Chatham Island oystercatcher (*Haematopus chathamensis*) management techniques

Guidelines for protecting nests and increasing their productivity

Peter J. Moore

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ABSTRACT

The Chatham Island oystercatcher (*Haematopus chathamensis*; torea) is an endangered species ranked by the New Zealand Department of Conservation as 'Nationally Critical', making it a very high priority for conservation management. The goal of the species' recovery plan is to improve productivity and adult survivorship, and to increase the total population to > 250 individuals, thus reducing its chance of extinction and its threat ranking. This report outlines the management techniques used in 1998–2004 to boost oystercatcher productivity. From 1998 to 2004, 16 km of shoreline in northern Chatham Island (Wharekauri and Maunganui) was managed using a combination of three general techniques: predator control, stock exclusion, and movement or raising of nests away from high tide. This three-pronged attack was considered the 'best practice' set of actions that would boost oystercatcher productivity and was a major success. Whereas productivity is usually low on average (0.35 chicks per pair), intensive management resulted in much higher breeding success (1.04 chicks per pair; range = 0.5–1.6). Birds that were reared in managed areas bred at 2–5 years of age, subdivided previously large territories and spread along previously unoccupied shoreline, particularly in northern Chatham Island. Survival of adults (98%) and juveniles (89%) was also higher in the managed zones. In 7 years, the total population increased from 144 to 316 birds, and the number of breeding pairs increased from 49 to 89 as a result of young birds recruiting into the population. The techniques outlined in this report should be of use to future managers of this endangered population of birds.

Keywords: Chatham Island oystercatcher, *Haematopus chathamensis*, torea, management techniques

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1. Introduction

1.1 CONSERVATION STATUS

The Chatham Island oystercatcher (*Haematopus chathamensis*; torea) is an endangered species that is at high risk of extinction due to its very small population size (IUCN 2006; BirdLife International 2009). The species is ranked as 'Nationally Critical' by the New Zealand Department of Conservation (DOC), making it a very high priority for conservation management (Molloy et al. 2002; Hitchmough et al. 2007).

1.2 OYSTERCATCHER ECOLOGY

The Chatham Island oystercatcher is found on the coasts of islands in the Chatham Islands group (Chatham Island (Rekohu), Pitt Island (Rangiauria), Rangatira (South East Island) and Mangere Island; Fig. 1), but also visits the lagoons and ponds of Chatham Island and farmland near the coasts. Birds feed in the tidal zone on molluscs, worms and other invertebrates by probing, picking, chiselling or hammering with the bill. Breeding pairs vigorously defend their territories from neighbouring oystercatchers using loud, shrill, piping calls and displays.

Birds start breeding at 2–6 years of age and generally form long-term partnerships, although they readily take a new partner if the old one dies.

The breeding season is from October to February. Nests are simple scrapes in the sand (Fig. 2) or shingle amongst tidal debris above the high-tide mark or in depressions on rocks. Birds usually nest where they have a good view of their territory but occasionally nest in open or sparsely vegetated sites behind the foredunes.

Birds lay 1–3 well camouflaged eggs (Fig. 2) and temporarily leave the nest at any sign of danger. The earliest clutches are laid about 20 October, but some pairs lay in November to mid-December. If nests are destroyed by predators or the sea, the birds readily lay a new clutch after 8–10 days, and may make up to four breeding attempts in a single season—the latest re-laying occurs in early February, after which birds give up for the year. Eggs hatch after 29 days. The chicks leave the nest in the first 1–2 days but stay with their parents for at least 6 weeks. When disturbed, the chicks hide in rock crevices or tidal debris (Fig. 3), relying on their excellent camouflage and lack of movement to avoid detection by visual predators such as birds (e.g. gulls, skuas, hawks). Once they can fly (usually in February–March), the juveniles may become independent; however, some remain with their parents for several months.

Juveniles and adults have high rates of survival and are long-lived. The oldest banded bird was at least 30 years old when it died (banded as a breeding adult in 1970 and died in 1998). Another bird banded as a chick in 1977 was still alive in 2006, 29 years later.

Figure 1. Chatham Island oystercatcher (*Haematopus chathamensis*) management areas and core census zones, 1998–2006.

