	Egg	
O	25402		Nov-13	Main Slope	M	Egg	
O	25406		Nov-11	Main Slope	N	Egg	
O	25414		Nov-11	Northern Slopes	P	Egg	
O	25427		Nov-11	Northern Slopes	P	Egg	
O	25437		Nov-13	Northern Slopes	P	Chick	
O	25445		Nov-10	Moriori Ledge	L	Egg	
O	25454		Nov-14	Northern Slopes	P	Failed nest	
O	25462		Nov-10	Main Slope	M	Egg	
O	25464		Nov-13	Main Slope	M	Egg	
O	25470		Nov-10	Main Slope	M	Egg	
O	25480		Nov-13	Western Ledges	I	Chick	
O	25494		Nov-13	Yellow Spur	O	Egg	
O	25495		Nov-13	Main Slope	M	Egg	
O	25501		Nov-11	Northern Slopes	P	Egg	
O	25507		Nov-09	Camp	A+B+E	Egg	
O	25563		Nov-12	Northern Slopes	P	Chick	
O	25566		Nov-11	Northern Slopes	P	Egg	
O	25568		Nov-13	Northern Slopes	P	Failed nest	
O	25580		Nov-12	Northern Slopes	P	Egg	
O	25598		Nov-11	Northern Slopes	P	Chick	
O	26373		Nov-11	Northern Slopes	P	Failed nest	
O	26374		Nov-11	Northern Slopes	P	Chick	
O	26405		Nov-12	Northern Slopes	P	Egg	

O	26418		Nov-11	Northern Slopes	P	Egg	
O	26430		Nov-12	Northern Slopes	P	Egg	
O	26450		Nov-14	Cave	G	Egg	
O	26452		Nov-11	Northern Slopes	P	Chick	
O	26461		Nov-11	Northern Slopes	P	Egg	
O	26464		Nov-11	Northern Slopes	P		Dead
O	26469		Nov-11	Northern Slopes	P	Egg	
O	26487		Nov-11	Northern Slopes	P	Egg	
O	26497		Nov-13	Northern Slopes	P		
O	26505		Nov-13	Main Slope	M	Chick	
O	26509		Nov-09	Cave	G	Egg	Below Cave
O	26515		Nov-11	Northern Slopes	P	Egg	
O	26516		Nov-13	Northern Slopes	P		
O	26529		Nov-10	Main Slope	M	Egg	
O	26548		Nov-13	Northern Slopes	P	Chick	
O	26612		Nov-14	Main Slope	M	Chick	
O	26650		Nov-13	Main Slope	M	Egg	
O	26652		Nov-10	Main Slope	M	Failed nest	
O	26656		Nov-10	Main Slope	M	Egg	
O	26657		Nov-10	Summit Ridge	J	Chick	
O	26664		Nov-13	Main Slope	M	Failed nest	
O	26683		Nov-14	Summit Ridge	J		
O	26738		Nov-13	Summit Ridge	J	Failed nest	
O	26740		Nov-10	Summit Ridge	J	Egg	
O	26748		Nov-12	Moriori Ledge	L	Egg	
O	26787		Nov-10	South Basin	F	Egg	
O	26790		Nov-12	South Basin	F	Failed nest	
O	26792		Nov-14	Moriori Ledge	K	Egg	
O	26826		Nov-10	Main Slope	M	Egg	
O	26855		Nov-14	Western Ledges	I	Egg	
O	26869		Nov-10	Western Ledges	I	Egg	
O	26883		Nov-12	Main Slope	M	Failed nest	
O	26897		Nov-11	Main Slope	M	Egg	
O	26909		Nov-11	Main Slope	M	Egg	
O	26911		Nov-12	Main Slope	M	Egg	
O	26915		Nov-13	Main Slope	M	Egg	
O	26922		Nov-14	Main Slope	M	Egg	
O	26933		Nov-11	Northern Slopes	P	Egg	
O	26934		Nov-13	Western Ledges	I	Egg	
O	26951		Nov-12	Summit Ridge	J		
O	26954		Nov-10	Summit Ridge	J	Egg	
O	26958		Nov-13	Summit Ridge	J	Chick	
O	26964		Nov-12	Summit Ridge	J	Egg	
O	26968		Nov-10	Summit Ridge	J	Egg	
O	26978		Nov-14	Summit Ridge	J	Egg	
O	26997		Nov-12	Main Slope	M	Egg	

