

## A census of variable oystercatcher (*Haematopus unicolor*) in the Marlborough Sounds

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**Abstract** A total of 730 variable oystercatchers (*Haematopus unicolor*) were recorded during a survey of the entire 1,500 km coastline of the Marlborough Sounds, New Zealand in spring 2006. This included 347 breeding pairs, 28 single birds and a non-breeding flock of 8 birds. The distribution of oystercatchers was influenced by habitat and human development, with fewer birds found in the inner sounds, where there is most development, and in the exposed outer coastline, where cliff or boulder habitat is limiting. Using similar methods of coastal surveys during the breeding season, the estimated national population of oystercatchers has increased from 2000 birds in 1970-71 to 7000 birds in 2006. This represents a population growth rate of 3.5% per annum. Winter flock counts give lower population estimates and coastal surveys are recommended for future monitoring of this species.

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**Keywords** Variable oystercatcher; census; breeding distribution; population estimate; Marlborough Sounds

### INTRODUCTION

The variable oystercatcher (*Haematopus unicolor*) is an endemic shorebird occurring on the coast of mainland New Zealand and inshore islands, but not on outlying oceanic islands. Birds favour sandy beaches (especially near river mouths), shell banks, and rocky shores, but are rarely found on boulder or gravel beaches (Marchant & Higgins 1993; Heather & Robertson 1996). Most birds are sedentary, defending territories throughout the year, but some disperse to form winter flocks, often associated with the South Island pied oystercatcher (*Haematopus finschi*; Marchant & Higgins 1993; Heather & Robertson 1996; Sagar *et al.* 1999).

Variable oystercatchers lay from mid-Sep to early Feb, although most clutches laid after mid-Dec are probably replacements. Usually, 2-3 eggs are laid at 48-hour intervals, with incubation starting after the last egg is laid. Average incubation period is 28 days, with fledging in 6-7 weeks. Young either remain with parents throughout winter, or join winter flocks independent of their parents (Marchant & Higgins 1993; Heather & Robertson 1996; Rowe 2008).

Following a survey of coastal New Zealand during 1970-71, Baker (1973) estimated the national population of variable oystercatchers at 2000 birds. By the mid 1990's the population had doubled, with Heather and Robertson (1996) estimating the population at 4000 birds, again based on the results of coastal surveys. Using winter flock counts, Sagar

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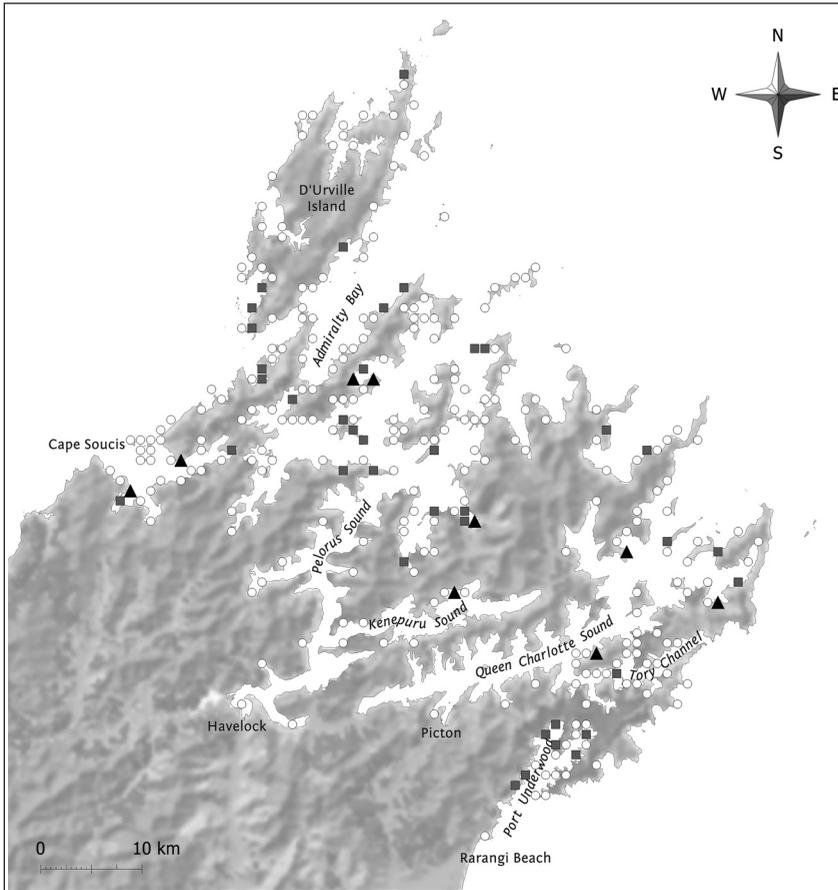


Fig. 1. The numbers of variable oystercatcher in each 1 km grid square in the Marlborough Sounds in 2006. Open circle represents 1 pair, grey square 2 pairs, and black triangle 3+ pairs.