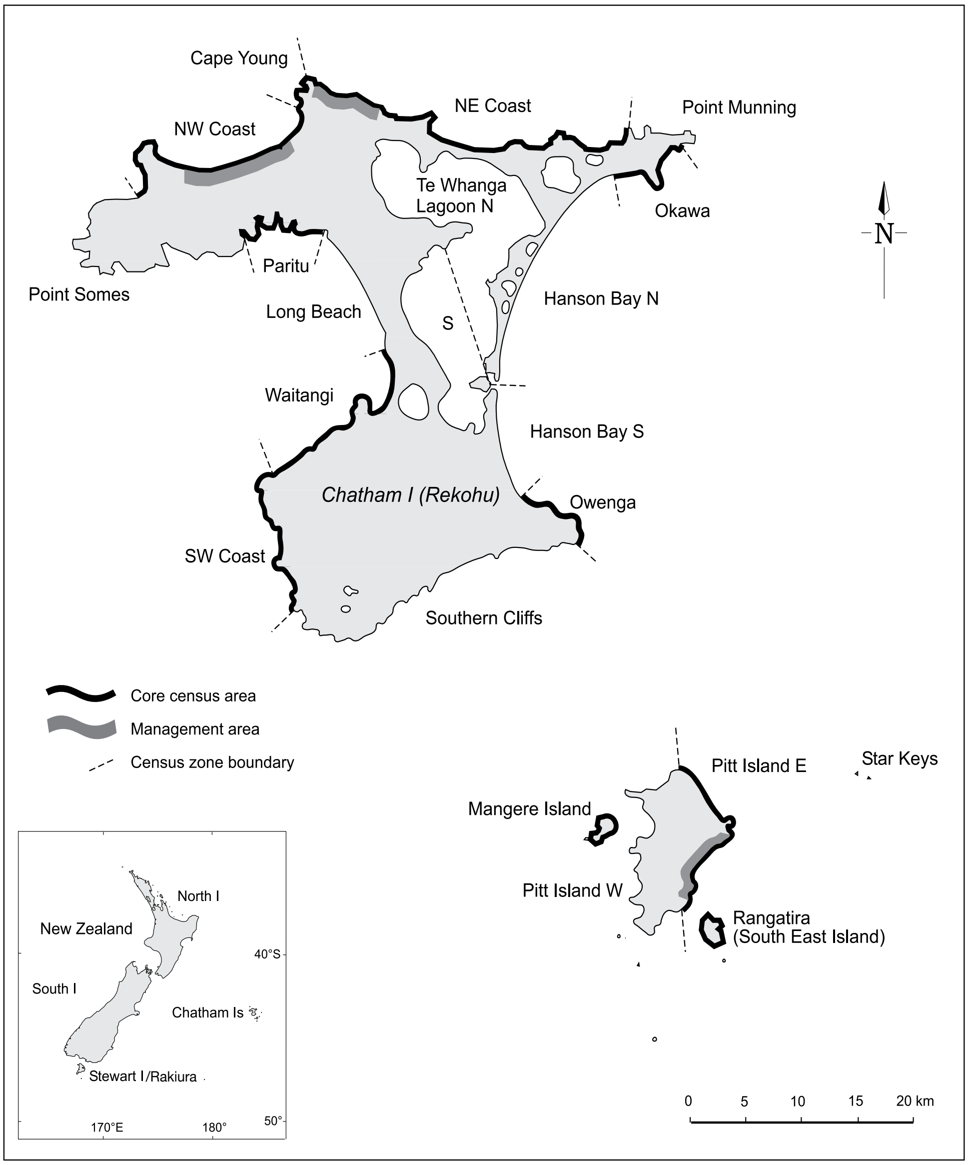

Figure 2. A Chatham Island oystercatcher (*Haematopus chathamensis*) nest on a sandy beach, with a simple scrape in the sand and a small amount of shelter from tidal debris (driftwood and seaweed). *Photo: Rex Williams.*

Figure 3. Chatham Island oystercatcher (*Haematopus chathamensis*) chicks hiding amongst tidal debris. *Photo: Peter Moore.*

1.3 THREATS

Low productivity is a key issue for the Chatham Island oystercatcher population. Predation of eggs and chicks is a major factor, but in stormier years eggs are washed away by the sea before predators take them. Video monitoring of nests in 1999–2001 recorded 19 nest failures: 13 (76%) caused by cats (*Felis catus*), three by weka (*Gallirallus australis hectori*), which were introduced from mainland New Zealand, and one each by a red-billed gull (*Larus novaehollandiae scopulinus*), a sheep (*Ovis aries*), which trampled eggs, and the sea, which washed the eggs away (Moore et al. 2001; Moore 2008; Moore & Reid 2009).

