Conservation assessment of the South Island Oystercatcher *Haematopus finschi*

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The South Island Oystercatcher *Haematopus finschi* is found throughout coastal regions of New Zealand, but breeding is confined to the South Island, and Hawkes Bay and Wairarapa in the North Island. Breeding used to be confined to gravel riverbeds, but in the past 60–70 years has spread onto farmland, and most recently onto coastal beaches. Most breeding adults leave inland nesting territories from December and move to coastal estuaries, with most settling in the northern South Island and northern North Island. Adults return to breeding areas from early June, but 16–18% of the population, presumably young birds, remain at estuaries throughout the year. On the coasts they occur on sandy, muddy and gravel intertidal flats and beaches although they will also use grassy fields. The clutch size is 1–3 eggs, with up to two replacement clutches being laid if earlier ones are lost. On farmland, trampling by stock, farm activities (such as cultivation) and unknown causes are the main causes of egg loss. The age of 1st breeding is 4–6 years and annual adult survival was 89% in the period 1987–1997, and so the oldest birds would survive >25 years.

In 1940 there were probably <10,000 birds, but since being protected from hunting the population increased to an estimated 49,000 by 1970–71, and then 112,000 in 1983–1994. Subsequently, numbers probably increased for a few more years, but then likely have declined. Changing land use within their core range enabled breeding birds to establish territories on farmland and this resulted in an increased population, eventually leading to an expansion of their breeding range south and north.

Since the arrival of humans in New Zealand, the main threats to these birds have been hunting (until 1940), the introduction of mammalian predators and invasion of riverbed nesting habitat by tall vegetation. Although land use changes initially provided new breeding areas, ongoing changes in land use may reverse this situation, with extensive areas converting from sheep to dairy farming. In addition, in their coastal wintering areas population abundance may be affected by introduced invasive plants reducing food and roosting space and continued expansion of urban dwellings and consequent rise in disturbance to feeding and breeding birds.

TAXONOMIC STATUS

Species. Although originally described as a full species (Martens 1897) for many years it was considered a subspecies of the cosmopolitan European Oystercatcher *Haematopus ostralegus* L. (e.g. Baker 1974a, 1975a; Turbott 1990). However, recently it has become more common to assign full species status (e.g. Marchant & Higgins 1993, Holdaway *et al.* 2001, Sagar *et al.* 2002), a classification supported by the most recent genetics data (Banks & Paterson 2007) and the latest New Zealand checklist (Gill *et al*. 2010.

BIOLOGICAL DATA

The South Island Oystercatcher *Haematopus finschi* is a large pied (black-and-white) oystercatcher, solidly built, and with strong legs and long, orange-red straight bill. It has a black head, neck, upperparts, and upper breast, with sharp demarcation of black breast from white underparts. It is similar to the pied morph of Variable Oystercatcher *H. unicolor*, but it is noticeably smaller and slimmer and with clear-cut black breast and white belly. The pied-morph Variable Oystercatcher has a smudged demarcation between black breast and white belly. The sexes are alike, but females tend to be slightly larger and have longer bill. The overall length is 46 cm. The male averages 490−520 g in weight and the female 530–560 g (Baker 1974b, Marchant & Higgins 1993). [Photo A.]

In coastal estuaries, it feeds mainly on molluscs and worms, and has a strongly developed behaviour for preying on bivalve molluscs. Gaping bivalves in shallow water are pierced between the valves, while closed shellfish are hammered in the umbo region. Other reported prey in marine areas includes crustaceans, cnidarians and fish (Baker 1974a, 1974c). On wet pasture in coastal areas, South Island Oystercatchers feed mainly on earthworms and coleopteran larvae (Baker 1974a, Sibson 1975). No detailed study of their food has been made on their inland breeding sites, where they feed on pasture and gravel riverbeds, although positive correlations were found between food (dipteran numbers and densities) and the breeding success of South Island Oystercatchers on lowland farms (Banks 1998).

Photo A. Close-up of the head of an adult South Island Oystercatcher (photo: Dick Veitch).

Breeding used to be confined to gravel riverbeds [Photo B], but since about 1950 it has spread onto arable land and onto high-country tussock grasslands (Baker 1974a). Nests are generally unlined scrapes on a mound or raised area of sand, gravel or soil with good visibility (Sagar *et al.* 2000). Some pairs breed on coastal beaches where their breeding timetable and habitat overlaps that of Variable Oystercatchers (*H. unicolor*); apparently this has resulted in hybridization at one location (Crocker *et al*. 2010).

