

# Status and conservation of the sooty shearwater colony at Mt Oneone, Wanganui River, Westland

Kerry Jayne Wilson  
Ecology and Entomology Group  
PO Box 84  
Lincoln University

Published by  
Department of Conservation  
Head Office, PO Box 10-420  
Wellington, New Zealand

This report was commissioned by the West Coast Conservancy

ISSN 1171-9834

© 1999 Department of Conservation, P.O. Box 10-420, Wellington, New Zealand

Reference to material in this report should be cited thus:

Wilson, K. J. 1999.

Status and conservation of the sooty shearwater colony at Mt Oneone, Wanganui River, Westland  
*Conservation Advisory Science Notes No. 250*, Department of Conservation, Wellington.

Keywords: Sooty shearwaters, *Puffinus griseus*, predation, Harihari Ecological District.

# 1. Introduction

Seabirds once nested on headlands and cliff-tops in many parts of New Zealand, and a few species even nested on mountains far from the coast. Remains of seabirds have been found in so many Maori middens, cave and sand dune deposits that breeding petrels must have been an important feature of mainland ecosystems in many parts of the country including Westland (Worthy & Mildenhall 1989, Worthy & Holdaway 1993). Now, because of introduced predators and human hunting, at least 14 species of petrels no longer breed on the mainland although they survive on offshore islands (Wilson 1997) and only four species of burrow-breeding petrel survive on the New Zealand mainland. Hutton's shearwaters (*Puffinus huttoni*) only breed above 1200 m in the Kaikoura Mountains, where predators presumably pose less of a threat than they do at lower altitudes. The large (1.2 kg) and pugnacious Westland petrel (*Procellaria westlandica*) breeds near sea level in the presence of introduced predators, but even they lose chicks to cats (*Felis catus*) or other predators. A few mainland colonies of grey-faced petrels (*Pterodroma macoptera*) and sooty shearwaters (*Puffinus griseus*) remain, but numbers are very low and their extinction from the mainland seems likely unless measures are taken to protect them. The only mainland sooty shearwater colony whose numbers are apparently not declining is at Taiaroa Head on Otago Peninsula, where a fence and ongoing predator control aimed at protecting the royal albatross (*Diomedea epomophora*) colony provides incidental protection for shearwaters (Hamilton et al. 1997).

The sooty shearwater colony at Mt Oneone (also known as the Doughboy) at the mouth of the Wanganui River is one of few mainland sooty shearwater colonies remaining in Westland (Hamilton et al. 1997). The Wanganui River Walkway provides access to a viewing platform on top of Mt Oneone (65 m) and the shearwater colony is beneath this platform. In this study we set out to determine the status of, and breeding success at, the Mt Oneone colony.

This external unprogrammed science advice was commissioned by Craig Miller, the CAS for the Westland Conservancy. The information sought by him was:

- Are the numbers of birds using the colony stable, increasing, or decreasing.
- Comment on burrow use, i.e. are the same burrows used each year.
- Comment on breeding success.
- Comment on likely key predators of eggs, chicks, and adults.
- Comment on research required to identify key predators.

## 2. Methods

The sooty shearwater colony at Mt Oneone was visited on five occasions between January 1995 and January 1998. Our plan was to visit the colony in late November or early December (shortly after egg laying) and in late January or early February (when all eggs should have hatched) (Warham et al. 1982) for several breeding seasons. A third visit in April, before chicks fledged, had been planned but survival was so low that this was not warranted. As this was a holiday project and colony visits had to be worked around other commitments, neither the timing nor the frequency of our visits was ideal. On each visit every burrow was inspected on the first day. Any sign of recent use, and the presence of live or dead adult shearwaters, eggs and chicks was recorded. A toothpick fence was erected across each burrow entrance which would be knocked down if a bird or predator entered or left the burrow. On the last day of each visit any burrow where the fence was knocked down was inspected again. During November or December visits, any burrow where an adult but no egg was recorded on day one was inspected again on the last day. During January or February visits, any burrow where an egg or chick was present on day one of that visit was inspected again on the last day.

On at least one evening each visit, the number of shearwaters returning to the colony were counted from the viewing platform. A watch began at dusk, and the count began when the first returning shearwater flew over the colony. All birds seen overhead plus all birds seen or heard landing on the colony during the hour that began with the sighting of the first bird were counted in three contiguous 20 minute intervals. Ideally this was done on three nights each visit, but often time constraints or adverse weather meant that counts were made on only one or two nights.

The viewing platform is sited directly over the colony and provides unobstructed views of birds circling the colony. Returning shearwaters always circle the colony several times before landing. Not every bird that circled the colony would land. We did not knowingly count the same circling bird twice. On nights when only one or two birds were overhead at any time, counts were probably very accurate, but we found it difficult to keep track of individual birds when three or more birds were overhead. This means that during the 1997/98 season we are unlikely to have missed any returning bird or counted any bird twice. Conversely, earlier counts are likely to be less precise, but we could not determine if we were more likely to double count or miss birds. Sooty shearwaters are incapable of slow, manoeuvrable flight, and landing birds crash noisily into the forest canopy. As the furthest point of the colony is only about 25 m from the platform it is unlikely many birds landed undetected.

