*Notornis, 2010, Vol. 57: 156-161*
0029-4470 

SHORT NOTE

# Changes in abundance of parea (Chatham Islands pigeon, *Hemiphaga chathamensis*), 1994-2009

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The parea or Chatham Islands pigeon (*Hemiphaga chathamensis*) is a large fruit pigeon (Millener & Powlesland 2001) endemic to the Chatham Is. Subfossil bone deposits indicate that parea were common and probably widespread throughout the Chatham Is prior to the arrival of people (Atkinson & Millener 1991). It was still common on Chatham, Pitt and Mangere Is during 1871–72 (Travers & Travers 1872). However, surveys for the species in the 1970's and 80's indicated that during the previous 100 years its numbers and distribution had declined dramatically. The main causes of the decline during this period were probably a combination of loss of forest habitat (clearing of forest for pastoral farms), hunting by people, predation by introduced pests (feral cat (*Felis catus*), brushtail possum (*Trichosurus vulpecula*), ship rat (*Rattus rattus*) and buff weka (*Gallirallus australis hectori*) (Innes *et al*. 2010)), and habitat degradation by introduced mammals (possum, rats (3 *Rattus* species), feral sheep (*Ovis aries*), feral cattle (*Bos taurus*) and feral pig (*Sus scrofa*)).

The parea population was estimated at just 40-45 individuals in 1989 (Grant 1990), and concern was expressed for the long-term survival of the species (Grant 1990; Pearson & Climo 1993). This was because parea were considered to be vulnerable to several introduced mammalian species, including feral cats (which take kereru (*H. novaeseelandiae*) nestlings, fledglings and adults), possums (which take kereru eggs and nestlings) and rats (which take kereru eggs and nestlings) (Innes *et al*. 2010). Feral cat, possum and rat populations in parea habitat have been controlled to varying extents since 1987, using a variety of techniques, mainly as part of taiko conservation efforts (Grant *et al*. 1997; Imber *et al*. 1994; Tuanui & Tuanui 2009; Wahlberg 2009a; Wahlberg 2009b). In addition, the population of the

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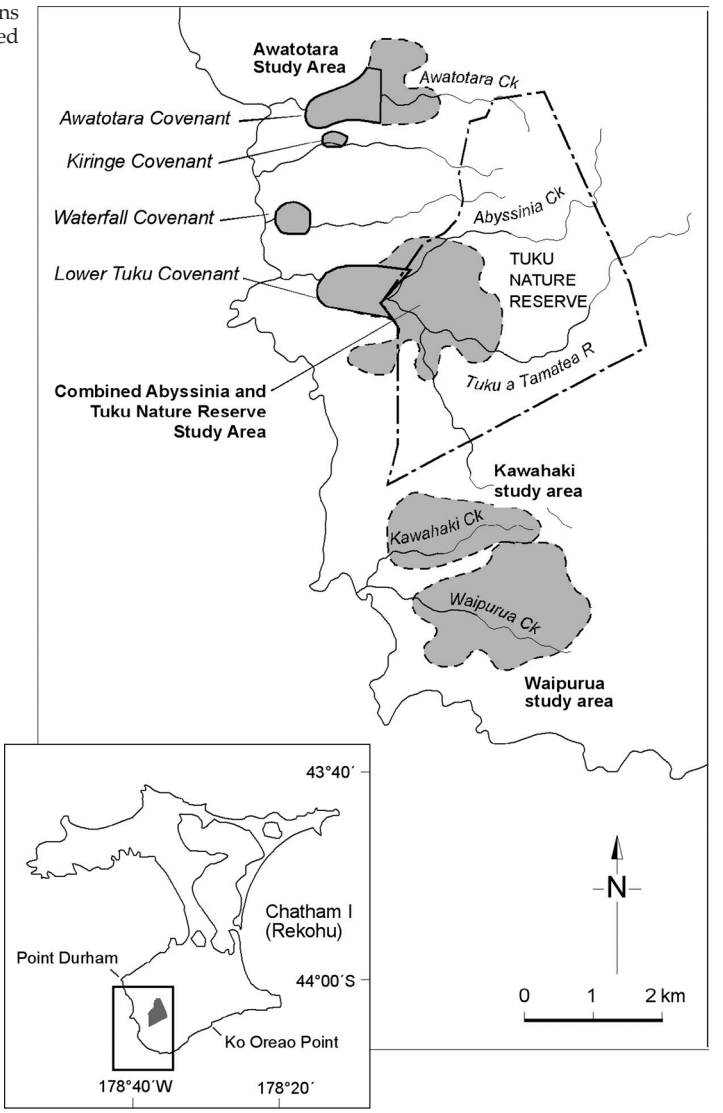