The clutch size is 1–3 eggs, with an average of 2.29 eggs (SD 0.51, n = 378). Laying dates at a lowland study site on farmland over 11 years from 1987 to 1997 extended from early August to mid-November, with up to two replacement clutches being laid if earlier ones were lost (Sagar *et al.* 2000). On average, 47% of eggs hatched and 59% of the resulting chicks survived to fledge. Both hatching and fledging rates declined through the season. On average, 52% of pairs which laid in any year failed to rear a fledgling. Hatching success was greater in arable than pasture nesting sites, but fledging success was similar at both sites. Trampling by stock, farming activities, and unknown causes were the main causes of egg loss.

South Island Oystercatchers which breed on lowland riverbeds lay clutches significantly later and fledged significantly fewer chicks per pair than birds breeding on adjacent farmland (Baker 1969, Sagar *et al.* 2000, Morgan 2001).

Moult information has been reported by Baker (1974b, 1975a,b) and Marchant & Higgins (1993). These papers showed that adults undergo complete post-breeding (pre-basic) moult with usually two, sometimes three, primaries in active moult at once. Moult is completed on the non-breeding grounds between January and April. Adults undergo a pre-breeding (pre-alternate) partial moult of all head, body, and of some or all wing coverts and tertials in the period August–September.

An ageing scheme proposed by Baker (1974b) is based on the colours of bare parts. It needs to be refined to take into account sequences of plumages (Marchant & Higgins 1993). Juvenile primaries are retained through the first year and are narrower and more pointed than those of adults.

RANGE

Non-breeding

Non-breeding South Island Oystercatchers are spread throughout the coastal regions of New Zealand with two thirds of the population (68%) found in the northern half of the North Island. The Nelson region is also significant as a non-breeding area for about 18% of the population (14,000 birds, Schuckard 2002). The Avon-Heathcote Estuary supports several thousand birds, and Otago Harbour 1,000–2,000; most other estuarine habitats have populations varying from

Photo B. Nest of South Island Oystercatcher in the bed of a braided river in New Zealand (photo: John Dowding).

Photo C. Roosting South Island Oystercatchers at Karaka, New Zealand (photo: Dick Veitch).

Photo D. Roost of South Island Oystercatchers at Kiwi Esplanade, Manukau Harbour, New Zealand (photo: Dick Veitch).

hundreds down to occasional winter sightings (Sagar *et al.* 1999). [Photo C.]

There have been occasional reports of this species on outlying islands around New Zealand, on Vanuatu (Hay 1985), and in southeastern Australia (Totterman *et al.* 1999).

Breeding distribution

South Island Oystercatchers breed inland on New Zealand's South Island, mainly east of the Southern Alps; breeding has been attempted in North Island's Hawkes Bay and southern Wairarapa since the 1980s (Marchant & Higgins 1993, Robertson *et al.* 2007).

POPULATION SIZE AND TREND

Early records of numbers and distribution are sparse or incomplete. The original breeding distribution seems to have been only the braided rivers of Canterbury. In 1940 the population was probably fewer than 10,000 but it seems likely to have been larger prior to the arrival of European migrants (Potts 1885). The species was protected from hunting in 1940 and subsequently an increase in population size was observed (Sibson 1966, Baker 1973). At about this time changing land use allowed their choice of nest sites to expand to include farmland within their previous range; subsequently their breeding distribution also extended further southwards. Numbers utilizing southern estuaries to breed and migrating to northern estuaries outside the breeding season increased. The number of oystercatchers using estuaries in Canterbury has remained approximately constant at "several thousand" (Potts 1885, Baker 1973, Crossland 1993). [Photo D.]

The increase in total numbers, as observed on the Manukau Harbour and Firth of Thames (Veitch & Habraken 1999, OSNZ data), was most evident from about 1960 to 2000.

The total population in 1970/71 was estimated at 49,000 birds (Baker 1973). However, numbers increased subsequently and national wader counts from 1983 to 1994 resulted in an estimated South Island Oystercatcher population size of 112,675 birds (Sagar *et al.* 1999). Continuing counts have not been as comprehensive, but during the period 1994–2003 numbers increased at some sites and declined at others (Southey 2009). Counts on the Manukau Harbour and Firth of Thames (OSNZ data) suggest that the total may have increased over the next several years, but has since declined and the population may now be at the 1988 level (Fig. 1).

Percentage change in generations

Percentage change in generations has not been calculated. The annual survival rate of birds breeding on farmland during the period 1987–2000 was estimated at 89%, with evidence of a small amount of variation in survival rates during this time (Sagar *et al.* 2002). This study showed that there was no indication that survival rates differed between males and females. With an annual survival rate of 89%, a breeding bird would have, on average, a reproductive lifespan of about nine years, with the oldest birds surviving over 25 years.

Juvenile survival in this species has not been estimated. However, fidelity to the natal site does not appear to be high because birds banded as chicks have been reported from a wide area during the breeding season. The age of first breeding is 4–6 years (average 5 years, n = 9 birds; P.M. Sagar & D. Geddes unpubl. data).