1.3.1 Predators

Breeding success of Chatham Island oystercatchers is generally low in unmanaged areas on Chatham and Pitt Islands because of predation by introduced animals, especially cats (Fig. 4). Cats take a high toll on eggs and chicks, but judging by the occasional corpse of adult oystercatchers, cats are a threat throughout the life cycle of oystercatchers.

Weka predation is opportunistic, occurring when eggs are left unattended, e.g. before incubation has got fully underway. Other opportunistic predators of eggs and chicks include red-billed gulls, dogs (*Canis lupus familiaris*), and probably harriers (*Circus approximans*), spur-winged plovers (*Vanellus miles*), possums (*Trichosurus vulpecula*) and pigs (*Sus scrofa*). The brown skua (*Catharacta skua lonnbergi*) is a predator on Rangatira, Mangere Island and, to a lesser extent, Pitt Island (Aikman et al. 2001). Predation by southern black-backed gulls (*L. dominicanus*) has been observed on Rangatira (Aikman et al. 2001) and is suspected elsewhere.

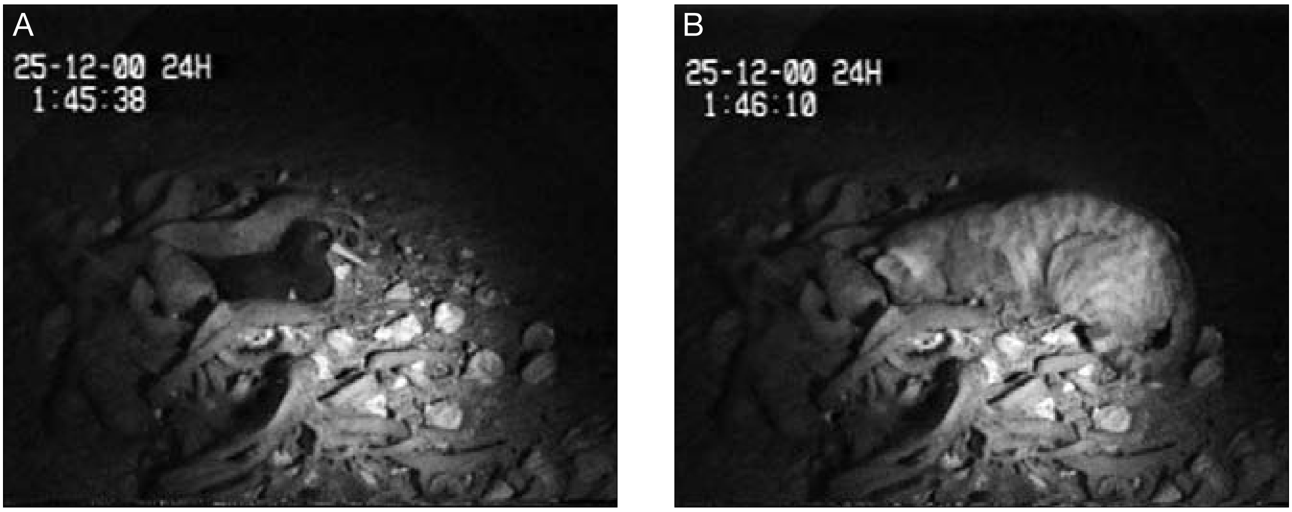

Figure 4. An adult Chatham Island oystercatcher (*Haematopus chathamensis*) incubating its nest at night and photographed by time-lapse video camera (A), shortly before a cat (*Felis catus*) arrives and eats the eggs (B). *Photos: Peter Moore.*

1.3.2 Trampling and disturbance

Sheep (Fig. 5), cattle (*Bos taurus*), vehicles and people crush eggs or chicks. They also disturb the adults, causing them to leave the nest, which can result in the loss of eggs due to other factors, such as predation.