**Fig. 1.** Southwest Chatham I showing locations of places, study areas and covenants mentioned in the text.

introduced buff weka, a likely predator of ground-nesting parea eggs and nestlings (Flux *et al*. 2001), was also markedly reduced as a result of by-kill by the pest control efforts. During 1991–94, parea numbers increased 3-fold, which was attributed to the trapping and poisoning of pest mammals since 1987 (Grant *et al*. 1997). Since 1994, surveys at 4–6 year intervals have been carried out to ascertain whether management actions, such as pest control, have continued to benefit the parea population. This note reports on the findings from the population surveys carried out in 1992, 1994, 1999, 2005 and 2009. The objective of the surveys was to count the number of parea territories and territorial adults in 8 study areas of southwest Chatham I to determine a population trend.

The 8 study areas were Awatotara Covenant, Kiringe Covenant, Waterfall Covenant, Tuku Covenant, Abyssinia, Tuku Nature Reserve, and catchments of the Kawhaki and Waipurua Creeks (Fig. 1, Table 1). The 2 study areas referred to as Abyssinia and Tuku Nature Reserve, with a combined area of about 120 ha, are a small portion of the entire Tuku Nature Reserve (1239 ha) (Fig. 1). Fencing of this reserve to exclude both farmed and feral stock has been carried out in stages: the western fence in 1983 and the eastern in 1999. The southern fence has yet to be completed (E. & B. Tuanui, *pers. comm*.). The Tuku (52 ha) and Awatotara Covenants (70 ha) were fenced in 1992, and the Kiringe (8.5 ha) and Waterfall Covenants (14.5 ha) in 1999 (E. & B. Tuanui, *pers. comm*.).

**Table 1.** Counts of parea and territories (in brackets) in 8 study areas along the southwest of Chatham I during five surveys.

| Month/Year of surveys | Northern study areas - fenced and pests controlled to some degree | | | | | | | Southern study areas - no pest control | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Awatotara Covenant | Kiringe Covenant | Waterfall Covenant | Tuku Covenant | Abyssinia | Tuku Nature Reserve | Total | Kawhaki | Waipurua | Total |
| Aug 1992 | 8 | 0 | 0 | 10 | 15 | 15 | 48 | 2 | 0 | 2 |
| Aug 1994 | 11 | 2 | 0 | 25 | 24 | 14 | 76 | 1 | 5 | 6 |
| Aug 1999 | 10 (5) | 2 (2) | 0 | 32 (16) | 22 (12) | 17 (10) | 83 (45) | 0 | 2 | 2 |
| Jul 2005 | 28 (15) | 12 (6) | 2 (1) | 29 (16) | 46 (26) | 24 (12) | 141 (76) | NC[1] | NC | - |
| Jul-Aug 2009 | 45 (27) | 24 (15) | 2 (1) | 59 (34) | 67 (40) | 37 (25) | 234 (142) | 6 (4) | 23 (13) | 29 (17) |

[1]NC = no count

Parea are most readily surveyed at the start of a nesting season (Jun–Aug) (Powlesland *et al*. 1997) when each pair defends a nesting territory, and in so doing are fairly sedentary and conspicuous (spending much time perched on prominent branches above the canopy). Territorial birds, especially males, chase away interlopers, are occasionally involved in fights with neighbours along territorial boundaries, and often give conspicuous display flights when flying about their territories and in response to other parea flying over their territories (Mander *et al*. 1998). The nesting of parea is mediated by the availability of ripe hoho (*Pseudopanax chathamicus*) fruit, with fewer pairs nesting in years when little fruit is available (Flux *et al*. 2001). Thus, observations of hoho fruit abundance by Department of Conservation Chatham Islands Area Office staff and Liz and Bruce Tuanui were used to determine in which years surveys were carried out.