O	27002		Nov-13	Main Slope	M	Empty nest	
O	27041		Nov-13	Main Slope	M	Egg	
O	27052		Nov-13	Main Slope	M	Egg	
O	27053		Nov-12	Cave	G	Failed nest	
O	27062		Nov-11	Main Slope	M	Egg	
O	27068		Nov-10	Main Slope	M	Chick	
O	32155		Nov-09	Camp	A+B+E	Egg	
O	32446		Nov-09	Camp	A+B+E	Egg	
O	33621		Nov-12	Camp	A+B+E	Egg	
O	33637		Nov-10	Camp	A+B+E	Egg	
O	33705		Nov-09	Camp	A+B+E	Egg	
O	33719		Nov-09	Camp	A+B+E	Chick	
O	33724		Nov-09	Camp	A+B+E	Failed nest	
O	33748		Nov-10	Camp	A+B+E	Chick	
O	33760	B01	Nov-09	Camp	A+B+E		Dead
O	33769		Nov-12	Camp	A+B+E	Egg	
O	33796		Nov-12	Camp	A+B+E	Egg	
O	33808		Nov-13	Camp	A+B+E	Egg	
O	33821		Nov-09	Camp	A+B+E	Empty nest	
O	33822		Nov-09	Camp	A+B+E	Egg	
O	33825		Nov-09	Camp	A+B+E	Egg	
O	33844		Nov-09	Camp	A+B+E	Egg	
O	33865		Nov-10	Camp	A+B+E	Empty nest	
O	33883		Nov-09	Camp	A+B+E	Egg	
O	33901		Nov-13	Camp	A+B+E		
O	33905		Nov-09	Camp	A+B+E	Egg	
O	33911		Nov-12	Camp	A+B+E	Empty nest	Band removed
O	33912		Nov-09	Camp	A+B+E		
O	33913		Nov-09	Camp	A+B+E		
O	33920		Nov-12	Camp	A+B+E	Egg	Geolocator Removed
O	33968		Nov-09	Camp	A+B+E	Chick	Paired with C39
		A05	Nov-11	Camp	A+B+E	Chick	
		A06	Nov-09	Camp	A+B+E	Egg	
		A08	Nov-09	Camp	A+B+E	Egg	
		A12	Nov-10	Camp	A+B+E	Egg	
		A14	Nov-11	Camp	A+B+E	Failed nest	
		A15	Nov-09	Camp	A+B+E	Chick	
		A16	Nov-10	Camp	A+B+E	Egg	
		A20	Nov-10	Camp	A+B+E	Chick	
		A23	Nov-10	Camp	A+B+E	Egg	
		A29	Nov-10	Camp	A+B+E	Egg	
		A30	Nov-13	Camp	A+B+E	Egg	
		A31	Nov-09	Camp	A+B+E	Egg	
		A33	Nov-12	Camp	A+B+E	Egg	
		A36	Nov-09	Camp	A+B+E	Egg	
		A37	Nov-10	Camp	A+B+E	Chick	