HABITAT

South Island Oystercatchers occur on the coasts during the non-breeding season (mostly February-June inclusive); the preferred habitat is sandy, muddy and gravel intertidal flats and beaches. They are the most frequently encountered shorebird in most estuaries with these habitat types. When forced off coastal banks by high tides or bad weather they make use of grassy paddocks or sports fields. Non-breeders tend to remain at coastal sites throughout the year. This species breeds inland on gravel-bed rivers, gravel beaches of lakes, and farmland, and tussockland up to an altitude of about 1800 m (Marchant & Higgins 1993).

MIGRATION AND MOVEMENTS

South Island Oystercatchers are migratory within New Zealand, with occasional sightings farther afield. Breeding adults leave inland nesting territories from December to early February (Soper 1963, Sagar & Geddes 1999). They move to nearby coastal estuaries, to the Nelson region, and to northern North Island estuaries. Some birds move southwards to the southern coast and Stewart Island. A few may

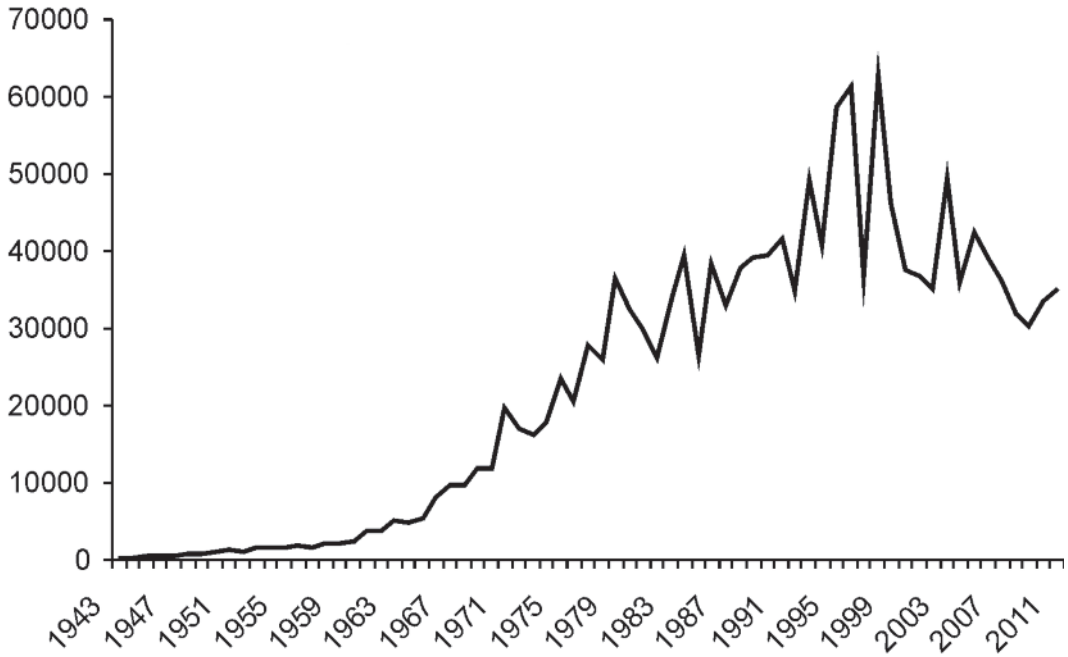

Fig. 1. Total numbers of South Island Oystercatchers counted in winter at Manukau Harbour and the Firth of Thames, 1943–2011.

remain on or near their breeding territories throughout the year (Robertson *et al* 2007).

The pair bond is not maintained during the non-breeding season and juveniles do not accompany their parents to wintering areas (Sagar & Geddes 1999).

The abundance of juveniles in estuarine flocks suggests a slower northward migration than adults (Baker 1975b, Marchant & Higgins 1993) although some juveniles travel rapidly to northern estuaries (Sagar & Geddes 1999).

Adults appear to return rapidly to the estuary of their choice and most individuals return to the same estuary every year (Sagar & Geddes 1999). This move appears to be undertaken in a single flight (Sagar & Geddes 1999) with the maximum likely distance being less than 1000 km.

The return to breeding areas begins in early June with most movement away from estuaries in July (Crossland 1993, Veitch 1999). The return flight from northern estuaries to breeding grounds appears also to be undertaken in a single flight.

Between 16% and 18% of the population, presumably 1–3 year old birds, remain at estuarine areas during the breeding season (Sagar 1990, Veitch & Habraken 1999), but some sub-adult birds move to inland South Island with pre-breeding flocks and stay there during early summer (Baker 1975).

