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3. Stock exclusion

Stock exclusion fences prevent Chatham Island oystercatcher eggs and young chicks from being trampled by sheep and cattle. However, on much of the Chatham Island coastline, farm animals have unimpeded access to the beaches. A time line of stock control activities is provided in Fig. 7 and Table 5.

TABLE 5. TIME LINE OF STOCK CONTROL AND NEST PROTECTION OF CHATHAM ISLAND OYSTERCATCHER (*Haematopus chathamensis*).

MONTH	DATE	MANAGEMENT ACTION
July		• Finalise staff work programme • Liaise with landowners for access and to discuss fence repairs
Sept	1 Sept	• Depending on condition and inspections: —Repair fences and gates —Repair fence extensions (e.g. Tioriori tie-off) —Renew oystercatcher signs at access points • Clear marram alcoves by hand-pulling seedlings to create space for moving oystercatcher nests into • Place two car tyre nest platforms in selected managed oystercatcher territories
Oct–Jan		• Shift nests in vulnerable territories away from high tide • Place electric fences around nests where stock have access to beaches
Feb	Late Feb	• Spray marram alcoves ready for next season
Apr		• Prepare summary report for Chatham Island Species Recovery Group • Provide feedback to landowners • Plan allocation of resources in following year • Arrange for any replacement gear (new platforms, spray, etc.)

3.1 PERMANENT FENCES

Figure 13. A stock exclusion fence at Tioriori. *Photo: Peter Moore.*

Permanent fences that are parallel to the coastline (Fig. 13) offer varying levels of protection, depending on whether they simply serve to channel wandering stock onto the beach from neighbouring areas of farmland. For example, the fence along the Wharekauri coast (see fence-lines parallel to the coast in Appendix 1, Figs A1.3 & A1.4), which demarcates the 'marginal strip' of Crown land, keeps most stock out from adjacent farmland. Entry to the western end is limited by cliffs around Cape Young; however, sheep can enter the beach from the eastern Taupeka end where the fence ends (beyond trap 1 in Appendix 1, Fig. A1.4). Although incursions by sheep were frequent in some years between 1998 and 2004, the daily trapping round gave the opportunity to herd them back down the fence-line before they had progressed very far.

For permanent fences to be effective, gates must be secure, well-maintained and kept closed by visitors to the beach. Good relations with the landowners are essential, as they can keep an eye out for any problems, and oystercatcher conservation signs at beach access gates can help educate the public about appropriate behaviour.

Plastic mesh attached to the fence and gates (e.g. as used at Tioriori) is used to improve predator exclusion, particularly of weka. Outrigger electric wires also help to protect the fences from stock.

In areas without natural boundaries, such as headlands or cliffs, fence extensions (tie-offs) that run down the beach perpendicular to the coast are required to prevent stock from moving onto the beach. At Tioriori, a fence extension was built in the mid-1990s to prevent stock from entering an oystercatcher breeding area. The outer extension used steel posts concreted onto tidal rocks, heavy wire cables and plastic mesh (Fig. 14). Regular (annual) repairs are required because storms and wave action damage the fence. An alternative to the mesh is a palisade of white plastic poles (Fig. 14), which offers less resistance to the waves and is easier to maintain.

Figure 14. A fence tie-off extension of plastic poles designed to prevent stock entering Tioriori. Part of the original version of steel waratahs, wire cables and plastic mesh is visible to the left of the photograph, and concreted onto tidal rocks in the background. *Photo: Peter Moore.*

3.2 TEMPORARY ELECTRIC FENCES

In areas where farm animals have access to the beaches, portable electric fences can be used to surround nests (Fig. 15). Different models of electric power units are solar charged or use replaceable batteries. The oystercatchers will remain off the eggs while a fence is being set up, so it is important to minimise the time taken (< 15 minutes) before moving on.

Figure 15. A temporary electric fence protecting a Chatham Island oystercatcher (*Haematopus chathamensis*) nest in an area where farm animals have access to the beach. *Photo: Rex Williams.*

The use of an electric fence should be noted on the breeding summary file for each nest (see section 5).