		A48	Nov-11	Camp	A+B+E	Egg	
		A51	Nov-11	Camp	A+B+E	Chick	
		A54	Nov-09	Camp	A+B+E	Egg	
		A55	Nov-09	Camp	A+B+E	Egg	
		A56	Nov-14	Camp	A+B+E		
		A60	Nov-09	Camp	A+B+E	Egg	
		A66	Nov-09	Camp	A+B+E	Chick	
		A68	Nov-09	Camp	A+B+E	Egg	
		A72	Nov-13	Camp	A+B+E	Egg	
		A75	Nov-09	Camp	A+B+E	Empty nest	
		A76	Nov-10	Camp	A+B+E	Chick	
		A80	Nov-09	Camp	A+B+E	Egg	
		A81	Nov-09	Camp	A+B+E	Empty nest	
		A90	Nov-09	Camp	A+B+E	Egg	
		A92	Nov-09	Camp	A+B+E	Egg	Paired with E50
		A93	Nov-10	Camp	A+B+E	Empty nest	
		A97	Nov-09	Camp	A+B+E	Egg	
		A99	Nov-13	Camp	A+B+E	Egg	
		B04	Nov-09	Camp	A+B+E	Empty nest	
		B09	Nov-12	Camp	A+B+E	Egg	
		B10	Nov-09	Camp	A+B+E	Egg	
		B13	Nov-09	Camp	A+B+E	Chick	
		B15	Nov-10	Camp	A+B+E	Chick	
		B20	Nov-13	Camp	A+B+E		
		B21	Nov-09	Camp	A+B+E	Egg	
		B22	Nov-10	Camp	A+B+E	Empty nest	Paired with E39
		B26	Nov-12	Camp	A+B+E	Egg	
		B29	Nov-10	Camp	A+B+E		
		B32	Nov-12	Camp	A+B+E	Egg	
		B37	Nov-09	Camp	A+B+E	Egg	
		B41	Nov-09	Camp	A+B+E	Empty nest	
		B43	Nov-10	Camp	A+B+E	Egg	
		B44	Nov-09	Camp	A+B+E	Egg	
		B45	Nov-09	Camp	A+B+E	Egg	
		B46	Nov-09	Camp	A+B+E	Egg	
		B47	Nov-09	Camp	A+B+E	Egg	
		B49	Nov-09	Camp	A+B+E	Egg	
		B50	Nov-09	Camp	A+B+E	Failed nest	
		B53	Nov-09	Camp	A+B+E	Egg	
		B56	Nov-12	Camp	A+B+E	Egg	
		B59	Nov-09	Camp	A+B+E	Egg	
		B65	Nov-12	Camp	A+B+E	Egg	
		B66	Nov-09	Camp	A+B+E		
		B67	Nov-12	Camp	A+B+E	Failed nest	
		B79	Nov-10	Camp	A+B+E	Failed nest	
		B82	Nov-12	Camp	A+B+E	Egg	

		B85	Nov-09	Camp	A+B+E	Egg	
		B86	Nov-09	Camp	A+B+E	Egg	
		B89	Nov-10	Camp	A+B+E	Chick	
		B93	Nov-09	Camp	A+B+E	Egg	
		B94	Nov-13	Camp	A+B+E	Egg	
		B95	Nov-13	Camp	A+B+E	Failed nest	
		C02	Nov-09	Camp	A+B+E	Egg	
		C03	Nov-09	Camp	A+B+E	Failed nest	
		C05	Nov-09	Camp	A+B+E	Egg	
		C06	Nov-09	Camp	A+B+E	Egg	
		C08	Nov-09	Camp	A+B+E	Empty nest	
		C25	Nov-10	Camp	A+B+E	Chick	
		C26	Nov-11	Camp	A+B+E	Chick	
		C27	Nov-09	Camp	A+B+E	Egg	
		C28	Nov-10	Camp	A+B+E	Egg	
		C32	Nov-10	Camp	A+B+E	Egg	
		C39	Nov-09	Camp	A+B+E	Chick	Paired with O33968
		C40	Nov-09	Camp	A+B+E	Chick	
		C41	Nov-12	Camp	A+B+E	Egg	
		C42	Nov-09	Camp	A+B+E	Egg	
		C43	Nov-13	Camp	A+B+E	Egg	
		C44	Nov-14	Camp	A+B+E	Egg	
		C45	Nov-12	Camp	A+B+E	Egg	
		C47	Nov-11	Camp	A+B+E		
		C48	Nov-09	Camp	A+B+E	Egg	
		C49	Nov-11	Camp	A+B+E	Egg	
		C50	Nov-10	Camp	A+B+E	Empty nest	
		C52	Nov-11	Camp	A+B+E	Egg	
		C53	Nov-09	Camp	A+B+E	Egg	
		C54	Nov-11	Camp	A+B+E	Egg	
		C58	Nov-11	Camp	A+B+E	Egg	
		C59	Nov-09	Camp	A+B+E	Chick	
		C61	Nov-09	Camp	A+B+E	Egg	
		C63	Nov-12	Camp	A+B+E	Egg	
		C67	Nov-13	Camp	A+B+E	Egg	
		C69	Nov-09	Camp	A+B+E	Chick	
		C73	Nov-10	Camp	A+B+E	Failed egg	
		C74	Nov-09	Camp	A+B+E	Egg	
		C75	Nov-09	Camp	A+B+E	Egg	
		C76	Nov-12	Camp	A+B+E	Chick	
		C77	Nov-10	Camp	A+B+E	Egg	
		C79	Nov-09	Camp	A+B+E	Egg	
		C82	Nov-09	Camp	A+B+E	Egg	
		C84	Nov-12	Camp	A+B+E	Egg	
		C85	Nov-14	Camp	A+B+E		
		C86	Nov-09	Camp	A+B+E	Egg	