I was present on all visits, and on all but the January 1998 visit I was assisted by one or two other people. Burrow inspections were made by either Amanda Freeman or myself. The same inspection and counting protocols were used throughout.

## 2.1 DATES OF VISITS TO THE MT ONEONE SOOTY SHEARWATER COLONY

1994/95  
21-23 January 1995.

1995/96  
27-30 November 1995 and 20-24 January 1996.

1996/97  
No visits made.

1997/98  
6-8 December 1997 and 25 January 1998.

## 3. Results

The numbers of eggs laid declined during the course of this study (Appendix 1). During the 1994/95 season the colony was only visited in January when most eggs should have hatched. During that visit, one late egg was still being incubated and the remains of six predator-eaten eggs were found on the surface near the burrows. In January 1996, the season when 11 or 12 eggs were laid, the remains of only two eggs were found on the surface, and in January 1998 following the laying of 6 eggs no surface remains were found. This suggests that many more than the 7 eggs recorded in January 1995 had been laid that season.

Breeding success was low and probably zero (Appendix 1). By late January each season only one (in 1995/96 possibly two) eggs or chicks still survived. In the 1995/96 season three chicks were killed between 21 and 24 January 1996 suggesting that young chicks left alone in their burrow are especially vulnerable to predators. Our results show that not even adults are safe from predators.

The number of burrows and the number of used burrows appears to be stable. The dip in the number of burrows in 1995/96 is probably due to construction work carried out on the viewing platform which destroyed several burrows prior to that breeding season. The number of used burrows is a poor indicator of shearwater activity. I considered any burrow with an entrance tunnel that had been cleared of leaf litter or cobwebs to be used. We had no way of telling if use was regular or infrequent. Some burrows had bird guano in the entrance, but for most we could not tell if they had been used by a shearwater or by some other animal.

The number of sooty shearwaters returning to the colony each evening declined steadily during the course of this study (Appendix 2). Although the sample size is small and the trends are not statistically significant ( $P=0.15$  for

numbers overhead in January/February) in each case the count in any season is lower than the minimum count the previous season.

## 4. Discussion

Breeding success in this sooty shearwater colony is low - probably zero - and the numbers of birds returning to the colony is declining at a rate that suggests the colony will decline to extinction within relatively few years. The primary cause of breeding failure appears to be predation. In addition several dead adults were found in burrows. Four nearly complete eggshells, three in January, one in November, plus other eggshell pieces were found on the ground surface. All four had about a third of the uppermost side of the egg removed while the rest of the shell was intact. These eggs were collected, but I was unable to match the shape of the hole in the shell to the mouth of any likely predator. Three of these near by complete eggs plus some other eggshell pieces were found on the surface in January. If the eggs had been laid on the ground surface, as occurs in some colonies where burrows are limiting (Warham et al. 1982), we would have found the surface eggs in November rather than January.

We have been unable to identify the predators. However, there are clues as to their identity. Adults, as well as eggs and chicks were killed and the adults were killed in their burrows. Thus a predator large enough to kill adult sooty shearwaters (mean mass 819 g) yet small enough to enter their burrows (diameter about 10 cm), is implicated. Stoats (*Mustela erminea*) can kill birds of this size, and will enter burrows in search of prey (King 1990). Cats are probably too large to enter shearwater burrows, and rats (*Rattus* spp.) too small to kill adult shearwaters. Neither weasels (*M. nivalis*) nor ferrets (*M. furo*) occur in Westland rainforest (King 1990). Young chicks could be killed by rats. It is likely that more than one species of predator is involved. Possums (*Trichosurus vulpecula*) were seen at or close to the colony each evening we were present. They are known predators of eggs and adults of tree-nesting birds (Brown et al. 1993) but they are less likely to interfere with the nests of burrow-breeding birds. No weka (*Gallirallus australis*) were seen or heard during the course of this study.

The area occupied by the colony is small, currently less than 50 by 50 m, and as the terrain is such that not all this area is suitable, it is unlikely the area burrowed was ever very much larger than this. Assuming a burrow density of one burrow per square metre, as recorded in forested habitats on the Snares Islands (Warham et al. 1982) the Oneone colony is likely to have been less than 2500 burrows. All likely introduced predators have been in South Westland for over a century, so if the birds had been exposed to the current levels of predation for that period the colony is unlikely to have survived this long. Oneone is a remnant of moraine attached to the mainland by a sandy spit. Both its partial isolation and the thick tangled scrub probably provided the colony with some protection from predators. The steps up to the summit of Oneone and the viewing platform were erected in 1985 (John Reid pers.

comm.), and until then there was no track leading to the colony. Stoats and cats are known to use tracks and follow human scent trails, so it is possible that the steps and viewing platform first exposed the colony to predators. Assuming a lifespan of about 20 years after first breeding (Warham 1996) and near-zero breeding success since the platform was constructed in 1985, conservation action is urgent if the colony is to be saved.