3.3 RESULTS OF STOCK EXCLUSION

In 1998–2004, stock exclusion in managed areas was very effective at eliminating or reducing the chance of egg loss. The nests that were filmed in 1999–2001 had no fatal incidents or close calls (Table 4), although sheep and cattle were seen in the vicinity of some nests. In comparison, some unmanaged areas were frequented by sheep, and often the sheep were curious and investigated oystercatcher nests. The result was multiple close calls as a result of sheep walking close to or sitting beside the nests. One nest was lost when a sheep sat on the eggs (Table 4).

4. Moving and raising nests

Moving nests away from the high-tide mark (by creating new nest scrapes or using platforms) or raising nests (using platforms or mounds), combined with localised marram removal/control, increases the protection of nests from sea action. Although some eggs can survive being washed over or moved a short distance, as birds will make a new scrape or roll them back into the nest, moving nests to safer ground allows eggs to get through the 29-day incubation period unscathed. The vulnerability of nests to sea action varies between sites, so previous oystercatcher monitoring data should be checked before moving nests.

Interestingly, once a pair has been successful at a site, they will often nest there again in following years. Therefore, to some extent you can train the birds to nest further up the beach than they were initially inclined to do.

Spring tides, large swells and onshore winds can push waves further up the beach than usual. During the worst storms, waves can sweep several metres into the dune vegetation, washing away all oystercatcher nests on exposed coasts. In years with frequent storms, 40–50% of egg losses are caused by the sea. Therefore, it is prudent to move as many nests to higher ground as possible during good weather conditions early in the incubation stage (Table 5).

The movement of nests should be summarised on the nest record sheets (see section 5).

4.1 CREATING SCRAPES

Natural nests are easily relocated by creating a new nest bowl and the surrounding pattern of seaweed and driftwood further up the beach (Fig. 2). When moving a nest, it is a good idea to smooth out the old site and use the fingertips to create imitation tracks of the oystercatchers to and from the new nest. Nests can be moved directly up a beach (Fig. 16) or on an angle to a better position, such as a more prominent sand crest or within an alcove in the marram (Figs 17 & 18).

Nests should be moved in small increments (< 3 m per day). Although the birds are well-adapted to an ever-changing beach environment, care is needed, since the adults may abandon their eggs if the nest is moved too far or too quickly (2 nests out of a total of 91 nests were abandoned after they were moved in 1998–2004). It is better

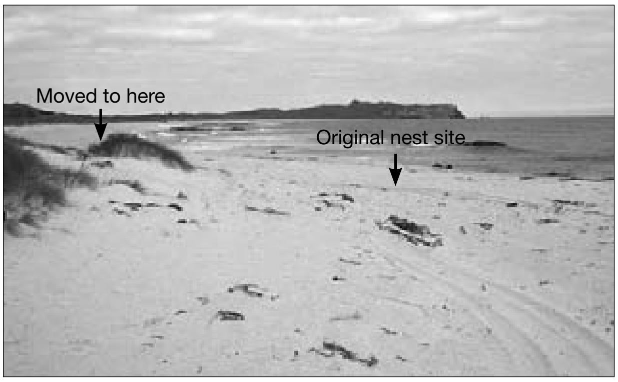


Figure 16. Movement of a nest from the tidal debris zone to a safer position in an alcove of sand in the marram (*Ammophila arenaria*) foredune, Woolshed territory (Wharekauri).
Photo: Rex Williams.

Figure 17. Movement of a nest site at Awamutu (Wharekauri) to a safer position in a sprayed alcove in the marram (*Ammophila arenaria*) foredune. *Photo: Rex Williams.*

Figure 18. Movement of a nest to an artificial alcove on a very narrow beach (T6 at the east end of Tioriori, Maunganui), and creation of a wall of boulders. *Photo: Rex Williams.*

to move a nest to safety over several days than to change its position abruptly when a storm is on its way. Also, the eggs can be quickly buried by sand and then abandoned in windy conditions if the oystercatcher is off the nest because people are present. Nevertheless, if the situation is urgent, a bold movement (or several staged movements in the same day) may be necessary.