*et al.* (1999) estimated a total population of 3413 variable oystercatchers, but recognised that winter counts probably underestimate true population size for this species.

Using a survey of the entire coastline of the Marlborough Sounds during Sep-Dec 2006, I estimated the breeding distribution and numbers of variable oystercatcher in this region, and then used this data to provide a revised estimate of the current size of the national population.

## METHODS

The entire coastline of the Marlborough Sounds was surveyed during the period 9 Sep to 16 Dec 2006 to census a range of coastal birds. The entire coastline from Rarangi Beach in the southeast, to Cape Soucis in the west was included in the survey, a total of 1,500 km. Surveys were primarily made from a boat travelling at 5-8 knots, and at a distance of 5-30 m (usually 5-10 m) from the shoreline, depending on shore topography. The boat was stopped offshore when sightings of oystercatchers were made to

undertake counts, observe behaviour and record the location on a hand-held GPS. Most sightings of variable oystercatcher were of 2 birds, and these were briefly observed to determine whether they were a pair. Two birds observed interacting, such as calling or in close company without showing aggressive behaviour, were considered to be a 'breeding' pair. When single birds were observed the shoreline was carefully observed to confirm whether a partner was present.

To estimate the size of the national population of variable oystercatchers, I used counts from this study and other published data to determine the average number of birds/km coastline. Using Robertson *et al.* (2007), the percentage of coastal atlas squares where variable oystercatchers were recorded was divided by the length of the entire New Zealand coastline, to provide a measure of the length of coastline where variable oystercatchers are present. A national population estimate was then calculated by multiplying this figure by the average number of breeding pairs/km of coastline.

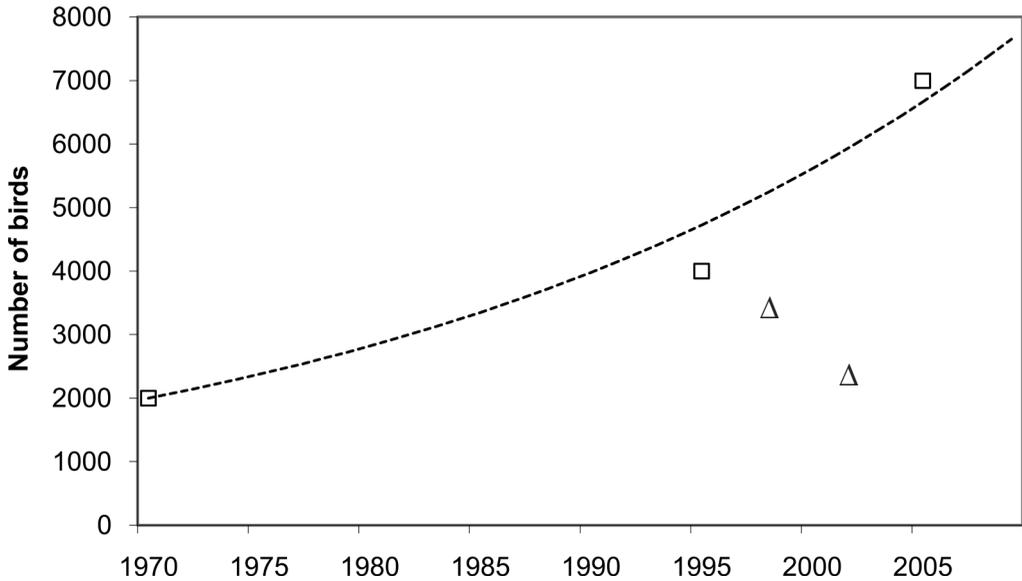


Fig. 2. Population trend of variable oystercatcher in New Zealand. Dashed line shows a 3.5% per annum population increase; squares are population estimates based on coastal survey during breeding season; triangles are population estimates based on winter flock counts. Data from Baker (1973), Heather and Robertson (1996), Sagar *et al.* (1999), Southey (2009), and this study.