The method used during each survey was the same (Grant *et al*. 1997; Powlesland *et al*. 1999; Adams *et al*. 2005). Observers in contact by 2-way radios were located on vantage points (hill- or ridge-tops) about a section of valley for about 3 hours in the morning (08:30 – 11:30) or afternoon (14:00 – 17:00) when incubating pairs were likely to swap duties at their nests (Flux *et al*. 2001). Observers communicated with each other to identify territory locations and the minimum number of parea seen in each. One monitoring session was carried out per survey for each section of a study area. However, if observers were unsure of the number of territories or parea present after a session, then the observations were repeated. We are confident that we were able to obtain a reasonably accurate count of the number of territories in each study area because of the conspicuous activities of the breeding parea, and because ridges about and through study areas provided excellent viewing into valleys where they bred. In comparison, areas of relatively flat or rolling forested habitat elsewhere on Chatham I would not be suitable for the use of this survey technique. It was not evident during our surveys that non-breeders were present and moving about the study areas. No doubt they were present in the population, such as subadult males less than 2 years old (Flux *et al*. 2001), but we suspect that most, if not all, were evicted from the study areas into non-breeding habitat (poorer quality) because of the apparent intense competition among breeders for suitable habitat in which to breed.

The total number of parea territories in the 6 northern study areas from Awatotara Covenant to the Tuku Nature Reserve increased from 45 in 1999 to 76 in 2005 (69% increase, 5.2 territories year$^{-1}$), and to 142 in 2009 (87% increase, 16.5 territories year$^{-1}$) (Table 1). From 1999 to 2005, the Abyssinia