Figure 5. A nesting Chatham Island oystercatcher (*Haematopus chathamensis*) being harassed by sheep. *Photo: Peter Moore.*

1.3.3 Nesting habitat

Since Chatham Island oystercatchers nest on beaches amongst high-tide debris, high seas and storms can wash nests away. This is particularly a problem in stormy years or in areas without safe nesting sites, and has been made worse by marram grass (*Ammophila arenaria*), which was introduced 100 years ago to stabilise dunes. The vigorous growth of marram has reduced the area of sparse vegetation on foredunes and has resulted in the formation of steep-fronted dunes with narrow beaches (Fig. 6). This leaves little space in which the oystercatchers can nest away from wave surges. Consequently, most birds nest on the remaining narrow beaches, where their eggs are prone to being washed away by storm seas (Davis 1988; Aikman et al. 2001; Schmechel 2001). In 1994–1997, 50% of egg losses were caused by the sea (Schmechel & Paterson 2005). Similarly, in stormy years between 1998 and 2004, 40–50% of egg losses were caused by the sea. This is likely to be an increasing phenomenon with climate change and the projected rise in sea levels.

Figure 6. Dense thickets of marram (*Ammophila arenaria*) on foredunes of northern Chatham Island. *Photo: Peter Moore.*

1.4 RECOVERY PLAN

The Chatham Island oystercatcher recovery plan 2001–2011 (Aikman et al. 2001) had two over-arching goals:

- **Ten-year goal**—Improve productivity and adult survivorship to increase the total population to > 250 individuals (to change its International Union for Conservation of Nature (IUCN) conservation ranking from Endangered to Vulnerable)
- **Long term goal**—Restore the natural coastal ecology so that minimal management is required to maintain a population of > 250 individuals

To achieve the 10-year goal, the aim was to improve average productivity from the unmanaged average of 0.34 chicks per pair per year to 1.0 chicks per pair per year through intensive management that combined three general techniques: predator control, stock exclusion and movement of nests away from high tide. The long-term goal will be partially achievable using dune restoration techniques, which will be the subject of a future report.

1.5 OBJECTIVES

With the aim of increasing the size of the oystercatcher population, 16 km of northern Chatham Island (Wharekauri and Maunganui) was managed and monitored from 1998 to 2004. A combination of three techniques was used: predator control, stock control and moving nests. This three-pronged attack for oystercatcher protection was considered by DOC managers to be the 'best practice' set of actions that would boost oystercatcher productivity.

To assist future managers, this report outlines the management techniques used in 1998–2004 and the net benefits and success of these. Years refer to breeding seasons, e.g. 1998 refers to the 1998/99 season. Figure 7 outlines the time line of management and monitoring actions in relation to the oystercatcher breeding season.

	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR
Stage of breeding season	Nest selection (scraping)		Eggs (first clutches and relaying)					
			Chicks					
						Juveniles		
Predator control	Trapping (daily check of traps)							
Stock control	Fix fences and gates	Put electric fences around nests						
Nest protection	Put out nest platforms; clear marram alcoves	Move nests from high tide					Collect nest platforms; spray marram alcoves	
Bird monitoring maximum	Daily checks of pairs and breeding success in managed areas; weekly–monthly checks in unmanaged areas							
				Census				
Monitoring minimum		Check breeding and territorial pairs		Check eggs & chicks		Final check of breeding success		

Figure 7. Time line of management and monitoring during the Chatham Island oystercatcher (*Haematopus chathamensis*) breeding season.

2. Predator control

2.1 AREAS

At Maunganui and Wharekauri, northern Chatham Island, trapping occurred annually from 1998 to 2004. In 2000, the trapping area used in 1998 and 1999 (Bell 1999; Moore et al. 2001) along 14 km of coast at Maunganui and Wharekauri was extended northeast of Tioriori to Tutuiri Creek, to protect about 16 km of coast and include some new territories (Appendix 1, Figs A1.1–A1.4). Initially, the trapping protected 16 oystercatcher territories, but by 2004 the population in the managed area had increased to 35 pairs.

In addition, partial seasons of predator control were conducted in other parts of northern Chatham Island (Paritu in 2002), southwest Chatham Island (Point Gap, Point Durham to Kauaeroa, and Kiringi Creek in 2001, 2003 and 2004) and Pitt Island (1999–2002).

Progress was reviewed in 2005. The main expansion of the oystercatcher population had occurred in northern Chatham Island, with minimal benefit to the southern range. Hence, it was recommended that management be rotated at 5-year intervals between northern Chatham Island, the southwest coast and eastern Pitt Island. Consequently, in 2005 the main trapping effort shifted to 8 km of coast on the east coast of Pitt Island, from North Head to Glory Bay South, to protect eight oystercatcher territories (Appendix 1, Figs A1.5 & A1.6).

2.2 TYPES OF TRAP

During 1998–2004, three types of traps were used to control predator numbers in oystercatcher territories on the Chatham Islands: leg-hold traps, wooden cage traps and metal cage traps. These trap types all needed to be checked daily.