With time and experimentation, an oystercatcher worker will build up experience at successfully moving nests and modifying the site to minimise losses from sea action.

4.2 PLATFORMS

Nest platforms are used to raise the nests and allow for their easy relocation. The raising of the nest by a few centimetres and the wall of the tyre itself may be all that is required to protect a nest from flooding at high tide. A simple design of nest platform is a car tyre tied to a sheet of plywood, which can be dragged up the beach using the rope handle (Fig. 19).

Figure 19. A nest platform made from a car tyre tied to a plywood sheet. *Photo: Georgie Hedley.*

Nest platforms can be placed in all managed oystercatcher territories before the start of the breeding season and stored behind dunes during the winter. Oystercatchers will generally explore a range of nest sites before laying their eggs, so it is useful to position the platforms in a couple of likely spots close to the high-tide or storm-tide zone. Knowledge of where previous nesting attempts occurred is helpful. Once in place, the wooden sheet is covered with sand and the

Figure 20. Chatham Island oystercatcher (*Haematopus chathamensis*) eggs laid in a car tyre platform. *Photo: Rex Williams.*

inside of the tyre circle is filled with sand. A sparse decoration of seaweed or driftwood on the platform may help to attract an oystercatcher, since they use tidal debris at natural nest sites to help camouflage the eggs and baffle the wind (Fig. 20). Birds that nest in tyres often continue to do so in future years.

4.3 MOUNDS

Low-profile beaches, particularly sandy spits alongside streams (e.g. Washout Creek at Maunganui), may have no safe sites to which a nest can be moved. However, a mound (with or without a tyre platform) can gradually be built up over several days. Driftwood or boulder barriers can also help baffle the waves (Fig. 21).

Figure 21. A car tyre nest platform placed under a Chatham Island oystercatcher (*Haematopus chathamensis*) nest, with a mound gradually raised beneath it over a few days. *Photo: Rex Williams.*

4.4 LOCALISED MARRAM REMOVAL

On narrow beaches, there may be no safe nest sites. Consequently, movement of a nest may only be successful if an alcove is first created in the foredune (Figs 17 & 18). It is best to spray a patch of marram with herbicide at the end of the breeding season and weed-eat or pull out the dead material in the spring. Any re-growth of marram can then be pulled out by hand during the season. An area that is approximately 10 m^2 is usually adequate, as it allows the incubating bird to survey its territory and escape predators. The nest is moved to the middle or back of the cleared site depending on the topography of the beach and foredune. If the foredune has a steep front, the nest will need to be moved up the bank gradually to avoid upsetting the birds with too abrupt a change to their nesting position.

4.5 RESULTS OF MOVING AND RAISING NESTS

Because of the relatively narrow, steep beaches at Maunganui/Wharekauri, it was anticipated that moving the nests would improve breeding success. Over the course of seven seasons in 1998–2004, 107 nests were moved, raised or were on tyre platforms. This action undoubtedly helped to protect many eggs from high tides, wind-generated waves and moderate storms, since many of the original nest sites were washed over at least once during the breeding season (Moore & Williams 2005). Table 6 suggests that moving or raising nests had no overall benefit, since 16% of these nests were washed away compared with 11% of nests that were not manipulated. However, this is because the manipulated nests tended to be on vulnerable sites and so suffered greater losses in the stormier seasons when waves washed through the breeding sites and into the foredunes.

The greatest benefit, therefore, probably occurred during years with few storms. For example, the position on the beach profile was measured for 21 nests in 2000 and 2001, and on average they were 8.5 m from the mean high-tide mark (and 0.39 m in elevation above high tide). Most of these were vulnerable to wave action, and four nests were actually below the mean high-tide mark. Nine nests of this measured sample were moved from their vulnerable sites (on average 5.2 m from high tide and 0.16 m elevation) to safer positions (on average 16.7 m from high tide and 1.08 m elevation).

Another benefit of moving nests was that the successful birds often chose to nest higher up the beach profile in subsequent years.

TABLE 6. MOVEMENT OF CHATHAM ISLAND OYSTERCATCHER (*Haematopus chathamensis*) NESTS AT MAUNGANUI/WHAREKAURI, NORTHERN CHATHAM ISLANDS, 1998–2004.