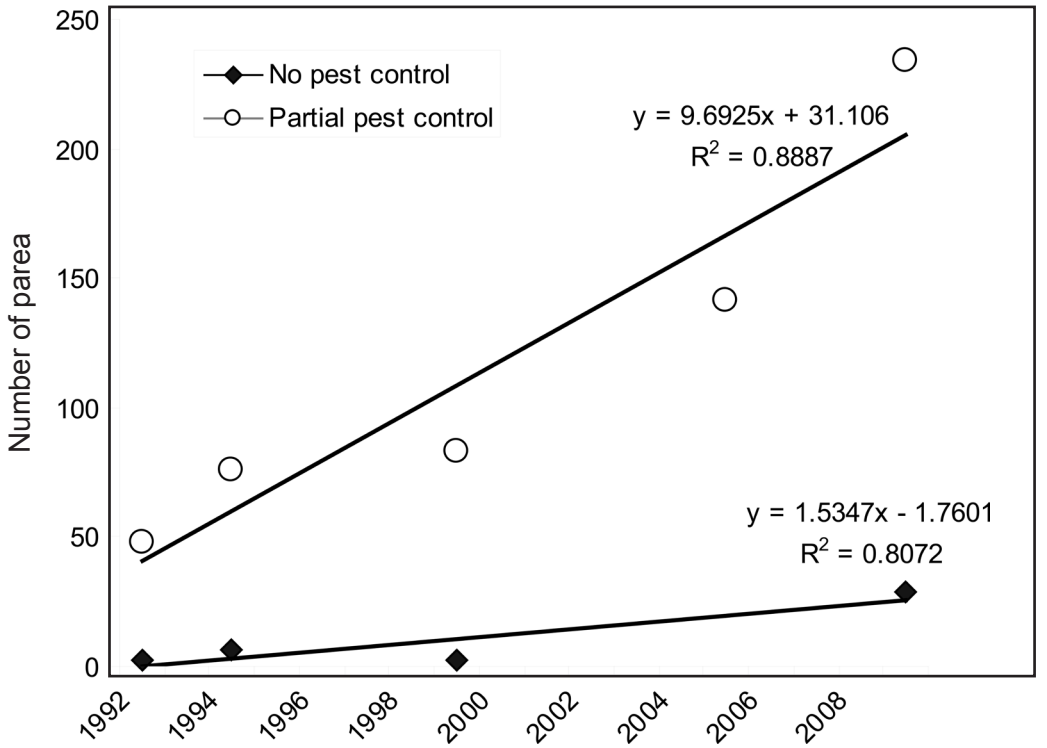


**Fig. 2.** Total number of parea counted during each survey in the northern study areas (Awatotara, Kiringe, Waterfall, Abyssinia and Tuku - partial pest control) and southern study areas (Kawahaki and Waipurua - no pest control) of southwest Chatham I.

and Awatotara areas had the greatest increases in numbers of territories year$^{-1}$, 2.3 and 1.7, respectively. During the subsequent 4 years (2006–2009), the study areas (except for Waterfall Covenant) had similar mean increases in numbers of territories per year: 3.0 to 4.5; the greatest increase was recorded in the Tuku Covenant.

For the period 1999 to 2009, the number of territories occupied by parea in the northern study areas increased from 45 to 142 (mean = 9.7 year$^{-1}$) (Table 1). By comparison, the increase in the 2 southern study areas increased from *c.* 2 to 17 (mean = 1.5 year$^{-1}$).

During the 2005 and 2009 surveys, some parea did not remain in their territories throughout the day. While we did not keep detailed records of individual movements, parea were regularly seen during both morning and afternoon sessions flying inland, presumably to feed, even though their territories contained fruiting hoho trees. A few parea were observed feeding on fruit of pouteretere (*Leptecophylla robusta*) outside the study areas. In addition, parea were seen flying inland to tarahinau (*Dracophyllum arboreum*) dominated forest that included scattered fruiting hoho trees. These movements suggest that while territories provided suitable habitat for nesting, not all provided sufficient food to meet each pair's requirements.

During the 2009 survey, 234 parea were counted in the northern study areas (265 ha) (Table 1), giving a density of 88 birds per 100 ha. By comparison, in the southern study areas, the tally was 29 parea, or 7 per 100 ha. The mean increase in parea numbers year$^{-1}$ between surveys in the northern study areas has varied considerably: from 1.4 (1994–1999) to 23.3 (2005–2009). During 1999–2009, the mean increase in the northern study areas was 9.7 parea year$^{-1}$ compared with 2.7 year$^{-1}$ in the southern study areas. Overall (1992–2009), the parea population in the northern study areas under partial pest control has increased at a greater rate than that in the southern study areas with no pest control (Fig. 2).

From 2005 to 2009, parea numbers increased in all the northern study areas, except for Waterfall where the tally remained at 2. Increases ranged from 46% in Abyssinia to 103% in the Tuku Covenant (Table 1). Overall, there was a marked increase in parea numbers (66%) between the 2005 and 2009 surveys in the Awatotara to Tuku Nature Reserve study areas. This is similar to the 58% increase from 1992 to 1994, and the 70% increase from 1999 to 2005, but

is much greater than the 9% increase from 1994 to 1999. In comparison, parea numbers in the southern study areas remained low and fairly static during 1992–1999, but increased moderately between 1999 and 2009, especially in the Waipurua (Table 1).

To obtain an estimate of parea numbers in southwest Chatham I, we extrapolated the density recorded for the Kawhaki and Waipurua study areas during the 2009 survey (*c*. 7 parea per 100 ha) to the total area of forest habitat (evident on the 1981 NZMS 260 topographic map of Chatham I) in the southwest that was not surveyed. This provides a conservative estimate of parea numbers because although there has been no pest control in the southern study areas, some areas of the Tuku Nature Reserve beyond where we surveyed have received significant pest control. We estimate that there is about 5000 ha of forest habitat south of Point Durham and west of Ko Oreao Point (Fig. 1) that we did not survey for parea. Using the 7 parea per 100 ha value provides an estimate of 350 birds for the area. Therefore, together with the 263 parea counted in the six northern study areas (Table 1), this gives a minimum tally of over 600 parea in southwest Chatham I. In addition, members of the public and Department of Conservation staff regularly observe a few parea each year in forest fragments elsewhere on Chatham I (D. Houston, *pers. comm*.).