THREATS

This species has survived all the threats introduced to New Zealand during the past few centuries since the arrival of humans. These include the introduction of mammalian predators, increased hunting by humans (until 1940), and invasion of braided riverbed nesting areas by tall vegetation. Future population abundance may now be threatened by further changes to land use in breeding areas, pollution of winter feeding areas, introduced invasive species reducing food and roosting space in wintering areas. Urban expansion in coastal areas is increasing with a consequent rise in disturbance to feeding and roosting birds. This could be balanced by a move into new North Island breeding areas.

The expanded breeding range of this species has recently put them into a small hybridization range with the Variable Oystercatcher and there are a few cases of these two species breeding together on Canterbury beaches (Banks & Paterson 2007). Continuation or extension of this hybridization could negate the differentiation between the two species.

A large proportion of the South Island Oystercatcher population spends the non-breeding season at Manukau Harbour, Auckland; a large proportion of New Zealand's human population is also concentrated in this region. Despite Manukau Harbour being considered relatively polluted as a result of human activities, Thompson & Dowding (1999) undertook a comparison of blood samples from oystercatchers here and at the relatively unpolluted Kaipara Harbour. Their results showed relatively low concentrations of mercury that were highly unlikely to result in any deleterious toxicological effects. Likewise cadmium concentrations were uniformly low in birds from both sites, often below detection limits, and so cadmium does not pose a toxicological threat. However, in contrast, there were clear and significant differences in lead concentrations between oystercatchers sampled at the two sites, with overall lead levels 146% greater at the urban Manukau Harbour site compared to the rural Kaipara Harbour site. While the majority of oystercatchers sampled at the Manukau Harbour site had lead concentrations below the threshold limit where deleterious effects might be manifest, several individuals were at or above this level, and so may experience sub-clinical symptoms of lead exposure (Thompson & Dowding 1999). However, the introduction of lead-free fuels may result in a reduction in lead levels within top-level predators such as oystercatchers and other shorebirds.

Climate change has the potential to affect populations of waders that depend upon estuaries via a combination of sea level rise and by affecting rainfall intensity patterns such that there are changes to the deposition of silts in estuaries. The former would reduce the intertidal area available for feeding waders, while the latter would likely reduce the density of prey species available to waders.

Large-scale development of wind farms in coastal regions has the potential to increase mortality of oystercatchers on migration or commuting between roosts and feeding areas.

Commercial-scale mechanical harvesting of cockles may reduce the prey available for oystercatchers feeding in intertidal areas such as Golden and Tasman Bays (Schmechel 2001). Likewise, a potential impact on prey numbers could arise through the reduction in benthic recruitment due to zooplankton harvesting by offshore mussel farms.

PROTECTION STATUS AND NEEDS

This species is absolutely protected in terms of the Wildlife Act 1953.

Most of the habitat utilized by this species, both during the breeding and non-breeding seasons, is not legally protected for the conservation of wildlife. However, some breeding and many wintering habitats do have a degree of protection due to policies in district and regional planning schemes, and recognition in international treaties.

There is no perceived need for changed protection status for this species.

RECOMMENDATIONS

1. **Population monitoring.** Biannual counts at high tide roosts at major sites should be continued.

2. **Breeding season monitoring.** There is a need to undertake breeding and population studies in areas of different land-use to determine the relative effects of different land management regimes.

3. **Non-breeding season monitoring.** There is a need to document food resources and roost sites used during the non-breeding season. This will enable the impacts of population abundance and perceived impacts on oystercatcher habitats to be documented.

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APPENDIX 1. OVERVIEW OF RECENT STUDIES AND RESEARCH

Allan Baker made a variety of comparisons between the New Zealand oystercatcher species, including the South Island Oystercatcher, when relating morphology and population, breeding, foraging and behavioural ecology to their systematics and affinities (Baker 1969, 1972, 1973, 1974a,b,c, 1975a,b).

Project River Recovery team of the Department of Conservation studied breeding and movements of oystercatchers on high country gravel-bed rivers (eg. Maloney 1999).

Jonathan Banks examined territoriality and sex roles of South Island Oystercatchers breeding on farmland (Banks 1999).

Dai Morgan compared the breeding of South Island Oystercatchers on river terraces and surrounding farmland (Morgan 2001).

Paul Sagar and Donald Geddes studied the breeding, dispersal and demography of South Island Oystercatchers on farmland during the period 1987–2007 (Sagar & Geddes 1999, Sagar *et al.* 2000, 2002).

The Ornithological Society of New Zealand, through its various regional groups, conducts high-tide roost counts of waders during both summer and winter at most important estuaries throughout New Zealand. In some locations monitoring extended as far back as 1940, thus providing an invaluable time-series of data. A recently started project individually marking non-breeding/migrant birds with engraved alpha-numeric leg flags in Tasman and Golden Bays will provide further information on movements, longevity etc (D. Melville & R. Schuckard pers. com.).