YEAR	TOTAL NUMBER		DISTANCE MOVED (m)			MANIPULATED*		NOT MANIPULATED	
	BREEDING PAIRS	NESTS	MEAN	SD	RANGE	NUMBER OF NESTS	% WASHED AWAY	NUMBER OF NESTS	% WASHED AWAY
1998	16	23	6.2	2.6	2–10	11	36.4	12	16.7
1999	16	21	5.3	4.2	2–15	12	16.7	9	22.2
2000	20	26	8.8	7.8	2–32	23	0.0	3	0.0
2001	24	33	6.2	4.3	1–18	18	0.0	15	0.0
2002	28	32	4.9	2.8	2–10	15	0.0	17	0.0
2003	34	43	4.8	4.0	1–12	11	9.1	32	3.1
2004	33	72	6.3	6.2	2–25	17	52.9	55	32.7
Total		**250**				**107**		**143**	
Mean							**16.4**		**10.7**

* Manipulated nests were moved, raised or placed on tyres.

5. Monitoring breeding pairs, productivity and population change

To gauge the effectiveness of management, the status and numbers of breeding pairs and their productivity should be monitored and compared with areas that are not being managed (Fig. 7; Table 7). In managed areas, the aim is to boost productivity to an average of 1.0 chicks per pair per year.

TABLE 7. TIME LINE OF INTENSIVE MONITORING OF CHATHAM ISLAND OYSTERCATCHER (*Haematopus chathamensis*).

MONTH	DATE	MONITORING ACTION
July		• Finalise contractor or staff work programme (e.g. combine with trapping work) • Liaise with landowners for access and other logistics • Plan for census in December: —Access from landowners —Staff, vehicles, boats —Transport and accommodation • Plan for colour band replacement: —Prepare list of birds requiring band maintenance
Oct–Feb		• Daily check of oystercatcher pairs while doing trapping round • Weekly check of unmanaged areas in the vicinity of managed zones or monthly check at less accessible sites • Record identity of non-breeders (if colour banded) • Update territory maps • Fill out daily data on nest sheets and colour band record sheets • Enter summarised nest data and colour band record on computer files
Dec	8–15 Dec	• Census during the second week of December
Dec–Feb	15 Dec – 28 Feb	• Band and colour band chicks in approved areas • Colour band adults in approved areas • Colour band maintenance: —Trained staff catch and replace any worn colour bands, using band database records to ensure none of the bands are >8 years old
Mar		• Collate data sheets and maps for season • Finalise computer data files • Summarise band recovery data for each individual bird and transfer to oystercatcher band database • Band Operator transfers band data (schedules and recoveries) to Banding Office via their electronic files format
Apr		• Contractor or supervisor prepares summary report for Chatham Island Species Recovery Group • Provide feedback to landowners—letter of thanks and summary of findings in their area • Plan allocation of resources in following year • Arrange for any replacement gear

5.1 INTENSIVE MONITORING

In managed zones, daily checking of breeding pairs can easily be achieved as part of the checking of traps.

At each territory, researchers should:

- Identify adults by band combination (if colour banded)
- Record nesting behaviour (e.g. making scrapes, or being furtive (eggs), aggressive (chicks) or quiet (no nest))
- Locate nest by searching area where birds were before they were disturbed
- Record location of nest with GPS and photograph nest site
- Note any management action taken (e.g. erecting electric fence, moving nests, using tyre platforms, building mounds, clearing alcove)

In unmanaged zones near the managed areas, breeding pairs should be checked weekly to provide a comparison of breeding success. However, it should be noted that some nesting attempts can be missed between visits if eggs are lost shortly after laying. Intensified scraping activity is an indication that eggs will soon be laid.

Records of bird activity and nest progress should be summarised on nest sheets (Appendix 2, section A2.2), and final outcomes and management actions should be summarised for each nest (Appendix 2, section A2.3). A summary report of the season's findings should then be produced.