Our observations do not amount to a census of parea in each study area because some birds on nests would have gone undetected. Determining when a bird movement is a changeover at a nest can be difficult unless a vantage point provides an unobstructed view of where a bird enters vegetation to its nest and its mate is seen to exit soon after. Thus, for example, the figure of 45 birds determined for the Awatotara Covenant (Table 1) involved 18 pairs and 9 singles. What proportion of the singles were actually pairs is unknown, but it does mean that the figures given in Table 1 are a conservative estimate of the number of parea that were present.

Our estimate of more than 600 parea in southwest Chatham I should be used with caution. The 2009 survey covered just 665 ha of an estimated 5665 ha of potentially suitable forest habitat for parea in the region. Much of the 1119 ha of the Tuku Nature Reserve that we did not survey is regularly traversed by Department of Conservation staff involved in taiko conservation activities. Their impression is that parea are widely dispersed through the reserve (J. Clarkson, *pers. comm*.). However, this still leaves 3881 ha or nearly 70% of potential parea habitat that was not surveyed for the species.

The continued increase in parea numbers suggests that management of the forest habitat, both by the Department of Conservation (Tuku Nature Reserve) and Chatham Islands Taiko Trust (covenants), continues to benefit the parea. The control of populations of introduced pests (feral cats, possums, rats) as well as reducing the incidence of parea predation, also benefits forest regeneration and fruit availability (reduced incidence of possum and rat foraging on seedlings, flower buds, flowers and fruit). In addition, the fencing of covenants and reserves, excluding feral and farmed stock, has resulted in the regeneration of several tree species (e.g. hoho and mahoe (*Melicytus chathamicus*)) as an understorey layer, making the forest more suitable as parea habitat.

Given the lack of pest control in the southern study areas, we assume the increase in numbers of parea there between the 1999 and 2009 surveys resulted mainly from immigration of parea from catchments to the north where parea densities were much greater. The distance from our study area in the Tuku-a-tamatea River catchment south to the Kawhaki and Waipurua study areas is only 3–4 km, and 1 parea radio-tagged as a nestling in the Tuku Covenant dispersed to and bred in the Kawhaki study area (Flux *et al*. 2001).

Because the total parea population in 2009 was estimated at more than 600 birds, the threat status of this species is likely to change when next assessed. The tally (250–1000 mature individuals), and that the population has increased by > 10% in the past 10 years, is likely to result in the threat ranking of the parea changing from 'nationally critical' to 'nationally vulnerable' (Miskelly *et al*. 2008).

Parea occasionally nest on the ground (Flux *et al*. 2001), and spend much time foraging on the ground in some seasons (Powlesland *et al*. 1997). As a result, all life stages of the species continue to be vulnerable to predation by introduced predators, particularly feral cats, possums, ship rats and weka. Therefore, on-going pest control in the Awatotara, Kiringe and Tuku Covenants and some of the Tuku Nature Reserve, where many parea occur, continues to be important. In addition, now that there are several hundred parea present, consideration should be given to the establishment of a second population to alleviate the biosecurity (e.g. disease) and stochastic (e.g. fire) risks of having all birds on Chatham I.

**ACKNOWLEDGEMENTS**

Our thanks to Liz and Bruce Tuanui, Ron Seymour and Robert Holmes for access about their properties and covenants to carry out this survey, to Abby Biltcliff and Nick Cameron of the Chatham Island Area Office, Department of Conservation, for assistance in the field, to Jim Clarkson and Ken Hunt of the Chatham Island Area Office, Department of Conservation, for logistical support, to Don Franklin, Colin Miskelly and Colin O'Donnell for constructive comments on drafts of the manuscript, Colin O'Donnell for statistical assistance, and to Lynette Clelland for editorial improvements.