During 2005–2007, trapping on Pitt Island used a combination of cages and *'Victor'* leg-hold traps. Trapping recommenced in 2007 at Wharekauri using a combination of *'Havahart'* cages, wooden cages and six *'Set-n-Forget'* (Pest-Tech Ltd, PO Box 40, Leeston, Canterbury, New Zealand) kill-traps in plywood boxes set at the marram edge.

Details of each of these trap types are provided below.

2.2.1 Leg-hold traps

'*Lanes-Ace*' leg-hold (gin) traps are spring-loaded serrated jaw traps. These were recessed in a wooden base and hidden with tissue paper covered by a thin layer of sand. Fish bait was hung on a nail (or sometimes in a mesh bait holder) on a wooden backing board behind the trap. Wire mesh walls were designed to prevent predators from reaching the bait from the side, forcing them to step on the hidden trap plate (Fig. 8).

Figure 8. A possum (*Trichosurus vulpecula*) caught by a leg-hold trap. *Photo: Peter Moore.*

Although gin traps are very effective at catching target animals when oiled and kept in good condition, there are two main disadvantages: they are less humane than other traps and non-target animals (including oystercatchers, penguins and harriers) can also be injured. The use of these traps is no longer considered acceptable because the serrated jaws often break the legs of a captured animal and up to 24 hours may elapse before the trap is checked. Two oystercatchers were injured by gin traps in 1999–2004 and each had to have a leg amputated. The amount of bycatch can be mitigated to some extent by placing driftwood in front of traps; however, trappers are generally reluctant to do this in case it decreases the chance that predators will approach the trap.

Long spring leg-hold traps such as gins have been phased out and are now restricted (Animal Welfare (Leg-hold Traps) Order 2007 pursuant to section 32 of the Animal Welfare Act 1999). An alternative leg-hold trap is the *'Victor'* soft jaw ('Oneida Victor® Soft Catch® 1½' leg-hold traps; Oneida Victor Inc. Ltd, PO Box 32398, Euclid, Ohio 44132, USA), which are used, for example, in walk-through sets in the Tuku (southwest Chatham Island) to catch cats for protection of the endangered taiko (*Pterodroma magentae*).

2.2.2 Wooden cage traps

Figure 9. A feral cat (*Felis catus*) caught in a wooden cage trap. *Photo: Peter Moore.*

A custom-made design of cage trap that was used consisted of a wooden frame, wire mesh walls and fibrolite trap-door (Fig. 9). A wire runs from a baited hook inside the cage along the roof to a hole in the trap-door, so that movement of the hook triggers the door to close. Cage traps such as these were used in the first few years of the trapping programme close to farm dwellings, so that pet cats could be released unharmed.

2.2.3 Metal cage traps

'*Havahart 1089*' (Havahart®, Woodstream Corp. 69 N. Locust St., Lititz, PA 17543, USA) is a cage trap made of stainless steel mesh with a door that is triggered by a foot treadle (Fig. 10). The treadle can easily be made inoperable by wind-blown sand, so many of the traps were modified to be triggered by a baited hook, similar to that described previously for the wooden cage. *'Cyclone'* metal traps (Fletcher Easysteel, 575 Great South Road, Private Bag 92803, Penrose, Auckland, New Zealand) were also used in the latter period of trapping (from 2004).

Figure 10. A weka (*Gallirallus australis hectori*) caught in a metal cage trap. *Photo: Peter Moore.*

Cage traps have the advantage of being effective at catching target animals and being humane. Setting the trap correctly and in a good location (see section 2.4) appeared to be more important than the type of trap used. Captured animals remained unharmed until the trap was checked, at which time they were dispatched by rifle-shot or a blow to the head (weka). Use of these traps also allowed the option of targeting cats and releasing weka (which was requested by landowners at Maunganui), and eliminated the bycatch of little blue penguins (*Eudyptula minor*) and harriers.

2.2.4 Kill-traps

Kill-traps can be checked less frequently, thus reducing labour costs. However, they do not allow the targeting of cats in preference to weka. Five types of kill-trap for cats have been approved for DOC use (Darren Peters, DOC, pers. comm.).