5.2 MINIMUM MONITORING

The minimum requirement for monitoring is a thorough check of pair status in October or November, nesting activity in December (e.g. as part of an island-wide census) and a follow-up check of breeding success in February to note the presence of juveniles (Fig. 7; Table 7).

5.3 BANDS AND COLOUR BANDING

Long-term monitoring of individual birds is undertaken using uniquely numbered metal bands (size K). Birds banded before 2000 were banded on the lower leg (tarsus), but more recent banding has been on the upper leg (tibia), in line with the best practice for banding of other waders (to reduce band wear). The bands on the tibia tend to be less noticeable from a distance as they can be obscured by feathers. Although the birds are only individually identifiable when they are captured, the presence of banded birds can help distinguish neighbouring pairs. The descriptions of the band positions should be summarised in the notes as NB (not banded), M:– (metal band on left tarsus), –:M (metal band on right tarsus), BLT (banded left tibia) or BRT (banded right tibia).

Detailed monitoring of breeding adults and the survival and movements of their chicks is only possible by marking individuals with colour combinations of plastic bands on the tarsi. Adult birds can be captured by using a noose-mat and decoy, and pre-fledged chicks can be captured by hand. Care must be taken to record the combination correctly and not to confuse similar colours (e.g. blue and green, yellow and orange, white and metal) or the left and right leg. Notebook entries must be double-checked in the field and any uncertain sightings discarded to minimise errors. The standard notation is left leg-right leg and upper followed by lower bands. For example, WR–BG represents white over red (left leg)–blue over green (right leg). Metal bands on the tarsus (but not the tibia) are included as part of the combination, e.g. M–R (metal on left leg, red on right leg).

All banding and colour banding must be conducted under the auspices of a permitted band operator, as approved by the New Zealand National Bird Banding Scheme (National Office, DOC).

Maintenance of colour bands is essential to prevent injury to the birds from eroded or unravelled bands. Initially, it was thought that bands would need to be replaced every 3–5 years. However, recent checks have indicated that colour bands for Chatham Island oystercatchers can be replaced every 8 years (S. O'Connor, DOC, pers. comm.). At the end of an intensive monitoring programme, all colour bands should be removed to prevent any injuries as a result of deteriorating bands.

Sightings of colour-banded oystercatchers should be recorded on the nest sheets for breeders and on a colour band record sheet for other birds (Appendix 2, section A2.4). These entries should then be compiled in a computer spreadsheet. A single entry for the year is usually added to the oystercatcher band database, which contains band data (bands applied and seen) between 1970 and 2006. Currently, the band database is administered by Wellington Hawke's Bay Conservancy, DOC (D. Houston, DOC, pers. comm.). Annual summaries of birds banded and seen are provided to the New Zealand National Bird Banding Scheme, National Office, DOC.

5.4 CENSUS

During management periods, an annual census of Chatham Island oystercatchers is required to measure the population response and recruitment movements of new breeders. During unmanaged periods, a full census should be carried out every 5 years to detect any population trends and to help assess the need for management action. If a census count of 90% of coast and lagoon encounters >320 birds, this probably represents a population of >250 mature individuals. This is the minimum required by the Chatham Island oystercatcher recovery plan 2001–2011 for a well-managed population (Aikman et al. 2001).

The standard timing of the census is during the second week of December (Fig. 7; Table 4).

Methodology and area boundaries for the census used by Schmechel & O'Connor (1999) were modified by Moore (2008). An example of census instructions is provided in Appendix 3 and a census record form in Appendix 2, section A2.5.

Eleven core census zones (northwest coast, Cape Young, northeast coast, Okawa, Owenga, southwest coast, Waitangi, Paritu, east Pitt Island, Mangere and Rangatira; Fig. 1) comprise approximately 167 km of coast and lagoon (36% of the total Chatham Islands coastline) and 96% of the oystercatcher territories that were found in 1998 (Schmechel & O'Connor 1999). These core census zones should be surveyed annually. The nine other lower priority areas of outer coastline (Point Somes, Long Beach, Point Munning, north and south Hansen Bay, southern cliffs, and west Pitt Island) and Te Whanga Lagoon (north and south sections) should be surveyed as often as possible (at least every 3 years on a rotating basis) to locate new pairs spreading out from the traditional breeding sites.