		C88	Nov-10	Camp	A+B+E	Chick	
		C89	Nov-12	Camp	A+B+E	Egg	
		C91	Nov-11	Camp	A+B+E	Egg	
		C92	Nov-12	Camp	A+B+E	Egg	
		C97	Nov-09	Camp	A+B+E	Egg	
		C98	Nov-09	Camp	A+B+E	Egg	
		C99	Nov-09	Camp	A+B+E	Egg	
		E02	Nov-14	Camp	A+B+E		
		E04	Nov-10	Camp	A+B+E	Egg	
		E05	Nov-09	Camp	A+B+E	Egg	
		E06	Nov-12	Camp	A+B+E	Egg	
		E07	Nov-09	Camp	A+B+E	Egg	
		E08	Nov-09	Camp	A+B+E	Egg	
		E09	Nov-12	Camp	A+B+E	Chick	
		E10	Nov-12	Camp	A+B+E	Chick	
		E11	Nov-10	Camp	A+B+E	Egg	
		E14	Nov-12	Camp	A+B+E	Egg	
		E15	Nov-10	Camp	A+B+E	Egg	
		E17	Nov-12	Camp	A+B+E	Egg	
		E18	Nov-09	Camp	A+B+E	Egg	
		E19	Nov-09	Camp	A+B+E	Egg	
		E20	Nov-09	Camp	A+B+E	Egg	
		E22	Nov-12	Camp	A+B+E	Egg	
		E24	Nov-09	Camp	A+B+E	Egg	
		E26	Nov-09	Camp	A+B+E	Empty nest	
		E29	Nov-10	Camp	A+B+E	Chick	
		E31	Nov-11	Camp	A+B+E	Chick	
		E32	Nov-09	Camp	A+B+E	Egg	
		E33	Nov-09	Camp	A+B+E	Egg	
		E34	Nov-14	Camp	A+B+E	Failed nest	
		E39	Nov-09	Camp	A+B+E	Failed nest	Paired with B22
		E40	Nov-09	Camp	A+B+E	Egg	
		E41	Nov-09	Camp	A+B+E	Empty nest	
		E42	Nov-09	Camp	A+B+E	Chick	
		E44	Nov-12	Camp	A+B+E	Chick	
		E45	Nov-11	Camp	A+B+E	Chick	
		E47	Nov-10	Camp	A+B+E	Chick	
		E48	Nov-09	Camp	A+B+E	Egg	
		E49	Nov-14	Camp	A+B+E	Failed nest	
		E50	Nov-09	Camp	A+B+E	Egg	Paired with A92
Loose bands found							
M	42242		Nov-11	Main Slope	M		Open/unused band on ground
O	25443		Nov-14	Camp	A+B+E		Closed band loose in nest
		B23	Nov-11	Camp	A+B+E		1/2 darvic on ground
		B52	Nov-11	Camp	A+B+E		1/2 darvic on ground

Salvin's Mollymawk recoveries							
O	32416		Nov-13	South Basin	F		Salvin's Mollymawk
O	33709		Nov-10	South Basin	F	Egg	Salvin's Mollymawk
		E30	Nov-09	Camp	A+B+E	Egg	Salvin's Mollymawk

Appendix 2. Details of study nests on Camp Flat and Slopes.