2.2.5 Trap efficiency

Trap efficiency, as measured by the capture index, was similar in 1998–2002 (5.5–7.5), but decreased to 3.2 in 2004 (Table 1; Fig. 11). The proportion of cage traps used also increased each year, but this does not explain the reduction in trap efficiency, as each trap type was similarly effective (Table 1). Rather, the decrease in efficiency was a result of an overall decrease in the number of animals caught in 2003 and 2004, particularly weka (Table 2; Fig. 12).

TABLE 1. TRAPPING STATISTICS AT MAUNGANUI/WHAREKAURI, NORTHERN CHATHAM ISLANDS, 1999–2004.

	1999	2000	2001	2002	2003	2004
Total no. traps	76	88	95	107	124	122
Trap nights	8864	13378	11408	12817	14200	11436
Trap index*	7.5	5.5	6.2	6.2	3.9	3.2
Total captures						
Leg-hold trap	64	62	42	44	29	23
Wooden cage trap	12	26	28	28	24	24
Metal cage trap (*Havahart*)	0	0	25	35	71	75

* Captures per 100 corrected trap nights.

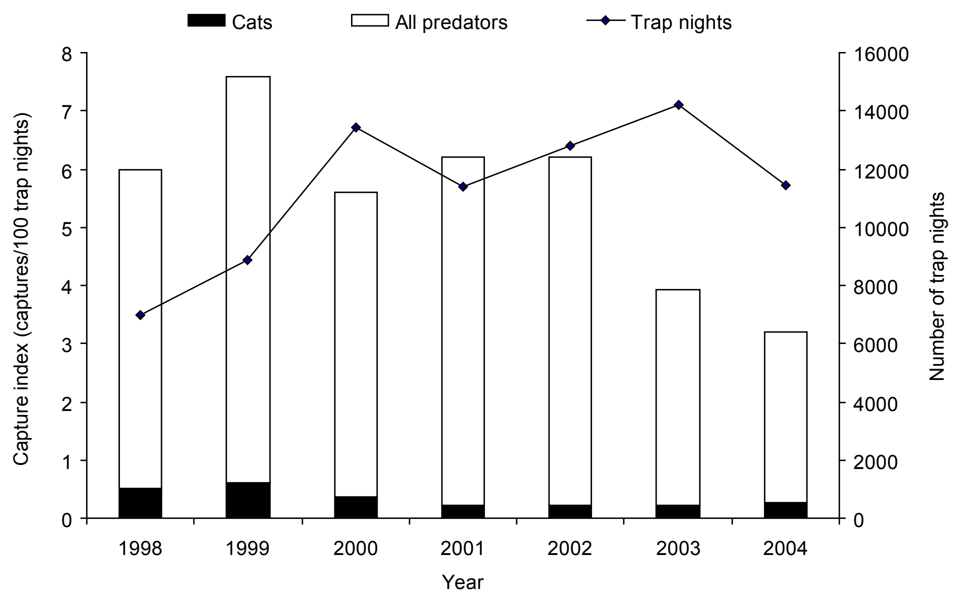

Figure 11. Total trap nights per year (line) and capture indices for cats and all predators (bars) in northern Chatham Island, 1998–2004.

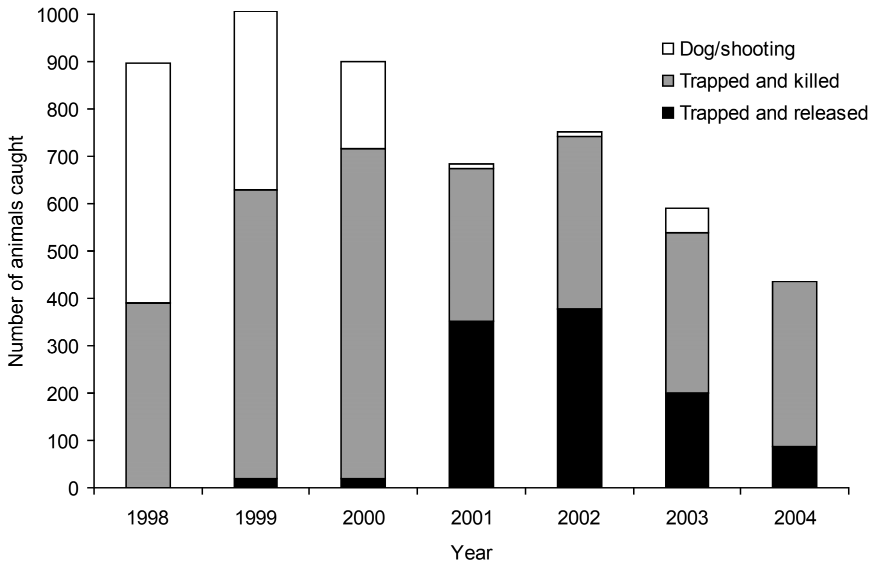

Figure 12. The number of animals killed by dog/shooting and killed or released by trapping in northern Chatham Island, 1998–2004.