Oystercatcher censuses should be carried out on quad motorbikes or on foot. Areas with difficult access or with potential oystercatcher habitat below cliffs can be searched from vantage points, using binoculars or telescope, or from a boat; however, viewing from a boat should be only be used as a last resort, as the chance of detecting birds is low. Where possible, experienced observers should be used, and the same people should be used to survey the same shoreline each year. Pairs of birds should be categorised as breeders, if nests or chicks are found; suspected breeders, if they show the characteristic furtive behaviour of birds that have eggs or loud and aggressive behaviour normally used by birds defending chicks; or territorial, if they appear to be defending the area. Breeding can be confirmed in some cases from subsequent monitoring of pairs during the season. Floaters include all apparently non-territorial birds (non-breeding adults and immature birds).

6. Public relations

Good public relations are essential if the Chatham Island oystercatcher management and monitoring programme is to be successful. Access to the shoreline is usually over private land, so it is essential that permissions and support for the work are obtained. Regular updates (stopping for a cup of tea) and an annual letter of thanks or summary of findings help maintain the relationship.

The placement of oystercatcher signs at key entry points to the coast helps to keep the public informed about how to avoid disturbing nests or crushing eggs and chicks (e.g. by driving on the beach below the high-tide mark). Occasional articles or entries in the conservation updates in the local newspaper (*The Chatham Islander*) help keep up the oystercatcher profile and remind people about conservation issues, such as the damage that cats (both feral and domestic) do to native wildlife. In 1999–2004, a short documentary about the conservation work being done to help oystercatchers was shown on Chatham Island television. At the end of the study, a fact sheet about oystercatchers was produced and given to all landowners.

7. Oystercatcher population response

The three-pronged management system described in this report was a major success in 1998–2004. It was not feasible to test the three components of management separately. However, since the video monitoring in 1999–2001 showed that predation caused the most losses in unmanaged areas, it is likely that predator control had the greatest impact on Chatham Island oystercatcher breeding success. Stock control and moving/raising nests is likely to have had an additive effect in most or some years.

Breeding success of Chatham Island oystercatchers is generally low without management (Table 8), although this varies annually. Davis (1988) and Schmechel (2001) estimated productivity at 0.22 and 0.44 fledged chicks per pair per year, and an average minimum productivity of 0.35 chicks per pair per year was calculated using a larger dataset (Table 8). Limited or sporadic trapping effort ('some management') resulted in slightly elevated breeding success, but the more intensive management in 1998–2004 resulted in much higher breeding success (1.04 chicks per pair per year; range = 0.5–1.6) (Table 8). During 3 years of detailed monitoring (1999–2001), only 6% of eggs laid in unmanaged areas survived to fledge as chicks, whereas 39% of eggs laid in managed areas survived to produce fledglings. High numbers of chicks (18–35) were produced by 16–35 pairs at Maunganui/Wharekauri during the 7 years of management (Fig. 22). However, in 2005–2006, chick output decreased to pre-management levels, despite the number of pairs continuing to increase to 42. This improved in 2007, with 26 chicks fledged at Maunganui/Wharekauri (Fig. 22), but this was

TABLE 8. BREEDING SUCCESS OF CHATHAM ISLAND OYSTERCATCHER (*Haematopus chathamensis*) UNDER VARYING LEVELS OF MANAGEMENT AND AT DIFFERENT LOCALITIES, 1970–2007.

MANAGEMENT LEVEL	MINIMUM NUMBER OF CHICKS PER PAIR			NO. RECORDS	AREAS
	MEAN	SD	RANGE		
Intensive management	1.04	0.34	0.52–1.56	7	Wharekauri/Maunganui (1998–2004)
Some management	0.41	0.30	0.00–0.85	18	Wharekauri/Maunganui (1990–1993, 1997) Taupeka (1999) Whanga (2002) Southwest (2001, 2003–2004) Pitt Island (1999–2002, 2005–2007) Wharekauri (2007)
No management	0.35	0.33	0.00–1.00	41	Wharekauri/Maunganui (1987–1988, 1994–1996, 2005–2006) Maunganui (2007) Other northern Chatham (1987–1988, 1991–2007) Southern Chatham (1987–1988, 1990, 1999, 2002, 2006) Pitt Island (1987–1988, 1999–2003, 2006)
Offshore island reserves	0.40	0.32	0.00–1.00	44	Mangere (1970, 1977–1988, 1999–2007) Rangatira (1974, 1977–1988, 1999–2007)

largely the result of a high output of chicks at the unmanaged Maunganui, rather than because trapping had recommenced at Wharekauri.