Nest no.	Breeding status	Bird 1	Bird 2	Notes
2				Nest gone
7				Nest gone
8	Failed	B67		
11	Egg	C48		
12	Empty			
14	Egg	B31	A48	
16	Chick	O33719		
17	Empty	A75		
18				Nest gone
19	Not used			Not used
20	Egg	Unbanded	Unbanded	
21				Nest gone
22	Egg	O32155		
23	Egg	Unbanded	Unbanded	
24	Egg	33708	Unbanded	
25				Nest gone
26				Nest gone
27	Egg	E18	Unbanded	
28	Not used			Not used
29	Egg	E20		
30	Egg	E19	C52	
31				Nest gone
34				Nest gone
35				Nest gone
36				Nest gone
37	Not used			Not used
38	Egg	O33905	B86	
40	Egg	Unbanded	B15	
41	Egg	E08	C84	
42				Nest gone
44				Nest gone
46				Nest gone
47				Nest gone
48				Nest gone
49				Nest gone
51	Chick	A68	A51	
52	Egg	O033844		
53	Egg	A92		
55	Chick	A66		
59				Nest gone
60	Egg	E05		
61	Egg	B93	C44	
62				Nest gone

63	Egg	C59	O33796	
65				Nest gone
66	Egg	Unbanded		
67	Egg	C27		
69	Egg	C53	B94	
70	Egg	Unbanded	E06	
71	Egg	O33883		
72				Nest gone
75				Nest gone
200				Nest gone
201	Chick	B85	Unbanded	
202	Failed			
203				Nest gone
204				Nest gone
205	Failed	A14		
206	Egg	M42255	A16	
207	Chick	A15	E45	
209				Nest gone
211	Egg and chick	C79	E29	Chick hatched 10/11
212	Chick	Unbanded		
213	Egg	C05	Unbanded	
215	Egg	Unbanded	Unbanded	
216	Egg	C06	Unbanded	
217	Egg	Unbanded	E14	
218	Egg	C75	B46	
219	Empty	C08	B95	
220	Egg	Unbanded	Unbanded	
221	Egg	Unbanded		
223				Nest gone
225				Nest gone
227	Egg	Unbanded		
242	Empty	Unbanded		
245				Nest gone
246				Nest gone
247				Nest gone
248	Empty	B04		
249				Nest gone
250	Egg	B45	Unbanded	
251	Egg	Unbanded	E22	
255		A30		Nest gone
256				Nest gone
257				Nest gone
258	Egg	Unbanded	Unbanded	
262	Egg	A34	Unbanded	
266	Egg	B49	O33621	
268	Egg	Unbanded		

269	Egg	C61	E17	
270	Egg	E33	Unbanded	
271				Nest gone
272	Failed	Unbanded	Unbanded	
273	Egg	C07		
277	Chick	B13	E44	
280				Nest gone
281				Nest gone
283	Failed			
285	Not used			Not used
289				Tag loose on slope
290	Egg	C82		
295	Egg	Unbanded		
301	Egg	E48	Unbanded	
303	Not used	O33911	Unbanded	Band so opened it was removed
305	Egg	Unbanded	Unbanded	
306	Egg	E32	C63	
351				Nest gone
353	Empty			
354	Egg	A97		
355	Egg	Unbanded		
Green 2	Egg	C98	C88	Chick hatched 10/11
Red 3	Egg	Unbanded	Unbanded	Chick hatched 10/11
Green 5	Egg	E12		
Green 19				Nest gone
Green 16	Egg	O33822	O25144	
Red 7	Egg	Unbanded		
Red 9	Egg	Unbanded		
Green 18	Empty			
Red 10	Egg	C89		
Red 11	Empty			
Green 4	Egg	Unbanded		
Green 1	Egg	E04	Unbanded	
Green 13	Egg	Unbanded	B26	