**LITERATURE CITED**

Adams, L.; Fastier, D.; Aikman, H. 2005. *Parea survey, south Chatham Islands, July – August 2005.* Unpubl. report. Wellington: Department of Conservation. 14 p.

Atkinson, I.A.E.; Millener, P.R. 1991. An ornithological glimpse into New Zealand's pre-human past. *Acta XX Congressus Internationalis Ornithologici*: 127-192.

Flux, I.A.; Powlesland, R.G.; Dilks, P.J.; Grant, A.D. 2001. Breeding, survival, and recruitment of Chatham Island pigeon (*Hemiphaga chathamensis*). *Notornis 48*: 197-206.

Grant, A. 1990. *Chatham Island pigeon: recovery plan 1990-1996 (draft)*. Unpubl. report. Christchurch: Department of Conservation.

Grant, A.D.; Powlesland, R.G.; Dilks, P.J.; Flux, I.A.; Tisdall, C.J. 1997. Mortality, distribution, numbers and conservation of the Chatham Island pigeon (*Hemiphaga novaeseelandiae chathamensis*). *Notornis 44*: 65-77.

Imber, M.J.; Taylor, G.A.; Grant, A.D.; Munn, A. 1994. Chatham Island taiko *Pterodroma magentae* management and research, 1987-1993: predator control, productivity, and breeding biology. *Notornis (supplement) 41*: 61-68.

Innes, J.; Kelly, D.; Overton, J.M.; Gillies, C. 2010. Predation and other factors currently limiting New Zealand forest birds. *New Zealand Journal of Ecology 34*: 86-114.

Mander, C.; Hay, R.; Powlesland, R. 1998. Monitoring and management of kereru (*Hemiphaga novaeseelandiae*). Department of Conservation Technical Series No. 15. Wellington: Department of Conservation. 44 p.

Millener, P.R.; Powlesland, R.G. 2001. The Chatham Islands pigeon (Parea) deserves full species status; *Hemiphaga chathamensis* (Rothschild, 1891); Aves: Columbidae. *Journal of the Royal Society of New Zealand 31*: 365-383.

Miskelly, C.M.; Dowding, J.E.; Elliott, G.P.; Hitchmough, R.A.; Powlesland, R.G.; Robertson, H.A.; Sagar, P.M.; Scofield, R.P.; Taylor, G.A. 2008. Conservation status of New Zealand birds, 2008. *Notornis 55*: 117-135.

Pearson, P.E.; Climo, G.C. 1993. Habitat use by Chatham Island pigeons. *Notornis 40*: 45-54.

Powlesland, R.G; Dilks, P.J.; Flux, I.A.; Grant, A.D.; Tisdall, C.J. 1997. Impact of food abundance, diet and food quality on the breeding of the fruit pigeon, parea *Hemiphaga novaeseelandiae chathamensis*, on Chatham Island, New Zealand. *Ibis 139*: 353-365.

Powlesland, R.; Grant, A.; Aikman, H.; Ogle, M. 1999. *Report of July-August 1999 parea census, southern Chatham Island.* Unpubl. report, file SIN 2250. Wellington: Department of Conservation. 18 p.

Travers, H.H.; Travers, W.T.L. 1872. On the birds of the Chatham Islands. *Transactions and Proceedings of the New Zealand Institute 5*: 212-222.

Tuanui, B.; Tuanui, L. 2009. *Tuku predator control biodiversity funding programme, 2008 – 2009.* Unpubl. report. Chatham Island: Tuku Farm. 30 p.

Wahlberg, E. 2009a. *Tuku Nature Reserve cat control for protection of Chatham Island taiko, 2008/09 season.* Unpubl. report. Chatham Island: Department of Conservation. 14 p.

Wahlberg, E. 2009b. *Tuku Nature Reserve rat control for protection of Chatham Island taiko, 2008/09 season.* Unpubl. report. Chatham Island: Department of Conservation. 6 p.

**Keywords:** parea; Chatham Islands pigeon; *Hemiphaga chathamensis*; survey; population increase; predator control