The potential effect of management on oystercatcher survival was inconclusive, as estimated by multi-state mark-recapture of 472 birds that were banded between 1970 and 2004 (D. MacKenzie, Proteus wildlife research consultants, Dunedin). Analysis was hampered by the majority of banding and band sighting effort being undertaken in the last 7 years of the 35-year period, and effort being concentrated in the managed areas (D. MacKenzie, pers. comm.). Consequently, there was little difference in annual survival rates for adults (98%), non-breeders (96%) or juveniles (87% increasing to 89%) before and during management at Maunganui/ Wharekauri. There was, however, lower survival in other unmanaged parts of northern Chatham Island (97%, 95% and 84% for the respective age classes) and the rest of the Chatham Islands (92%, 86% and 65%).

During 1998–2004, birds bred at 2–5 years of age and the population expanded in northern Chatham Island. Large territories were subdivided and new breeders spread along previously unoccupied sandy shoreline with little or no rocky habitat, especially at stream mouths. Because oystercatchers tend to recruit close to their natal site, the increased production of chicks in managed areas in northern Chatham Island in 1998–2004 mainly benefited the northern part of the range. Of 170 chicks banded at managed areas in 1998–2004, 87 (51%) had recruited (bred or held a territory) by 2006. Of these recruits, 69% had returned to the managed zones, 25.3% to other northern Chatham Island areas, 4.6% to other parts of Chatham Island and 1.1% to Pitt Island. By 2004, 60% of the population was in northern Chatham Island and only 20% on the southern islands.

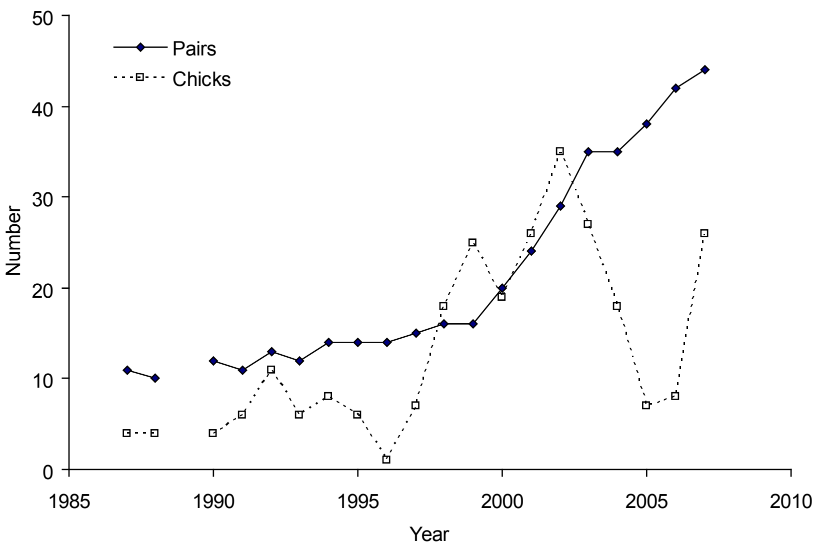


Figure 22. Number of pairs of Chatham Island oystercatchers (*Haematopus chathamensis*) and number of chicks produced at Maunganui and Wharekauri, northern Chatham Island, 1987–2007.