TABLE 2. NUMBER OF PREDATORS CAPTURED/KILLED AT MAUNGANUI/ WHAREKAURI, NORTHERN CHATHAM ISLANDS, 1998–2004.

Data from trapping, hunting by dog and shooting are combined.

	1998	1999	2000	2001	2002	2003	2004
Cat	47	51	46	27	26	29	31
Weka	654	719	495	560[a]	660[b]	428[c]	261[d]
Possum	133	61	68	8	16	9	15
Rat	?	44	71	39	21	34	19
Hedgehog	39	41	56	19	11	15	16
Gull	23	53	116	2	11	58	4
Bycatch	?	33	47	29	18	17	12

[a] 327 of the weka were released alive (148 banded birds were recaptured and 30 were subsequently killed in leg-hold traps).

[b] 362 released alive.

[c] 188 released alive.

[d] 78 released alive.

2.3 BAIT

In 1998–2004, fish was used as bait for predators such as cats and weka on the Chatham Islands. Boxes of mackerel were kept in a freezer at Wharekauri farm and chunks were taken during each trapping round to replenish any bait that was missing. Depending on the weather conditions, all bait was replaced every 2–3 days.

2.4 TRAP LOCATION

Most traps were set at the beach/dune edge, but some were also set behind the main dune and, in a few cases, on the edges of small patches of forest close to the beach.

For optimal results, traps should cover as much coastline as possible, with a higher concentration of traps in the oystercatcher territories or areas where predator tracks have been noted. The underlying principles for trap location were:

- The beach front, streams, tracks and fence-lines would act as highways for prospecting predators
- Traps set at the beach edge in oystercatcher territories would protect nests from predation
- Predator tracks would be visible in the sand and allow trappers to target hot-spots by placing new traps or by shifting traps

Between 1998 and 2004, there was an increase in the number of traps (76 to 124) and trap nights (7000 to 14200) (Table 1; Fig. 11), to protect the expanding number of oystercatcher territories (Appendix 1, Figs A1.1–A1.4). On average, the number of traps per territory was 3.5–4.5 during the study period. Depending on the density of birds and likely predator pathways, traps were placed at 50–100-m intervals along the coast, with occasional gaps of 0.5–1 km where there were no oystercatcher territories (Appendix 1, Figs A1.2 & A1.4). Double rows of traps were placed at either end of the trapping lines, and at stream, track and fence-line access points to increase the chance of catching predators migrating into the managed area. These strategies were successful, as judged by the high level of nest and chick survival in managed areas compared with unmanaged areas.

2.5 TIMING

Trapping should commence in late September or early October and continue until late February (Fig. 7; Table 3). The early period of trapping is designed to remove the resident cats before the oystercatchers begin to lay their eggs (from about 20 October to mid-December). The ongoing trapping removes new cats that migrate into the area during the season, protecting the birds during the chick-rearing period as well as any replacement clutches laid later in the season (through to early February) following the loss of first eggs. Most juveniles are flying and relatively safe by late February, but birds that re-lay in January may still have small chicks at this stage.

TABLE 3. TIME LINE OF PREDATOR CONTROL TO PROTECT CHATHAM ISLAND OYSTERCATCHER (*Haematopus chathamensis*).

MONTH	DATE	MANAGEMENT ACTION
July		• Finalise trapping contractor or staff work programme • Liaise with landowners for access and other logistics • Outline plan of trap types at different locations • Arrange vehicle, trailer and quad motorbike • Arrange accommodation and transport from mainland New Zealand if necessary
Sept	15 Sept	• Set up trap line of numbered traps and begin trapping • Carry out additional hunting with dog if available and/or shooting for an initial knock-down of predators • Take GPS of trap locations, produce a map and record trap types
Sept–Feb		• One-person operation: 6 day per week trapping; backup person to run traps over Christmas period • Two-person operation: continuous trapping • Fill out daily trap sheets • Update trap locations if they are moved or removed • Enter catch data on computer
Feb	28 Feb	• Close trap line and remove traps
Mar		• Clean and store traps, oil leg-hold traps • Finalise computer data files
Apr		• Contractor or supervisor prepares summary report for Chatham Island Species Recovery Group • Provide feedback to landowners • Plan allocation of resources in following year • Arrange for any replacement traps and other gear

Short periods of trapping (e.g. over a few weeks or for part of a season) may partially protect oystercatcher areas. However, although this is an attractive option for managers with scarce resources, oystercatcher breeding success in areas with only partial management tends to be similar to that in areas with no management. For example, in seven seasons of intensive management at Maunganui/Wharekauri, the mean oystercatcher productivity was more than double that in areas with partial or no protection (see section 7). Hence, putting in half the effort yields poor returns.