## RESULTS

### Marlborough Sounds population

A total of 730 birds was recorded in the Marlborough Sounds. Birds were distributed throughout the Sounds, with lower densities in the inner Queen Charlotte and Pelorus Sounds, and on the exposed parts of the outer sounds (Fig. 1). Birds were mostly found in pairs, with 347 breeding pairs recorded, compared to only 28 observations of single birds. Only 1 flock of 8 birds was seen.

### National population estimate

The density of variable oystercatchers recorded in the Marlborough Sounds was 48.6 birds/100 km, which is similar to the 66 birds/100 km recorded by Robertson (1992) in Wellington Harbour each spring during 1986-88.

During the 1999-2004 atlas period, variable oystercatcher were recorded in 697 of the 10- km grid squares, or 82% of the 855 squares that included some coastline (Robertson *et al.* 2007). With the total coastline of New Zealand being 15,134 km (Wellings 2010), based on the atlas data, variable oystercatcher occupied an estimated 12,410 km. Pooling the Marlborough and Wellington densities (57 birds/100 km) gives a national population estimate of 7000 birds.

### Population trend

During the 1969-79 atlas surveys (Bull *et al.* 1985), variable oystercatcher were recorded in 53% (486/913 squares) of squares that included some

coastline. In the 1999-2004 atlas survey (Robertson *et al.* 2007), this had increased significantly, with variable oystercatchers recorded in 82% of coastal squares.

Baker (1973), Heather and Robertson (1996) and this study used coastal surveys during the breeding season to estimate population numbers. These estimates show that between 1971 and 2006 there has been an increase from 2000 to 7000 birds (Fig. 2); an increase of around 3.5% per annum. Estimates using winter flocks (Sagar *et al.* 1999; Southey 2009) are lower (Fig. 2).

## DISCUSSION

Variable oystercatchers were the most numerous shorebird in the Marlborough Sounds during my survey, and breeding pairs are widely distributed throughout the region. The fewer birds occupying the more developed inner parts of Queen Charlotte and Pelorus Sounds suggests that coastal development may be limiting numbers in these areas, because the habitat appears otherwise suitable. Lower densities in outer areas of the sounds are likely due to the presence of unsuitable habitat, with steep coastal cliffs and boulder beaches providing more restricted feeding or nesting opportunities.

The low incidence of single birds, or non-breeding flocks (36 of 730 birds; <5%) suggests that birds are rapidly recruited into existing territories after the disappearance of a partner, or that there

is still sufficient room for young birds to establish new territories as the population expands.

There are no earlier data to assess trends in the Marlborough Sounds population. However, the national population appears to be increasing. Comparison of atlas survey data indicates that the variable oystercatcher's range has greatly expanded during the past 30 years (Bull *et al.* 1985; Robertson *et al.* 2007). Population estimates using coastal surveys suggest a population growth of 3.5% per annum nationally. Population densities in Wellington and Marlborough were similar, but Rowe (2008) recorded densities significantly higher at Kaikoura (400 birds/100 km). Small areas of particularly good habitat, such as on the Kaikoura Peninsula can seemingly support proportionally more birds and have been excluded from population estimates here as being untypical.

If population growth continues at the current rate, the population is likely to become limited by habitat and further increases will cease. Fledging success for variable oystercatcher has been reported at between 0.47 to 0.54 chicks/pair (Hansen 2005; Rowe 2008), although there are no published data on juvenile or adult mortality rates. Presumably these are relatively low to enable such population growth.

As suggested by Sagar *et al.* (1999), with variable oystercatchers being mainly sedentary, coastal surveys during the breeding season provide an accurate population estimate. In contrast, estimates using winter flock counts at high tide roosts in estuaries (Sagar *et al.* 1999; Southey 2009) are significantly lower than those from coastal surveys, presumably because not all individuals gather in winter flocks and are missed. Thus, it is necessary to establish a regular series of nationally coordinated surveys along large stretches of coastline to provide an accurate population estimate of this species, and to monitor future population trends. Such survey sites could also be used as a long-term monitoring protocol for a range of coastal shorebirds.

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