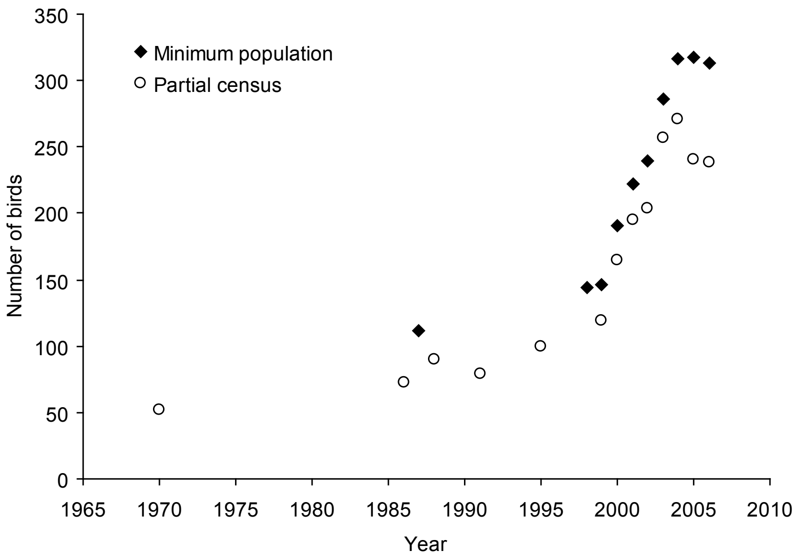
In 1998, there were 144 adults (Schmechel & O'Connor 1999), including 49 breeding pairs in the entire population. Over the next 7 years (1998–2004), during the period of intensive management in northern Chatham Island, the minimum total population more than doubled from 144 to 316 birds (121% increase) (Table 9; Fig. 23), comprising 89 pairs (Moore 2008).

In 2005, management effort shifted to Pitt Island. However, because only 1–5 juveniles were produced there in 2005–2006 and productivity in the formerly managed northern Chatham Island also decreased markedly during that time, the total population levelled off. Despite this, the number of pairs increased to 109 as the cohorts of young birds continued to enter the breeding population (Moore 2008).

TABLE 9. MINIMUM POPULATION ESTIMATES OF CHATHAM ISLAND OYSTERCATCHER (*Haematopus chathamensis*) IN DIFFERENT PARTS OF THE CHATHAM ISLANDS, 1970–2006.

	1970	1987	1998	1999	2000	2001	2002	2003	2004	2005	2006
Northern Chatham Island	10	32	68	79	108	136	141	186	189	203	194
Other Chatham Island	8	32	27	20	22	29	38	45	64	58	60
Other islands	34	48	49	47	61	57	60	55	63	56	59
Total	**52**	**112**	**144**	**146**	**191**	**222**	**239**	**286**	**316**	**317**	**313**

Figure 23. Minimum population estimates and partial censuses of Chatham Island oystercatcher (*Haematopus chathamensis*), 1970–2006.



8. Future management of Chatham Island oystercatcher

The best practice for future management of Chatham Island oystercatcher should combine intensive predator control (continuous trapping from October to February), stock exclusion (permanent or temporary fences) and the movement/raising of nests away from high tide.

Predation causes the most losses in unmanaged areas. Sporadic or partial trapping does not appreciably improve oystercatcher productivity. Stock control and moving/raising nests has an additive effect on productivity in most years, as both stock and wave action cause losses. However, in the stormiest years there is probably little benefit in moving nests, as there are no safe sites to move the nests to. Each individual nest requires 1 month of benign conditions before chicks hatch, but given the wide range in laying dates of oystercatcher pairs and the vulnerability of non-flying chicks, 5 months of full protection is required.

Although 7 years of intensive management on northern Chatham Island successfully boosted the population of Chatham Island oystercatchers, it was still short of the recovery goal of > 250 mature individuals. Consequently, the species remains endangered (IUCN 2006; BirdLife International 2007) and 'Nationally Critical' (Hitchmough et al. 2007), and is still a very high priority for conservation management.

A DOC management review in 2005 (Moore et al. 2006) endorsed the decision of the Chatham Island Species Recovery Group to shift management effort to Pitt Island to secure the southern range of the species. The reviewers recommended rotation of effort over 5-year periods between Maunganui/Wharekauri, Pitt Island and southwest Chatham Island, depending on the outcomes and success of the work at Pitt Island in 2005–2009.

9. Acknowledgements

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