2.6 INTENSITY

The ideal trapping regime is a continuous 7-day-per-week operation; hence, two people are required—or backup staff to cover the weekends. This occurred on northern Chatham Island for three seasons (1999–2001), when two contractors shared the responsibility for trapping and video monitoring of managed and unmanaged nests. The result was a mean oystercatcher productivity of 1.2 chicks per pair over the three seasons. The alternative regime is a 6-day-a-week operation run by one person, allowing traps to be operational (available for catching predators) for 5 days and nights per week; e.g. traps are set on Monday and closed on Saturday. This occurred for four seasons (1998 and 2002–2004), with periods of continuous operation when support staff were available. In those years combined, the mean productivity was 0.90 chicks per pair per year, although factors such as a high frequency of storm wash contributed to lower success than in the other 3 years.

2.7 OTHER PREDATOR CONTROL

To maximise the control of cats, a standard intensive trapping regime should be supplemented with other control methods, such as shooting and hunting with a trained dog. This occurred in northern Chatham Island in 1998 and 1999, and the early part of 2000 (Fig. 12). The total number of animals killed per year decreased after 1999 (Fig. 12), possibly as a result of the shift to using trapping as the predominant control method combined with a cumulative effect of the annual trapping and natural fluctuations in predator numbers.

2.8 RECORDS

Daily records should be kept of trap catch, sprung traps and bait loss (Appendix 2, section A2.1), and these should then be summarised on an Excel spreadsheet. A trap index is calculated for each trap or area, based on the number of animal captures and the number of nights (24-hour periods) the traps were open and available to catch animals (i.e. a correction is made for the number of nights where traps were closed or had caught an animal).

Predator control work can be combined with monitoring of oystercatcher breeding success, to allow the success of the protection to be gauged and the workers to feel more directly connected to the conservation of the bird.

2.9 RESULTS OF PREDATOR CONTROL

The predator control regime in 1998–2004 removed a variety of potential predators (Table 2). The number of cats caught was highest in 1998–2000 (46–51 per year), but decreased in 2001–2004 to 26–31 per year (Table 2). Up to 719 weka were killed each year (Moore et al. 2001; Table 2), but from 2001 onwards up to 58% of weka were released alive (at the request of the landowners), mostly from Maunganui. Weka captures decreased after 2002, presumably a result of a decrease in their population.

Video monitoring of nests in 1999–2001 found fewer nests were lost or impacted by predators at managed areas compared with unmanaged areas (Table 4; Moore & Reid 2009). The only predation observed on film at a managed area occurred when a red-billed gull (which was not a predator control target) ate the eggs at an island at Wharekauri. Some close calls did occur at managed nests that were filmed; for example, one visit by a cat and two visits by a possum—in all three cases the eggs were investigated by the animals but not eaten (Table 4). In comparison, 16 unmanaged nests failed because of predators, particularly cats, and there were another 13 close calls by predators that were observed on film visiting the nests (Table 4). In several cases the eggs were handled but not eaten (Moore & Reid 2009).

TABLE 4. NUMBER OF EVENTS THAT WERE FATAL TO CHATHAM ISLAND OYSTERCATCHER (*Haematopus chathamensis*) EGGS, OR HAD A HIGH RISK OF EGG LOSS, IN NORTHERN CHATHAM ISLANDS, 1999–2001.

Data from video of 21 nests in managed areas (422 nights) and 27 nests in unmanaged areas (332 nights).

		CAT	WEKA	GULL	POSSUM	STOCK	PEOPLE	SEA	OTHER	TOTAL
Managed	Fatal	0	0	1	0	0	0	1	0	2
	High risk	1	0	0	2	0	1	1	0	5
Unmanaged	Fatal	13	3	0	0	1	0	0	0	17
	High risk	4	4	0	5	32	1	3	4	53

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