## SHORT NOTE

## First complete post-breeding survey of the Bounty Island shag (*Leucocarbo ranfurlyi*)

JOHANNA A. HISCOCK PETER J. MCCELLAND Southern Islands, Department of Conservation, PO Box 743, Invercargill, New Zealand

B. LOUISE CHILVERS\*

Marine Species and Threats, Department of Conservation, PO Box 10 420, Wellington, New Zealand

New Zealand is a world hotspot for shag (Phalacrocoracidae) biodiversity with 12 breeding species, of which 8 species are endemic (Marchant & Higgins 1990). Five of the endemic species breed only in New Zealand's sub-Antarctic islands. The Bounty Islands (47.7500° S, 179.0500° E) are the only breeding site of the endemic Bounty Island shag (Leucocarbo ranfurlyi), a species which is currently listed as "Nationally Critical" (Heather & Robertson 1996; Miskelly et al. 2008). The Bounty Island shag nests and roosts mainly on small ledges on steep cliffs above the water's edge (Robertson & van Tets 1982). Little is known about the population size, population trends or the biology of this species as the remote and inhospitable nature of the Bounty Islands make visits difficult.

Since the first counts of the Bounty Island shag in 1978, surveys have used a variety of methodologies (Clark *et al.* 1998; Robertson & van Tets 1982; De Roy & Amey 2004; Amey 2012) including ground, boat and aerial-based counts. Nest counts undertaken in November have ranged from 569 nests in 1978 (Robertson & van Tets 1982), 120 nests in 1997, 359 nests in 2004 (De Roy & Amey 2004) to 393 nests in 2011 (Amey 2012). However, all of these counts have covered only parts of the Island group.

Here we report the first bird count to include an entire circumnavigation of the Bounty Islands group (Fig. 1). We carried out the survey on 27 February 2013 using an 8 m rigid hulled inflatable boat based from the RNZ patrol boat HMNZS Otago. This provided an ideal platform as it was large and high enough to provide good views but small enough to maneuver around the islands. The survey started at 0705 h and was completed at 0945 h. The sea conditions were relatively calm with little swell, however, the sea between the islands was confused and choppy. The day was overcast with fog arriving after the survey was completed. The islands were circumnavigated at a distance of 20-75 m from the shore. There was ~300 m of coast where islands were too close together for the boat

*Received 5 October 2013; accepted 30 November 2013* \*Correspondence: *lchilvers@doc.govt.nz* 



Fig. 1. Survey track line for February 2013 survey for Bounty Island shags.

to safely travel through, such as between Depot and Proclamation Islands (Fig. 1), however these areas were searched by binoculars from ~100-150 m distance. When shags were sighted on land the boat was stopped and the birds were counted by 2 people/observers independently using binoculars. The shags were situated on the rocky islands in loose groups of small numbers, and were systematically counted from left to right, or vice versa depending on the orientation of the island and the drift of the boat. Two different people in the boat also kept count of the number of birds seen on the water and flying around the islands. The independent counts of the 2 observers were averaged.

The mean count of Bounty Island shags on land was 1386.5  $\pm$  75.5 birds (SD, range 1311-1462) and 150 birds were also seen swimming or flying in the area. Previous counts of individual birds (not nest counts) were undertaken in November and recorded 366 birds in 1997, 428 birds in 1998, 633 birds in 2004 and 304 birds in 2008 (Robertson & van Tets 1982; De Roy & Amey 2004; Clark *et al.* 1998; Russ & Terauds 2008).

Our count of Bounty Island shags undertaken in February 2013 was over twice that of any previous count undertaken in November in previous years. This difference was expected as the number of juveniles present at the islands in February is higher near the end of the breeding season. For the purposes of this survey, the distance from the birds and the movement of the boat meant that distinguishing between juveniles and adults was not practicable. It should also be noted that our survey represents a minimum population estimate, as we could not estimate the number of birds that may have been away from the islands and feeding in deeper waters.

This is the first Bounty island shag count undertaken across the entire Bounty Islands group. It was undertaken in February as this was the time transport was available. The variability in results across the years and the known vulnerability of this range-restricted species indicates that a full island group survey using standardised methods and timing needs to be undertaken to get an accurate population estimate. This is a difficult undertaking due to the distance and cost of getting to the Bounty Islands. This bird count undertaken in February and the previous bird and nest surveys undertaken in November now gives the opportunity that comparable surveys could be undertaken at different times of the year depending on transport opportunities. Apart from timing of the survey, the biggest difference between this survey and earlier surveys is that this is the first entire island survey undertaken in a small boat which made all areas around the

islands accessible. In future surveys, regardless of timing, entire island group surveys need to be attempted. It would be useful to have counts specified by island (unfortunately not undertaken during this survey), so that if the survey needs to stop early due to weather conditions or any other reason, comparisons can be made between surveys for the parts that could be undertaken.

## ACKNOWLEDGEMENTS

We thank Graeme Elliot, Kath Walker and Sharon Trainor for observations and GPS work on the survey. We sincerely thank the Captain and crew of the HMNZS Otago for logistics and transport support.

## LITERATURE CITED

- Amey, J. 2012. Bounty Islands Trip Report 11 to 14 November 2011. Internal report to the Department of Conservation, Invercargill.
- Clark, G.; Booth, A; Amey, J.M. 1998. The "Totorore" expedition to the Bounty Islands, New Zealand. October 1997 to January 1998 Internal report to the Department of Conservation, Invercargill.

- De Roy, T.; Amey J.M. 2004. Mahalia Bounties / Antipodes Expedition: November 2004. Internal report to the Department of Conservation, Invercargill.
- Heather, B.D.; Robertson H.A. 1996. The field guide to the Bird of New Zealand. Penguin Books, Auckland, New Zealand.
- Miskelly, C.M.; Downing, 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.
- Marchant, S; Higgins, P. J. 1990. Handbook of Australian, New Zealand and Antarctic birds, 1: ratites to ducks. Oxford University Press, Melbourne.
- Robertson, C. J. R.; van Tets G.F. 1982. The status of birds at the Bounty Islands. Notornis 29:311-336.
- Russ, N.; Terauds, A. 2008. Bounty Island Shag Census onboard Spirit of Enderby while working for Heritage Expeditions. Internal report to the Department of Conservation, Invercargill.

Keywords survey; Bounty Islands shag; Leucocarbo ranfurlyi; endangered species