Why should we spend scarce conservation dollars protecting the species that Warham & Wilson (1982) considered to be the most abundant seabird in New Zealand? Mainland breeding seabirds were an important feature of coastal ecosystems and the nutrients the birds deposited ashore in the form of guano and dead eggs, chicks and adults would have been key factors in the functioning of those ecosystems, just as they remain important on many offshore islands (Warham 1996). There are now few mainland locations where breeding seabirds remain part of coastal ecosystems. These locations should be conserved as examples of once common ecological processes. The Oneone colony sits atop a small nugget only just attached to the mainland by a sand bar so it is practical to eradicate introduced predators then control reinvasion by them. The prognosis for successful recovery if this colony is protected is good. Most available burrows continue to be used, suggesting that birds additional to those that actually lay eggs visit the colony. Despite the loss of burrows when the viewing platform was repaired prior to the 1995/96 season, new burrows had been dug by the beginning of the 1997/98 breeding season (Appendix 1).

Another reason for the conservation of these common birds is to allow people to see and experience a feature of New Zealand's natural heritage. While seabird colonies occur on numerous offshore islands, the ground on most such islands is densely burrowed and the colonies too fragile to allow access to the public. Mainland colonies could offer the public an opportunity to experience an aspect of their heritage. The viewing platform at Mt Oneone offers the public a unique opportunity to watch the nightly return of the birds without disturbing the birds or damaging the colony.

Certain information is required before conservation action can proceed. The predators need to be identified. This could be done by monitoring burrows using still cameras coupled with event recorders or by using video cameras. Our studies of breeding success, mortality and numbers returning to the colony need to be repeated during the 1999/2000 breeding season.

## 5. Acknowledgements

Amanda Freeman shared my interest in mainland breeding shearwaters and took part in most visits to the Oneone colony. Paul Donald and Jacque Todd also assisted on one trip. I am grateful to Adrian Paterson and Amanda Freeman for comments on this manuscript.

## 6. References

- Brown, K., Innes, J. & Shorten, R. 1993. Evidence that possums prey on and scavenge birds' eggs, birds and mammals. *Notornis* 40: 169-177.
- Hamilton, S.A., Moller, H. & Robertson, C.JR. 1997. Distribution of sooty shearwater (*Puffinus griseus*) breeding colonies along the Otago Coast, New Zealand, with an indication of countrywide population trends. *Notornis* 44: 15-25.
- King, CM. editor. 1990. The handbook of New Zealand mammals. Oxford University Press, Auckland.
- Warham, J. 1996. The behaviour, population biology and physiology of the petrels. Academic Press.
- Warham, J., Wilson, G.J. 1982. The size of the sooty shearwater (*Puffinus griseus*) population at the Snares Islands, New Zealand. *Notornis* 29: 23-30.
- Warham, J., Wilson, G.J., Keeley, B.R. 1982. The annual cycle of the sooty shearwater (*Puffinus griseus*) at the Snares Islands, New Zealand. *Notornis* 29: 269-292.
- Wilson, K.-J. 1997. Extinct and introduced vertebrate species in New Zealand: a loss of biodistinctiveness and gain in biodiversity. *Pacific Conservation Biology* 3:
- Worthy, T.H., Mildenhall, D.C. 1989. A late Otiran-Holocene paleoenvironment reconstruction based on cave excavations in northwest Nelson, New Zealand. *New Zealand Journal of Geology and Geophysics* 32: 243-253.
- Worthy, T.H., Holdaway, R.N. 1993. Quaternary fossil faunas from caves in the Punakaiki area, West Coast, South Island, New Zealand. *Journal of the Royal Society of New Zealand* 23: 147-254.



**Appendix 1. Breeding success and mortality at the sooty shearwater colony at Mt Oneone, Westland.**

	1994/95	1995/96	1996/97	1997/98
No. burrows	56	45	-	53
No. used burrows	50	37	-	40
No. eggs laid	7*	11 + 1?	-	6
No. failed eggs	6	7 + 1?	-	5
No. chicks hatched	1	3 + 1?	-	-
No. chicks killed	-	3	-	-
No. eggs or chicks alive late January	1	1 + 1?	-	1
No. adults killed	1	2 + 2?*	-	1 + 1?*

\*In 1995/95 the colony was only visited in January. At that time one egg was still being incubated and the remains of six predator killed eggs were found. The number of eggs laid was almost certainly much higher.

\*\* Some burrows contained the remains of dead adult birds almost certainly killed by predators. Feathers but not corpses were found in other burrows suggesting that additional adults had also been killed.

**Appendix 2. The number of sooty shearwaters recorded in flight over the Mt Oneone shearwater colony and the number that landed in the colony each evening.**

	1994/95	1995/96	1996/97	1997/98
<b>November/ December</b>				
No. overhead		15.3 (12-17, n=3)	-	3.5 (2-5, N=2)
No. landed		9.3 (7-11, N=3)	-	1.5 (1-2, N=2)
<b>January/ February</b>				
No. overhead	36 (N=1)	17 (10-28, N=3)	-	7 (N=1)
No. landed	21	16 (10-26, N=3)	-	5 (N=1)